NAME,C,80	NUM,(	HARDNESS,C,35
Abelsonite (Nickel porphyrin)	1000	e2-3
Abernathyite	1001	e2-3
Abhurite	1002	d2
Acanthite	1003	e2-3
Acetamide	1004	c1-2
Achavalite	1005	e2-3
Actinolite	1006	k5-6
Adamite	1007	g3-4
Adelite	1008	j5
Admontite	1009	e2-3
Adularia (variety of Microcline)	101	m6-7
Aegirine (Acmite)	1010	m6-7
Aenigmatite	1011	k5-6
Aerugite	1012	h4
Aeschynite-(Ce)	2956	k5-6
Aeschynite-(Nd)	2957	k5-6
Aeschynite-(Y) (syn. Priorite)	2958	k5-6
Afghanite	2959	k5-6
Afwillite	1013	f3
Agardite-(La)	2924	g3-4
Agardite-(Y)	2923	g3-4
Agate (variety of Quartz)	538	o7-8
Agrellite	1014	k5-6
Agrinierite	1015	vNot determined
Aguilarite	1016	e2-3
Ahlfeldite	1017	e2-3
Aikinite	1018	e2-3
Ajoite	1019	vNot determined
Akagan,ite	1020	vNot determined
Akatoreite	1021	l6
Akdalaite	1022	VHN=1085
Akermanite	2919	k5-6
Akrochordite	1023	g3-4
Aksaite	1024	e2-3
Aktashite	1025	g3-4
Alabandite (Alabandine)	449	g3-4
Alamosite	1026	i4-5
Albite	100	m6-7
Aldermanite	1027	d2
Aldzhanite	1028	vNot determined
Aleksite	1029	vNot determined
Alforsite	1030	vNot determined
Algodonite	1031	h4
Allactite	1032	i4-5
Allanite-(Ce) (Orthite)	464	k5-6
Allargentum	2960	VHN=189
Alleghanyite	1033	k5-6

Alloclasite	1034	k5-6
Allophane	1035	e2-3
Alluaudite	2961	k5-6
Almandine (Almandite)	219	o7-8
Alstonite	074	i4-5
Altaite	1036	e2-3
Althausite	1037	g3-4
Aluminocopiapite	1039	vNot determined
Aluminum	1038	vNot determined
Alumohydrocalcite	1040	e2-3
Alumopharmacosiderite	1041	vNot determined
Alumotantite	1042	q8-9
Alunite	067	g3-4
Alunogen	027	c1-2
Alvanite	1043	g3-4
Amakinite	1044	g3-4
Amarantite	1045	e2-3
Amarillite	1046	e2-3
Amazonite (variety of Microcline)	548	m6-7
Amber (fossilized organic resin)	552	e2-3
Amblygonite	1047	k5-6
Ameghinite	1048	e2-3
Amesite	1049	e2-3
Amethyst (variety of Quartz)	217	o7-8
Amicite	1050	uLow
Aminoffite	1051	k5-6
Ammonioborite	1052	vNot determined
Ammoniojarosite	1053	vNot determined
Ammonioleucite	1054	vNot determined
Analcime (Analcite)	089	k5-6
Anandite	2962	g3-4
Anapaite	1055	g3-4
Anatase (Octahedrite)	235	k5-6
Ancylite-(Ce)	1056	i4-5
Andalusite	426	m6-7
Andersonite	1057	e2-3
Andesine	1058	m6-7
Andorite (Sundtite; Webnerite)	1059	g3-4
Andradite	356	m6-7
Andremeyerite	1060	k5-6
Andrewsite	1061	h4
Anduoite	1062	m6-7
Angelellite	1063	k5-6
Anglesite	402	e2-3
Anhydrite	190	g3-4
Anilite	1064	g3-4
Ankerite	060	g3-4
Annabergite (Cabrerite)	249	e2-3

Annite	1065	vNot determined
Anorthite	102	m6-7
Anorthoclase	1066	m6-7
Antarcticite	1067	e2-3
Anthoinite	1068	c1-2
Anthonyite	1069	d2
Anthophyllite	345	k5-6
Antigorite	489	e2-3
Antimonpearceite	1070	f3
Antimony	381	g3-4
Antlerite	1071	g3-4
Apachite	1072	e2-3
Apatite	281	k5-6
Aphthitalite (Glaserite)	1073	f3
Apjohnite	028	c1-2
Aplowite	1074	f3
Apuanite	1075	q8-9
Aquamarine (gem variety of Beryl)	517	o7-8
Aragonite	063	g3-4
Aramayoite	1076	e2-3
Arcanite	1077	d2
Archerite	1078	vNot determined
Arctite	1079	k5-6
Ardaite	1080	vNot determined
Ardealite	1081	vNot determined
Ardennite	2963	m6-7
Arfvedsonite	470	k5-6
Argentite	365	e2-3
Argentojarosite	1082	vNot determined
Argentopentlandite	1083	g3-4
Argentopyrite	1084	g3-4
Argutite	1085	vNot determined
Argyrodite	307	e2-3
Arhbarite	2964	vNot determined
Aristarainite	1086	g3-4
Armalcolite	1087	vNot determined
Armangite	1088	i4-5
Armenite	1089	o7-8
Armstrongite	1090	i4-5
Arrojadite	1091	k5-6
Arsenbrackebuschite	2965	i4-5
Arsendescloizite	1092	i4-5
Arsenic	380	g3-4
Arseniosiderite	1093	c1-2
Arsenobismite	2966	vNot determined
Arsenoclasite	1094	k5-6
Arsenocrandallite	2967	k5-6
Arsenogoyazite	1095	h4
Arsenohauchecornite	1096	k5-6

Arsenolamprite	1097	e2-3
Arsenolite	038	c1-2
Arsenopalladinite	1098	vNot determined
Arsenopyrite	015	k5-6
Arsenosulvanite (Lazarevicite)	1099	g3-4
Arsenpolybasite	1100	g3-4
Arsentsumebite	1101	vNot determined
Arsenuranospathite	1102	e2-3
Arsenuranylite	1103	e2-3
Arthurite	2968	vNot determined
Artinite	1104	e2-3
Asbecasite	1105	m6-7
Asbestos (Clinochrysotile)	255	e2-3
Asbolane	2969	vNot determined
Aschamalmite	1106	g3-4
Ashanite	1107	m6-7
Ashcroftine-(Y)	1108	vNot determined
Asselbornite	2970	vNot determined
Astrophyllite	328	g3-4
Atacamite	266	g3-4
Atelestite	1109	i4-5
Athabascaite	1110	vNot determined
Atheneite	1111	j5
Atokite	1112	i4-5
Attakolite (Attacolite)	2971	vNot determined
Aubertite	1113	vNot determined
Augelite	1114	i4-5
Augite	467	k5-6
Aurichalcite	225	c1-2
Auricupride	1115	g3-4
Aurorite	1116	e2-3
Aurostibite	1117	g3-4
Austinite	1118	i4-5
Autunite	138	e2-3
Avicennite	1119	d2
Avogadrite	1120	vNot determined
Awaruite	1121	j5
Axinite	357	m6-7
Azoproite	1122	k5-6
Azurite	230	g3-4
Babefphite	1123	g3-4
Babingtonite	1124	k5-6
Baddeleyite	473	m6-7
Bafertisite	1125	k5-6
Baghdadite	1126	m6-7
Bahianite	1127	q8-9
Bakerite	1128	i4-5
Balangeroite	2972	vNot determined
Balipholite	1129	vNot determined

Balkanite	1130	g3-4
Balyakinite	1131	e2-3
Bambollaite	1132	f3
Banalsite	1133	l6
Bandylite	1134	e2-3
Bannermanite	2973	vNot determined
Bannisterite	2922	h4
Baotite	1135	l6
Bararite	1136	e2-3
Baratovite (Katayamalite)	1137	g3-4
Barbertonite	1138	c1-2
Barbosalite	1139	k5-6
Barentsite	1140	f3
Bariandite	1141	vNot determined
Baricite	1142	c1-2
Bario-Orthojoaquinite	1143	k5-6
Bariomicrolite (Rijkeboerite)	1144	i4-5
Bariopyrochlore (Pandaite)	2974	i4-5
Barite	234	g3-4
Barium-pharmacosiderite	1146	g3-4
Barnesite	1147	vNot determined
Barrerite	1148	vNot determined
Barringerite	1149	vNot determined
Barringtonite	1150	vNot determined
Bartelkeite	1151	i4-5
Bartonite	1152	o7-8
Barylite	1153	o7-8
Barysilite	1154	g3-4
Barytocalcite	153	h4
Barytolamprophyllite	2975	e2-3
Basaluminite	1155	vNot determined
Bassanite	1156	vNot determined
Bassetite	1157	e2-3
Bastn„site-(Ce) (Bastnaesite)	1158	i4-5
Bastn„site-(Y)	1159	i4-5
Batisite	1160	k5-6
Baumhauerite	1161	f3
Baumite	2976	vNot determined
Bauxite (variety of aluminium hydroxides)	568	vNot determined
Bavenite	1162	k5-6
Bayankhanite	2977	vNot determined
Bayerite	1163	vNot determined
Bayldonite	1164	i4-5
Bayleyite	1165	vNot determined
Baylissite	1166	vNot determined
Bazirite	1167	vNot determined
Bazzite	1168	m6-7
Bearsite	1169	vNot determined

Beaverite	2978	vNot determined
Becquerelite	1170	e2-3
Behierite	1171	o7-8
Behoite	1172	i4-5
Beidellite	2979	c1-2
Bellidoite	1173	c1-2
Bellingerite	1174	i4-5
Belovite	2980	j5
Bementite	1175	l6
B,navid,site	1176	vNot determined
Benitoite	241	m6-7
Benjaminite	2981	vNot determined
Benstonite	1177	g3-4
Bentorite	2982	d2
Beraunite	1178	g3-4
Berborite	1179	f3
Berdesinskiite	1180	vNot determined
Bergenite	2983	vNot determined
Bergslagite	1181	j5
Berlinite	1182	m6-7
Bermanite	1183	g3-4
Bernalite	2955	h4
Berndtite	1184	vNot determined
Berryite	1185	vNot determined
Berthierine	2984	vNot determined
Berthierite	222	e2-3
Bertossaite	1186	m6-7
Bertrandite	1187	m6-7
Beryl	305	o7-8
Beryllite (Berillite)	1188	b1
Beryllonite	1189	k5-6
Berzelianite	1190	e2-3
Berzeliite	2985	i4-5
Bessmertnovite	1191	q8-9
Betafite	329	i4-5
Betekhtinite (Betechtinite)	1192	f3
Betpakdalite	2986	f3
Beudantite	269	i4-5
Beusite	2987	j5
Beyerite	1193	e2-3
Bianchite	1194	e2-3
Bicchulite	1195	vNot determined
Bideauxite	1196	g3-4
Bieberite	1197	d2
Bijvoetite-(Y)	2988	vNot determined
Bikitaite	1198	l6
Billietite	1199	vNot determined

Billingsleyite	1200	e2-3
Bindheimite	1201	i4-5
Biotite	444	e2-3
Biphosphammite	1202	vNot determined
Biringuccite (Hoeferite)	1203	vNot determined
Birnessite	1204	c1-2
Bischofite	1205	c1-2
Bismite	1206	i4-5
Bismoclite	1207	e2-3
Bismuth	004	e2-3
Bismuthinite	1208	b1
Bismutite	1209	g3-4
Bismutoferrite	2989	vNot determined
Bismutomicrolite (Westgrenite)	2990	j5
Bismutostibiconite	1210	i4-5
Bismutotantalite	1211	j5
Bityite	1212	k5-6
Bixbyite	1213	m6-7
Bjarebyite	2991	h4
Blakeite	1214	e2-3
Blixite	1215	f3
Bloedite (Bl”dite)	1216	e2-3
Bobfergusonite	1217	h4
Bobierrite	1218	e2-3
Boehmite (B”hmite)	1219	g3-4
Bogdanovite	2992	vNot determined
Boggildite	1220	i4-5
Bohdanowiczite	1221	g3-4
Bokite	2993	f3
Bol,ite	243	g3-4
Bolivarite	1222	g3-4
Boltwoodite	1223	g3-4
Bonaccordite	1224	q8-9
Bonattite	1225	vNot determined
Bonchevite	1226	e2-3
Bonshtedtite	1227	h4
Boothite	1228	e2-3
Boracite	114	o7-8
Borax	043	e2-3
Borcarite	1229	k5-6
Borickite (probably = Delvauxite)	2994	g3-4
Borishanskiite (perhaps = polarite)	2995	VHN2;0=182-292
Bornemanite	1230	g3-4
Bornhardtite	1231	h4
Bornite	429	g3-4
Borovskite	1232	vNot determined
Bostwickite	1233	c1-2
Botallackite	1234	vNot determined
Botryogen	183	e2-3

Boulangerite	378	e2-3
Bournonite	383	e2-3
Boussingaultite	1235	d2
Boyleite	1236	d2
Brabantite	1237	k5-6
Bracewellite	1238	vNot determined
Brackebuschite	1239	vNot determined
Bradleyite	1240	vNot determined
Braggite	1241	vNot determined
Braitschite-(Ce)	1242	vNot determined
Brammallite	2996	vNot determined
Brandtite	1243	g3-4
Brannerite	1244	k5-6
Brannockite	1245	vNot determined
Brassite	1246	vNot determined
Braunite	440	m6-7
Bravoite	1247	k5-6
Brazilianite	1248	k5-6
Bredigite	1249	vNot determined
Breithauptite	386	k5-6
Brenkite	1250	vNot determined
Brewsterite	1251	l6
Brezinaite	1252	vNot determined
Brianite	1253	i4-5
Briartite	1254	g3-4
Brindleyite (Nimesite)	2997	e2-3
Britholite-(Ce)	2998	j5
Britholite-(Y) (syn. Abukumalite, Yttrobritholite)	2999	j5
Brochantite	1255	g3-4
Brockite	3000	vNot determined
Bromargyrite	1256	e2-3
Bromellite	1257	p8
Brookite	198	k5-6
Brownmillerite	1258	vNot determined
Brucite	1259	e2-3
Br□ggenite	1260	g3-4
Brugnatellite	1261	d2
Brunogeierite	1262	k5-6
Brushite	1263	e2-3
Buchwaldite	1264	e2-3
Buddingtonite	1265	k5-6
Buergerite	1266	n7
Buetschliite	1267	vNot determined
Bukovite	1268	d2
Bukovskyite	3001	c1-2
Bulachite	1269	e2-3
Bultfonteinite	1270	i4-5
Bunsenite	1271	k5-6

Burangaite	3002	j5
Burbankite	3003	g3-4
Burckhardtite	3004	d2
Burkeite	1272	g3-4
Bursaite	1273	vNot determined
Burtite	1274	f3
Bustamite	1275	m6-7
Butlerite	1276	e2-3
Buttgenbachite	3005	f3
Bystr”mite	1277	n7
Bytownite	3006	m6-7
Cabriite	1278	h4
Cacoxenite	148	g3-4
Cadmium	1279	vNot determined
Cadmoselite	1280	vNot determined
Cadwaladerite	1281	vNot determined
Cafarsite	3007	k5-6
Cafetite	1282	i4-5
Cahnite	1283	f3
Calaverite	1284	e2-3
Calciborite	1285	g3-4
Calciocopiapite (Tusiite)	1286	vNot determined
Calcioferrite	3008	e2-3
Calciotantite	1287	m6-7
Calciovolborthite (Tangeite)	3703	g3-4
Calcite	051	f3
Calcium catapleiite	1289	i4-5
Calcjarlite	1290	h4
Calclacite	1291	vNot determined
Calcurmolite	3009	vNot determined
Calderite	3010	vNot determined
Caledonite	262	e2-3
Calkinsite-(Ce)	1292	e2-3
Callaghanite	1293	g3-4
Calomel	393	c1-2
Calumetite	1294	d2
Calzirtite	1295	m6-7
Campigliaite	1296	vNot determined
Canaphite	1297	d2
Canasite (monoclinic)	1298	vNot determined
Canavesite	1299	vNot determined
Cancrinite	1300	k5-6
Canfieldite	1301	e2-3
Cannizzarite	1302	vNot determined
Cappelenite-(Y)	1303	l6
Caracolite	1304	i4-5
Caratiite	1305	vNot determined

Carboborite	1306	d2
Carbocernaite	3011	f3
Carboirite	1307	m6-7
Carbonate-cyanotrichite	3012	d2
Carbonate-fluorapatite (Francolite)	159	k5-6
Carbonate-hydroxylapatite (Dahllite)	1308	j5
Carletonite	1309	i4-5
Carlfriesite	1310	g3-4
Carlhintzeite	1311	vNot determined
Carlinite	1312	c1-2
Carlosturanite	3013	vNot determined
Carlsbergite	1313	vNot determined
Carminite	1314	g3-4
Carnallite	036	e2-3
Carnotite	149	vNot determined
Carobbiite	1315	vNot determined
Carpholite (Karpholite)	163	k5-6
Carrboydite	3014	vNot determined
Carrollite	1316	i4-5
Caryinite	3015	h4
Caryopilite	1317	g3-4
Cascandite	1318	vNot determined
Cassidyite	1319	vNot determined
Cassiterite	439	m6-7
Caswellsilverite	1320	vNot determined
Catapleiite	1321	k5-6
Cattierite	1322	i4-5
Cavansite	1323	g3-4
Caysichite-(Y)	3016	i4-5
Cebaite-(Ce)	1324	i4-5
Cebollite	1325	j5
Cechite	1326	i4-5
Celadonite	3017	d2
Celestite (Celestine)	1327	g3-4
Celsian	1328	m6-7
Cerianite-(Ce)	1329	vNot determined
Ceriopyrochlore-(Ce) (Marignacite)	3018	k5-6
Cerite-(Ce)	3019	k5-6
Cernyite	1330	h4
Cerotungstite-(Ce)	1331	c1-2
Cerul,ite	1332	k5-6
Cerussite	321	g3-4
Cervantite	1333	i4-5
Cesanite	1334	e2-3
Cesbronite	1335	g3-4
Cesium kupletskite	3020	h4
Chabazite	077	i4-5
Chabourneite	3021	vNot determined

Chalcanthite	227	e2-3
Chalcedony (variety of Quartz)	501	vNot determined
Chalcoalumite	1336	e2-3
Chalcocite (Chalcosine)	370	e2-3
Chalcocyanite (Chalcokyanite)	1337	g3-4
Chalcomenite	1338	e2-3
Chalconatronite	1339	uLow
Chalcophanite	3022	e2-3
Chalcophyllite	253	d2
Chalcopyrite	124	g3-4
Chalcosiderite	1340	i4-5
Chalcostibite	1341	g3-4
Chalcothallite	1342	e2-3
Chalcotrichite (variety of Cuprite)	196	vNot determined
Chambersite	1343	n7
Chameanite	3023	vNot determined
Chamosite	404	g3-4
Changbaiite	1344	k5-6
Chantalite	1345	vNot determined
Chaoite	1346	vNot determined
Chapmanite	1347	e2-3
Charlesite	3024	e2-3
Charoite	1348	i4-5
Chatkalite	1349	h4
Chelkarite	1350	vNot determined
Chenevixite	1351	i4-5
Chenite	1352	e2-3
Cheralite	1353	j5
Cherepanovite	1354	k5-6
Chernovite-(Y)	1355	i4-5
Chernykhite	3025	vNot determined
Chervetite	1356	g3-4
Chessexite	3026	vNot determined
Chevkinite	3027	k5-6
Chiavennite	1357	vNot determined
Childrenite	3028	i4-5
Chiolite	1358	g3-4
Chkalovite	1359	m6-7
Chloraluminite	1360	vNot determined
Chlorapatite	1361	j5
Chlorargyrite (Cerargyrite)	039	e2-3
Chloritoid	3029	k5-6
Chlormagaluminite	3030	vNot determined
Chlormanganokalite	1362	e2-3
Chlorophoenicite	3031	g3-4
Chlorothionite	1363	e2-3
Chloroxiphite	1364	e2-3
Choloalite	1365	g3-4

Chondrodite	349	m6-7
Christite	1366	c1-2
Chromatite	1367	vNot determined
Chromdravite	1368	vNot determined
Chromite	457	k5-6
Chromium	1369	vNot determined
Chrysoberyl	304	q8-9
Chrysocolla	265	g3-4
Chrysoprase (variety of Quartz)	540	vNot determined
Chudobaite	1370	e2-3
Chukhrovite-(Ce)	3032	vNot determined
Chukhrovite-(Y)	1371	f3
Churchite-(Y) (Weinschenkite)	1372	f3
Chursinite	1373	g3-4
Cinnabar	184	e2-3
Citrine (variety of Quartz)	167	n7
Cl-Tyretskite	3043	vNot determined
Clairite	3033	vNot determined
Claraite	3034	c1-2
Claringbullite	3035	vNot determined
Clausthalite	372	e2-3
Cliffordite	1374	g3-4
Cliftonite (A form of carbon with pseudocubic morphology)	3036	vNot determined
Clinobisvanite	1375	vNot determined
Clinochalcomenite	1376	d2
Clinochlore (Corundophilite)	248	e2-3
Clinochrysotile	1377	vNot determined
Clinoclase	1378	e2-3
Clinoenstatite	1379	k5-6
Clinoferrosilite	1380	k5-6
Clinohedrite	1381	k5-6
Clinoholmquistite	3037	k5-6
Clinohumite	1382	l6
Clinojimthompsonite	3038	vNot determined
Clinokurchatovite	3039	i4-5
Clinophosinaite	1383	h4
Clinoptilolite	3040	g3-4
Clinosafflorite	3041	i4-5
Clinotyrolite	3042	vNot determined
Clinozoisite	292	m6-7
Clintonite	1384	g3-4
Coalingite	1385	c1-2
Cobalt Pentlandite	1386	i4-5
Cobalt-zippeite	3045	vNot determined
Cobaltite	1387	k5-6
Cobaltkoritnigite	3044	vNot determined
Cobaltomenite	1388	e2-3
Cochromite	1389	q8-9

Coconinoite	3046	vNot determined
Coeruleolactite	3047	j5
Coesite	1390	o7-8
Coffinite	3048	k5-6
Cohenite	3049	k5-6
Colemanite	066	i4-5
Collinsite	1391	g3-4
Coloradoite	1392	e2-3
Colquiriite	1393	h4
Columbite (Group)	469	m6-7
Colusite	1394	g3-4
Comancheite	1395	d2
Combeite	1396	vNot determined
Comblainite	3050	vNot determined
Compreignacite	1397	vNot determined
Congolite	1398	vNot determined
Conichalcite	1399	i4-5
Connellite	1400	g3-4
Cookeite	1401	g3-4
Cooperite	1402	i4-5
Copiapite	3051	e2-3
Copper	177	e2-3
Coquimbite	1403	e2-3
Corderoite	1404	vNot determined
Cordierite (Iolite, Dichroite)	244	o7-8
Cordylite-(Ce)	1405	i4-5
Corkite	1406	i4-5
Cornetite	1407	i4-5
Cornubite	1408	vNot determined
Cornwallite (Erinite)	278	i4-5
Coronadite	450	i4-5
Corundum	512	p8
Cosalite	1409	e2-3
Costibite	1410	l6
Cotunnite	1411	e2-3
Coulsonite	3052	i4-5
Covellite (Covelline)	221	c1-2
Cowlesite	1412	k5-6
Coyoteite	1413	c1-2
Crandallite (Pseudowavellite)	1414	k5-6
Creaseyite	1415	e2-3
Crednerite	1416	h4
Creedite	1417	h4
Crichtonite	3053	k5-6
Cristobalite	1418	m6-7
Crocidolite (variety of Riebeckite)	488	k5-6
Crocoite	188	e2-3
Cronstedtite	448	g3-4
Crookesite	1419	e2-3

Crossite	3054	l6
Cryolite	040	e2-3
Cryolithionite	1420	e2-3
Cryptohalite	1421	e2-3
Cryptomelane	1422	m6-7
Cualstibite	3055	c1-2
Cubanite	1423	g3-4
Cumengite (Cumeng,ite)	1424	e2-3
Cummingtonite	3056	k5-6
Cupalite	1425	i4-5
Cuprite	195	g3-4
Cuprobismutite	1426	vNot determined
Cuprocopiapite	3057	e2-3
Cuproiridsite	1427	k5-6
Cupropavonite	1428	d2
Cuprorhodsite	1429	i4-5
Cuprorivaite	1430	k5-6
Cuprosklodowskite (Jachimovite)	251	h4
Cuprospinel	1431	m6-7
Cuprostibite	3058	vNot determined
Cuprotungstite	3059	vNot determined
Curetonite	1432	g3-4
Curienite	1433	vNot determined
Curite	156	i4-5
Cuspidine (Custerite)	1434	k5-6
Cuzticite	3060	f3
Cyanochroite	1435	vNot determined
Cyanophyllite	3061	c1-2
Cyanotrichite	223	vNot determined
Cylindrite	377	e2-3
Cymrite	1436	e2-3
Cyrilovite (Avelinoite)	1437	vNot determined
Dachiardite	3062	55
Dadsonite	3063	e2-3
Dalyite	1438	o7-8
Danalite	1439	k5-6
Danbaite	1440	h4
Danburite	427	n7
Dannemorite	2925	k5-6
Daomanite	1441	g3-4
Daqingshanite-(Ce)	3065	vNot determined
Darapiosite	3064	j5
Darapskite	1442	e2-3
Datolite	086	k5-6
Daubr,eite	1443	e2-3
Daubr,elite	1444	vNot determined
Davanite	1445	k5-6

Davidite-(La)	3066	l6
Davreuxite	1446	e2-3
Davyne (Microsommite)	3067	l6
Dawsonite	1447	g3-4
Deerite	3068	vNot determined
Defernite	3069	vNot determined
Delafossite	1449	k5-6
Delhayelite	3070	vNot determined
Delrioite	1450	d2
Delvauxite	169	g3-4
Demantoid (variety of Andradite)	525	m6-7
Demesmaekerite	1451	g3-4
Denisovite	1452	i4-5
Denningite	1453	h4
Derbylite	1454	j5
Derriksite	1455	vNot determined
Dervillite	1456	c1-2
Desautelsite	2934	d2
Descloizite	406	g3-4
Despujolsite	1457	e2-3
Devillite (Devilline)	257	e2-3
Dewindtite	1458	vNot determined
Diabol,ite	1459	e2-3
Diadochite (Destinezite)	3071	g3-4
Diamond	513	t10
Diaphorite	1460	e2-3
Diaspore	107	m6-7
Dickinsonite	3072	g3-4
Dickite	1461	e2-3
Dietzeite	1462	g3-4
Digenite	1463	e2-3
Dimorphite	1464	c1-2
Diopside	286	m6-7
Dioptase	284	j5
Dittmarite	1465	uLow
Dixenite	3073	g3-4
Djerfisherite	1466	vNot determined
Djurleite	1467	e2-3
Dolerophane (Dolerophanite)	1468	h4
Dolomite	151	g3-4
Doloresite	1469	vNot determined
Domeykite	1470	g3-4
Donathite	1471	m6-7
Donnayite-(Y)	1472	f3
Donpeacorite	1473	k5-6
Dorfmanite	3074	c1-2
Douglasite	3075	vNot determined
Downeyite	1474	vNot determined

Doyleite	1475	e2-3
Dravite	359	o7-8
Dresserite	1476	e2-3
Dreyerite	1477	e2-3
Drugmanite	1478	vNot determined
Drysdallite	1479	vNot determined
Dufrenite	3076	g3-4
Dufrenoysite	1480	h4
Duftite	1481	g3-4
Dugganite	1482	f3
Duhamelite	1483	f3
Dumontite	1484	vNot determined
Dumortierite	216	q8-9
Dundasite	1485	d2
Durangite	1486	k5-6
Duranusite	3077	vNot determined
Dussertite	1487	g3-4
Duttonite	1488	e2-3
Dwornikite	1489	vNot determined
Dypingite	3078	vNot determined
Dyscrasite	1490	g3-4
Dzhalindite	1491	vNot determined
Eakerite	1492	k5-6
Earlandite	1493	vNot determined
Earlshannonite	1494	g3-4
Ecdemite (Ekdemite)	1495	e2-3
Eckermannite	3079	k5-6
Eclarite	1496	e2-3
Edenite	3080	k5-6
Edingtonite	1497	h4
Eggletonite	3081	g3-4
Eglestonite	1498	e2-3
Ehrleite	1499	g3-4
Eifelite	1500	vNot determined
Eitelite	1501	g3-4
Ekanite	1502	i4-5
Ekaterinite	3082	a0-1
Elbaite (variety of Tourmaline)	1503	n7
Ellisite	1504	d2
Elpasolite	1505	e2-3
Elpidite	1506	l6
Elyite	1507	d2
Embreyite	1508	g3-4
Emerald (gem variety of Beryl)	516	vNot determined
Emmonsite (Durdenite)	1509	j5
Emplectite	1510	d2
Empressite	1511	g3-4
Enargite	1512	h4
Endellite (Hydrohalloysite)	1513	e2-3

Englishite	3083	f3
Eosphorite	1514	j5
Ephesite	1515	i4-5
Epididymite	1516	m6-7
Epidote (Pistacite)	295	m6-7
Epistilbite	1517	h4
Epistolite	1518	c1-2
Epsomite	045	e2-3
Erdite	1519	c1-2
Ericaite	3084	o7-8
Ericssonite	1520	i4-5
Eriochalcite	1521	e2-3
Erionite	3085	vNot determined
Erlianite	3086	g3-4
Erlichmanite	1522	vNot determined
Ernstite	3087	g3-4
Ertixiite	1523	m6-7
Erythrite	210	e2-3
Erythrosiderite	1524	vNot determined
Eskebornite	1525	g3-4
Eskimoite	3088	vNot determined
Eskolaite	1526	q8-9
Esperite (Calcium-larsenite)	1527	j5
Esseneite	3089	k5-6
Ettringite	1528	e2-3
Eucairite	003	e2-3
Euchlorine (Euchlorin)	3090	vNot determined
Euchroite	271	g3-4
Euclase	1529	o7-8
Eucryptite	1530	m6-7
Eudialyte	1531	k5-6
Eudidymite	099	m6-7
Eugsterite	3091	a0-1
Eulytite (Eulytine)	1532	i4-5
Euxenite-(Y)	344	m6-7
Evansite	069	g3-4
Eveite	1533	h4
Evenkite	3092	b1
Ewaldite	3093	vNot determined
Eylettersite	3094	vNot determined
Ezcurrite	1534	g3-4
Eztlite	3095	f3
Fabianite	1535	l6
Faheyite	1536	vNot determined
Fairbankite	1537	d2
Fairchildite	1538	vNot determined
Fairfieldite	1539	g3-4
Falcondoite	3096	e2-3

Famatinite	1540	g3-4
Farringtonite	1541	vNot determined
Faujasite	1542	j5
Faustite	2926	k5-6
Fayalite	418	n7
Fedorite	3097	vNot determined
Fedorovskite	1543	i4-5
Fenaksite	3098	k5-6
Ferberite	1544	i4-5
Ferdisilicite	2920	m6-7
Fergusonite	461	m6-7
Fergusonite-beta-(Ce)	3100	k5-6
Fergusonite-beta-(Nd)	3101	k5-6
Fergusonite-beta-(Y)	3099	vNot determined
Fermorite	3102	i4-5
Feroxyhyte	3103	vNot determined
Ferrarisite	1545	vNot determined
Ferri-annite	3104	e2-3
Ferricopiapite (= Ferrian copiapite or oxidized copiapite ?)	3105	vNot determined
Ferridravite	3106	n7
Ferrierite	2927	g3-4
Ferrihydrite	3107	vNot determined
Ferrikatophorite	3109	vNot determined
Ferrilotharmeyerite	2954	e2-3
Ferrimolybdite	3108	c1-2
Ferrinatrite	1546	e2-3
Ferrisicklerite	1547	h4
Ferritungstite	1548	vNot determined
Ferro-actinolite	3110	k5-6
Ferro-alluaudite	3111	vNot determined
Ferro-anthophyllite	3112	k5-6
Ferro-axinite	1549	m6-7
Ferrobustamite	1550	i4-5
Ferrocarpholite	1551	k5-6
Ferrocolumbite	1552	l6
Ferrogedrite	3113	k5-6
Ferroglaucophane	3114	l6
Ferrohexahydrite	1553	vNot determined
Ferrohornblende	468	k5-6
Ferronickelplatinum	3116	vNot determined
Ferropargasite	3117	k5-6
Ferrorichterite	3118	k5-6
Ferroselite	1554	m6-7
Ferrostrunzite	3119	h4
Ferrotantalite	472	m6-7
Ferrotschermakite	3120	k5-6
Ferrotychite	1555	h4

Ferrowyllieite	3121	h4
Ferruccite	1556	g3-4
Fersilicite	1557	m6-7
Fersmanite	3122	k5-6
Fersmite	3123	i4-5
Fibroferrite	1558	e2-3
Fiedlerite	1559	g3-4
Fillowite	1560	i4-5
Fingerite	1561	vNot determined
Finnemanite	1562	e2-3
Fischesserite	1563	d2
Fiz,lyite	1564	d2
Flagstaffite	1565	vNot determined
Fleischerite	1566	uLow
Fletcherite	1567	i4-5
Flinkite	1568	i4-5
Florencite-(Ce)	1569	k5-6
Florencite-(La)	3124	k5-6
Fluckite	1570	g3-4
Fluellite (Kreuzbergite)	1571	f3
Fluoborite (Nocerite)	1572	g3-4
Fluocerite-(Ce) (Tysonite)	1573	i4-5
Fluocerite-(La)	1574	i4-5
Fluorapatite	1575	j5
Fluorapophyllite	1576	i4-5
Fluorellestadite	3125	j5
Fluorite	073	h4
Foggite	1577	h4
Formanite-(Y)	1578	m6-7
Fornacite	3126	vNot determined
Forsterite	165	n7
Foshagite	1579	vNot determined
Fourmarierite	1580	g3-4
Fraipontite	3127	vNot determined
Francevillite	2928	h4
Franciscanite	1581	h4
Franckeite	1582	e2-3
Francoanellite	3128	a0-1
Franconite	3129	vNot determined
Frankdicksonite	1583	e2-3
Franklinite	476	m6-7
Fransoletite	1584	f3
Franzinite	3130	j5
Freboldite	1585	vNot determined
Fredrikssonite	1586	l6
Freedite	3131	f3
Freibergite	382	i4-5
Freieslebenite	1587	e2-3

Fresnoite	1588	g3-4
Freudenbergite	1589	k5-6
Friedelite	3132	i4-5
Friedrichite	1590	g3-4
Fritzscheite	3701	e2-3
Frohbergite	1591	g3-4
Frondelite	3133	i4-5
Froodite	1592	vNot determined
Fukalite	1593	h4
Fukuchilite	1594	l6
F□l”ppite	1595	e2-3
Furongite	3134	vNot determined
Furutobeite	3135	vNot determined
Gabrielsonite	1596	g3-4
Gadolinite-(Ce)	474	m6-7
Gadolinite-(Y)	1597	m6-7
Gagarinite-(Y)	1598	i4-5
Gageite	3136	vNot determined
Gahnite	1599	o7-8
Gaidonnayite	1600	j5
Gainesite	1601	h4
Gaitite	1602	k5-6
Galaxite	3137	o7-8
Galeite	1603	vNot determined
Galena	366	e2-3
Galenobismutite	1604	g3-4
Galkhaite	3138	f3
Gallite	1605	g3-4
Gamagarite	3139	i4-5
Ganomalite	1606	f3
Ganophyllite	3140	i4-5
Garavellite	3141	vNot determined
Garrelsite	1607	vNot determined
Gartrellite	2953	vNot determined
Garyansellite	1608	h4
Gasp,ite	1609	i4-5
Gatehouseite	2952	h4
Gatumbaite	1610	i4-5
Gaudefroyite	3142	l6
Gaylussite	042	e2-3
Gearksutite	3143	d2
Gebhardite	1611	h4
Gedrite	415	k5-6
Geerite	3144	vNot determined
Geffroyite	3145	vNot determined
Gehlenite	1612	k5-6
Geikielite	1613	k5-6
Genkinite	1614	k5-6

Genthelvite	1615	m6-7
Geocronite	1616	e2-3
Georgechaoite	1617	j5
Georgeite	3146	c1-2
Georgiadesite	1618	g3-4
Gerhardtite	1619	d2
Germanite	1620	h4
Gersdorffite	1621	k5-6
Gerstleyite	3147	e2-3
Gerstmannite	1622	i4-5
Getchellite	1623	c1-2
Geversite	1624	i4-5
Gianellaite	1625	h4
Gibbsite	1626	g3-4
Giessenite	1627	e2-3
Gilalite	1628	e2-3
Gillespite	1629	e2-3
Giniite	1630	g3-4
Ginorite	1631	g3-4
Giraudite	3148	vNot determined
Girdite	1632	e2-3
Gismondine (Gismondite)	1633	i4-5
Gittinsite	1634	g3-4
Giuseppettite	3149	vNot determined
Gladite	1635	e2-3
Glauberite	044	e2-3
Glaucochroite	1636	l6
Glaucodot	1637	j5
Glaucokerinite (Glaucocerinite)	3150	b1
Glauconite	3151	d2
Glaucophane	1638	l6
Glaukosphaerite	1639	g3-4
Glushinskite	1640	vNot determined
Gmelinite	1641	i4-5
Gobbinsite	1642	vNot determined
Godlevskite	1643	i4-5
Goedkenite	1644	j5
Goethite	462	k5-6
Gold	121	e2-3
Goldamalgam	1645	f3
Goldichite	1646	e2-3
Goldmanite	1647	m6-7
Gonnardite	1648	i4-5
Gonyerite	3152	e2-3
Goosecreekite	1649	i4-5
Gorceixite	1650	l6
Gordonite	1651	g3-4
G”rgeyite (Goergyite)	1652	g3-4
Gormanite	1653	i4-5

Gortdrumite	3153	vNot determined
Goslarite	1654	e2-3
G”tzenite (Geotzenite) (Calcium rinkite or mosandrite)	3154	vNot determined
Goudeyite	3155	g3-4
Gowerite	1655	f3
Goyazite (Hamlinite)	1656	i4-5
Graemite	1657	g3-4
Graftonite	3156	j5
Grandidierite	3157	o7-8
Grantsite	3158	c1-2
Graphite	441	c1-2
Gratonite	1658	e2-3
Grayite	1659	g3-4
Greenalite	1660	vNot determined
Greenockite	143	g3-4
Greigite (Melnikovite)	1661	i4-5
Grimaldiite	1662	vNot determined
Grimselite	1663	e2-3
Griphite	3159	k5-6
Grischunite	1664	j5
Grossular (Grossularite)	1665	m6-7
Groutite	1666	k5-6
Grunerite	1667	k5-6
Gruzdevite	1668	i4-5
Guanajuatite	1669	g3-4
Guanine	1670	vNot determined
Gudmundite	1671	l6
Guerinite	1672	c1-2
Guettardite	1673	g3-4
Gugiaite	1674	vNot determined
Guildite	1675	e2-3
Guilleminite	3160	vNot determined
Gunningite	1676	e2-3
Gupeiite	1677	i4-5
Gustavite	1678	vNot determined
Guyanaite	3161	vNot determined
Gypsum	031	d2
Gyrolite	3162	g3-4
Gysinite-(Nd)	3163	vNot determined
Haapalaite	3164	vNot determined
Hafnon	3165	vNot determined
Hagendorfite	3166	g3-4
H„ggite	1679	vNot determined
Haidingerite	1680	e2-3
Haiweeite (Ranquilite)	1681	g3-4
Hakite	1682	i4-5
Halite	224	d2
Hallimondite	1683	e2-3

Halloysite (Metahalloysite)	1684	e2-3
Halotrichite	139	c1-2
Halurgite	1685	e2-3
Hambergite	115	o7-8
Hammarite	1686	g3-4
Hancockite	3167	m6-7
Hanksite	1687	g3-4
Hannayite	1688	vNot determined
Haradaite	1689	i4-5
Hardystonite	1690	g3-4
Harkerite	3168	vNot determined
Harmotome	076	i4-5
Harstigite	1691	k5-6
Hashemite	1692	g3-4
Hastingsite	3169	k5-6
Hastite	1693	l6
Hatchite	1694	vNot determined
Hatrurite	3170	vNot determined
Hauchecornite	1695	j5
Hauckite	3171	e2-3
Hauerite	1696	h4
Hausmannite	434	k5-6
Ha□yne (Ha□ynite)	238	k5-6
Hawleyite	1697	vNot determined
Haxonite	1698	k5-6
Haycockite	1699	h4
Heazlewoodite	1700	h4
Hectorite	1701	c1-2
Hedenbergite	343	m6-7
Hedleyite	1702	d2
Hedyphane	1703	i4-5
Heideite	3172	vNot determined
Heidornite	1704	i4-5
Heinrichite	1705	e2-3
Heliodor (variety of Beryl)	518	o7-8
Heliophyllite	3173	d2
Hellandite	3174	k5-6
Hellyerite	1706	e2-3
Helmutwinklerite	1707	i4-5
Helvite (Helvine)	166	l6
Hematite	436	k5-6
Hematolite	3175	g3-4
Hematophanite	1709	e2-3
Hemihedrite	1710	h4
Hemimorphite	079	i4-5
Hemusite	3176	h4
Hendersonite	1711	e2-3
Hendricksite	3177	e2-3
Henmilite	1712	vNot determined

Henritermierite	3178	vNot determined
Henryite	3179	vNot determined
Hentschelite	1713	g3-4
Hercynite	1714	o7-8
Herderite	1715	k5-6
Herschelite	1716	i4-5
Herzenbergite	1717	vNot determined
Hessite	369	e2-3
Hetaerolite	1718	l6
Heterogenite-3R	1719	i4-5
Heteromorphite	374	e2-3
Heterosite	1721	i4-5
Heulandite	071	g3-4
Hewettite	1722	vNot determined
Hexahydrite	1723	vNot determined
Hexahydroborite	1724	e2-3
Hexatestibiopanickelite	1725	e2-3
Heyite	1726	h4
Heyrovskyite	1727	g3-4
Hibonite	3180	o7-8
Hidalgoite	2929	i4-5
Hieratite	1728	e2-3
Hilairite	1729	i4-5
Hilgardite-4M	1730	i4-5
Hillebrandite	1731	k5-6
Hingganite-(Y)	1732	m6-7
Hingganite-(Yb)	1733	m6-7
Hinsdalite	2930	i4-5
Hiortdahlite	3181	k5-6
Hisingerite	1734	e2-3
Hocartite	1735	h4
Hodgkinsonite	1736	i4-5
Hodrushite	1737	g3-4
Hoelite	3182	vNot determined
H”gbomite (Hoegbomite)	1738	m6-7
Hohmannite	1739	f3
Holdenite	3183	h4
Hollandite	3184	l6
Hollingworthite	3185	k5-6
Holmquistite	1740	k5-6
Holtedahlite	1741	i4-5
Holtite	3186	q8-9
Homilite	1742	i4-5
Hongquiite	1743	l6
Hongshiite (= Platinian copper ?)	1744	h4
Hopeite	047	g3-4
H”rnesite (Hoernesite)	1745	b1
Hotsonite	3187	e2-3
Howieite	3188	vNot determined

Howlite	1746	g3-4
Hsianghualite	1747	m6-7
Huanghoite-(Ce)	1748	i4-5
Huebnerite (H□bnerite)	455	i4-5
Huegelite (H□gelite)	1749	vNot determined
Hulsite (Paigeite)	1750	f3
Humberstonite (Chile-Loweite)	1751	e2-3
Humboldtine	1752	c1-2
Humite	106	l6
Hummerite	1753	vNot determined
Hungchaoite	1754	e2-3
Huntite	1755	vNot determined
Hureaulite	1756	g3-4
Hurlbutite	1757	l6
Hutchinsonite	1758	c1-2
Huttonite	1759	vNot determined
Hyalophane	1760	m6-7
Hyalotekite	3189	k5-6
Hydroastrophyllite	3190	vNot determined
Hydroboracite	1761	e2-3
Hydrocalumite	3191	f3
Hydrocerussite	1762	g3-4
Hydrochlorborite	1763	e2-3
Hydrodresserite	1764	g3-4
Hydrogrossular	3192	m6-7
Hydrohetaerolite	1765	k5-6
Hydrohonessite	3193	c1-2
Hydromagnesite	065	g3-4
Hydromolysite	1766	vNot determined
Hydronium jarosite	3194	i4-5
Hydrophilite (= Antarcticite or sinjarite ?)	1767	vNot determined
Hydroromarchite	3195	vNot determined
Hydroscarbroite	3196	c1-2
Hydrotalcite	1768	d2
Hydrotungstite	1769	d2
Hydrougrandite	3197	k5-6
Hydroxyapophyllite	1770	i4-5
Hydroxylapatite (Hydroxyapatite)	082	j5
Hydroxylbastn„site-(Ce)	3198	h4
Hydroxylellestadite	3199	i4-5
Hydroxylherderite	1771	k5-6
Hydrozincite	1772	e2-3
Hypercinnabar	3200	f3
Ianthinite	1773	e2-3
Ice	1774	c1-2
Idaite	1775	e2-3
Idrialite (Curtisite)	1776	c1-2
Iimoriite-(Y)	1777	k5-6

Ikaite	1778	vNot determined
Ikunolite	1779	d2
Ilesite	1780	vNot determined
Ilimaussite-(Ce)	1781	h4
Illite	3201	c1-2
Ilmajokite	3202	b1
Ilmenite	458	k5-6
Ilmenorutile	3203	vNot determined
Ilvaite	342	k5-6
Imandrite	1782	vNot determined
Imgreite	1783	g3-4
Imhofite	1784	c1-2
Imit,rite	1785	vNot determined
Inaglyite	1786	i4-5
Incaite	3204	vNot determined
Inderborite	1787	g3-4
Inderite (Lesserite)	1788	e2-3
Indialite	1789	o7-8
Indite	1790	i4-5
Indium	1791	h4
Inesite	1792	k5-6
Ingodite	1793	d2
Innelite	3205	i4-5
Insizwaite	1794	k5-6
Inyoite	037	d2
Iodargyrite (Iodyrite)	1795	c1-2
Iowaite	1796	c1-2
Iquiqueite	1797	d2
Iranite	3206	vNot determined
Iraqite-(La)	3207	i4-5
Irarsite	3208	VHN=976
Irhtemite	3209	vNot determined
Iridarsenite	3210	VHN100=488 and 606
Iridium	1798	m6-7
Iridosmine	1799	m6-7
Iriginite	1800	c1-2
Iron	385	h4
Irtyshite	1801	m6-7
Isoferroplatinum	3702	vNot determined
Isokite	1802	j5
Isomertieite	3211	VHN100=592
Itoite	1803	vNot determined
Iwakiite	3212	m6-7
Ixiolite	3213	k5-6
Izoklakeite	1804	g3-4
Jacobsite	3214	k5-6
Jadeite	301	m6-7

Jagoite	1805	f3
Jagowerite	1806	i4-5
Jahnsite-(CaMnMg)	3215	h4
Jalpaite	1807	e2-3
Jamborite	3216	vNot determined
Jamesite	1808	f3
Jamesonite	375	e2-3
Janggunite	3217	e2-3
Janhaugite	1809	i4-5
Jarlite	1810	i4-5
Jarosewichite	3218	h4
Jarosite	322	g3-4
Jask¢lskiite	3219	h4
Jasmundite	1811	j5
Jeanbandyite	1812	g3-4
Jeffreyite	3220	j5
Jennite	1813	vNot determined
Jeppeite	1814	k5-6
Jeremejevite (Eremeyevite)	1815	o7-8
Jerrygibbsite	1816	k5-6
Jervisite	3221	vNot determined
Jimboite	1817	k5-6
Jimthompsonite	1818	vNot determined
Jinshajiangite	3222	vNot determined
Jixianite	1819	f3
Joaquinite-(Ce)	3223	k5-6
Joesmithite	3224	k5-6
Johachidolite	1820	o7-8
Johannite	3225	e2-3
Johannsenite	1821	l6
Johillerite	1822	h4
Johnbaumite	1823	i4-5
Johnsomervilleite	3226	i4-5
Johnwalkite	3227	h4
Jokokuite	1824	e2-3
Joliotite	3228	vNot determined
Jonesite	3229	vNot determined
Jordanite	432	f3
Jordisite	3230	Soft
Joseite-A	1825	d2
Joseite-B	3231	d2
Jouravskite	3232	e2-3
Julgoldite-(Fe2+)	3233	i4-5
Juli‰nite	1826	vNot determined
Jungite	1827	b1
Junitoite	1828	i4-5
Junoite	1829	g3-4

Jurbanite	1830	e2-3
Kaatialaite	1831	vNot determined
Kaersutite	1832	k5-6
Kafehydrocyanite	3234	e2-3
Kahlerite	1833	vNot determined
Kainite	046	e2-3
Kainosite-(Y) (Cenosite)	3235	k5-6
Kalborsite	1834	l6
Kaliborite (Paternoite)	1835	i4-5
Kalicinite (Kalicine)	1836	vNot determined
Kalininite	1837	j5
Kaliophilite	1838	l6
Kalipyrochlore	3236	i4-5
Kalistrontite	1839	d2
Kalsilite	1840	n7
Kamacite (a-Nickel-iron)	3237	h4
Kamaishilite	1841	vNot determined
Kambaldaite	1842	f3
Kamitugaite	3238	vNot determined
Kanemite	1843	h4
Kankite	3239	e2-3
Kanoite	3240	vNot determined
Kanonaite	3241	m6-7
Kaolinite	021	e2-3
Karelianite	1844	q8-9
Karibibite	1845	vNot determined
Karlite	1846	k5-6
Karnasurtite-(Ce) (Kozhanovite)	3242	d2
Karpatite (Carpathite, Caronene)	1847	a0-1
Karpinskite	3243	e2-3
Kashinite	1848	o7-8
Kasolite	1849	i4-5
Kassite	1850	k5-6
Katoite	3245	vNot determined
Katoptrite (Catoptrite)	3246	k5-6
Kawazulite	1851	c1-2
Kazakovite	1852	h4
Keckite	3247	i4-5
Kegelite	3248	vNot determined
Keithconnite	3249	VHN15=410
Keiviite-(Y)	1853	vNot determined
Keldyshite	3250	g3-4
Kellyite	3251	vNot determined
Kelyanite	3252	vNot determined
Kemmlitzite	3253	k5-6
Kempite	1854	g3-4
Kennedyite	1855	vNot determined

Kentrolite	1856	j5
Kenyaite	3254	c1-2
Kermesite	182	c1-2
Kernite	1857	e2-3
Kerstenite	1858	g3-4
K‰sterite (Kosterite)	1859	i4-5
Kettnerite	1860	vNot determined
Keyite	3255	g3-4
Khamrabaevite	1861	q8-9
Khanneshite	3256	c1-2
Khatyrkite	1862	i4-5
Khibinskite	1863	k5-6
Khinite	1864	g3-4
Kiddcreekite	1865	g3-4
Kidwellite	1866	f3
Kieserite	1867	g3-4
Kilchoanite	1868	vNot determined
Killalaite	1869	vNot determined
Kimrobinsonite	3257	VHN20=70
Kimuraite-(Y)	1870	e2-3
Kimzeyite	3258	n7
Kingite	1871	vNot determined
Kingsmountite	3259	e2-3
Kinichilite	3260	c1-2
Kinoite	1872	j5
Kinoshitalite	3261	g3-4
Kipushite	3262	h4
Kirkiite	3263	VHN=150
Kirschsteinite	1873	vNot determined
Kitkaite	1874	f3
Kittatinnyite	1875	h4
Kivuite	3264	vNot determined
Kladnoite	1876	vNot determined
Klebelsbergite	1877	vNot determined
Kleberite	3265	g3-4
Kleemanite	2935	vNot determined
Kleinite	3266	g3-4
Klockmannite	1878	e2-3
Knorringite	1879	vNot determined
Koashvite	3267	l6
Kobeite-(Y)	3268	vNot determined
Kobellite	3269	e2-3
Koechlinite	1880	vNot determined
Koenenite	3270	c1-2
Kogarkoite	1881	g3-4
Koktaite	1882	vNot determined
Kolarite	1883	vNot determined
Kolbeckite (Sterrettite, Eggonite)	1884	j5

Kolfanite	3271	vNot determined
Kolicite	3272	i4-5
Kolwezite	3273	h4
Kolymite	1885	h4
Komarovite	1886	c1-2
Konderite	3274	VHN=592
Koninckite (Strengite or Metastrengite)	3275	g3-4
Konyaite	1887	e2-3
Koritnigite	3276	d2
Kornelite	1888	vNot determined
Kornerupine	3277	m6-7
Korshunovskite	3278	d2
Kosmochlor (Ureyite)	1889	vNot determined
Kostovite	1890	e2-3
Kostylevite	1891	j5
Kotoite	1892	m6-7
K”ttigite (Koettigite)	1893	e2-3
Kotulskite	1894	vNot determined
Koutekite	1895	i4-5
Kovdorskite	3279	h4
K“zulite	3280	j5
Kraisslite	3281	g3-4
Kratochvilite	3282	vNot determined
Krausite	1896	e2-3
Krauskopfite	1897	h4
Krautite	1898	h4
Kremersite	1899	vNot determined
Krennerite	007	e2-3
Krinovite	1900	m6-7
Kr”hnkite (Kroehnkite)	229	e2-3
Krupkaite	1901	g3-4
Krutaite	1902	h4
Krutovite	1903	k5-6
Kryzhanovskite (Kruzhanovskite)	1904	g3-4
Ktenasite	2931	e2-3
Kulanite	3283	h4
Kulkeite	3284	c1-2
Kullerudite	1905	vNot determined
Kunzite (variety of Spodumene)	530	o7-8
Kupletskite	3285	f3
Kuramite	1906	i4-5
Kuranakhite	1907	i4-5
Kurchatovite	3286	i4-5
Kurnakovite	1908	f3
Kutinaite	1909	i4-5
Kutnohorite (Kutnahorite)	3287	g3-4
Kuznetsovite	1910	e2-3

Kvanefjeldite	3288	k5-6
Kyanite (Disthene)	236	m6-7
Kyzylkumite	1911	vNot determined
Labradorite	544	m6-7
Labuntsovite	2932	l6
Lacroixite	1912	i4-5
Laffittite	1913	f3
Laihunite	1914	l6
Laitakarite	1915	vNot determined
Lammerite	1916	g3-4
Lamprophyllite	3289	e2-3
Lanarkite	1917	e2-3
Landauite	3290	o7-8
Landesite	3291	g3-4
Langbeinite	1918	g3-4
Langisite	3293	VHN50=780-857
Langite	263	e2-3
Lannonite	3294	d2
Lansfordite	1919	e2-3
Lanthanite-(Ce)	1921	e2-3
Lanthanite-(La)	1920	e2-3
Lanthanite-(Nd)	1922	e2-3
Laphamite	1923	vNot determined
Lapieite	1924	i4-5
Laplandite-(Ce)	1925	e2-3
Larderellite	1926	vNot determined
Larnite	1927	l6
Larosite	3295	VHN25=87-124
Larsenite	1928	f3
Latiumite	3296	k5-6
Latrappite	3297	k5-6
Laubmannite	1929	g3-4
Laueite	1930	f3
Laumontite	070	g3-4
Launayite	1931	g3-4
Laurionite	1932	g3-4
Laurite	1933	o7-8
Lautarite	1934	g3-4
Lautite	1935	g3-4
Lavendulan (Freirinite)	3298	e2-3
Lawrencite	1936	vNot determined
Lawsonbauerite	1937	i4-5
Lawsonite	1938	m6-7
Lazarenkoite	3300	b1
Lazulite	239	k5-6
Lazurite (Lapis Lazuli)	547	k5-6
Lead	1939	c1-2
Leadamalgam	1940	c1-2
Leadhillite	3301	e2-3

Lecontite	1941	e2-3
Legrandite	1942	i4-5
Leifite	2933	l6
Leightonite	1943	g3-4
Leiteite	1944	c1-2
Lemoynite	1945	h4
Lengenbachite	1946	vNot determined
Lennilenapeite	3302	f3
Leonite	1947	e2-3
Lepersonnite-(Gd)	3303	vNot determined
Lepidocrocite	335	j5
Lepidolite	211	e2-3
Letovicite	1948	vNot determined
Leucite	092	k5-6
Leucophanite (Leucophane)	3304	h4
Leucophoenicite	1949	k5-6
Leucophosphite	1950	g3-4
Leucosphenite	1951	m6-7
Levyne (Levynite)	078	i4-5
Lewisite (Titanian romeite)	3305	vNot determined
Liandratite	1952	g3-4
Liberite	1953	n7
Libethenite	275	h4
Liddicoatite	3306	o7-8
Liebenbergite	3307	vNot determined
Liebigite	1954	e2-3
Likasite	1955	vNot determined
Lillianite	1956	e2-3
Lime	1957	g3-4
Linarite	226	e2-3
Lindgrenite	1958	i4-5
Lindsleyite	3308	VHN100=1505
Lindstr”mite	1959	g3-4
Linnaeite	387	k5-6
Liottite	3309	j5
Lipscombite	3310	vNot determined
Liroconite	228	e2-3
Litharge	1960	d2
Lithiophilite	1961	i4-5
Lithiophorite	1962	g3-4
Lithiophosphate	1963	h4
Lithiotantite	1964	m6-7
Lithosite	1965	k5-6
Litidionite (Lithidionite)	1966	k5-6
Liveingite	1967	h4
Livingstonite	1968	d2
Lizardite	1969	d2
Lokkaite-(Y)	1970	vNot determined
L”llingite (Loellingite)	010	k5-6

Lomonosovite	1971	g3-4
Lonecreekite	1972	vNot determined
Lonsdaleite	1973	vNot determined
Loparite-(Ce)	3311	k5-6
Lopezite	1974	e2-3
Lorandite	1975	e2-3
Lorenzenite (Ramsayite)	1976	l6
Lorettoite	1977	e2-3
Loseyite	3312	f3
Lotharmeyerite	3313	f3
Loudounite	3314	i4-5
Lovdarite	3315	k5-6
Loveringite	3316	vNot determined
Lovozerite	1978	j5
L”weite (Loeweite)	1979	e2-3
Luddenite	1980	h4
Ludlamite	1981	g3-4
Ludlockite	1982	c1-2
Ludwigite	456	j5
Lueshite	1983	k5-6
Luetheite	1984	h4
Lun'okite	3317	g3-4
L□neburgite (Lueneburgite)	1985	d2
Lusungite	3318	vNot determined
Luzonite	1986	g3-4
L†ngbanite	3292	m6-7
L†venite	3299	l6
Macaulayite	1987	vNot determined
Macdonaldite	1988	g3-4
Macedonite	1989	k5-6
Macfallite	3319	j5
Machatschkiite	3320	e2-3
Mackayite	1990	i4-5
Mackinawite	1991	e2-3
Macphersonite	1992	e2-3
Macquartite	1993	g3-4
Madocite	1994	g3-4
Magadiite	3321	vNot determined
Maghemite	1995	j5
Magnesio-anthophyllite	1996	k5-6
Magnesio-arfvedsonite	1997	k5-6
Magnesio-axinite	1998	m6-7
Magnesiochloritoid	3322	m6-7
Magnesiochromite (Picrochromite)	1999	k5-6
Magnesiocopiapite (Knoxvillite)	2000	e2-3
Magnesiocummingtonite	2001	k5-6
Magnesioferrite	2002	m6-7

Magnesiohornblende	2003	k5-6
Magnesioriebeckite	2004	j5
Magnesiosadanagaite	3323	l6
Magnesite	405	i4-5
Magnesium astrophyllite	3324	f3
Magnesium-chlorophoenicite	3325	vNot determined
Magnesium-zippeite	3326	vNot determined
Magnetite	433	m6-7
Magnetoplumbite	2005	l6
Magniotriplite	3327	k5-6
Magnocolumbite	3328	l6
Magnussonite	3329	g3-4
Majakite (Mayakite)	2006	j5
Majorite	3330	o7-8
Makatite	2007	vNot determined
M„kinenite	2008	vNot determined
Malachite	273	g3-4
Malanite	2009	vNot determined
Malayaite	2010	g3-4
Maldonite	2011	c1-2
Malladrite	2012	vNot determined
Mallardite	2013	e2-3
Mammothite	2014	e2-3
Manandonite	2015	e2-3
Manasseite	2016	d2
Mandarinoite	2017	e2-3
Mangan-neptunite	2018	k5-6
Manganarsite	2019	g3-4
Manganaxinite	2020	m6-7
Manganbabingtonite	3331	k5-6
Manganberzeliite	3332	i4-5
Manganese-H”rnesite	2021	b1
Manganese-Shadlunite	3333	VHN20=195
Manganhumite	3334	h4
Manganite	451	h4
Manganochromite	2022	k5-6
Manganocolumbite	2023	m6-7
Manganolangbeinite	2024	vNot determined
Manganosite	2025	k5-6
Manganostibite	2026	vNot determined
Manganotantalite	2027	m6-7
Manganotapiolite	2028	k5-6
Manganpyrosmalite	2029	i4-5
Manjiroite	3335	n7
Mannardite	2030	n7
Mansfieldite	2031	g3-4
Mantienneite	2032	vNot determined
Mapimite	2033	f3
Marcasite	127	m6-7

Margaritasite	3336	vNot determined
Margarite	395	i4-5
Margarosanite	2034	e2-3
Marialite	087	k5-6
Maricite	2036	i4-5
Marokite	2037	vNot determined
Marrite	2038	f3
Marshite	2039	e2-3
Marsturite	2040	l6
Marthozite	2041	vNot determined
Mascagnite	2042	e2-3
Maslovite	2043	i4-5
Massicot	2044	d2
Masutomilite	3337	e2-3
Masuyite	2045	vNot determined
Mathiasite	3338	VHN100=1505
Matildite	2046	e2-3
Matlockite	2047	e2-3
Matraite	2048	g3-4
Mattagamite	2049	i4-5
Matteuccite	2050	vNot determined
Matulaite	2051	b1
Maucherite	179	j5
Mawbyite	2951	g3-4
Mawsonite	3339	g3-4
Mayenite	2052	vNot determined
Mazzite	3340	vNot determined
Mbobomkulite	3341	a0-1
Mcallisterite	2053	e2-3
Mcconnellite	2054	vNot determined
Mcgillite	2055	g3-4
Mcgovernite (Macgovernite)	3342	vNot determined
Mcguinnessite	2936	e2-3
Mckelveyite-(Y) (Mackelveyite)	2056	vNot determined
Mckinstryite (Mackinstryite)	2057	vNot determined
Mcnearite	2058	vNot determined
Medaite	3343	vNot determined
Meionite	081	k5-6
Melanocerite-(Ce)	3344	l6
Melanophlogite	2059	m6-7
Melanostibite (Melanostibian, Lamprostibian)	2060	h4
Melanotekite	2061	m6-7
Melanothallite	2062	vNot determined
Melanovanadite	2063	e2-3
Melanterite	252	d2
Meliphanite (Melinophane)	3345	k5-6
Mellite	2064	e2-3
Melonite	2065	c1-2

Melonjosephite	3346	j5
Mendipite	2066	e2-3
Mendozavilite	3347	c1-2
Mendozite	2067	d2
Meneghinite	2068	e2-3
Mercallite	2069	vNot determined
Mercury	001	vNot determined
Merenskyite	3348	g3-4
Merlinoite	3349	vNot determined
Merrihueite	3350	vNot determined
Mertieite-I	2070	VHN50=561-593
Mertieite-II	3351	VHN50=570-593
Merwinite	2072	l6
Mesolite	084	j5
Messelite (Neomesselite)	2073	g3-4
Meta-aluminite	2074	vNot determined
Meta-ankoleite	2075	vNot determined
Meta-autunite	2076	e2-3
Meta-uranocircite	2077	e2-3
Meta-uranospinite	2078	e2-3
Metaborite	2079	j5
Metacinnabar (Metacinnabarite)	430	g3-4
Metadelrioite	2080	d2
Metahaiweeite	3352	g3-4
Metaheinrichite	2081	e2-3
Metahewettite	2082	vNot determined
Metakahlerite	2083	vNot determined
Metakirchheimerite	3353	e2-3
Metak”ttigite (Metakoettigite)	3354	vNot determined
Metalodevite	2084	vNot determined
Metanovacekite	2085	e2-3
Metarossite	2086	vNot determined
Metaschoderite	2087	d2
Metaschoepite (Schoepite II)	2088	e2-3
Metasideronatrite	2089	e2-3
Metastibnite	3355	e2-3
Metastudtite	2090	vNot determined
Metaswitzerite	2091	e2-3
Metatorbernite	2092	e2-3
Metatyuyamunite	2093	d2
Metavandendriesscheite	3356	f3
Metavanmeersscheite	3357	vNot determined
Metavanuralite	3358	d2
Metavariscite	2094	g3-4
Metavauxite	2095	f3
Metavivianite	3359	c1-2
Metavoltine	2096	e2-3
Metazellerite	2097	e2-3
Metazeunerite	2098	e2-3

Meyerhofferite	2099	d2
Meymacite	3360	vNot determined
Mgriite	2100	i4-5
Miargyrite	2101	e2-3
Michenerite	2102	e2-3
Microcline	545	m6-7
Microlite	2103	i4-5
Microsommite	3361	vNot determined
Miersite	2104	e2-3
Miharaite	2105	g3-4
Milarite	098	k5-6
Millerite	123	g3-4
Millisite	3362	k5-6
Millosevichite	3363	c1-2
Mimetite	146	g3-4
Minasgeraisite-(Y)	2106	m6-7
Minasragrite	2107	vNot determined
Minehillite	3364	h4
Minguzzite	3365	vNot determined
Minium	2108	e2-3
Minnesotaite	2109	e2-3
Minrecordite	2110	vNot determined
Minyulite	2111	g3-4
Mirabilite	030	c1-2
Misenite	2112	vNot determined
Miserite	2113	k5-6
Mitridatite	2114	g3-4
Mitscherlichite	2115	e2-3
Mixite	2116	g3-4
Moctezumite	2117	f3
Modderite	2118	vNot determined
Mohite	2119	i4-5
Mohrite	2120	vNot determined
Moissanite-6H (Carborundum)	2121	q8-9
Moluranite	3366	g3-4
Molybdenite (Molybdenite-2H)	362	c1-2
Molybdite	134	vNot determined
Molybdofornacite	3367	e2-3
Molybdomenite	2122	g3-4
Molybdophyllite	2123	g3-4
Molysite	2124	vNot determined
Monazite-(Ce)	337	k5-6
Monazite-(La)	3368	k5-6
Moncheite	2125	vNot determined
Monetite	2126	g3-4
Mongolite	3369	d2
Monimolite	2127	k5-6

Monohydrocalcite	2128	vNot determined
Monsmedite	3370	c1-2
Montbrayite	2129	e2-3
Montdorite	3371	vNot determined
Montebrasite	3372	k5-6
Monteponite	2130	f3
Monteregianite-(Y)	2131	g3-4
Montesite (= Plumboan Herzenbergite ?)	3373	e2-3
Montgomeryite	2132	h4
Monticellite	2133	k5-6
Montmorillonite	019	c1-2
Montroseite	2134	vNot determined
Montroyalite	3374	g3-4
Montroydite	2135	e2-3
Mooihoekite	2136	h4
Moolooite	3375	vNot determined
Mooreite	3376	f3
Moorhouseite	3377	e2-3
Mopungite	2137	f3
Moraesite	2138	vNot determined
Mordenite (Ptilolite)	2139	i4-5
Moreauite	2140	vNot determined
Morelandite	3378	i4-5
Morenosite	2141	e2-3
Morinite (Jezekite)	2142	i4-5
Morozeviczite	3379	VHN50=122
Mosandrite (Rinkolite, Johnstrupite, Lovchorrite, Rinkite)	3380	j5
Moschellandsbergite	2143	g3-4
Mosesite	3381	g3-4
Mottramite (Psittacinite)	324	g3-4
Motukoreaite	3382	c1-2
Mounanaite	2144	vNot determined
Mountainite	2145	vNot determined
Mountkeithite	3383	vNot determined
Mourite	2146	g3-4
Moydite-(Y)	3384	c1-2
Mrazekite	2950	e2-3
Mroseite	2147	h4
Muirite	3385	e2-3
Mukhinite	2148	p8
Mullite	2149	m6-7
Mundite	3386	vNot determined
Mundrabillaite	2150	vNot determined
Munirite	2151	vNot determined
Murataite	3387	m6-7
Murdochite	2152	h4
Murmanite	3388	e2-3
Murunskite	2153	f3

Muscovite	312	e2-3
Musgravite	3389	vNot determined
Mushistonite	3390	i4-5
Muskoxite	3391	f3
Na-Komarovite	3394	vNot determined
Nabaphite	2154	d2
Nacaphite	2155	f3
Nacrite	397	e2-3
Nadorite	2156	g3-4
Nagashimalite	2157	l6
Nagelschmidtite	3392	vNot determined
Nagyagite	361	c1-2
Nahcolite	2158	e2-3
Nahpoite	2159	vNot determined
Nakauriite	3393	vNot determined
Nambulite	2160	m6-7
Namibite	2161	i4-5
Namuwite	3395	d2
Nanlingite	2162	e2-3
Nantokite	2163	e2-3
Narsarsukite	2164	m6-7
Nasinite	2165	vNot determined
Nasonite	2166	j5
Nastrophite	2167	d2
Natalyite	2168	n7
Natanite	2169	j5
Natisite	2170	g3-4
Natrite	3396	g3-4
Natroalunite	2171	g3-4
Natroapophyllite	2172	i4-5
Natrobistantite	3397	vNot determined
Natrochalcite	2173	i4-5
Natrodufrenite	3398	vNot determined
Natrofairchildite (= Nyrereite ?)	3399	e2-3
Natrojarosite	2174	f3
Natrolite	088	k5-6
Natromontebrasite (Fremontite)	3400	k5-6
Natron	2175	c1-2
Natronambulite	2176	k5-6
Natrophilite	2177	i4-5
Natrophosphate	2178	e2-3
Natrosilite	2179	vNot determined
Natrotantite	2180	n7
Naujakasite	3401	e2-3
Naumannite	2181	e2-3
Navajoite	2182	c1-2
Nealite	2183	vNot determined

Nefedovite	2184	i4-5
Neighborite	2185	i4-5
Nekoite	2186	vNot determined
Nekrasovite	2187	i4-5
Nelenite (Ferroschallerite)	3402	j5
Neltnerite	2188	l6
Nenadkevichite	3403	j5
Nepheline (Nephelite)	291	k5-6
Nepouite	3404	e2-3
Neptunite	465	k5-6
Nesquehonite	2189	e2-3
Nevskite	2190	e2-3
Newberyite	2191	g3-4
Neyite	2192	e2-3
Niahite	2193	vNot determined
Niccolite (Nickeline)	180	k5-6
Nickel	2194	g3-4
Nickel-boussingaultite	3406	e2-3
Nickel-skutterudite (Chloanthite)	014	k5-6
Nickel-zippeite	3407	vNot determined
Nickelalumite	3405	vNot determined
Nickelbischofite	2196	c1-2
Nickelbl”dite (Nickelbloedite)	2197	c1-2
Nickelhexahydrite	2195	vNot determined
Nifontovite	2198	g3-4
Nigerite	3408	q8-9
Niggliite	2199	f3
Nimite	3409	f3
Ningyoite	3410	vNot determined
Niningerite	3411	vNot determined
Niobo-aeschynite-(Ce)	3412	k5-6
Niobophyllite	3413	vNot determined
Niocalite	2200	l6
Nisbite	2201	i4-5
Nissonite	2202	e2-3
Niter (Nitre)	025	d2
Nitratine (Soda-niter)	2203	c1-2
Nitrobarite	2204	vNot determined
Nitrocalcite	2205	vNot determined
Nitromagnesite	2206	vNot determined
Nobleite	2207	f3
Nolanite	3414	k5-6
Nontronite (Chloropal, Faratsihite)	3415	c1-2
Norbergite	2208	m6-7
Nordenski”ldine	2209	k5-6
Nordite-(La)	3416	j5
Nordstrandite	2210	g3-4

Nordstr”mite	2211	e2-3
Norsethite	2212	g3-4
Northupite	2213	g3-4
Nosean (Noselite)	416	k5-6
Novacekite	2214	e2-3
Novakite	2215	g3-4
Nowackiite	2216	vNot determined
Nsutite (g-MnO2)	3417	q8-9
Nuffieldite	2217	g3-4
Nukundamite	2218	f3
Nullaginite	2219	d2
Nyerereite	2220	vNot determined
O'Danielite	3420	vNot determined
Oboyerite	3418	c1-2
Obradovicite	3419	e2-3
Offretite	2221	vNot determined
Ogdensburgite	3421	d2
Ohmilite	3422	vNot determined
Ojuelaite	2222	vNot determined
Okanoganite-(Y)	3423	h4
Okenite	2223	i4-5
Oldhamite	2224	h4
Olgite	2225	i4-5
Oligoclase	2226	m6-7
Olivenite (Leucochalcite)	267	f3
Olivine (Group)	528	o7-8
Olmsteadite	2227	h4
Olsacherite	2228	g3-4
Olympite	2229	h4
Omeiite	2230	vNot determined
Omphacite	285	k5-6
Onoratoite	2231	vNot determined
Onyx (variety of Quartz)	111	o7-8
Oosterboschite	2232	i4-5
Opal	112	k5-6
Ordonezite	2233	m6-7
™rebroite	3424	h4
Oregonite	2234	j5
Orickite	2235	vNot determined
Orientite	2236	i4-5
Orpheite	3425	vNot determined
Orpiment	131	c1-2
Orthobrannerite	2237	k5-6
Orthochrysotile	3426	e2-3
Orthoclase	205	m6-7
Orthoericssonite	2238	i4-5
Orthojoaquinite-(Ce)	3427	k5-6
Orthopinakiolite	2239	l6
Osarizawaite	2240	vNot determined

Osarsite	2241	vNot determined
Osbornite	2242	vNot determined
Osmiridium	2243	m6-7
Osmium	2244	m6-7
Osumilite	3428	vNot determined
Osumilite-(Mg)	3429	vNot determined
Otavite	2245	vNot determined
Otjisumeite	3430	vNot determined
Ottemannite	2246	vNot determined
Ottrelite	3431	vNot determined
Otwayite	2937	h4
Oursinite	2247	vNot determined
Overite	2248	g3-4
Owyheeite	3432	e2-3
Oxammite	2249	e2-3
Oyelite	3433	k5-6
P„„kk”nenite	3434	d2
Pabstite	2251	l6
Pachnolite	2252	f3
Paderaite	2253	vNot determined
Pahasapaite	3435	i4-5
Painite	2254	p8
Palarstanide	3436	VHN50=470
Palermoite	3437	k5-6
Palladium	2255	i4-5
Palladoarsenide	2256	i4-5
Palladobismutharsenide	2257	j5
Palladseite	2258	vNot determined
Palmierite	2259	vNot determined
Palygorskite (Attapulgite)	399	c1-2
Panasqueiraite	2260	j5
Panethite	3438	vNot determined
Paolovite	2261	i4-5
Papagoite	2262	k5-6
Parabariomicrolite	2263	h4
Parabutlerite	2264	e2-3
Paracelsian	2265	m6-7
Paracoquimbite	2266	e2-3
Paracostibite	2267	m6-7
Paradamite	2268	g3-4
Paradocrasite	2269	e2-3
Paragonite	2270	e2-3
Paraguanajuatite	2271	e2-3
Parahilgardite (Hilgardite-3Tc)	2272	j5
Parahopeite	2273	g3-4
Parakeldyshite	2274	k5-6
Parakhinite	2275	g3-4
Paralaurionite	2276	vNot determined
Paralstonite	3439	i4-5

Paramelaconite	2277	i4-5
Paramendozavilite	3440	a0-1
Paramontroseite	2278	vNot determined
Paranatrolite	2279	k5-6
Parapierrotite	2280	e2-3
Pararammelsbergite	2281	k5-6
Pararealgar	2282	c1-2
Paraschachnerite	2283	vNot determined
Paraschoepite	2284	e2-3
Parascholzite	2285	h4
Paraspurrite	2286	vNot determined
Parasymplesite	2287	d2
Paratacamite	2288	f3
Paratellurite	2289	b1
Paraumbite	2290	i4-5
Paravauxite	2291	f3
Parawollastonite (Wollastonite-2M)	2292	i4-5
Pargasite	3441	k5-6
Parisite-(Ce)	2293	i4-5
Parkerite	2294	d2
Parnauite	3442	d2
Parsettensite	3443	c1-2
Parsonsite	2295	e2-3
Partheite	2296	vNot determined
Partzite	2297	g3-4
Parwelite	2298	k5-6
Pascoite	2299	e2-3
Patronite	3444	vNot determined
Paulingite	3445	j5
Paulkerrite	3446	f3
Paulmooreite	2300	g3-4
Pavonite	3447	d2
Paxite	2301	g3-4
Pearceite	2302	f3
Pecoraite	3448	vNot determined
Pectolite	083	i4-5
Pehrmanite	3449	q8-9
Peisleyite	3450	vNot determined
Pekoite	3451	vNot determined
Pellyite	2303	l6
Penikisite	3452	g3-4
Penkvilksite	3453	j5
Pennantite	2306	e2-3
Penroseite (Blockite)	2307	e2-3
Pentagonite	2308	g3-4
Pentahydrite	2309	e2-3
Pentlandite	2310	g3-4
Penzhinite	2305	vNot determined
Peretaite	2311	g3-4

Perhamite	3454	j5
Periclase	094	k5-6
Perite	2312	f3
Perlialite	2313	i4-5
Perloffite	2938	j5
Permingeatite	2314	i4-5
Perovskite	459	k5-6
Perrierite	3455	k5-6
Perroudite	2948	vNot determined
Perryite	3456	vNot determined
Petalite	2315	m6-7
Petarasite	2316	k5-6
Petedunnite	2317	vNot determined
Petersite-(Y)	3457	vNot determined
Petrovicite	2318	f3
Petrovskaite	2319	e2-3
Petscheckite	2320	j5
Petzite	2321	e2-3
Pharmacolite	048	e2-3
Pharmacosiderite	2322	e2-3
Phaunouxite	2323	vNot determined
Phenakite (Phenacite)	116	o7-8
Philipsbornite	2324	i4-5
Philipsburgite	3458	g3-4
Phillipsite	075	i4-5
Phlogopite	403	e2-3
Phoenicochroite	2325	e2-3
Phosgenite	309	e2-3
Phosinaite	2326	g3-4
Phosphammite	2327	vNot determined
Phosphoferrite	2328	g3-4
Phosphofibrite	3459	h4
Phosphophyllite	2329	g3-4
Phosphorr”sslerite (Phosphoroesslerite)	2330	e2-3
Phosphosiderite (Metastrengite)	2331	g3-4
Phosphuranylite	3460	e2-3
Phuralumite	3461	f3
Phurcalite	3462	f3
Phyllotungstite	2332	d2
Pickeringite	2333	c1-2
Picotpaulite	2334	d2
Picromerite	2335	e2-3
Picropharmacolite	2336	vNot determined
Piemontite (Piedmontite)	350	l6
Pierrotite	2337	g3-4
Pigeonite	3463	l6
Pilsenite	2338	e2-3
Pinakiolite	2339	l6
Pinchite	2340	vNot determined

Pinnoite	2341	g3-4
Pirquitasite	2342	h4
Pirssonite	2343	g3-4
Piypite	2344	e2-3
Plagionite	2345	e2-3
Plancheite	2346	k5-6
Platarsite	2347	o7-8
Platiniridium	2348	m6-7
Platinum	009	i4-5
Plattnerite	2349	k5-6
Platynite	2350	e2-3
Playfairite	2351	g3-4
Plombierite	2352	vNot determined
Plumalsite	2353	k5-6
Plumbobetafite	3464	vNot determined
Plumboferrite	2354	j5
Plumbogummite	2355	i4-5
Plumbojarosite	2356	vNot determined
Plumbomicrolite	3465	j5
Plumbonacrite (= Hydrocerussite ?)	3466	vNot determined
Plumbopalladinite	2357	j5
Plumbopyrochlore	3467	vNot determined
Plumbotellurite	3468	VHN=38
Plumbotsumite	2358	d2
Poitevinite	2359	g3-4
Pokrovskite	2360	j5
Polarite	3469	VHN=168-232
Polhemusite	2361	h4
Polkovicite	3470	VHN50=122
Pollucite	419	m6-7
Polybasite	2362	e2-3
Polycrase	341	m6-7
Polydymite	2363	k5-6
Polyhalite	2364	g3-4
Polylithionite	2365	e2-3
Polymignite	3471	m6-7
Portlandite	2366	d2
Posnjakite	2367	e2-3
Potarite	2368	g3-4
Potassium Alum	2369	e2-3
Poubaite	3472	vNot determined
Poughite	3473	e2-3
Powellite	2370	g3-4
Poyarkovite	2371	e2-3
Prehnite	294	m6-7
Preisingerite	2372	g3-4
Preiswerkite	2373	e2-3
Preobrazhenskite	2374	i4-5
Priceite (Pandermite)	2375	g3-4

Priderite	3474	vNot determined
Probertite	2376	g3-4
Prosopite	2377	i4-5
Prosperite	2378	i4-5
Protasite	2379	vNot determined
Proustite	185	e2-3
Przhevalskite	3475	vNot determined
Pseudo-autunite	3476	vNot determined
Pseudobol,ite	2380	e2-3
Pseudobrookite	3477	l6
Pseudolaueite	3478	f3
Pseudomalachite (Tagilite)	277	i4-5
Pseudorutile	2381	g3-4
Pseudowollastonite (= Cyclowollastonite or wollastonite-2T ?)	2382	j5
Pucherite	2383	h4
Pumpellyite-(Mg)	3479	l6
Pumpellyite-(Mn)	3480	j5
Purpurite	2384	i4-5
Putoranite	3481	VHN50=263
Pyrargyrite	186	e2-3
Pyrite	125	m6-7
Pyroaurite	2385	e2-3
Pyrobelonite	2386	g3-4
Pyrochlore	334	k5-6
Pyrochroite	2387	e2-3
Pyrolusite	379	m6-7
Pyromorphite	325	g3-4
Pyrope	527	o7-8
Pyrophanite	2388	k5-6
Pyrophyllite	023	c1-2
Pyrosmalite	279	i4-5
Pyrostilpnite	2389	d2
Pyroxferroite	2390	vNot determined
Pyroxmangite	2391	k5-6
Pyrrhotite	128	i4-5
Qandilite	2392	n7
Qingheiite	3482	k5-6
Qitianlingite	3483	VHN=520-580
Quartz	110	n7
Queitite	3484	h4
Quenselite	2393	e2-3
Quenstedtite	2394	e2-3
Quetzalcoatlite	2395	f3
Rabbittite	3485	e2-3
Radhakrishnaite	2396	vNot determined
Raguinite	2397	vNot determined
Raite	2398	h4
Rajite	2399	i4-5
Ralstonite	3486	i4-5

Ramdohrite (Andorite VI)	2400	f3
Rameauite	2401	vNot determined
Rammelsbergite	392	k5-6
Ramsbeckite	2402	g3-4
Ramsdellite	2403	f3
Ranci,ite	3487	vNot determined
Rankachite	3488	e2-3
Rankamaite	3489	g3-4
Rankinite	2404	k5-6
Ransomite	2405	e2-3
Ranunculite	3490	f3
Rapidcreekite	2406	e2-3
Raspite	2407	e2-3
Rasvumite	2408	i4-5
Rathite	2409	f3
Rauenthalite	2410	vNot determined
Rauvite	3491	vNot determined
Rayite	3492	vNot determined
Realgar	181	c1-2
Rebulite	3493	vNot determined
Reddingite	2411	g3-4
Redledgeite (Chromrutile)	3494	vNot determined
Reedmergnerite	2412	m6-7
Reevesite	2413	vNot determined
Refikite	2414	vNot determined
Reichenbachite	2415	g3-4
Reinerite	2416	k5-6
Reinhardbraunsite	2417	k5-6
Renardite (=Dewindtite ?)	3495	g3-4
Renierite	3496	i4-5
Retgersite	2418	e2-3
Retzian-(Ce)	2419	h4
Retzian-(La)	3497	g3-4
Retzian-(Nd)	3498	g3-4
Revdite	2420	d2
Reyerite	3499	g3-4
Rhabdophane-(Ce)	2421	g3-4
Rhabdophane-(La)	3500	g3-4
Rhenium	3501	vNot determined
Rhodesite	2422	vNot determined
Rhodium	3502	VHN30=165
Rhodizite	2423	q8-9
Rhodochrosite	192	g3-4
Rhodonite	200	m6-7
Rhodostannite	3503	VHN=243-266
Rhomboclase	2424	d2
Rh”nite (Rhoenite)	3504	vNot determined
Ribbeite	2425	j5
Richellite	3505	e2-3

Richelsdorfite	3506	d2
Richetite	2426	vNot determined
Richterite	2427	k5-6
Rickardite	2428	g3-4
Riebeckite	488	k5-6
Ringwoodite	2429	vNot determined
Rinneite	2430	g3-4
Rivadavite	2431	g3-4
Riversideite	2432	f3
Roaldite	2433	k5-6
Robertsite	2434	g3-4
Robinsonite	2435	e2-3
Rockbridgeite	3507	i4-5
Rodalquilarite	2436	e2-3
Roeblingite	3508	f3
Roedderite	3509	vNot determined
Roggianite	2437	vNot determined
Rohaite	3510	VHN25=94
Rok□hnite	2438	vNot determined
Romanechite	460	k5-6
Romarchite	3511	k5-6
Rom,ite	154	m6-7
R”merite (Roemerite)	2439	g3-4
R”ntgenite-(Ce) (Roentgenite)	2440	i4-5
Rooseveltite	2441	i4-5
Roquesite	2442	g3-4
Rosasite	2443	i4-5
Roscherite	3512	i4-5
Roscoelite	2444	e2-3
Roselite	2445	g3-4
Roselite-beta	2446	g3-4
Rosenbuschite	2447	k5-6
Rosenhahnite	2448	i4-5
Rosickyite (g-sulphur or g-sulfur)	2449	vNot determined
Rossite	2450	e2-3
R”sslerite (Roesslerite)	2451	e2-3
Rostite	2452	vNot determined
Roubaultite	3513	f3
Rouseite	2453	f3
Routhierite	3514	VHN25=148
Roweite	2454	j5
Rowlandite-(Y)	3515	k5-6
Rozenite	2455	vNot determined
Ruarsite	2456	m6-7
Rubellite (pink Elbaite - variety of Tourmaline)	2457	o7-8
Rucklidgeite	2458	vNot determined
Ruizite	2459	j5
Russellite	2460	g3-4
Rustenburgite	2461	i4-5

Rustumite	2462	vNot determined
Ruthenarsenite	2463	l6
Rutheniridosmine	3516	m6-7
Ruthenium	3517	vNot determined
Ruthenosmiridium (Iridium)	3518	n7
Rutherfordine	2464	vNot determined
Rutile	203	m6-7
Rynersonite	2465	i4-5
Sabatierite	3519	vNot determined
Sabieite	3520	vNot determined
Sabinaite	2466	vNot determined
Sabugalite	2467	e2-3
Sacrofanite	3521	k5-6
Safflorite	388	i4-5
Sahamalite-(Ce)	3522	vNot determined
Sahlinite	2468	e2-3
Sainfeldite	2469	vNot determined
Sakhaite	2470	j5
Sakharovaite (Bismuth jamesonite)	3523	vNot determined
Sakuraiite	3524	h4
Sal-ammoniac	017	c1-2
Sal,eite	2471	g3-4
Salesite	2472	f3
Samarskite-(Y)	3525	k5-6
Sampleite	2473	h4
Samsonite	2474	e2-3
Samuelsonite	3526	j5
Saneroite	3527	vNot determined
Sanidine	420	l6
Sanjuanite	3528	f3
Sanmartinite	3529	vNot determined
Santaclaraite	2475	m6-7
Santafeite	3530	vNot determined
Santanaite	2476	h4
Santite	2477	vNot determined
Saponite	022	c1-2
Sapphirine-2M	2478	o7-8
Sarabauite	2479	h4
Sarcolite	2480	l6
Sarcopside	3531	h4
Sarkinite	2481	i4-5
Sarmientite	3532	vNot determined
Sartorite	2482	f3
Saryarkite-(Y)	3533	g3-4
Sasaite	3534	c1-2
Sassolite	2483	b1
Satimolite	2484	vNot determined

Satterlyite	3535	i4-5
Sauconite	3536	c1-2
Sayrite	2485	vNot determined
Sazhinite-(Ce)	2486	e2-3
Sborgite	2487	vNot determined
Scacchite	2488	vNot determined
Scarbroite	2489	vNot determined
Scawtite	2490	i4-5
Schachnerite	3537	e2-3
Schafarzikite	2491	g3-4
Schairerite	2492	g3-4
Schallerite	2493	j5
Schaurteite	2494	vNot determined
Scheelite	157	i4-5
Schertelite	2495	vNot determined
Scheteligite	3538	k5-6
Schieffelinite	2496	d2
Schirmerite	2497	d2
Schmitterite	2498	c1-2
Schneiderh”hnite (Schneiderhoehnite)	2499	f3
Schoderite	2500	d2
Schoenfliesite	2501	vNot determined
Schoepite	2502	e2-3
Sch”llhornite	2503	c1-2
Scholzite	2504	g3-4
Schoonerite	2505	h4
Schorl	479	n7
Schorlomite	2506	m6-7
Schreibersite (Rhabdite)	2507	m6-7
Schreyerite	3539	k5-6
Schr”ckingerite (Schroeckingerite)	137	e2-3
Schubnelite	2508	vNot determined
Schuetteite	2509	f3
Schuilingite-(Nd)	3540	g3-4
Schulenbergite	2939	d2
Schultenite	2510	e2-3
Schumacherite	3541	f3
Schwartzembergite	2511	e2-3
Scolecite	091	j5
Scorodite	407	g3-4
Scorzalite	3542	k5-6
Scotlandite	2512	d2
Seamanite	2513	j5
Searlesite	2514	vNot determined
Sederholmite	3543	vNot determined
Sedovite	2515	f3
Seeligerite	2516	vNot determined

Segelerite	2517	j5
Segnitite	2947	h4
Seidozerite	3544	i4-5
Sein„jokite	3545	VHN=332
Sekaninaite (Iron-Cordierite)	2518	o7-8
Selenium	2519	d2
Selenostephanite	2520	e2-3
Seligmannite	2521	f3
Sellaite	2522	k5-6
Semenovite	3546	g3-4
Semseyite	376	e2-3
Senaite	2523	m6-7
Senarmontite	2524	e2-3
Senegalite	2525	k5-6
Sengierite	3547	e2-3
Sepiolite	024	e2-3
Serandite	2526	k5-6
Serendibite	3548	m6-7
Sergeevite (= Huntite ?)	3549	g3-4
Serpentine (Group)	021	e2-3
Serpierite	2940	vNot determined
Shabynite	3550	f3
Shadlunite	3551	VHN20=210
Shafranovskite	3552	e2-3
Shakhovite	2527	g3-4
Shandite	2528	j5
Sharpite	3553	e2-3
Shattuckite	2529	vNot determined
Shcherbakovite	3554	m6-7
Shcherbinaite	2530	vNot determined
Sherwoodite	3555	d2
Shigaite	2531	d2
Shortite	2532	f3
Shuiskite	3556	k5-6
Sicklerite	2533	h4
Siderazot	2534	vNot determined
Siderite	317	h4
Sideronatrite	2535	e2-3
Siderophyllite	2536	e2-3
Siderotil	2537	vNot determined
Sidorenkite	2538	d2
Sidwillite	2539	e2-3
Siegenite	2540	k5-6
Sieleckiite	2945	f3
Sigloite	3557	f3
Silhydrite	2541	b1
Sill,nite	2542	vNot determined
Sillimanite	206	o7-8
Silver (Silver-3C)	363	e2-3

Simonellite	3558	vNot determined
Simonite	3559	vNot determined
Simonkolleite	2543	c1-2
Simplotite	2544	c1-2
Simpsonite	3560	o7-8
Sincosite	2545	vNot determined
Sinhalite	2546	m6-7
Sinkankasite	2547	h4
Sinnerite	2548	vNot determined
Sinoite	2549	vNot determined
Sj”grenite	2550	e2-3
Skinnerite	2551	g3-4
Sklodowskite	3561	e2-3
Skutterudite	391	k5-6
Slavikite	3562	vNot determined
Slawsonite (monoclinic)	2552	k5-6
Smirnite	2553	i4-5
Smithite	2554	c1-2
Smithsonite	411	i4-5
Smolianinovite	3563	e2-3
Smythite	2555	vNot determined
Sobolevite	2556	i4-5
Sobolevskite	2557	i4-5
Sobotkite (= Aluminian saponite ?)	3564	f3
Sodalite	093	k5-6
Soddyite	150	g3-4
Sodium alum (Soda Alum)	2558	f3
Sodium autunite	2559	e2-3
Sodium betpakdalite	3565	vNot determined
Sodium boltwoodite	3566	g3-4
Sodium dachiardite	3567	vNot determined
Sodium pharmacosiderite	2560	g3-4
Sodium uranospinite	3568	e2-3
Sodium-zippeite	3569	vNot determined
Sogdianite	3570	n7
S”hngeite	2561	i4-5
Solongoite	2562	g3-4
Sonolite	2563	k5-6
Sonoraite	2564	g3-4
Sopcheite	2565	g3-4
Sorbyite	2566	g3-4
Sorensenite	2567	k5-6
Sosedkoite	3571	VHN20=800-860
Soucekite	2568	g3-4
Souzalite	3572	k5-6
Spangolite	2569	f3
Spencerite	2570	f3

Sperrylite	2571	m6-7
Spertiniite	2572	vNot determined
Spessartine (Spessartite)	2573	o7-8
Sphaerocobaltite (Spherocobaltite, Cobaltocalcite)	2574	h4
Sphalerite	142	g3-4
Spheniscidite	3573	c1-2
Spinel	246	o7-8
Spionkopite	2575	vNot determined
Spiroffite	2576	g3-4
Spodumene (Triphane)	108	o7-8
Spurrite	2577	j5
Srebrodolskite	2578	k5-6
Srilankite	2579	m6-7
Stanfieldite	2580	i4-5
Stanleyite	2581	c1-2
Stannite	384	h4
Stannoidite	2582	h4
Stannomicrolite (Sukulaite)	2583	vNot determined
Staringite	3574	m6-7
Starkeyite (Leonhardtite)	2584	vNot determined
Staurolite	358	o7-8
Steacyite	2585	j5
Steenstrupine-(Ce)	3575	j5
Stellerite	194	g3-4
Stenhuggarite	3576	h4
Stenonite	2586	g3-4
Stepanovite	2587	d2
Stephanite	373	e2-3
Stercorite	2588	d2
Sterlinghillite	3577	f3
Sternbergite	2589	c1-2
Sterryite	2590	vNot determined
Stetefeldtite (Stetefeldite)	2591	i4-5
Stevensite	2592	e2-3
Stewartite	2593	vNot determined
Stibarsen	2594	vNot determined
Stibiconite	2595	k5-6
Stibiobetafite	3578	k5-6
Stibiocolumbite	2596	k5-6
Stibiopalladinite	2597	i4-5
Stibiotantalite	2598	k5-6
Stibivanite	2599	h4
Stibnite (Antimonite)	367	d2
Stichtite	2600	c1-2
Stilbite	072	g3-4
Stilleite	2601	j5
Stillwaterite	2602	i4-5
Stillwellite-(Ce)	2603	vNot determined

Stilpnomelane	314	f3
Stishovite	2604	vNot determined
Stistaite	2605	f3
Stoiberite	2606	vNot determined
Stokesite	2607	l6
Stolzite	323	e2-3
Stottite	2608	i4-5
Straczekite	3579	vNot determined
Stranskiite	2609	h4
Strashimirite	2610	vNot determined
Str„tlingite (Straetlingite)	2611	vNot determined
Strelkinite	2612	e2-3
Strengite	2613	i4-5
Stringhamite	2614	vNot determined
Stromeyerite	2615	e2-3
Stronalsite	2616	m6-7
Strontianite	064	g3-4
Strontio-Orthojoaquinite	3583	k5-6
Strontioborite	2617	vNot determined
Strontiochevkinite	3580	vNot determined
Strontiodresserite	3581	vNot determined
Strontioginorite (Volkolvite)	2618	e2-3
Strontiojoaquinite	3582	k5-6
Strontium-apatite	3584	j5
Strunzite	2619	vNot determined
Str□verite (Strueverite)	471	m6-7
Struvite	394	d2
Studtite	2620	vNot determined
Stumpflite	2621	j5
Sturmanite	3585	e2-3
St□tzite (Stuetzite)	3586	g3-4
Suanite	2622	k5-6
Sudburyite	2623	i4-5
Sudoite	2624	vNot determined
Suessite	2625	vNot determined
Sugilite	2626	m6-7
Sulfoborite	2627	i4-5
Sulphohalite (Sulfohalite)	2628	g3-4
Sulphotsumoite	2629	vNot determined
Sulphur (Sulfur)	130	e2-3
Sulvanite	2630	g3-4
Sundiusite	2631	f3
Suolunite	2632	g3-4
Surinamite	2633	vNot determined
Surite	3587	e2-3
Sursassite	3588	vNot determined
Susannite	3589	e2-3
Sussexite	2634	g3-4

Suzukiite	2635	i4-5
Svabite	3590	i4-5
Svanbergite	3591	j5
Sveite	2636	vNot determined
Sverigeite	2637	m6-7
Svetlozarite (= Twinned dachiardite ?)	3592	h4
Svyazhinite	3593	vNot determined
Swamb”ite	2638	vNot determined
Swartzite	2639	vNot determined
Swedenborgite	2640	p8
Sweetite	2641	vNot determined
Swinefordite	3594	c1-2
Switzerite	2642	vNot determined
Sylvanite	002	c1-2
Sylvite	035	e2-3
Symplesite	2643	e2-3
Synadelphite	3595	i4-5
Synchysite-(Ce)	2644	i4-5
Synchysite-(Nd)	2645	i4-5
Synchysite-(Y) (Doverite)	2646	m6-7
Syngenite	2647	e2-3
Szaibelyite (Camsellite)	2648	g3-4
Szmikite	2649	c1-2
Szomolnokite	2650	e2-3
Taaffeite	2651	q8-9
Tacharanite	2652	vNot determined
Tachhydrite (Tachyhydrite)	2653	d2
Tadzhikite-(Y)	3596	l6
Taeniolite (Tainiolite)	2654	e2-3
Taenite (Nickel-iron)	3597	h4
Taikanite	2655	m6-7
Taimyrite	2656	j5
Takanelite	3598	VHN100=480
Tak,uchiite	3599	k5-6
Takovite (Eardleyite)	2657	vNot determined
Talc (Steatite)	020	b1
Talmessite	2658	j5
Talnakhite	2659	vNot determined
Tamarugite	2660	f3
Tancoite	2661	i4-5
Taneyamalite	3600	d2
Tantalaeschynite-(Y)	3601	k5-6
Tanteuxenite-(Y)	3602	k5-6
Tantite	2662	n7
Tapiolite	2663	m6-7
Taramellite	3603	k5-6
Taramite	3604	k5-6

Taranakite	2664	vNot determined
Tarapacaite	2665	vNot determined
Tarasovite (An interlayered mica-smectite)	3605	vNot determined
Tarbuttite	2666	j5
Tauriscite	2667	e2-3
Tausonite	2668	m6-7
Tavorite	2669	j5
Tazheranite	2670	o7-8
Teallite	2671	c1-2
Teepleite	2672	g3-4
Teineite	2673	e2-3
Telargpalite	2674	vNot determined
Tellurantimony	2675	vNot determined
Tellurite	2676	d2
Tellurium	364	e2-3
Tellurobismuthite (Wehrlite)	2677	c1-2
Tellurohauchecornite	2678	k5-6
Telluropalladinite	2679	i4-5
Temagamite	2680	e2-3
Tengerite-(Y)	2681	vNot determined
Tennantite	2682	i4-5
Tenorite	2683	g3-4
Tephroite	2684	l6
Terlinguaite	2685	e2-3
Terskite	2686	j5
Teruggite	2687	e2-3
Teschemacherite	2688	c1-2
Testibiopalladite	2689	g3-4
Tetra-auricupride	2690	i4-5
Tetradymite	2691	c1-2
Tetrahedrite	431	i4-5
Tetrakalsilite (Panuzite)	2692	vNot determined
Tetranatrolite	2693	vNot determined
Tetrataenite	2694	g3-4
Tetrawickmanite	2695	vNot determined
Thadeuite	3606	g3-4
Thalcusite	2696	e2-3
Thalenite-(Y)	2697	l6
Thalfenisite	3607	VHN10=17
Thaumasite	3608	g3-4
Theisite	2698	c1-2
Thenardite	2699	e2-3
Theophrastite	2700	g3-4
Thermonatrite	2701	c1-2
Thometzekite	3609	vNot determined
Thomsenolite	2702	d2
Thomsonite	090	k5-6
Thorbastn„site (Thorbastnaesite)	2703	vNot determined

Thoreaulite	2704	k5-6
Thorianite	2705	m6-7
Thorikosite	3610	vNot determined
Thorite	332	i4-5
Thorogummite	3611	b1
Thorosteenstrupine	2706	h4
Thortveitite	340	m6-7
Thorutite (Smirnovite)	3612	vNot determined
Threadgoldite	2941	vNot determined
Tiemannite	2707	e2-3
Tienshanite	2708	m6-7
Tikhonenkovite	2709	g3-4
Tilasite	2710	j5
Tilleyite	2711	vNot determined
Tin	2712	d2
Tinaksite	2714	l6
Tincalconite	2715	vNot determined
Tinsleyite	2716	j5
Tintinaite	2717	vNot determined
Tinzenite	2718	m6-7
Tiptopite	3613	g3-4
Tiragalloite	2719	vNot determined
Tirodite	2720	m6-7
Tisinalite	3614	h4
Titanite (Sphene)	339	k5-6
Titantaramellite	3615	k5-6
Tivanite	2721	k5-6
Tlalocite	3616	b1
Tlapallite	3617	f3
Tobelite	3618	vNot determined
Tobermorite	2722	e2-3
Tochilinite	3619	VHN5=15-49
Todorokite	2723	vNot determined
Tokkoite	2724	i4-5
Tolbachite	2725	vNot determined
Tolovkite	2726	k5-6
Tombarthite-(Y)	3620	k5-6
Tomichite	2727	l6
Tongbaite	2728	q8-9
Topaz	117	n7
Torbernite	261	e2-3
T”rnebohmite-(Ce) (Toernebohmite)	3621	i4-5
Torreyite	3622	f3
Tosudite	3623	c1-2
Tourmaline (Group)	480	n7
Tranquillityite	2729	vNot determined
Traskite	3624	h4
Trechmannite	2730	c1-2
Tremolite	414	k5-6

Trevorite	2731	j5
Triangulite	3625	vNot determined
Tridymite (a-Tridymite)	113	n7
Trigonite	3626	e2-3
Trikalsilite	2732	l6
Trimerite	2733	m6-7
Triphylite	2734	i4-5
Triplite	3627	k5-6
Triploidite	2735	i4-5
Trippkeite	2736	vNot determined
Tripuhyite	2737	n7
Tristramite	3628	vNot determined
Tritomite-(Ce)	3629	k5-6
Tritomite-(Y) (Spencite)	3630	i4-5
Tr”gerite (Troegerite)	3631	e2-3
Trogtalite	2738	vNot determined
Troilite	2739	i4-5
Trolleite	2740	q8-9
Trona	2741	e2-3
Truscottite	2742	vNot determined
Tr□stedtite	2743	e2-3
Tschermakite	3632	k5-6
Tschermigite (Ammonia Alum)	029	c1-2
Tsumcorite	2744	i4-5
Tsumebite	3633	g3-4
Tsumoite	2745	vNot determined
Tucekite	2746	k5-6
Tugarinovite	2747	i4-5
Tugtupite	2748	h4
Tuhualite	2749	g3-4
Tulameenite	2750	j5
Tundrite-(Ce)	3634	f3
Tunellite	2751	e2-3
Tungstenite-2H	2752	e2-3
Tungstite	2753	e2-3
Tunisite	2921	i4-5
Tuperssuatsiaite	2754	vNot determined
Turneaureite	2755	j5
Turquoise	546	k5-6
Tuscanite	3635	k5-6
Tusionite	2756	m6-7
Tvalchrelidzeite	2757	h4
Tveitite	3636	vNot determined
Twinnite	2758	o7-8
Tychite	2759	g3-4
Tyretskite-1A	3637	vNot determined
Tyrolite (Trichalcite)	250	d2

Tyrrellite	2760	g3-4
Tyuyamunite	2761	e2-3
Uchucchacuaite	2762	g3-4
Uklonskovite	2763	vNot determined
Ulexite	2764	e2-3
Ullmannite	012	k5-6
Ulrichite	2946	g3-4
Ulv”spinel (Ulvite)	2765	vNot determined
Umangite	2766	f3
Umbite	2767	i4-5
Umbozerite	3638	j5
Umohoite	2768	e2-3
Ungemachite	2769	e2-3
Upalite	3639	vNot determined
Uralborite	2770	h4
Uralolite	2771	e2-3
Uramphite	3640	vNot determined
Urancalcarite	3641	e2-3
Uraninite	443	k5-6
Uranmicrolite (Djalmaite)	3642	k5-6
Uranocircite	136	e2-3
Uranophane	2772	e2-3
Uranophane-Beta (Beta-uranophane)	2773	e2-3
Uranopilite	3643	vNot determined
Uranosilite	2774	vNot determined
Uranospathite	2775	vNot determined
Uranosphaerite	2776	e2-3
Uranospinite	2777	e2-3
Uranotungstite	3644	d2
Uranpyrochlore (Hatchettolite)	3645	i4-5
Urantsevite	2778	vNot determined
Urea	2779	vNot determined
Uricite	3646	vNot determined
Ushkovite	2780	g3-4
Usovite	2781	g3-4
Ussingite	2782	m6-7
Uvanite	2783	vNot determined
Uvarovite	303	m6-7
Uvite	3647	o7-8
Uytenbogaardtite	2784	vNot determined
Uzonite	2785	c1-2
Vaesite	2786	vNot determined
Valentinite	049	e2-3
Valleriite	3648	c1-2
Vanadinite	326	g3-4
Vanalite	2787	vNot determined
Vandenbrandeite	2788	h4
Vandendriesscheite	2789	f3

Vanmeersscheite	3649	vNot determined
Vanthoffite	2790	g3-4
Vanuralite	2942	d2
Vanuranylite	3650	d2
Variscite	276	i4-5
Varlamoffite (Souxite)	2791	vNot determined
Varulite	3651	j5
Vashegyite	2792	e2-3
Vaterite	2793	f3
Vauquelinite	2943	e2-3
Vauxite	2794	g3-4
V„yrynenite	2795	j5
Veatchite	2796	e2-3
Veatchite-A	2797	vNot determined
Veenite	2798	g3-4
Velikite	3652	vNot determined
Vernadite	3653	vNot determined
Verplanckite	3654	e2-3
Versiliaite	3655	VHN20=330
Vertumnite	2799	j5
V,signi,ite	2800	g3-4
Vesuvianite (Idocrase)	351	m6-7
Veszelyite (Arakawaite, Kipushite)	3656	g3-4
Vigezzite	3658	i4-5
Viitaniemiite	3657	j5
Vikingite	2801	g3-4
Villamaninite	3659	i4-5
Villiaumite	2802	e2-3
Villyaellenite	2803	vNot determined
Vimsite	2804	h4
Vinciennite	2805	h4
Vinogradovite	2806	h4
Violarite	2807	k5-6
Virgilite	3660	VHN=681-722
Vis,ite	3661	g3-4
Vishnevite (Sulfate Cancrinite)	3662	k5-6
Vismirnovite	2808	h4
Vitusite-(Ce)	2809	i4-5
Vivianite	209	c1-2
Vladimirite	2810	g3-4
Vlasovite	2811	l6
Voglite	2812	vNot determined
Volborthite	2813	g3-4
Volkovskite	2814	vNot determined
Voltaite	2815	f3
Volynskite	2816	e2-3
Vonsenite (Paigeite)	2817	j5
Vozhminite	3663	VHN100=270-436
Vrbaite	2818	g3-4

Vuagnatite	2819	vNot determined
Vulcanite	2820	c1-2
Vuonnemite	2821	e2-3
Vuorelainenite	2822	m6-7
Vyacheslavite	2823	vNot determined
Vysotskite	2824	vNot determined
Vyuntspakhkite-(Y)	2825	m6-7
Wadeite	2826	k5-6
Wadsleyite	2827	vNot determined
Wagnerite	085	k5-6
Wairakite	2828	k5-6
Wairauite	2829	vNot determined
Wakabayashilite	2830	c1-2
Wakefieldite-(Ce) (Kusuite)	3664	i4-5
Wakefieldite-(Y)	2831	j5
Walentaite	3665	f3
Wallisite	2832	vNot determined
Wallkilldellite	2833	f3
Walpurgite	2834	g3-4
Walstromite	2835	g3-4
Wardite	282	j5
Wardsmithite	3666	e2-3
Warikahnite	2836	vNot determined
Warwickite	447	g3-4
Wavellite	068	g3-4
Waylandite	3667	i4-5
Weberite	2837	g3-4
Weddellite	2838	h4
Weeksite (Gastunite)	2839	vNot determined
Wegscheiderite	2840	e2-3
Weibullite	2841	e2-3
Weilerite	3668	vNot determined
Weilite	2842	vNot determined
Weissbergite	2843	c1-2
Weissite	2844	f3
Welinite	2845	h4
Wellsite	2846	i4-5
Weloganite	2847	g3-4
Welshite	2848	m6-7
Wendwilsonite	2849	g3-4
Wenkite	2850	l6
Wermlandite	2851	c1-2
Westerveldite	2852	vNot determined
Wheatleyite	2853	c1-2
Wherryite	3669	vNot determined
Whewellite	050	e2-3
Whiteite-(CaFeMg)	3670	h4

Whitlockite	2854	k5-6
Whitmoreite	2855	f3
Wickenburgite	2856	j5
Wickmanite	2857	vNot determined
Wicksite	2858	i4-5
Widenmannite	2859	vNot determined
Widgiemoolthalite	2944	vNot determined
Wightmanite	2860	k5-6
Wilcoxite	2861	d2
Wilhelmvierlingite	3671	h4
Wilkmanite	2862	e2-3
Willemite	283	k5-6
Willemseite	2863	d2
Willhendersonite	2864	h4
Willyamite	2865	k5-6
Winchite	2866	vNot determined
Winstanleyite	2867	h4
Wiserite	2868	e2-3
Witherite	056	g3-4
Wittichenite (Klaprothite)	2869	e2-3
Wittite	2870	e2-3
Wodginite	3672	k5-6
W”hlerite (Woehlerite)	3673	k5-6
Wolfeite	3674	i4-5
Wolframite	454	i4-5
Wolframoixiolite	3675	VHN50=412
Wollastonite-1A	080	i4-5
W”lsendorfite (Woelsendorfite)	2871	vNot determined
Wonesite	3676	e2-3
Woodhouseite	3677	i4-5
Woodruffite	2872	i4-5
Wroewolfeite	2873	e2-3
Wulfenite	172	e2-3
Wurtzite	316	g3-4
W□stite (Wuestite)	3679	vNot determined
Wyartite	3678	g3-4
Xanthiosite	2874	h4
Xanthoconite	2875	e2-3
Xanthoxenite	2876	e2-3
Xenotime-(Y)	2877	i4-5
Xiangjiangite	3680	c1-2
Xifengite	2878	j5
Xilingolite	2879	vNot determined
Xingzhongite	3681	VHN50=753
Xitieshanite	2880	f3
Xocomecatlite	2881	h4
Xonotlite (Jurupaite)	2882	l6

Yafsoanite	2883	k5-6
Yagiite	2884	vNot determined
Yaroslavite	2885	h4
Yarrowite	2886	e2-3
Yavapaiite	2887	e2-3
Ye'elimite	3683	vNot determined
Yeatmanite	2888	h4
Yecoraite	3682	f3
Yedlinite	2889	e2-3
Yftisite-(Y)	3684	g3-4
Yimengite	3685	h4
Yixunite (= Indian platinum ?)	3706	VHN10=159.4
Yoderite	2891	l6
Yofortierite	2892	e2-3
Yoshimuraite	3686	i4-5
Yttrobetafite-(Y)	3687	vNot determined
Yttrocrasite-(Y)	3688	k5-6
Yttropyrochlore-(Y)	3689	vNot determined
Yttrotantalite-(Y)	2893	k5-6
Yttrotungstite-(Y)	2894	vNot determined
Yugawaralite	2895	i4-5
Yukonite	3690	vNot determined
Yuksporite	3691	vNot determined
Yushkinite	3692	a0-1
Zaherite	2896	g3-4
Zairite	3693	i4-5
Zakharovite	2897	d2
Zapatalite	2898	c1-2
Zaratite	268	g3-4
Zavaritskite	2899	vNot determined
Zektzerite	2900	l6
Zellerite	2901	d2
Zemannite	3694	c1-2
Zeophyllite	2902	f3
Zeunerite	2903	e2-3
Zhemchuzhnikovite	2904	d2
Zhonghuacerite-(Ce)	2905	i4-5
Ziesite	2906	vNot determined
Zinalsite (= Fraipontite ?)	3695	e2-3
Zinc	2907	d2
Zinc-melanterite	2908	e2-3
Zincite	197	h4
Zincobotryogen	3696	e2-3
Zincocopiapite	2909	d2
Zincsilite	2910	c1-2

Zinkenite (Zinckenite)	2911	g3-4
Zinnwaldite	311	g3-4
Zippeite	133	vNot determined
Zircon	521	o7-8
Zircophyllite	3697	i4-5
Zircosulfate	2912	e2-3
Zirkelite	2913	k5-6
Zirsinalite	2914	k5-6
Zoisite	293	m6-7
Zorite	2915	g3-4
Zoubekite	2916	g3-4
Zunyite	2917	n7
Zussmanite	3698	vNot determined
Zvyagintsevite	2918	i4-5
Zwieselite	3699	k5-6
Zykaite	3700	c1-2

COLOUR,C,30	STREAK,C,20	TRANSPAREN,C,30	CLEAVAGE,C,30
Pink to purple		Translucent	Not determined
Yellow	Yellow-yellowish	Transparent	Perfect
Colourless	White-whitish	Transparent	None
Black		Opaque	Not determined
Colourless			Not determined
Grey		Opaque	Not determined
Light green to blackish green		Transparent-opaque	Good
Yellow to yellowish green			Good
Yellow to yellowish green		Transparent	None
Colourless			None
White	White-whitish	Transparent-translucent	Perfect
Green	Yellow-yellowish	Translucent-opaque	Good
Black		Opaque	Perfect in two directions
Green			Not determined
Black	Brown-brownish		
Black	Brown-brownish		
Black	Brown-brownish		
Blue		Transparent	Perfect
Colourless to white		Transparent-translucent	Perfect
Yellow			
Bluish green			
Variety of colours	White-whitish	Transparent-opaque	Good
White			Excellent in two directions
Orange			Good
Grey		Opaque	None
Brown		Transparent	Fair
Grey	Grey-black	Opaque	Indistinct
Bluish green			Perfect
			Not determined
Yellow to orange			Excellent in two directions
White		Translucent	None
Green		Transparent-translucent	Distinct in one direction
Brown		Translucent	Excellent in two directions
Grey			Not determined
Black		Opaque	None
Black	Green-greenish	Opaque	Perfect
Colourless to white		Transparent-translucent	Perfect
Colourless to white	White-whitish	Transparent-Sub-translucent	Perfect
Colourless			Not determined
Colourless			Not determined
Colourless			Perfect
Colourless			Not determined
Silver		Opaque	None
Reddish brown		Translucent	Distinct in one direction
Brown	Green-greenish	Translucent-opaque	None
Grey to silver		Opaque	Not determined
Brown		Transparent-translucent	None

Grey	Black	Opaque	Perfect
Colourless	Colourless	Transparent-translucent	None
Yellow to yellowish brown	Yellow-yellowish	Translucent-opaque	Good
Reddish brown	White-whitish	Transparent-translucent	None
Colourless to white	White-whitish	Transparent-translucent	Imperfect
White	Black	Opaque	Perfect
Grey			Perfect
Yellow			Not determined
Grey		Opaque	Not determined
White			Perfect
White			Not determined
Colourless		Transparent	None
White	White-whitish	Transparent-opaque	Distinct in one direction
Variety of colours	White-whitish	Transparent	Perfect
Bluish green	White-whitish		Perfect
Green			Not determined
Red	Yellow-yellowish	Transparent	Perfect
Yellow		Transparent	Good
Variety of colours	White-whitish	Transparent-translucent	Perfect
Yellow	White-whitish	Transparent-translucent	Not determined
White		Transparent-translucent	Perfect
Colourless			Good
Green		Translucent	Perfect
White	White-whitish	Transparent-opaque	Good
Colourless	White-whitish	Transparent	None
Colourless		Transparent	Imperfect
White			None
Yellow			Not determined
White		Translucent	Not determined
Colourless to white	White-whitish	Transparent-translucent	Not determined
Black		Opaque	Perfect
Green	White-whitish	Transparent	Perfect
Variety of colours	White-whitish	Transparent-opaque	Perfect
Variety of colours		Transparent-Sub-translucent	None
Variety of colours	Colourless	Transparent-opaque	Distinct in one direction
Yellow to yellowish green		Transparent-translucent	Not determined
Colourless	White-whitish	Transparent-translucent	Perfect
Grey	Black	Opaque	None
Light green to blackish green	White-whitish	Transparent-opaque	None
Green			Perfect
Greenish blue			Not determined
Grey	Grey-black	Opaque	Not determined
Brown	Brown-brownish		Not determined
Variety of colours	Colourless	Transparent-opaque	Good
Variety of colours	White-whitish	Transparent-translucent	Perfect in two directions
Grey	Black	Opaque	None
White	White-whitish	Translucent-Sub-translucent	Perfect
Green	Green-greenish	Transparent-translucent	Perfect

Brown			Perfect
Colourless to white	White-whitish	Transparent-translucent	Perfect
Colourless to white	White-whitish	Transparent-translucent	Perfect
Colourless			Perfect
White			Perfect
Violet			Good
Light green to blackish green	Colourless	Transparent-opaque	Perfect
Variety of colours	White-whitish	Translucent-opaque	Perfect
Black	Black	Opaque	None
White	Grey	Opaque	Perfect
Dark green	Green-greenish	Translucent	Perfect
Blue			Not determined
Light green to blackish green	White-whitish	Transparent-opaque	Indistinct
Colourless to white		Transparent-opaque	Fair
Variety of colours	White-whitish	Translucent	Not determined
Pink	White-whitish		Not determined
Black			Perfect
Light green to blackish green	White-whitish	Transparent-translucent	Indistinct
Variety of colours	White-whitish	Transparent-translucent	Distinct in one direction
Black		Opaque	Perfect
Colourless		Transparent	Good
White	White-whitish		None
Colourless			Perfect
			Not determined
Yellow			Not determined
Yellow to yellowish brown			Perfect
Dark green	Grey	Opaque	Perfect
Dark grey	Grey	Opaque	Poor
Yellow			Not determined
			Not determined
Grey			None
			Not determined
Grey	Grey-black	Opaque	Not determined
Blue			
Colourless			Perfect in two directions
Grey		Opaque	Not determined
Black	Brown-brownish	Transparent	Fair
Greyish green		Translucent	Perfect
Brown			Perfect
Dark green		Translucent	Distinct in one direction
Yellow to yellowish brown	Brown-brownish		Perfect
Yellow		Transparent	None
White	Black	Opaque	Perfect
Yellow to yellowish brown	Yellow-yellowish	Opaque	Good
Yellow to yellowish brown			Not determined
Red			Perfect
Blue			
Green			Not determined
Bronze to brassy		Opaque	None

Dark grey	Black	Transparent	Perfect
White	White-whitish	Transparent	Distinct in one direction
			Not determined
Silver	Black	Opaque	Distinct in one direction
Bronze to brassy		Opaque	Not determined
Black	Black	Opaque	Imperfect
Green			Not determined
White		Transparent-translucent	Perfect
Orange			Perfect
Green			
White		Transparent	Perfect
Yellow		Transparent	Not determined
Green	White-whitish	Translucent	Good
Black	Black		
Grey		Opaque	Perfect
Brown	Brown-brownish		None
			Perfect
Yellow to yellowish brown			
Bronze to brassy	Yellow-yellowish	Translucent	Perfect
Green	Green-greenish	Transparent-translucent	Perfect
Yellow		Transparent-translucent	Indistinct
			Not determined
			Not determined
			Not determined
Red			
Blue			Perfect
Variety of colours	White-whitish	Transparent-translucent	Perfect
Brown	Green-greenish	Translucent-opaque	Good
Greenish blue	Blue-bluish	Transparent	Perfect
			Not determined
White			Not determined
Grey		Opaque	Not determined
Variety of colours		Transparent-translucent	Good
Yellow	Yellow-yellowish	Transparent-translucent	Perfect
Black	Grey-black	Opaque	None
Colourless			Not determined
Silver		Opaque	None
Lilac	White-whitish	Transparent	Good
Black		Transparent	Good
Blue	Blue-bluish	Transparent-opaque	Imperfect
White			None
Dark green			Perfect
Variety of colours	White-whitish	Opaque	Very good
Red			Fair
Colourless			None
Colourless			Perfect
Colourless		Transparent	Not determined
Brown			
Yellow			Not determined

Grey		Opaque	None
Green	Green-greenish		None
Grey		Opaque	Not determined
White		Translucent	Distinct in one direction
Blue	Blue-bluish	Translucent	Perfect
Black			Perfect
Brown		Translucent	Perfect
Brown			Good in two directions
White			Perfect
White			Perfect
Violet	White-whitish	Translucent-Transparent	Perfect
Dark green			Not determined
Colourless			Perfect
Black		Opaque	Perfect
Colourless			Perfect
Yellow to yellowish brown			Good
Pink			Not determined
Yellow to yellowish brown			Poor
Variety of colours	White-whitish	Transparent-translucent	Very good
Reddish brown			Not determined
Red			Not determined
White			Not determined
White			Not determined
Colourless			Distinct in one direction
Colourless			Distinct in one direction
Brown	Black		Distinct in one direction
Blue		Transparent-translucent	Perfect
White			Distinct in one direction
White	White-whitish	Transparent-translucent	Perfect
Brown			Perfect
White			Not determined
Colourless			Not determined
Green		Transparent	Perfect
Reddish brown		Transparent-translucent	Distinct in one direction
Reddish brown			Not determined
Brown	Pink		Good
Grey	Brown-brownish	Opaque	Perfect
Black			
White	White-whitish		Perfect
Black	Black		
Colourless			Not determined
Green		Sub-translucent	Not determined
Yellow		Transparent	Not determined
Colourless			Not determined
Colourless			Not determined
Blue		Transparent	Not determined
White			Not determined

Yellow			
Yellow	Yellow-yellowish	Transparent	Perfect
Pink	White-whitish		Distinct in one direction
Colourless			None
White			Perfect
			Not determined
Green	Green-greenish	Transparent-translucent	Not determined
Yellow			Imperfect
Brown		Translucent	Perfect
Grey	Brown-brownish		Not determined
Variety of colours	Colourless	Transparent-translucent	Indistinct
White		Translucent	Good
Violet	Pink		Perfect
Reddish brown	Yellow-yellowish	Translucent	Good
Colourless			Perfect
Black			Not determined
Yellow			
Colourless to white		Translucent	None
Colourless		Transparent-translucent	None
Red			Perfect
Dark green		Opaque	None
Grey	Yellow-yellowish	Transparent-translucent	Not determined
Grey		Opaque	Not determined
Green			
Grey	Grey	Opaque	Indistinct
Pink			Good
Colourless		Transparent	Perfect
Variety of colours	White-whitish	Transparent-translucent	Indistinct
White		Transparent	Not determined
Variety of colours		Transparent-translucent	Perfect
Grey		Opaque	None
Yellow to orange		Transparent-translucent	
			Not determined
Black	Yellow-yellowish	Translucent-opaque	None
			Not determined
Yellow			Very good
Variety of colours	Green-greenish	Transparent-translucent	Not determined
Reddish brown	Pink	Translucent	Good
White to yellowish			None
Variety of colours		Transparent	Not determined
Colourless			Not determined
Colourless	White-whitish		None
Red		Translucent	Perfect
Yellow			
Colourless	White-whitish	Transparent	Perfect
Yellow to yellowish brown	Yellow-yellowish	Transparent-translucent	Perfect

Dark grey		Opaque	Not determined
Brown to brownish green		Translucent-opaque	Not determined
Black	Colourless	Transparent-opaque	Perfect
Colourless		Transparent-translucent	None
			Good
Black		Opaque	Not determined
Colourless		Transparent-translucent	None
Yellow	Yellow-yellowish	Translucent	Not determined
Yellow to yellowish brown		Transparent-translucent	Perfect
Silver	Silver-white	Opaque	Good in two directions
Grey	Grey	Opaque	Perfect
Yellow to yellowish brown		Transparent-translucent	Distinct in one direction
Yellow			
Variety of colours			
Yellow			None
Brown	Brown-brownish		Perfect
White to yellowish		Transparent	Perfect
Black	Black	Opaque	Not determined
Green	White-whitish		Perfect
Brown			Not determined
Yellow	Yellow-yellowish		Distinct in one direction
Colourless		Transparent	None
Green	Brown-brownish		Perfect
Colourless to white		Transparent	Perfect
Brown			Perfect
Bronze to brassy			
Red			Not determined
Grey		Opaque	Not determined
Orange			Perfect
Blue	Blue-bluish	Translucent	Perfect
Yellow to yellowish green			None
Yellow			Perfect
Reddish brown			Not determined
Blue			Not determined
Grey			Perfect
Colourless			Perfect
Blue		Transparent-translucent	Imperfect
Variety of colours	White-whitish	Transparent-translucent	None
Colourless	White-whitish	Transparent-opaque	Perfect
Greenish blue			Perfect
Red			
Grey			
Yellow		Translucent-Transparent	Perfect
Red			Not determined
Bronze to brassy	Grey-black	Opaque	Not determined
Grey		Opaque	Not determined
Red			Not determined
Green			Perfect
Orange	Yellow-yellowish	Transparent-translucent	Perfect

Grey	Brown-brownish	Opaque	Good
Grey	Grey-black	Opaque	Imperfect
Colourless		Transparent	Perfect
White			Not determined
Brown			Not determined
Brown	Brown-brownish		Not determined
Black	Yellow-yellowish	Translucent-opaque	Not determined
Grey			Not determined
Grey		Opaque	Not determined
Colourless to white			Not determined
White			
Colourless to white		Transparent-translucent	Perfect
	Brown-brownish	Translucent-opaque	None
Colourless		Transparent	None
White			Very good
Black	Grey-black	Opaque	Perfect
Grey		Opaque	Not determined
Colourless		Transparent	Good
Colourless			Distinct in one direction
Red	Brown-brownish	Opaque	None
Colourless	White-whitish		None
White		Transparent	Perfect
Grey		Opaque	Not determined
Colourless		Transparent	Not determined
Grey		Opaque	Not determined
Yellow to yellowish green			
Variety of colours			
Black			
Green	Green-greenish	Transparent-translucent	Perfect
Reddish brown		Translucent	
Greyish green		Transparent-translucent	None
White		Transparent	Distinct in one direction
Brown	White-whitish	Transparent-opaque	Indistinct
Reddish brown			Not determined
Variety of colours	White-whitish	Transparent	Perfect
Yellow		Transparent-translucent	Not determined
Pink	White-whitish	Translucent-Transparent	Perfect
Grey		Opaque	Not determined
Colourless to white		Transparent-translucent	Perfect
White			Not determined
Colourless	Grey	Transparent	Good
Brown			Distinct in one direction
			Not determined
Brown		Opaque	Good
Yellow to yellowish green	Yellow-yellowish		
Colourless			None
Colourless			Distinct in one direction
Yellow to yellowish green	Black	Transparent	Not determined

Blue	Blue-bluish		Perfect
Colourless			Imperfect
Violet			Perfect
White		Transparent	Not determined
Grey		Opaque	Not determined
Colourless			Not determined
Red		Transparent-translucent	Perfect
Orange	Yellow-yellowish	Transparent	Perfect
Blue		Translucent	
Grey	Grey		None
Colourless	White-whitish	Transparent-translucent	Perfect
White			Not determined
Yellow	Yellow-yellowish	Translucent	Not determined
White			Not determined
Black	Black		Perfect
Yellow		Transparent	None
Brown	Yellow-yellowish		
Yellow			Good in two directions
Colourless to white		Transparent	Perfect
Yellow	Green-greenish	Opaque	None
White			None
Yellow			Not determined
Yellow to yellowish green		Translucent	Perfect
Colourless		Transparent	None
Yellow to yellowish green		Sub-translucent	Perfect
Variety of colours	White-whitish	Transparent-translucent	Perfect
Yellow		Opaque	Not determined
White			None
White			Not determined
Yellow			
Yellow			
Bluish green	Green-greenish	Transparent-translucent	Perfect
Yellow			Perfect
Blue	White-whitish	Transparent	Perfect
Light green to blackish green	White-whitish	Transparent-translucent	Good
Blue			Good
Brown		Transparent	Not determined
Blue		Transparent	Perfect
Colourless	White-whitish	Transparent	Perfect
Yellow	Colourless	Transparent-translucent	Perfect
White			Not determined
Variety of colours	Colourless	Transparent-translucent	Perfect
Grey	Grey-black	Opaque	Not determined
Grey			Not determined
Brown			None
Colourless		Transparent	Not determined
Green			Not determined

Colourless			Perfect
Colourless		Transparent	Poor
Green			Not determined
Blue			
Colourless	White-whitish	Transparent-opaque	Indistinct
Colourless to white			Indistinct
Pink		Transparent-translucent	Perfect
Yellow	Yellow-yellowish		Fair
Colourless	White-whitish		Not determined
Grey			Perfect
Brown	White-whitish		
			Not determined
Red	Red-reddish	Translucent	Distinct in one direction
Colourless	White-whitish	Transparent-translucent	None
Yellow	Yellow-yellowish	Translucent	Perfect
Colourless			Not determined
Yellow	White-whitish	Translucent	Perfect
Yellow to yellowish green			
Grey		Opaque	Imperfect
Yellow to yellowish brown		Sub-translucent	Good
Brown			Not determined
Pink			Good
Green			Not determined
Variety of colours	White-whitish	Transparent-opaque	Imperfect
Grey		Opaque	Not determined
Yellow to yellowish brown		Transparent-opaque	Perfect
Pink		Opaque	Perfect
Blue		Transparent	Good
White	White-whitish		
Yellow to orange	Yellow-yellowish		Imperfect
Colourless		Transparent	Not determined
Black	Black		None
Green			Perfect
Variety of colours		Transparent-translucent	Perfect
Colourless		Transparent	Perfect
Yellow to yellowish green		Translucent	Not determined
Brown	Brown-brownish		
Brown			
Grey	Black		Not determined
Orange			Perfect
Blue			Not determined
Variety of colours	Colourless	Transparent-Sub-translucent	Distinct in one direction
Yellow			Distinct in one direction
Colourless			Not determined
Green			Good
			Perfect
Colourless	Colourless	Transparent-translucent	Distinct in one direction
Black		Opaque	

Blue	Colourless	Transparent-translucent	Imperfect
Blue		Transparent-translucent	Perfect
Grey	Grey-black	Opaque	Indistinct
Variety of colours		Transparent-translucent	Not determined
Blue		Transparent	None
Greenish blue			Not determined
Black	Brown-brownish	Opaque	Perfect
Greenish blue	Green-greenish	Transparent-translucent	Perfect
Yellow	Green-black	Opaque	Distinct in one direction
Green		Transparent-translucent	Perfect
Grey		Opaque	Perfect
Grey	Black		Very good
Violet			None
		Opaque	
Green	Grey	Opaque	Good
Variety of colours	White-whitish		Perfect
Colourless to white			Not determined
			Not determined
Yellow to yellowish green	Yellow-yellowish		Not determined
Colourless	White-whitish	Transparent	Perfect
Violet			Not determined
Pink			Not determined
Colourless		Transparent	Perfect
Green	Yellow-yellowish	Sub-translucent	Not determined
Blue		Transparent-translucent	Good
Dark green		Transparent	Distinct in one direction
Black		Opaque	Not determined
Yellow			Perfect
Green			
Colourless	White-whitish		Not determined
White	White-whitish		Not determined
Reddish brown		Opaque	None
Orange to orange-brown	White-whitish	Translucent	Good
Brown		Transparent-translucent	Poor
Colourless to white		Transparent-translucent	Perfect
White		Transparent-translucent	Imperfect
Colourless to white			Not determined
Yellow		Transparent-translucent	Indistinct
Yellow to yellowish green	White-whitish	Transparent-translucent	None
Grey		Translucent	Perfect
Colourless			Good
Yellow		Transparent	None
Green		Translucent	Clear
Blue			Good
Green	Green-greenish	Translucent	Perfect
Green			None

Variety of colours	White-whitish	Transparent-translucent	Indistinct
Red	Orange		Perfect
Yellow			None
Dark green			Not determined
Black	Brown-brownish	Opaque	None
			Not determined
Variety of colours	White-whitish	Transparent-translucent	Distinct in one direction
Bluish green	Green-greenish	Translucent-opaque	
Green			
Pink			Good in two directions
White			
Colourless to white		Transparent-translucent	Indistinct
Colourless to white		Transparent	Perfect
Yellow to yellowish brown			Not determined
Red	Red-reddish	Transparent-translucent	Perfect
Variety of colours	White-whitish	Transparent-opaque	Good
Yellow			Perfect
Blue			Perfect
Blue		Transparent	
Grey	Grey-black	Opaque	Good
Yellow			Not determined
Black			
Orange			Not determined
Green		Transparent	Perfect
Light green to blackish green	White-whitish	Translucent	Perfect
Dark green			Not determined
Green	Green-greenish	Transparent-translucent	Perfect
Colourless		Transparent-translucent	Distinct in one direction
Colourless		Transparent	Distinct in one direction
Colourless		Transparent	Perfect
Yellow to yellowish brown		Transparent-translucent	Indistinct
Colourless			
Violet			Not determined
Colourless to white		Transparent-translucent	Perfect
Grey to silver		Opaque	
Green			
Variety of colours	Colourless	Transparent-translucent	Perfect
Variety of colours	Colourless	Transparent-translucent	Perfect
Reddish brown			Not determined
Bronze to brassy		Opaque	Distinct in one direction
Orange			
Silver	Grey-black	Opaque	Perfect
Pink to purple			Perfect
Red		Transparent	Not determined
Black	Grey		Not determined

Yellow			
Blue			None
Colourless		Transparent	None
Black			
Grey to silver		Opaque	Good
Colourless	White-whitish	Transparent-translucent	Perfect
Colourless		Transparent-translucent	Perfect
Black		Opaque	None
White			None
Black	Black	Translucent	Distinct in one direction
Bronze to brassy	Black	Opaque	None
Red	Orange	Transparent-translucent	Fair
Colourless			None
Blue			
Yellow			Perfect
Red		Transparent	Not determined
Green		Sub-translucent	None
Blue	Blue-bluish	Translucent	Not determined
Variety of colours		Transparent-translucent	Perfect
Grey		Opaque	Not determined
Yellow		Transparent-translucent	Perfect
Red	Red-reddish	Opaque	None
Yellow		Transparent	Imperfect
Orange			Not determined
Variety of colours	White-whitish	Transparent-translucent	Distinct in one direction
Yellow		Transparent	Distinct in one direction
Yellow to yellowish green			Perfect
Blue		Transparent-translucent	None
Green			Not determined
Green	Green-greenish	Sub-translucent	Not determined
Black	Brown-brownish	Opaque	Not determined
Variety of colours	White-whitish	Transparent-translucent	None
Grey	Black	Opaque	None
Grey		Opaque	Not determined
Colourless to white		Transparent-translucent	Perfect
Grey	Black	Opaque	
Blue	Grey-black	Opaque	Perfect
Colourless to white			Perfect
Black			Perfect
Yellow		Transparent-Sub-translucent	Perfect
Green			Not determined
Black	Black	Opaque	Perfect
Colourless to white		Transparent	Perfect
Black			
White		Translucent-opaque	None
Light green to blackish green	Blue-bluish	Translucent-opaque	Perfect
Orange	Yellow-yellowish	Transparent-translucent	Distinct in one direction
Dark green	Green-greenish	Translucent-opaque	Perfect
Grey		Opaque	Good

Blue		Translucent	Perfect
Variety of colours	White-whitish	Transparent-translucent	None
Colourless to white		Transparent	Distinct in one direction
Colourless to white		Transparent	Perfect
Grey	Brown-brownish	Opaque	Not determined
Bluish green	Blue-bluish		
Bronze to brassy		Opaque	None
Blue	Blue-bluish	Translucent	Good
Green		Translucent-opaque	Good
Yellow		Opaque	Not determined
Red	Red-reddish	Translucent-Transparent	Not determined
Black	Black	Opaque	Not determined
Yellow to yellowish green		Transparent-translucent	Perfect
Black			None
			Not determined
Black			None
Blue			Perfect
Green	Green-greenish	Transparent-translucent	Distinct in one direction
Black	Black	Opaque	None
Grey		Opaque	Clear
Brown to brownish green	Green-greenish		
Yellow to yellowish green	White-whitish		Good
Yellow			Not determined
Orange	Orange	Transparent-translucent	Good
Light green to blackish green		Transparent-translucent	Distinct in one direction
Yellow to yellowish brown			
Greenish blue		Transparent	Perfect
Greenish blue			Perfect
Blue	Blue-bluish	Translucent	Good
Black	Black	Opaque	Good
Colourless		Transparent-translucent	Perfect
Brown to brownish green	Yellow-yellowish		Not determined
Colourless		Transparent	Perfect
Grey		Opaque	
Colourless		Transparent	Good
Variety of colours		Transparent-translucent	Poor
Silver		Opaque	None
Variety of colours	Colourless	Transparent-translucent	Indistinct
Dark green		Translucent-opaque	Good
Grey			Very good
Yellow	White-whitish		Perfect
Colourless to white			
Colourless		Transparent-translucent	Excellent in two directions
Variety of colours	Colourless	Transparent-translucent	None
Yellow			Perfect
Black		Opaque	Distinct in one direction
Colourless			None

Black		Opaque	
White			Good
Colourless to white		Transparent	Perfect
Colourless to white		Transparent	Perfect
Black		Opaque	Good
Colourless			Perfect
Black	Black	Opaque	Imperfect
Colourless			Distinct in one direction
Yellow to yellowish green		Translucent	Not determined
Yellow to yellowish brown	Yellow-yellowish		Not determined
Green	White-whitish	Transparent-opaque	None
Green			None
Grey			Not determined
Colourless			Perfect
Black		Opaque	None
Green		Translucent	Very good
Black		Opaque	Not determined
Orange	Orange		Perfect
Variety of colours	Brown-brownish	Transparent-opaque	None
Yellow			Not determined
Light green to blackish green	White-whitish	Transparent	Perfect
Yellow	Yellow-yellowish	Translucent	Perfect
Blue	Blue-bluish	Transparent-translucent	Perfect
Yellow to yellowish brown		Translucent-opaque	
Variety of colours	White-whitish	Transparent-opaque	Perfect
Grey		Opaque	None
Variety of colours	White-whitish	Transparent-Sub-translucent	Perfect
Yellow to yellowish green		Transparent-translucent	Perfect
Colourless to white		Transparent-translucent	Perfect
Yellow		Transparent	Imperfect
Blue		Opaque	Not determined
Orange		Transparent	None
Variety of colours	White-whitish	Transparent-opaque	Good
Green	Blue-bluish	Transparent-translucent	Perfect
Colourless		Transparent	Not determined
Bronze to brassy		Translucent	Perfect
Brown			Not determined
Dark grey		Opaque	Not determined
Brown	Yellow-yellowish	Translucent-opaque	Perfect
Colourless to white	White-whitish	Transparent-Sub-translucent	Perfect
Brown	Black	Opaque	Not determined
Silver	Brown-brownish	Opaque	Not determined
Black	Black	Opaque	None
Variety of colours	White-whitish		Indistinct
Yellow to orange			Perfect
White			
Green			
Colourless		Transparent	Not determined

White	White-whitish	Transparent	Perfect
Light green to blackish green	Colourless	Transparent-opaque	Indistinct
White	White-whitish	Transparent	Not determined
Yellow to orange	Yellow-yellowish		Not determined
Colourless		Transparent	Not determined
Black	Black	Opaque	Perfect
Dark green		Translucent	Perfect
Grey	Brown-brownish	Opaque	Perfect
Green		Translucent	Not determined
Colourless			Poor
Green	Green-greenish		Not determined
Yellow	Yellow-yellowish	Translucent	Not determined
Blue	White-whitish	Transparent-translucent	Good
White		Transparent	Perfect
Yellow to orange	Yellow-yellowish	Translucent	Distinct in one direction
		Opaque	
Yellow to yellowish green			Not determined
Brown			Distinct in one direction
White			Not determined
White			
Silver			Distinct in one direction
Yellow to yellowish brown			Not determined
Colourless to white		Transparent	None
White			Not determined
Yellow			Not determined
Yellow		Translucent	Perfect
Bluish green		Translucent	Perfect
Grey		Opaque	Not determined
White			Perfect
White		Transparent-translucent	Perfect
Brown	Brown-brownish		Perfect
Yellow to yellowish brown	Yellow-yellowish	Translucent	Not determined
Colourless to white	White-whitish	Transparent	Not determined
Colourless	White-whitish	Transparent	None
Colourless to white	White-whitish	Transparent	Distinct in one direction
Yellow to orange	White-whitish		Distinct in one direction
White			
Variety of colours	Colourless	Transparent-translucent	Indistinct
Dark grey	Brown-brownish	Opaque	Very good
Colourless		Transparent	None
Variety of colours		Transparent	Perfect
Violet	White-whitish	Transparent	Good
Orange	Yellow-yellowish	Transparent-translucent	None
Yellow to yellowish green		Transparent-translucent	Perfect
Grey		Opaque	Perfect
	Grey-black		None
Dark grey	Grey-black	Opaque	Perfect
Colourless to white		Transparent-translucent	None

Colourless to white		Transparent-translucent	Perfect
Variety of colours		Transparent-translucent	Poor
Pink		Translucent	Perfect
Colourless to white		Transparent-translucent	Perfect
Green	Colourless	Transparent-opaque	Perfect
Colourless to white		Transparent-translucent	Perfect
White		Translucent	Perfect
Colourless to white	White-whitish	Transparent	Perfect
Red			Good
Variety of colours			
Black	Brown-brownish		Perfect
Greenish blue		Transparent	Perfect
White			
Black	Brown-brownish	Opaque	Perfect
Grey		Opaque	Not determined
Yellow to yellowish brown			Good
Colourless	White-whitish	Transparent	None
Pink to purple	Red-reddish	Transparent-translucent	Perfect
Yellow to yellowish brown			Perfect
Bronze to brassy		Opaque	Perfect
		Opaque	
Black	Green-greenish	Opaque	None
White		Transparent-translucent	Distinct in one direction
Reddish brown	White-whitish		Perfect
Colourless		Transparent	Perfect
Silver	White-whitish	Opaque	None
Green			
Green	Green-greenish	Transparent-translucent	Indistinct
Colourless		Transparent-translucent	Perfect
Colourless to white		Transparent	Indistinct
Variety of colours	Colourless	Translucent	Indistinct
White	White-whitish	Transparent-translucent	Perfect
Colourless		Transparent	
Colourless		Transparent-translucent	Indistinct
Black	Grey	Opaque	None
Colourless	White-whitish	Transparent-translucent	Poor
Green	White-whitish		Fair
Colourless			Good
Bluish green			None
White			None
Colourless		Transparent	Very good
Red	Orange		Good
Colourless			Not determined
White			Perfect
Colourless		Transparent	Not determined
Colourless			Good
White	White-whitish	Transparent	Perfect
Green			

Brown	Black	Opaque	Good
White			Fair
Colourless to white		Transparent	Distinct in one direction
Green	White-whitish	Opaque	Not determined
Green	Colourless	Transparent-translucent	Imperfect
Red			Very good
Brown			Perfect
Red			Good
Black	Black	Opaque	Perfect
Grey		Opaque	None
Black	Grey	Opaque	Good
Reddish brown	Brown-brownish		None
Reddish brown	Brown-brownish		
Yellow			
Pink	White-whitish	Translucent	
Colourless		Transparent	Perfect
Brown			Perfect
Yellow			
Black	Brown-brownish		
Colourless to white		Transparent-translucent	Perfect
Yellow to yellowish brown			
Brown to brownish green	Yellow-yellowish	Translucent	Good
Yellow	Yellow-yellowish	Opaque	
Variety of colours		Transparent	Perfect
Yellow to yellowish brown		Opaque	Good
Yellow		Translucent	Not determined
Green			Good
Dark green			
Greyish green	Grey	Transparent-opaque	Perfect
Variety of colours			Good
Green			Perfect
Dark green			Perfect
Black	Black		Distinct in one direction
Brown to brownish green		Transparent-opaque	Perfect
Variety of colours	Blue-bluish		Perfect
Colourless		Transparent	Not determined
Green	Grey	Translucent	Perfect
Grey to silver		Opaque	
Variety of colours		Translucent-opaque	Perfect
Reddish brown		Transparent-translucent	Perfect
Grey	Black	Opaque	Perfect
Brown	Brown-brownish		Good
Black	Brown-brownish	Opaque	Distinct in one direction
Green		Translucent-opaque	Perfect
Colourless			None

Green			Perfect
Colourless			Not determined
White		Opaque	None
Brown	White-whitish	Translucent	
Brown	Brown-brownish		None
Variety of colours			Perfect
Colourless to white		Transparent	Good
Yellow to yellowish brown	White-whitish	Transparent-translucent	Perfect
Black	Brown-brownish		Not determined
Grey		Translucent-opaque	Distinct in one direction
			Not determined
Grey	Grey	Opaque	Not determined
Colourless		Transparent	Imperfect
White			None
Grey			
Brown		Transparent	None
Pink		Transparent-translucent	Good
Yellow		Transparent	Good
Pink			Perfect
Colourless to white		Transparent	Indistinct
Colourless to white		Transparent-translucent	Indistinct
Yellow to yellowish brown	White-whitish	Transparent-translucent	Distinct in one direction
Yellow to yellowish green			Imperfect
Variety of colours	White-whitish	Transparent-opaque	Indistinct
Colourless to white			Perfect
			Clear
Variety of colours	White-whitish	Transparent-translucent	Perfect
Colourless to white			Perfect
Black		Opaque	Not determined
Green	Yellow-yellowish		None
Green	Colourless	Transparent-translucent	Good
White			Distinct in one direction
Reddish brown		Transparent-translucent	Perfect
White		Opaque	
Yellow			Perfect
Reddish brown			None
Black	Grey-black	Opaque	Perfect
Yellow		Opaque	
White	Colourless	Opaque	
Colourless		Transparent	Perfect
Black	Brown-brownish	Opaque	Poor
Colourless to white		Transparent	Imperfect
White			
Red	Brown-brownish	Opaque	Not determined
Reddish brown			Poor
Green			Perfect
Grey	Black	Opaque	None
Grey	Grey	Opaque	Imperfect

Yellow	White-whitish		Fair
Black	Brown-brownish	Transparent	Good in two directions
Reddish brown		Transparent-translucent	Perfect
			Not determined
Reddish brown		Translucent	Perfect
			None
Dark green		Sub-translucent	Perfect
Grey			Perfect
White			Not determined
Grey			Not determined
Grey	Grey	Opaque	None
Yellow		Translucent	Perfect
		Opaque	
Black	Brown-brownish	Transparent	None
Black	Green-greenish	Opaque	None
Black	Grey	Translucent-Transparent	None
White	White-whitish		Fair
Colourless		Transparent	
Black	Grey	Translucent-opaque	Indistinct
Colourless to white			None
Violet			Not determined
Colourless to white			Good
Black	Red-reddish	Opaque	
White			Not determined
Grey	Grey	Opaque	Perfect
Grey	Black	Opaque	Good
Orange	Orange		
Grey	Grey-black	Opaque	Not determined
Brown			Clear
Colourless to white		Transparent-translucent	Not determined
Brown		Translucent	Perfect
		Opaque	
Colourless			Not determined
Yellow	Yellow-yellowish	Translucent	Not determined
Brown	Brown-brownish		Good
Green	Green-greenish		Good
Yellow to orange	Yellow-yellowish	Translucent	Distinct in one direction
White			Not determined
Black		Opaque	
Colourless to white	White-whitish	Transparent-translucent	Not determined
White		Opaque	None
Brown	White-whitish	Transparent	Perfect
Variety of colours	Colourless	Transparent-opaque	Perfect
		Opaque	
		Opaque	
Light green to blackish green		Transparent-translucent	Distinct in one direction
Black	Brown-brownish	Opaque	Distinct in one direction
			Not determined

Variety of colours		Transparent	None
Silver	White-whitish	Opaque	Indistinct
Colourless to white			None
Blue	Blue-bluish	Sub-translucent-Opaque	
White			None
Green	Green-greenish	Transparent	Perfect
Grey		Opaque	None
White	Grey-black	Opaque	Perfect
Red	Red-reddish		Good in two directions
White	White-whitish	Translucent-opaque	Good
Red	Orange		Perfect
Grey			Not determined
Yellow			Not determined
White		Translucent-Transparent	Perfect
Black		Opaque	Not determined
Green			Not determined
Red		Translucent	Distinct in one direction
Dark green	Green-greenish		None
White		Transparent-translucent	Not determined
		Opaque	
White			Not determined
Colourless to white		Transparent-translucent	Distinct in one direction
White			Not determined
Violet			
Grey	Black	Opaque	Good
Colourless	White-whitish	Transparent-translucent	Perfect
Variety of colours		Translucent	Indistinct
Grey to silver	Black	Opaque	Perfect
Blue			
Green		Translucent-opaque	Perfect
Black	Blue-bluish	Translucent	Perfect
Green			Good
White			Not determined
Variety of colours		Transparent-translucent	Distinct in one direction
White			None
			Not determined
Colourless			Fair
Brown to brownish green	Yellow-yellowish	Opaque	Perfect
Yellow	Yellow-yellowish	Opaque	None
Bronze to brassy			None
Yellow to yellowish green			Perfect
Dark green			None
White		Translucent	Not determined
Brown	Brown-brownish	Translucent	Perfect
Colourless to white			Perfect
White			Not determined
Colourless to white	White-whitish	Transparent	Perfect
Colourless			Distinct in one direction
Bluish green			Poor

Variety of colours		Transparent	Perfect
Colourless		Transparent	Perfect
Yellow to yellowish green			
Colourless	White-whitish	Transparent	Distinct in one direction
Colourless		Transparent	Perfect
Bluish green			Good
Pink		Translucent	Distinct in one direction
Greenish blue		Translucent	Perfect
Dark green	Green-greenish		
Black	Black	Opaque	Perfect
Dark grey	Black	Opaque	None
Yellow			None
Green		Translucent-opaque	None
Yellow to orange	Yellow-yellowish	Translucent	Distinct in one direction
Pink	Black		None
Red			Not determined
Yellow	Yellow-yellowish		None
Brown		Translucent	None
Reddish brown	Brown-brownish		Not determined
Variety of colours	White-whitish	Transparent-opaque	None
Black	Brown-brownish	Opaque	Perfect
Grey		Translucent-opaque	Good
Black		Opaque	None
Grey	Grey	Opaque	Distinct in one direction
White			Not determined
Silver		Opaque	None
Colourless to white			Perfect
Black	Black		Perfect
Colourless		Transparent	Perfect
Yellow to yellowish brown	Yellow-yellowish	Translucent	Perfect
Yellow			Perfect
White	White-whitish		Not determined
Grey	Black	Opaque	None
Grey		Opaque	Indistinct
Reddish brown			
Colourless	White-whitish	Transparent	Perfect
White		Transparent-translucent	Perfect
Pink	Pink		None
Bronze to brassy			
Light green to blackish green			Good
Black		Opaque	None
Colourless to white		Transparent-translucent	Perfect
Yellow to yellowish green			Good
Brown		Opaque	Not determined
Variety of colours	White-whitish	Transparent-translucent	Perfect
Yellow	Yellow-yellowish	Transparent-translucent	Indistinct

Colourless to white		Transparent-translucent	None
Colourless to white	White-whitish	Transparent-translucent	Poor
White			Not determined
Colourless to white	White-whitish	Transparent-translucent	Perfect
Grey	Black	Opaque	Poor
Reddish brown		Translucent	Perfect
Colourless	White-whitish	Transparent-translucent	Good
Yellow		Transparent	Perfect
Bluish green			Perfect
White		Translucent	Distinct in one direction
Colourless		Transparent	None
Colourless to white	White-whitish	Transparent-translucent	Distinct in one direction
Colourless		Transparent	None
Dark green			Not determined
Dark green		Translucent-opaque	Perfect
Reddish brown			Not determined
Grey	Brown-brownish		Not determined
Bronze to brassy	Grey-black		None
Orange	Yellow-yellowish		Perfect
Reddish brown	Pink	Opaque	Perfect
Black	Brown-brownish	Opaque	Very good
Blue	White-whitish	Transparent-translucent	Distinct in one direction
Yellow			None
White		Opaque	Not determined
Bronze to brassy		Opaque	Not determined
Bronze to brassy	Brown-brownish	Opaque	None
White			Perfect
Green	White-whitish	Translucent-opaque	Good
Grey to silver		Opaque	Perfect
White		Translucent	Not determined
Colourless		Transparent	Perfect
Yellow to yellowish green		Transparent-translucent	Perfect
Variety of colours	White-whitish	Transparent-translucent	Indistinct
Yellow to yellowish green		Translucent	Perfect
Reddish brown		Translucent	None
Blue			Perfect
Blue			None
Variety of colours	White-whitish	Transparent-translucent	Distinct in one direction
Grey	Red-reddish	Opaque	None
Reddish brown		Translucent-opaque	Perfect
Reddish brown	Pink	Opaque	Very good
Orange to orange-brown	Yellow-yellowish		Not determined
Colourless to white	Colourless	Transparent-translucent	Perfect
Grey		Opaque	Not determined
Dark green	Green-greenish		Not determined
Red			Perfect
Violet	White-whitish	Transparent	Not determined

Brown			None
		Opaque	
Green	Green-greenish		None
Black	Green-greenish	Opaque	Not determined
Colourless		Transparent-translucent	Not determined
White		Transparent-translucent	Distinct in one direction
Black	Black	Opaque	Not determined
Grey	Grey	Opaque	Indistinct
Black	Brown-brownish	Opaque	Distinct in one direction
Black	Black	Opaque	Not determined
Black	Black	Opaque	Good
Lilac	Pink	Sub-translucent-Opaque	Good
Colourless to white	Colourless	Transparent-translucent	Perfect
Red	Brown-brownish		Not determined
Colourless to white		Transparent	Perfect
Colourless			Perfect
Yellow			Not determined
Yellow to orange	Yellow-yellowish	Transparent	Poor
Grey		Opaque	Not determined
Brown			Clear
Yellow to yellowish green		Transparent-opaque	None
Colourless to white		Transparent	Perfect
Brown		Transparent	None
Colourless		Transparent	Perfect
White		Transparent	Not determined
Colourless			None
Colourless		Transparent	None
Yellow to yellowish green		Transparent-translucent	Perfect
Yellow		Transparent-translucent	Clear
Black	Brown-brownish		None
Grey			Not determined
Reddish brown		Transparent-translucent	Perfect
Grey		Opaque	None
Black	Grey	Opaque	Imperfect
Reddish brown	Orange	Transparent-translucent	Perfect
Red		Translucent	Poor
Black	Black	Opaque	Poor
Grey		Opaque	
Violet		Transparent-translucent	Perfect
Colourless			None
Brown			Clear
Brown			None
White			Not determined
Brown		Opaque	None
Colourless to white	White-whitish	Transparent-translucent	Perfect
White		Transparent	Perfect
White	White-whitish	Opaque	
Dark green			Good

White			Not determined
White		Transparent-translucent	None
Yellow to yellowish green		Translucent	Distinct in one direction
Reddish brown	Yellow-yellowish	Transparent-translucent	Perfect
Yellow to orange		Transparent-translucent	Good
Black			Good
Colourless		Transparent	Perfect
Yellow		Transparent-translucent	Perfect
Variety of colours	White-whitish	Transparent-translucent	Distinct in one direction
Orange		Translucent	Not determined
Colourless to white			Good
White			Not determined
Variety of colours	White-whitish	Transparent-translucent	Good
Colourless to white	White-whitish	Transparent-translucent	Not determined
Red	Pink	Sub-translucent	Good
Colourless to white			Distinct in one direction
Colourless to white		Transparent-translucent	Perfect
White		Translucent	Good in two directions
Brown			Good
Colourless to white		Transparent	Perfect
Colourless		Transparent	Perfect
Colourless		Transparent-translucent	Perfect
Colourless			Good
Colourless to white	White-whitish		Perfect
White		Transparent-translucent	None
Brown	Brown-brownish		Not determined
Yellow			
Colourless to white	White-whitish	Transparent	Perfect
Orange to orange-brown			Not determined
Yellow		Transparent-translucent	Clear
White		Transparent-translucent	Perfect
White			
White			
White	White-whitish	Transparent	Perfect
Yellow to yellowish green			Imperfect
Green			
Colourless to white	White-whitish		Perfect
Variety of colours	White-whitish	Transparent-opaque	Indistinct
Brown			Imperfect
Pink to purple		Translucent	Good
Variety of colours			Not determined
Variety of colours	White-whitish	Translucent	Perfect
Black			Not determined
Lilac	Brown-brownish	Transparent	Perfect
Colourless	Colourless	Transparent	None
Reddish brown		Opaque	Not determined
Yellow to yellowish green			Perfect
Grey	White-whitish		Distinct in one direction

White			Not determined
Grey	Grey	Opaque	Perfect
Green		Transparent	Not determined
Brown to brownish green		Sub-transparent	Not determined
White		Opaque	Perfect
Yellow			Perfect
Black	Black	Opaque	None
Black		Opaque	
Black	Black	Opaque	Distinct in one direction
Yellow			Not determined
Red		Opaque	Not determined
Red		Translucent	Not determined
Grey			Not determined
Grey			Not determined
		Opaque	Perfect
Colourless to white		Transparent	Good
Colourless		Transparent	Good
Colourless		Transparent	Not determined
Black		Opaque	Not determined
Grey		Opaque	Not determined
Orange to orange-brown		Translucent	Perfect
Silver		Opaque	Perfect
Yellow to yellowish brown			Perfect
			Not determined
Colourless	White-whitish	Transparent	Good
Yellow	Yellow-yellowish	Transparent-translucent	Perfect
Bluish green			Perfect
Yellow			Perfect
Yellow			
Yellow to yellowish green	White-whitish		Good in two directions
Black		Opaque	
White			
Silver		Opaque	Not determined
Grey to silver	Grey	Opaque	Perfect
Yellow			Not determined
Grey	Grey	Opaque	Good
Colourless			None
Grey		Opaque	
Pink			Very good
White			Not determined
Light green to blackish green	Black	Opaque	None
Black		Opaque	
Grey	Grey-black	Opaque	Good
Black	Brown-brownish	Opaque	None
Green	Colourless	Transparent	Good

Yellow to yellowish green	Yellow-yellowish		Perfect
Green			Good
Brown		Transparent-translucent	Good
Grey	Black		Good
Green			
Reddish brown			Not determined
Grey	Grey-black	Opaque	Good
Black	Brown-brownish	Opaque	Distinct in one direction
Reddish brown	Brown-brownish		Distinct in one direction
Colourless to white		Transparent-translucent	Not determined
Red	Red-reddish		
Yellow	Yellow-yellowish	Translucent	Distinct in one direction
Grey	Grey	Opaque	
Brown			Not determined
Orange	Yellow-yellowish		Fair
Colourless		Transparent	Perfect
White			Distinct in one direction
Black	Brown-brownish		Perfect
Colourless			None
Pink to purple			Not determined
Green			
Brown			Perfect
Colourless			Perfect
Red	Yellow-yellowish		Perfect
Reddish brown	Yellow-yellowish	Transparent	None
Yellow		Transparent-translucent	
Black	Brown-brownish		Perfect
Colourless		Transparent	None
Green	Green-greenish	Transparent-translucent	Good
Grey		Translucent-opaque	Good
Violet		Transparent	Perfect
White	White-whitish		Distinct in one direction
Brown			Perfect
Reddish brown	Green-greenish		Good
Pink	White-whitish		None
Yellow			
Colourless		Transparent	
Grey	Black	Opaque	Perfect
Black		Opaque	
Grey		Opaque	Perfect
Grey to silver		Opaque	Perfect
Yellow to yellowish green			Good
Black	Green-greenish	Opaque	Good
Blue			Not determined
Yellow to yellowish green	Yellow-yellowish		Perfect
Colourless		Transparent	Poor
			Good

Colourless		Transparent	None
Grey			Not determined
Brown		Translucent-opaque	Perfect
Yellow			Clear
Yellow			Very good
Colourless	White-whitish	Transparent-translucent	Perfect
Yellow		Transparent-translucent	Good
Colourless			Perfect
Colourless to white		Transparent	Perfect
Colourless to white		Transparent	Not determined
Black			Not determined
Colourless		Transparent	Indistinct
Green			
Colourless		Transparent	Perfect
Colourless to white		Transparent-translucent	Poor
Grey			
Colourless		Transparent	None
Green	Green-greenish		Not determined
			Good
Colourless to white			Perfect
Yellow to yellowish green			
Pink to purple			
Dark green	Grey		
Variety of colours	White-whitish	Translucent-opaque	Perfect
Black			Not determined
Yellow			Not determined
White			Perfect
Yellow	Yellow-yellowish		Good
Black		Opaque	Perfect
Blue		Translucent	
Grey		Opaque	None
Variety of colours		Transparent-translucent	Perfect
Yellow			Perfect
White	White-whitish		
Black		Translucent	Perfect
Silver	Grey	Opaque	Perfect
Yellow			None
Yellow to yellowish brown			Good
White			
Colourless		Transparent	Perfect
White		Transparent-translucent	Poor
Yellow		Transparent	Perfect
Reddish brown			
Brown			Poor
Green			None
Black		Translucent	Not determined

Reddish brown			Distinct in one direction
White	White-whitish		
Red	Red-reddish	Translucent-opaque	Perfect
Colourless		Transparent	Perfect
Yellow			Imperfect
Black	Black	Opaque	None
Yellow			Not determined
Blue	Blue-bluish		Good
Grey			None
Yellow			Poor
Yellow			Not determined
Yellow			Not determined
Dark green	Green-greenish		Fair
			Not determined
Yellow to yellowish green			Perfect
Colourless to white		Transparent-translucent	Perfect
White			None
			Perfect
White	White-whitish		
Pink to purple			Perfect
Brown	Brown-brownish		
White			Not determined
White	White-whitish		
Brown	Brown-brownish		None
Blue		Transparent-translucent	Very good
Yellow to yellowish brown			Perfect
Green	Blue-bluish	Transparent-translucent	None
White			
Green			Not determined
Yellow		Opaque	Good
Yellow	Yellow-yellowish		Perfect
Yellow			
			Not determined
Yellow		Transparent	Not determined
Brown			
Colourless			
Yellow to yellowish brown	Yellow-yellowish	Transparent-translucent	None
Dark grey		Opaque	Perfect
Green			None
Yellow		Transparent	None
Brown			
Grey	Black	Opaque	Clear
Yellow to yellowish green	Yellow-yellowish	Transparent	Perfect
Colourless		Transparent	Perfect
Blue			Not determined
Colourless to white			None
			Not determined
Colourless		Transparent	Fair

Red			Distinct in one direction
Yellow	Orange		None
Black			
Silver		Opaque	Not determined
Pink	White-whitish		Fair
Grey		Opaque	Good in two directions
Yellow			
White			Not determined
Colourless		Transparent	Perfect
Pink to purple			Not determined
Variety of colours		Transparent-translucent	Poor
Colourless		Transparent	
Green			Good
		Opaque	Distinct in one direction
Colourless		Transparent	Perfect
Colourless		Transparent	Perfect
Red	White-whitish	Translucent	Perfect
			None
Grey	Black		Not determined
Pink			None
Red	Brown-brownish		Perfect
Brown	Brown-brownish		Perfect
White			
Yellow		Transparent	Perfect
Colourless to white	White-whitish		Perfect
Pink			Good
Reddish brown			Perfect
Silver	Yellow-yellowish	Opaque	Perfect
Green			None
Blue	White-whitish	Transparent-translucent	Perfect
Grey		Opaque	Not determined
			Not determined
Grey		Opaque	Not determined
Reddish brown	Brown-brownish	Translucent	Not determined
Light green to blackish green		Transparent	Not determined
Greenish blue		Transparent-translucent	Clear
Colourless		Transparent	Perfect
Dark grey		Opaque	Not determined
Variety of colours	White-whitish	Transparent-translucent	Perfect
Brown	Brown-brownish		Perfect
Grey		Opaque	Not determined
Brown	Brown-brownish		Not determined
Grey			Perfect
Colourless		Transparent	Good
Silver		Opaque	Not determined
Pink		Translucent	Perfect
Brown			Not determined

Pink			Good
Blue	Colourless	Transparent-translucent	Perfect
Black			Not determined
Variety of colours	White-whitish	Transparent-translucent	Perfect
Brown to brownish green			Perfect
Yellow to yellowish green			Indistinct
Red		Opaque	Imperfect
Black	Brown-brownish	Opaque	Perfect
Grey		Opaque	Very good
Dark green	Green-greenish		Good
Brown		Translucent	Perfect
Grey	White-whitish	Transparent-translucent	Perfect
Black	Grey	Translucent	None
Brown			Clear
Colourless		Transparent-translucent	None
		Opaque	
Bluish green	Blue-bluish	Translucent	Perfect
White		Opaque	
Colourless		Transparent-translucent	Perfect
Colourless		Transparent	Good
Colourless		Transparent	Not determined
Pink			Perfect
Red	Orange	Translucent-opaque	Perfect
		Opaque	Distinct in one direction
Grey			None
White			Perfect
Colourless		Transparent-translucent	Distinct in one direction
		Opaque	
White		Transparent	Distinct in one direction
White			Perfect
Black		Opaque	
Green		Sub-translucent-Opaque	Not determined
Brown		Transparent-translucent	Perfect
White	Colourless	Transparent-translucent	Perfect
Grey	Black	Opaque	Perfect
Colourless to white		Transparent	Distinct in one direction
Black	Grey	Opaque	Perfect
Colourless		Transparent	Good
Black		Opaque	Not determined
Blue		Translucent	Good
Green			Perfect
Colourless to white			None
Variety of colours	White-whitish	Translucent	Perfect
Orange			
Blue	White-whitish	Translucent-opaque	Indistinct
Blue	Blue-bluish	Translucent	Imperfect
Grey	Grey	Opaque	None
Silver		Opaque	Not determined
Variety of colours		Transparent-translucent	Perfect

Colourless		Transparent	Distinct in one direction
Yellow		Transparent-translucent	Fair
Colourless to white		Transparent	Distinct in one direction
Bluish green		Transparent-translucent	None
Colourless			Perfect
Colourless to white			Distinct in one direction
Grey	Black	Opaque	Perfect
Brown			Perfect
Colourless		Transparent	None
Yellow			Not determined
Red	Orange	Transparent	Perfect
Pink to purple	Colourless	Transparent-translucent	Perfect
Colourless to white		Transparent	Distinct in one direction
Colourless	Colourless	Transparent-translucent	Imperfect
White		Transparent-translucent	Perfect
Pink to purple		Transparent-translucent	Imperfect
Brown		Transparent-translucent	Not determined
Colourless to white		Transparent-translucent	Distinct in one direction
Colourless to white	White-whitish	Transparent-translucent	Not determined
Brown			
Yellow to yellowish brown	Yellow-yellowish	Translucent	None
Yellow			Perfect
Green	Green-greenish	Transparent-translucent	Indistinct
Variety of colours			None
Yellow to yellowish green			
Green		Transparent-translucent	Distinct in one direction
Blue			Perfect
Grey	Black	Opaque	None
White			Perfect
Blue	Blue-bluish	Transparent-translucent	Perfect
Green		Transparent-translucent	Perfect
Black		Opaque	None
Grey	Black	Opaque	Good
Grey	Grey-black	Opaque	Imperfect
Colourless		Transparent	
Light green to blackish green		Opaque	
Bluish green	Blue-bluish	Transparent-translucent	Indistinct
Red		Transparent	Perfect
Brown	Colourless	Translucent-Transparent	Very good
Black	Grey-black	Opaque	Perfect
Colourless to white			Perfect
Colourless		Transparent	Not determined
Colourless		Transparent	Not determined
Blue			Not determined
Grey		Opaque	Not determined
Grey	Red-reddish	Opaque	Perfect
Green		Translucent	Perfect
White			Not determined
Silver	Grey-black	Opaque	Clear

Brown		Transparent	Perfect
Colourless		Transparent	Not determined
Yellow			Not determined
Black	Red-reddish	Opaque	
Orange		Transparent	Perfect
Red	Red-reddish	Translucent-Transparent	Perfect
Variety of colours			Distinct in one direction
Yellow	Yellow-yellowish	Translucent	Perfect
Blue		Transparent	
Red	Orange	Translucent	
Colourless	Colourless		
Colourless			Good
Reddish brown		Opaque	Not determined
Yellow		Transparent	Not determined
Green			Not determined
Green		Transparent-translucent	Perfect
Red	Brown-brownish		Not determined
Green	Green-black	Opaque	Perfect
Black	Grey		Imperfect
Blue			Distinct in one direction
Colourless to white			Perfect
White			Fair
Brown	Black	Opaque	Good
Black		Opaque	None
Variety of colours		Transparent-translucent	Perfect
Red			Not determined
White	White-whitish		Perfect
Black		Opaque	None
Brown	Brown-brownish		Perfect
Colourless		Transparent-translucent	None
Yellow to yellowish green	Green-greenish	Transparent	Not determined
Bronze to brassy	Black		Perfect
White			Perfect
Orange			Good
Grey	Grey-black	Opaque	Perfect
White			
Brown	Brown-brownish	Opaque	Not determined
Variety of colours	Colourless	Transparent-opaque	Perfect
Black	Grey	Opaque	Perfect
Blue			Good
Light green to blackish green		Translucent	Perfect
Black		Opaque	None
Yellow		Transparent-translucent	Perfect
Green		Translucent-opaque	Good
Black	Black	Opaque	Not determined

Green			Perfect
Blue		Translucent-opaque	Perfect
Brown	Brown-brownish		Perfect
Colourless to white	White-whitish	Transparent-translucent	Perfect
Yellow			Perfect
Colourless to white			Perfect
Yellow			
Black	Black	Opaque	None
Black	Brown-brownish	Opaque	Perfect
Reddish brown			Good
Black	Brown-brownish	Opaque	Clear
Green	White-whitish		
			Not determined
			None
White			Not determined
Yellow			Not determined
Green	Green-greenish	Translucent-opaque	Perfect
White		Opaque	Not determined
Yellow		Translucent	Not determined
Silver		Opaque	Distinct in one direction
Red			Not determined
Red		Opaque	Good
Blue			Not determined
Colourless		Transparent	Perfect
White		Transparent	Perfect
Green	Green-greenish		None
Red			Perfect
Brown	Pink		Perfect
			Good
			Perfect
Yellow		Transparent-translucent	None
White			Perfect
Grey		Opaque	
Orange to orange-brown			Perfect
Black	Brown-brownish	Opaque	Perfect
			Not determined
Green			Distinct in one direction
Red			Not determined
Green	Brown-brownish	Transparent	Fair
Black	Brown-brownish	Opaque	Not determined
Black	Red-reddish	Translucent	Distinct in one direction
Brown	Brown-brownish	Translucent-opaque	Not determined
Brown			Perfect
Grey	Black	Opaque	None
Black	White-whitish	Opaque	Good
White		Transparent	Imperfect
Yellow to yellowish brown			Perfect
Bluish green			Not determined
Bronze to brassy	Green-black	Opaque	Distinct in one direction

Yellow			Not determined
Pink	Colourless	Translucent	Perfect
Colourless	White-whitish	Transparent	Perfect
Variety of colours	Colourless	Transparent-translucent	Distinct in one direction
Grey	White-whitish	Transparent-translucent	None
Black	Brown-brownish		Perfect
Grey	Black		None
Pink	Yellow-yellowish	Transparent	Perfect
White		Transparent-translucent	Imperfect
Green			Perfect
Colourless		Transparent	Good
			Not determined
Yellow	Yellow-yellowish	Translucent	Distinct in one direction
Pink to purple		Transparent	Perfect
Orange		Transparent	Perfect
Black		Opaque	None
Grey	Grey	Opaque	None
Yellow		Transparent	Perfect
Brown to brownish green		Transparent	Distinct in one direction
			Not determined
Colourless			Not determined
Colourless to white			Perfect
Grey	Grey-black	Opaque	None
Orange to orange-brown	Orange	Transparent-translucent	Distinct in one direction
		Opaque	
Colourless		Transparent	Not determined
Colourless	White-whitish	Transparent	
Blue			Perfect
Colourless		Transparent	Good
Red			Not determined
Red			Good
Reddish brown		Translucent	Perfect
Bluish green			
Yellow			Not determined
Grey	Grey	Opaque	Poor
White			Perfect
Pink			Good
Variety of colours	Colourless	Transparent-translucent	Distinct in one direction
Brown		Translucent	None
Variety of colours		Transparent-translucent	None
Black	Red-reddish	Transparent	Perfect
Black		Opaque	Not determined
Black			Perfect
Black	Brown-brownish	Opaque	Perfect
Green	Colourless	Translucent	Perfect
Yellow		Transparent	Perfect
Brown		Transparent-translucent	Indistinct
White	Grey	Opaque	Perfect

Light green to blackish green			Perfect
Colourless to white	White-whitish	Transparent-translucent	Perfect
Yellow	Yellow-yellowish		Not determined
Colourless to white		Transparent	Good
Grey	Black	Opaque	Perfect
Colourless		Transparent	None
Silver	Colourless	Opaque	None
White			
Bluish green			Not determined
Bronze to brassy		Opaque	Not determined
Bronze to brassy		Opaque	Not determined
Colourless		Transparent-translucent	Perfect
Colourless to white	White-whitish	Transparent	Perfect
Colourless to white	White-whitish	Transparent	Perfect
White			Not determined
Yellow			Perfect
Yellow		Translucent-opaque	Perfect
Yellow to yellowish green		Transparent-translucent	Not determined
Yellow to yellowish green			Perfect
Colourless			Not determined
Black	Black	Opaque	Not determined
Yellow to yellowish green			Not determined
Yellow to yellowish green		Translucent	Clear
Yellow to yellowish green		Transparent-translucent	Perfect
Red	Red-reddish		Not determined
Yellow			Very good
Pink			Very good
Grey			Perfect
Yellow			Not determined
Yellow		Opaque	Perfect
Yellow			Not determined
Orange			Not determined
Yellow			Perfect
Yellow			Perfect
Red	Red-reddish	Translucent	None
Yellow	Yellow-yellowish		Not determined
Pink			Perfect
Green		Transparent-translucent	Perfect
Yellow			Perfect
Orange		Transparent-translucent	Perfect
Yellow			Good
Yellow			Perfect
Green	White-whitish	Transparent-translucent	Not determined
Colourless to white		Transparent-translucent	Not determined
Green		Transparent-opaque	Perfect
Yellow to yellowish brown		Translucent	Perfect
Yellow			Not determined
Green		Transparent-translucent	Perfect

Colourless		Transparent-translucent	Perfect
Yellow to yellowish brown			None
Grey			None
Grey	Red-reddish	Opaque	Imperfect
Grey to silver	Black	Opaque	None
Variety of colours	White-whitish	Transparent-translucent	Perfect
Yellow to yellowish brown		Translucent-opaque	Distinct in one direction
Colourless	Colourless	Transparent	
Yellow	Yellow-yellowish	Transparent	Perfect
			Not determined
Yellow to yellowish green	White-whitish	Transparent-translucent	None
Bronze to brassy	Black	Opaque	Perfect
White		Opaque	Poor
Red	Red-reddish		
Variety of colours	White-whitish	Transparent-translucent	Not determined
Lilac	Blue-bluish		Very good
Blue			None
Colourless to white		Transparent-translucent	Perfect
Green			Perfect
Red	Orange	Opaque	Perfect
Grey			Perfect
Colourless to white			Perfect
Colourless to white		Transparent	Perfect
Colourless	White-whitish	Transparent-opaque	Perfect
White		Transparent-translucent	Distinct in one direction
Pink to purple		Translucent	Perfect
Red	Green-greenish	Translucent-opaque	Good
Green		Transparent	Not determined
Bluish green			Not determined
Orange			Perfect
White		Opaque	Not determined
			Not determined
Green			Perfect
Variety of colours			Not determined
Black		Translucent-opaque	None
Grey	Green-greenish	Opaque	Perfect
Yellow to yellowish green	Yellow-yellowish	Transparent	Perfect
Green	Yellow-yellowish	Transparent	None
Green			Perfect
Green		Transparent	Perfect
Reddish brown			Perfect
Variety of colours	White-whitish	Transparent-Sub-translucent	Distinct in one direction
Variety of colours	White-whitish	Transparent-translucent	Good
Grey		Opaque	Not determined
Colourless to white		Transparent-translucent	Indistinct
Lilac			Distinct in one direction
Variety of colours	Yellow-yellowish	Translucent-opaque	Indistinct

White			Not determined
Dark green		Translucent-opaque	Good
White		Opaque	Distinct in one direction
Light green to blackish green			Perfect
Variety of colours		Transparent-translucent	Perfect
Black		Transparent	Not determined
Colourless to white	White-whitish		Perfect
Grey to silver		Opaque	
Variety of colours		Transparent-translucent	Perfect
Colourless		Transparent-translucent	Indistinct
White	White-whitish	Opaque	Perfect
Black	Black	Opaque	Good
White		Translucent	None
Red	Brown-brownish	Translucent-Transparent	Perfect
Bronze to brassy		Opaque	Not determined
Bluish green			
Colourless		Transparent	Perfect
Pink	White-whitish		
Colourless to white			None
White	White-whitish		Perfect
Colourless to white		Transparent-translucent	Perfect
Yellow to yellowish green			Good
Yellow	White-whitish		Poor
Green	Green-greenish	Transparent-translucent	Distinct in one direction
Colourless to white		Translucent	Perfect
Grey	Grey	Opaque	
Variety of colours		Translucent	Good
Silver		Opaque	Distinct in one direction
Yellow	Yellow-yellowish		Clear
Green	Yellow-yellowish	Transparent-opaque	None
White			
Reddish brown			Not determined
White			Not determined
Pink			Perfect
Violet	Blue-bluish		Not determined
Yellow		Transparent	Perfect
Royal blue	Blue-bluish	Transparent	Good
Colourless to white			Not determined
Orange	Orange		Clear
Black	Grey		Not determined
Colourless		Transparent-translucent	Distinct in one direction
Yellow			Perfect
Colourless			Not determined
White			Not determined
Black		Opaque	None
Black		Opaque	Not determined
Pink to purple		Opaque	Perfect
Grey			Not determined

Variety of colours	Colourless	Transparent-translucent	Perfect
Green			
Reddish brown	Orange		Perfect
White			
Colourless		Transparent	Distinct in one direction
Colourless		Transparent	None
Colourless to white	White-whitish	Translucent	Perfect
Brown		Translucent	Perfect
Black	Green-greenish		None
Colourless		Transparent	Good
Grey	Grey-black	Opaque	Perfect
Colourless		Transparent-translucent	Perfect
White			Not determined
Blue			Not determined
Reddish brown	Yellow-yellowish		Perfect
Green	Green-greenish		Good
Green		Transparent-translucent	Perfect
Reddish brown	Yellow-yellowish		Not determined
Colourless to white		Transparent	Not determined
Variety of colours		Transparent-translucent	Perfect
			Not determined
White			Good
Colourless			None
Green	Green-greenish		Not determined
Green			None
Yellow to yellowish green			Perfect
White		Transparent-translucent	Perfect
White	White-whitish	Transparent-opaque	Distinct in one direction
Colourless			Perfect
Yellow to yellowish green		Transparent-translucent	Not determined
Green	Green-greenish	Transparent	Perfect
Green		Opaque	
White			Perfect
Yellow to yellowish brown	Yellow-yellowish	Transparent-translucent	Perfect
Colourless to white	White-whitish	Transparent-translucent	Very good
White		Translucent	Perfect
Colourless to white			Distinct in one direction
Orange	White-whitish		Perfect
Yellow		Transparent-translucent	Good
Colourless		Transparent	Imperfect
Colourless			Distinct in one direction
Colourless		Transparent	
Grey			Good
Black	Black	Opaque	None
Brown	Brown-brownish		None
Orange	Orange		None

Colourless		Transparent	Not determined
Colourless		Transparent-translucent	None
White			Distinct in one direction
			Not determined
Brown	Brown-brownish		Perfect
Black			Not determined
Brown	Pink	Opaque	Poor
Variety of colours	White-whitish	Transparent-opaque	Indistinct
Green		Opaque	Perfect
Black	Brown-brownish	Opaque	Perfect
Colourless to white		Transparent-translucent	Perfect
Grey		Opaque	Perfect
Colourless		Transparent	Perfect
Grey		Opaque	None
Orange			Not determined
Red	Black	Opaque	None
White		Opaque	Not determined
Greenish blue			Poor
Silver	Black	Opaque	Distinct in one direction
Yellow			Not determined
Blue		Transparent-translucent	
Green	Green-greenish		Perfect
Green		Transparent	Not determined
Green			Perfect
Colourless			Poor
Yellow to yellowish brown		Transparent-opaque	None
Silver		Opaque	None
Yellow to yellowish green			Clear
Brown to brownish green			Not determined
		Opaque	Not determined
Black			None
Brown			Perfect
Yellow		Transparent	None
			Not determined
Bluish green			Fair
Colourless to white	White-whitish	Transparent	Very good
Colourless to white		Transparent	Perfect
Colourless		Transparent	None
White		Transparent	Not determined
Colourless to white		Transparent	Perfect
Colourless	White-whitish	Transparent	Perfect
Black	Black	Opaque	None
Yellow to yellowish green		Opaque	Perfect
Yellow		Transparent-translucent	None
Colourless		Transparent	Perfect
Brown		Translucent	Clear
Light green to blackish green			Perfect

Grey		Opaque	Good
White			Good
Colourless		Transparent	None
Colourless to white	White-whitish	Transparent-translucent	Indistinct
Yellow		Transparent-translucent	Perfect
Grey	Black	Opaque	None
Grey		Opaque	Not determined
Black	Black	Opaque	
Grey	Green-black	Opaque	Indistinct
Brown	Grey-black	Opaque	Perfect
Green			Not determined
Colourless			Not determined
Lilac			
White			Not determined
Green		Translucent	None
Colourless to white		Transparent-translucent	Distinct in one direction
Orange			Perfect
Pink			
Green			Not determined
Pink	White-whitish		None
White		Transparent-translucent	Perfect
Brown		Transparent	Not determined
Bluish green			Not determined
Colourless to white	White-whitish	Transparent-translucent	Perfect
Green	Green-greenish	Translucent-opaque	Indistinct
Green	Colourless	Transparent-translucent	Imperfect
Reddish brown	Green-greenish		Good
Colourless	Colourless	Transparent	Good
Colourless		Translucent	None
Grey		Opaque	Not determined
Green	Green-greenish	Translucent	Good
White			Not determined
White	White-whitish	Transparent-translucent	Good
			Not determined
Variety of colours	White-whitish	Transparent-opaque	None
Brown		Transparent	None
Brown	Red-reddish		None
			Not determined
Bronze to brassy		Opaque	Good
Brown	Brown-brownish		Imperfect
Variety of colours			
Yellow to orange	Yellow-yellowish	Transparent-translucent	Perfect
Black	Brown-brownish		None
White		Translucent	
Variety of colours	White-whitish	Transparent-translucent	Perfect
Black	Brown-brownish		Perfect
			Good
Black	Grey	Opaque	Good
Green			Not determined

			Not determined
Yellow			Not determined
Grey		Opaque	Not determined
Grey	Grey	Opaque	Perfect
Blue		Translucent	None
Black		Translucent-opaque	
White			Not determined
Colourless to white		Transparent-translucent	
			Not determined
Green			
Green			Not determined
Yellow			Not determined
Green		Transparent-translucent	Perfect
Grey	Red-reddish	Opaque	Good
Colourless		Transparent	Distinct in one direction
White			
Grey		Opaque	
Colourless			Not determined
Colourless to white		Transparent-translucent	Indistinct
Grey		Opaque	Not determined
Pink		Transparent-translucent	None
Red		Transparent	Not determined
Grey		Opaque	
Colourless to white	White-whitish	Transparent	Perfect
Grey		Opaque	None
Grey		Opaque	Not determined
			Not determined
			Not determined
Colourless			Not determined
Grey	White-whitish	Translucent	Not determined
Pink			Poor
Orange		Transparent	Not determined
White		Opaque	Not determined
Blue		Transparent-translucent	Distinct in one direction
White	White-whitish	Translucent	Not determined
Orange		Transparent	Poor
Colourless		Transparent	Poor
Violet		Transparent	Imperfect
Grey to silver		Opaque	Not determined
Yellow		Transparent	Perfect
Silver	Black	Opaque	None
Colourless		Transparent-translucent	Perfect
Grey	Grey	Opaque	Perfect
Colourless		Transparent	Perfect
White		Transparent	Very good
White		Translucent	Perfect
Green	Green-greenish		Not determined
Colourless to white		Transparent	Perfect
Colourless to white		Transparent-translucent	Not determined

Black	Black	Opaque	None
Yellow			Perfect
Black	Black	Opaque	Good
Colourless		Transparent	None
Black		Opaque	Not determined
Silver	Grey-black	Opaque	Perfect
Yellow to orange	Yellow-yellowish		None
			Not determined
Yellow			Perfect
White	White-whitish		None
Colourless			Poor
Greenish blue			Perfect
Green		Translucent-opaque	Good
White			Not determined
Colourless			Perfect
Colourless to white	White-whitish	Transparent-translucent	Perfect
White		Transparent-translucent	Perfect
Brown		Translucent-opaque	Perfect
Brown to brownish green		Transparent-translucent	Distinct in one direction
Bronze to brassy	Black	Opaque	Very good
Greenish blue		Transparent-translucent	
Red		Opaque	Perfect
Yellow to yellowish brown		Transparent-translucent	Indistinct
White			Distinct in one direction
Green			None
Yellow to yellowish brown		Transparent	Poor
Yellow to orange	Yellow-yellowish	Translucent	Distinct in one direction
Dark green		Opaque	
Colourless		Transparent	None
Yellow to yellowish brown	Colourless	Transparent-translucent	Perfect
Orange			Perfect
Grey	Grey	Opaque	None
Grey	Black	Opaque	Perfect
Black	Black	Opaque	None
Green		Translucent	
Colourless to white	White-whitish	Transparent-translucent	Perfect
Green			Not determined
White		Opaque	
		Opaque	
Colourless		Translucent	Poor
Greenish blue	Green-greenish	Transparent-translucent	Good
White		Opaque	Perfect
Red		Translucent	Perfect
Grey	Black	Opaque	Perfect
Blue		Transparent	Good
White			None
Bronze to brassy	Brown-brownish	Opaque	None
			Not determined
Colourless			Perfect

Brown			Not determined
Colourless	White-whitish	Transparent	Very good
Yellow			Distinct in one direction
White			Not determined
Brown			Perfect
Red		Opaque	Not determined
Black	Colourless	Transparent-opaque	Imperfect
Black	Brown-brownish		None
Red	Red-reddish	Transparent	Not determined
			Not determined
Colourless to white		Transparent-translucent	Perfect
Yellow to yellowish green			Perfect
Dark green		Translucent	Perfect
Yellow to yellowish green			None
			Poor
Grey	Grey	Opaque	Not determined
Black	Brown-brownish	Opaque	None
Grey		Opaque	Not determined
Colourless to white	White-whitish	Transparent-translucent	Perfect
Green		Transparent-translucent	Imperfect
Colourless			Not determined
Variety of colours	White-whitish	Transparent	Distinct in one direction
Green			None
Green	Green-greenish		None
Colourless to white	White-whitish	Transparent-translucent	Distinct in one direction
Brown	White-whitish	Transparent-translucent	Perfect
Red	Orange	Translucent-Transparent	Good
Colourless to white	White-whitish	Transparent-translucent	Distinct in one direction
Colourless			Perfect
Colourless		Transparent	Not determined
Colourless		Transparent-translucent	Poor
Yellow to yellowish green			Perfect
Bluish green		Transparent	Perfect
Colourless		Transparent-translucent	Not determined
Light green to blackish green		Transparent-translucent	Good
Yellow		Translucent	Perfect
Yellow			Not determined
Yellow			Perfect
Yellow	Yellow-yellowish		Perfect
Colourless to white		Transparent-translucent	Poor
Brown			Not determined
Colourless to white		Transparent	Perfect
Colourless to white		Transparent-translucent	Perfect
Brown	Pink	Translucent-opaque	Perfect
Grey		Transparent	Not determined
Brown		Translucent-opaque	Good
Silver		Opaque	Not determined
Black	Grey	Opaque	Good
Black	Brown-brownish		None

Yellow		Translucent	Not determined
			Not determined
Colourless to white		Transparent	Not determined
Green	Green-greenish		Perfect
Grey	Grey-black	Opaque	Distinct in one direction
Blue		Translucent	Not determined
			Not determined
Silver		Opaque	Indistinct
Grey		Opaque	None
Black	Brown-brownish	Opaque	None
Grey	Black	Opaque	Good
Grey	Black	Opaque	Perfect
White		Translucent	Not determined
Yellow			None
Yellow			
Black	Red-reddish	Opaque	Distinct in one direction
Variety of colours	Colourless	Translucent	Not determined
Yellow to yellowish brown			Fair
Yellow to yellowish brown		Translucent	Not determined
			Not determined
Yellow to yellowish green		Transparent-translucent	None
Greyish green	Grey		Not determined
Colourless		Transparent	Perfect
Red			None
White	White-whitish		Not determined
		Opaque	Not determined
Black			Not determined
Grey	Grey	Opaque	None
Colourless to white	White-whitish	Transparent	None
Black	Black	Opaque	Imperfect
Black	Grey	Opaque	None
Grey		Opaque	Imperfect
Colourless		Transparent-translucent	Perfect
White		Transparent	Perfect
Black	Brown-brownish	Opaque	Poor
Colourless		Transparent	Perfect
Blue	Blue-bluish		Not determined
Silver	Silver-white	Opaque	None
Colourless to white		Transparent	Not determined
		Opaque	Clear
Yellow to yellowish green			Perfect
Variety of colours		Transparent	Indistinct
Red	Red-reddish		None
Green	Colourless	Transparent-translucent	Distinct in one direction
White	White-whitish	Translucent	Not determined
Green			Perfect
Colourless			Not determined
White			Perfect

Black	Grey	Opaque	Perfect
Colourless		Transparent	Perfect
Colourless to white		Transparent-translucent	Perfect
White	White-whitish		None
Orange		Transparent	Good
Red	Red-reddish	Transparent-translucent	Distinct in one direction
Yellow			Clear
Yellow			Perfect
Blue		Translucent	Perfect
Black	Red-reddish	Opaque	Clear
Orange			Not determined
Green	Blue-bluish	Translucent	Perfect
Brown	Brown-brownish	Transparent	Not determined
Colourless		Transparent	Not determined
Brown	Yellow-yellowish	Transparent-opaque	Perfect
Bluish green		Translucent	Clear
Pink			
Red	Red-reddish	Sub-translucent	Good
		Opaque	
Red	Red-reddish	Translucent	Distinct in one direction
Bronze to brassy	Green-black	Opaque	Indistinct
White		Transparent	Perfect
Red	Orange	Transparent	None
Brown	Brown-brownish	Translucent-opaque	Distinct in one direction
Variety of colours		Transparent	Perfect
Black	Black	Opaque	
Variety of colours	White-whitish	Transparent-translucent	Not determined
Red	White-whitish	Transparent-translucent	None
Red			Perfect
White	White-whitish	Transparent-translucent	Perfect
Light green to blackish green	Green-greenish	Translucent	Perfect
Red	Orange	Translucent	Perfect
Yellow			Not determined
Reddish brown		Transparent-translucent	Perfect
Bronze to brassy	Grey-black	Opaque	None
Black	Black		Perfect
Yellow to yellowish green		Transparent	Poor
Black		Opaque	
Variety of colours	White-whitish	Transparent-translucent	Indistinct
Yellow		Transparent	Poor
Black	Grey	Opaque	Perfect
Violet		Transparent	Perfect
Blue			Fair
Green			
			Not determined
Bronze to brassy			None
Brown			Perfect
Green			Not determined
Colourless to white		Transparent-translucent	Imperfect

Grey	Grey-black	Opaque	Not determined
Orange			Good
White	Grey-black	Opaque	Not determined
Green	Green-greenish		None
Grey	Black	Opaque	Not determined
Black	Black	Opaque	Not determined
Brown		Opaque	Perfect
White		Translucent-opaque	None
Colourless to white		Transparent	None
Blue		Transparent	Perfect
Yellow			Not determined
Colourless to white	White-whitish		Perfect
Yellow			Perfect
Grey		Opaque	Perfect
Grey	Brown-brownish	Opaque	Perfect
White			Not determined
Variety of colours	Yellow-yellowish	Opaque	Fissile
Grey		Opaque	None
Red	Yellow-yellowish	Transparent-translucent	Distinct in one direction
Grey	Brown-brownish	Opaque	
White		Transparent-translucent	Poor
Black		Opaque	
Colourless		Transparent	Perfect
Yellow to yellowish green			Not determined
			Not determined
Green	Green-greenish		Not determined
Blue			Good
Pink			Distinct in one direction
Yellow to yellowish brown		Transparent-translucent	Perfect
Bronze to brassy		Opaque	None
Green	White-whitish		Perfect
Brown	Brown-brownish	Sub-translucent	Not determined
Reddish brown			None
Reddish brown	Brown-brownish		None
Colourless		Transparent	Perfect
Colourless to white		Transparent-translucent	Perfect
			Not determined
Brown			
Black		Opaque	
White			Good
Colourless to white		Transparent-translucent	Not determined
Colourless	White-whitish	Transparent-translucent	Perfect
Red	White-whitish	Transparent-translucent	Perfect
Red		Opaque	
Colourless to white		Transparent	Perfect
Brown			
Pink	Pink	Transparent	Not determined
Yellow to yellowish brown			Not determined

Blue			Perfect
Black			Perfect
Light green to blackish green		Transparent-translucent	Perfect
Pink to purple	Red-reddish	Opaque	None
Light green to blackish green	Blue-bluish	Translucent-opaque	Perfect
Violet			Not determined
Colourless to white			Good
Colourless		Transparent	Very good
White			Not determined
White			Not determined
Reddish brown	Brown-brownish		Good
Grey		Opaque	None
Light green to blackish green		Sub-translucent-Opaque	Perfect
Green			Good
White		Translucent	Perfect
Colourless		Transparent	None
White			Perfect
Colourless		Transparent	Very good
Black	Black	Opaque	Not determined
Black		Opaque	Not determined
Yellow	Yellow-yellowish	Transparent-opaque	Imperfect
Brown		Translucent	Perfect
Brown		Transparent-translucent	None
Grey			Not determined
Grey		Opaque	Not determined
Green			Not determined
Variety of colours			Good
Brown		Translucent	Perfect
Pink		Transparent-translucent	Perfect
Pink		Transparent-translucent	Perfect
Orange to orange-brown		Transparent	Perfect
Colourless			Perfect
Colourless			None
Yellow		Transparent	Good
Colourless to white		Transparent	Imperfect
White			Not determined
Green			Perfect
Yellow to orange			Perfect
Red		Opaque	Good
Brown		Transparent	Fair
Green		Transparent-translucent	
Colourless to white		Transparent-translucent	Not determined
Grey	Grey-black		Not determined
Light green to blackish green	Colourless	Transparent-translucent	Indistinct
Colourless	Grey		Not determined
Orange to orange-brown	Orange		Not determined
Yellow to yellowish green			Not determined
			Not determined

Colourless			Poor
			Not determined
White		Opaque	
		Opaque	
White		Opaque	
White			Perfect
Reddish brown	Brown-brownish	Transparent-translucent	Distinct in one direction
White	White-whitish		None
		Opaque	Not determined
White		Opaque	
White			Perfect
Yellow		Transparent-translucent	Perfect
Colourless		Transparent	Perfect
Silver	Grey-black	Opaque	Distinct in one direction
Colourless		Transparent	Poor
Yellow			Perfect
Colourless		Transparent	Not determined
Grey		Transparent	Not determined
Grey		Opaque	Perfect
Grey	Grey	Opaque	None
Colourless to white	White-whitish	Transparent	Imperfect
Yellow		Translucent-Transparent	Perfect
Bluish green		Transparent	Perfect
Black	Black	Sub-translucent-Opaque	Good
Bluish green			Perfect
Black	Red-reddish	Opaque	None
Colourless		Transparent	Fair
Orange			Perfect
Colourless to white	White-whitish	Translucent	Perfect
White		Opaque	None
Brown			Perfect
Pink			Good
Black	Brown-brownish	Opaque	Perfect
Yellow			Perfect
Colourless			Not determined
White	White-whitish	Opaque	Perfect
Blue		Transparent	Indistinct
Red	Orange		Not determined
Red		Translucent	Not determined
Brown		Transparent-Sub-translucent	Good
Red	Red-reddish		Distinct in one direction
Orange		Opaque	Not determined
Grey	Brown-brownish	Opaque	Fair
White		Opaque	None
White		Opaque	Perfect
White		Transparent	Perfect
White			Not determined

Yellow to yellowish brown	Yellow-yellowish	Transparent	None
Reddish brown		Opaque	Perfect
Yellow to orange			Distinct in one direction
White			Perfect
Colourless		Transparent	Not determined
Variety of colours			Perfect
White			Not determined
Colourless			Fair
Grey		Opaque	
Reddish brown		Opaque	Perfect
Colourless		Transparent	Not determined
Reddish brown			Distinct in one direction
White			Not determined
Variety of colours	White-whitish	Transparent-translucent	Distinct in one direction
Colourless		Transparent	None
Black	Yellow-yellowish	Opaque	None
Colourless			Good
Grey		Opaque	None
Colourless			Not determined
Brown		Opaque	Perfect
Yellow to orange			Not determined
			Not determined
Yellow	Yellow-yellowish	Transparent-translucent	Perfect
			Perfect
Colourless to white		Transparent-translucent	Fair
Brown			Good
Black	Colourless	Translucent-opaque	Indistinct
Black			None
Silver		Opaque	Perfect
Yellow to yellowish green	Yellow-yellowish	Transparent	Perfect
Black		Transparent	Not determined
Yellow			Not determined
Blue	Blue-bluish	Transparent	Perfect
Greenish blue		Transparent	Not determined
Colourless	White-whitish	Transparent	Good
Yellow to yellowish green		Transparent-translucent	None
Yellow	Yellow-yellowish		Distinct in one direction
Colourless to white	White-whitish	Transparent-translucent	Perfect
Green	Grey	Transparent-translucent	Imperfect
Bluish green	White-whitish	Sub-translucent-Opaque	Good
Yellow			Perfect
Yellow		Transparent	Distinct in one direction
White			Perfect
		Opaque	
Brown		Opaque	Not determined
Yellow			Perfect

Yellow to yellowish green		Transparent-translucent	Perfect
Yellow to yellowish brown	Yellow-yellowish	Transparent-translucent	Good
Reddish brown		Translucent	Perfect
Grey		Opaque	Not determined
Blue		Transparent-translucent	Imperfect
Grey		Transparent	Distinct in one direction
			Not determined
Grey	Brown-brownish	Opaque	Poor
Colourless to white		Transparent	Perfect
Reddish brown		Transparent-translucent	None
Grey	Black	Opaque	Perfect
Black	Black	Opaque	Not determined
Colourless to white	White-whitish	Transparent	Not determined
Yellow			Imperfect
Green		Transparent	Perfect
White	White-whitish	Opaque	Not determined
Pink		Transparent-translucent	Perfect
Blue			None
White		Opaque	None
Variety of colours	White-whitish	Translucent-opaque	Perfect
Blue		Transparent	Perfect
White			
		Opaque	
Green			
Green			Not determined
Bronze to brassy		Opaque	Perfect
Light green to blackish green			Not determined
Blue		Translucent	Very good
Brown		Transparent-translucent	Good
Yellow to yellowish green		Translucent	Not determined
Light green to blackish green			None
Yellow	Yellow-yellowish		Not determined
Yellow		Transparent	Distinct in one direction
Brown	Green-greenish		Perfect
Brown		Opaque	Good
Silver		Opaque	Not determined
Variety of colours	White-whitish	Translucent-Sub-translucent	Perfect
Yellow	White-whitish		Perfect
Green			Perfect
White			Not determined
Red			Perfect
Yellow			Perfect
Grey		Opaque	Imperfect
Royal blue	Blue-bluish	Opaque	Not determined
Yellow to yellowish brown			Perfect
White			Not determined
Green		Translucent	Not determined
Variety of colours	Colourless	Transparent-translucent	Perfect
Silver	Silver-white	Opaque	None

White			
Red		Opaque	
Colourless	White-whitish	Transparent-translucent	Perfect
Yellow to yellowish green	Black		Not determined
Yellow to yellowish brown		Transparent	None
Green			Perfect
Variety of colours		Transparent	Not determined
Colourless to white		Transparent-translucent	Good
Grey	Grey-black	Opaque	Not determined
Colourless			None
White		Transparent	Perfect
Grey		Opaque	Not determined
Yellow to yellowish green		Transparent-translucent	Perfect
Grey	Black	Opaque	Distinct in one direction
Yellow to yellowish green			Not determined
			Perfect
Colourless			Perfect
Red	Red-reddish	Opaque	Perfect
Variety of colours	White-whitish	Transparent-translucent	Very good
Yellow to yellowish brown		Opaque	
Black	Grey	Opaque	Perfect
Brown			Perfect
			Not determined
Green			
Colourless	Colourless	Transparent-translucent	Poor
Yellow	Yellow-yellowish	Transparent-opaque	Perfect
Colourless		Transparent	None
Yellow			Perfect
Yellow			Not determined
Yellow			Not determined
Colourless		Transparent	Not determined
Green			Imperfect
Yellow to yellowish green		Transparent-translucent	Perfect
Yellow			Not determined
Pink to purple		Transparent	Perfect
Yellow			Not determined
Colourless		Transparent	Not determined
Orange			None
Yellow to yellowish green		Transparent	Not determined
			Not determined
Black	Black	Opaque	Perfect
Colourless			Distinct in one direction
Colourless		Transparent	None
Grey		Opaque	Not determined
Dark green			Poor
Green	Green-greenish	Transparent-translucent	Perfect
White			Perfect

Silver	Black	Opaque	Indistinct
Bluish green		Transparent	None
Red	White-whitish	Transparent-translucent	None
Pink	Red-reddish	Transparent-translucent	Perfect
Variety of colours	Brown-brownish	Transparent-translucent	Perfect
Brown		Opaque	Not determined
Variety of colours	White-whitish	Transparent-opaque	Indistinct
			Not determined
Red			Not determined
Variety of colours	White-whitish	Transparent-translucent	Perfect
Grey		Translucent	Distinct in one direction
Black			Not determined
Black			Not determined
Red		Transparent	Not determined
Blue			Not determined
Grey	Black	Opaque	Indistinct
Bronze to brassy	Brown-brownish		None
Yellow to yellowish brown		Translucent	Not determined
Black		Opaque	None
White			Not determined
Brown	Colourless	Translucent-opaque	Distinct in one direction
Brown			None
Reddish brown	White-whitish	Opaque	None
White	White-whitish	Translucent	Perfect
Orange	Yellow-yellowish		None
Colourless to white			Not determined
Green			None
Black	Black	Opaque	Imperfect
Colourless to white		Transparent	None
White			Perfect
Brown		Opaque	Perfect
Black	Black	Opaque	Perfect
Black			Not determined
Pink		Translucent	Perfect
Yellow to yellowish brown			Distinct in one direction
Grey		Opaque	Not determined
Yellow to orange		Transparent-translucent	Not determined
Brown	Brown-brownish	Opaque	None
Reddish brown	Yellow-yellowish	Translucent	Distinct in one direction
Silver		Opaque	None
Yellow to yellowish brown		Transparent-translucent	Distinct in one direction
Yellow to yellowish green			Not determined
Grey	Grey	Opaque	Perfect
Lilac	White-whitish	Translucent	Perfect
Variety of colours	Colourless	Transparent-translucent	Perfect
Grey		Opaque	Not determined
			Not determined
Grey		Translucent	Not determined

Black	Green-greenish	Translucent-opaque	Perfect
Colourless		Transparent	Not determined
Grey		Opaque	None
Black	Brown-brownish		Not determined
Colourless			Perfect
Variety of colours	Colourless	Transparent-translucent	Imperfect
Brown	Grey		Good
Dark green	Green-greenish	Opaque	Perfect
Blue			Perfect
White			Not determined
Colourless			Perfect
Yellow			Perfect
Variety of colours	White-whitish	Transparent-translucent	Good
Blue		Transparent-translucent	Not determined
Grey	Grey	Opaque	None
White			None
Colourless to white	White-whitish	Transparent-translucent	Very good
			Good
Colourless		Transparent	Not determined
Grey		Translucent	Not determined
White		Transparent-translucent	Not determined
Colourless		Transparent	Perfect
Yellow to yellowish green			Good
Yellow to yellowish green		Transparent	
Yellow to yellowish brown			Not determined
Black	Grey-black	Opaque	Not determined
Colourless	White-whitish	Transparent-translucent	Good
Yellow			Not determined
White		Opaque	Not determined
Yellow to yellowish green		Transparent-translucent	Perfect
Grey		Opaque	None
White			Perfect
			Not determined
White		Translucent	Perfect
			Not determined
Yellow to yellowish brown			Poor
Colourless		Transparent	Good
Colourless		Transparent	Not determined
Grey		Opaque	Perfect
Yellow	Yellow-yellowish	Transparent-translucent	Imperfect
Bronze to brassy	Black	Opaque	Perfect
Colourless to white	White-whitish		Perfect
White			None
Blue			Not determined
White	White-whitish	Transparent-translucent	Perfect
Reddish brown		Translucent	Clear
Yellow to yellowish green		Transparent-translucent	Perfect
White	White-whitish		Not determined

Green	Green-greenish		Perfect
Yellow to yellowish green		Transparent-translucent	Clear
Variety of colours		Translucent	Clear
White			Perfect
Yellow	Yellow-yellowish		Perfect
Colourless to white		Transparent-translucent	Good in two directions
Colourless		Transparent	Not determined
Yellow			Good
Green			Not determined
Yellow		Transparent	Distinct in one direction
Colourless to white			Not determined
Green	White-whitish	Translucent	Perfect
Pink		Transparent-translucent	Perfect
Silver	Silver-white	Opaque	Perfect
White	White-whitish	Transparent	Perfect
Bluish green		Transparent-translucent	Perfect
Variety of colours		Transparent-translucent	Imperfect
Grey		Translucent	Not determined
Blue			Not determined
Reddish brown	Brown-brownish		Not determined
Colourless to white		Transparent-translucent	Perfect
White	White-whitish		Not determined
White			Not determined
Variety of colours		Transparent-translucent	Not determined
Variety of colours		Transparent-translucent	Not determined
White			Not determined
Colourless		Transparent	Perfect
Brown		Translucent	Clear
Colourless		Transparent	Perfect
Grey		Opaque	None
Black			Perfect
Grey			Not determined
Grey	Brown-brownish	Opaque	None
Black	Brown-brownish	Opaque	Not determined
Yellow to yellowish green			Not determined
Green	White-whitish	Translucent	Perfect
Colourless to white			Not determined
Bronze to brassy		Opaque	Not determined
Colourless		Transparent	Perfect
Colourless			Fair
Greyish green	Yellow-yellowish	Transparent-translucent	Perfect
Brown	Brown-brownish	Opaque	None
Brown		Opaque	None
Colourless		Transparent	None
Black	Brown-brownish	Opaque	None
Reddish brown			Perfect
Bluish green			Perfect

White			Not determined
Yellow		Transparent	Distinct in one direction
Variety of colours	White-whitish	Transparent-translucent	Perfect
Green		Transparent	Not determined
Red			None
Yellow to yellowish green	Green-greenish	Transparent-translucent	Distinct in one direction
Orange			None
Grey	Black	Opaque	Perfect
White		Transparent	Not determined
Blue	White-whitish		Distinct in one direction
			Not determined
			Not determined
White		Transparent	Perfect
White	Grey	Opaque	Perfect
Grey	Grey	Opaque	Perfect
			Not determined
			Not determined
			Not determined
White			Not determined
Grey	Brown-brownish	Opaque	None
Grey		Opaque	Not determined
Green		Transparent-translucent	Distinct in one direction
Yellow to yellowish green		Transparent-translucent	Perfect
Violet			Not determined
Colourless		Transparent	Good
Colourless to white		Transparent	Perfect
Grey		Opaque	Imperfect
Yellow			Not determined
Grey	Grey	Opaque	Perfect
Grey	Black	Opaque	None
			Not determined
White		Translucent-opaque	Not determined
Silver		Opaque	Not determined
Yellow to orange		Transparent-translucent	None
Orange	White-whitish	Translucent	Good
			Not determined
Variety of colours		Translucent	None
		Opaque	
Colourless to white		Transparent-translucent	Clear
Green			Not determined
Colourless to white		Transparent-translucent	Perfect
Green	Green-greenish		Perfect
Colourless to white		Transparent	Not determined
Bluish green		Translucent	
Colourless to white		Transparent-translucent	Perfect
White	Colourless	Transparent-translucent	Perfect
Brown			Not determined

Brown to brownish green	Yellow-yellowish	Opaque	Perfect
Variety of colours		Translucent-opaque	Poor
Yellow		Transparent-translucent	Perfect
Brown to brownish green	Brown-brownish	Translucent-opaque	Distinct in one direction
Variety of colours		Sub-translucent-Opaque	Not determined
Brown	Brown-brownish	Translucent	Not determined
Green	Green-greenish	Translucent-Transparent	Distinct in one direction
Black	Brown-brownish	Translucent	None
Yellow to yellowish green			
Grey	Black	Opaque	None
Green			Distinct in one direction
Colourless			Perfect
Grey		Translucent	Good
Colourless to white			Perfect
White		Opaque	Indistinct
Yellow			Perfect
White		Opaque	Not determined
Red	Pink		None
Grey	Black		Distinct in one direction
Yellow			Perfect
Colourless		Transparent-translucent	None
Orange			Good
Variety of colours		Transparent-translucent	Perfect
Orange			None
Variety of colours	White-whitish	Transparent-opaque	Indistinct
Pink to purple		Transparent-translucent	Perfect
Black	Black	Opaque	Not determined
Blue	Blue-bluish		Not determined
Green			
White to yellowish		Sub-transparent	Perfect
White		Translucent	Distinct in one direction
Black		Opaque	Good
Grey	Brown-brownish	Opaque	Perfect
Yellow			Not determined
Brown			Perfect
Grey		Opaque	None
Black		Translucent-opaque	None
Black	Black		Not determined
Yellow	Grey	Opaque	Not determined
Variety of colours	Colourless	Transparent-translucent	Perfect
Green	Green-greenish	Transparent-translucent	Perfect
Green		Translucent	Not determined
White		Translucent	Good
Blue		Translucent	Perfect
Variety of colours	Colourless	Transparent-translucent	Indistinct
Red		Opaque	Not determined
Reddish brown	Red-reddish	Transparent-translucent	None
Red		Opaque	Good
Variety of colours	White-whitish	Transparent-translucent	Good

Black	Black	Opaque	None
Yellow			Separation planes
Colourless		Transparent	None
Yellow to yellowish brown		Translucent	Perfect
Colourless		Transparent	Not determined
Pink		Transparent	Distinct in one direction
Grey	Colourless	Translucent-Transparent	Perfect
Reddish brown	Brown-brownish	Translucent-opaque	Good
Variety of colours	White-whitish	Transparent-translucent	Good
Greenish blue			Perfect
Yellow	Yellow-yellowish	Translucent	Not determined
Yellow to yellowish green			Not determined
Brown		Translucent	None
Black		Translucent	None
Yellow		Transparent	Perfect
Violet			Not determined
Brown	Black	Opaque	None
Green			Indistinct
Variety of colours		Transparent-translucent	Perfect
White		Translucent	Perfect
			Not determined
Dark green		Sub-translucent-Opaque	Perfect
White	White-whitish	Transparent	Not determined
Brown		Translucent	Not determined
Green		Transparent	None
Silver		Opaque	Not determined
Yellow		Opaque	Not determined
Brown	Grey		Not determined
White		Transparent-translucent	Distinct in one direction
Black			Good
			Not determined
Yellow to yellowish green	Yellow-yellowish	Transparent	Not determined
Colourless			Perfect
Grey	Grey	Opaque	Not determined
Yellow		Transparent	Perfect
Colourless to white			Very good
Reddish brown			Not determined
Colourless to white	White-whitish		None
Blue	White-whitish	Transparent	Perfect
Colourless		Transparent	Clear
Yellow to yellowish brown		Transparent-translucent	Perfect
Grey	Grey-black		Perfect
White			
Black	Black	Opaque	Perfect
Colourless		Transparent	None
White			Separation planes
Greenish blue	Blue-bluish	Translucent	Perfect

Bronze to brassy		Opaque	Distinct in one direction
Yellow		Translucent-opaque	Perfect
Grey		Opaque	Not determined
Colourless		Transparent	Not determined
Colourless to white			Perfect
White	Grey-black	Opaque	Perfect
Green	Green-greenish	Translucent	Not determined
Black			Not determined
Black	Black	Opaque	Poor
Colourless			Perfect
Green			None
Black		Opaque	None
Yellow		Transparent	Perfect
Yellow			
Colourless		Transparent	Distinct in one direction
Colourless to white			Not determined
Light green to blackish green		Transparent-translucent	Good in two directions
Yellow			None
Black	Black	Opaque	Not determined
Yellow to yellowish brown		Translucent	None
Yellow	Yellow-yellowish	Transparent	Perfect
Yellow		Transparent-translucent	Perfect
Yellow		Transparent-translucent	Perfect
Yellow		Translucent	Perfect
Yellow			Not determined
Yellow to yellowish green			Perfect
Yellow to orange	Orange		Distinct in one direction
Yellow			Perfect
Yellow to yellowish brown	Yellow-yellowish		Perfect
Yellow to yellowish brown		Translucent-opaque	None
			Perfect
Yellow			Not determined
Yellow to orange			Perfect
Brown	White-whitish	Translucent	Perfect
Red			Perfect
Brown to brownish green			Not determined
Green	White-whitish	Transparent-translucent	None
Variety of colours	White-whitish	Transparent-translucent	None
			Not determined
Yellow			Distinct in one direction
White		Opaque	Perfect
Yellow to yellowish brown	White-whitish	Transparent	Perfect
Bronze to brassy		Opaque	Perfect
Red	White-whitish	Transparent-opaque	Not determined
Yellow			Perfect
Green		Translucent	Perfect
Orange		Transparent-translucent	Perfect

			Good
Colourless		Transparent	Not determined
Yellow		Transparent	Perfect
Yellow		Translucent	Perfect
Green	White-whitish	Transparent-translucent	Perfect
Yellow			None
Yellow to yellowish green		Transparent-translucent	Good
White		Sub-translucent	Perfect
Colourless			Not determined
Green	Green-greenish	Transparent-translucent	
Blue	White-whitish	Transparent-translucent	None
Pink		Transparent	Distinct in one direction
Colourless		Transparent	Perfect
Colourless		Transparent	Perfect
Grey	Black		None
Grey		Opaque	
Black	Black	Opaque	
Yellow to yellowish brown	Orange	Transparent-translucent	Good
Black		Opaque	Perfect
Colourless		Transparent	None
Green			Good
Variety of colours	White-whitish	Transparent-translucent	Indistinct
Blue		Translucent	Good
Orange		Opaque	Clear
Grey			Clear
			Not determined
Black		Opaque	None
Red	White-whitish	Transparent-translucent	Perfect
Colourless			None
Colourless		Transparent	Perfect
Orange		Opaque	Not determined
Colourless			Perfect
Grey		Opaque	Imperfect
Colourless		Transparent	
White		Transparent-translucent	None
Variety of colours	Colourless	Transparent-translucent	Perfect
Yellow			Not determined
Red			Not determined
Greenish blue	Colourless	Translucent	Perfect
Red		Transparent	Good
Colourless		Transparent	Distinct in one direction
Green	Green-greenish		Perfect
Green		Translucent-Sub-translucent	Perfect
Orange			Perfect
Dark green	Green-greenish	Opaque	None
Grey		Opaque	Perfect
Black		Opaque	None
Yellow	Black	Opaque	Distinct in one direction
Black	Red-reddish	Translucent	Good

White			Not determined
Bronze to brassy			Not determined
Yellow			Perfect
Grey			Not determined
Green			Not determined
Silver			Not determined
Colourless		Transparent	None
Colourless		Transparent	None
Brown			Not determined
Brown to brownish green	White-whitish	Translucent-opaque	Imperfect
Colourless to white			Distinct in one direction
Grey		Opaque	Not determined
Yellow	Yellow-yellowish		Perfect
Black	Brown-brownish	Opaque	None
Yellow			Not determined
Yellow to yellowish green	Yellow-yellowish		Perfect
Grey		Opaque	Good
Red	Orange		Perfect
Yellow		Transparent-translucent	Perfect
White			Perfect
Colourless to white	White-whitish	Transparent-translucent	Perfect
Colourless		Transparent	Poor
Yellow			Perfect
Brown	Black	Sub-translucent	Perfect
Variety of colours	White-whitish	Transparent-translucent	Perfect
White	White-whitish	Opaque	Not determined
White	White-whitish	Translucent	Poor
Colourless to white		Transparent	Good
Yellow			Not determined
Colourless			Distinct in one direction
Grey	Grey	Opaque	Good
White			Not determined
White			Not determined
Grey			Perfect
Black	Black	Opaque	None
Reddish brown			Poor
Colourless to white		Transparent-translucent	Good
White	White-whitish	Transparent	Perfect
Brown	Brown-brownish		None
Red	Pink	Transparent	Perfect
Grey			Poor
Grey			Perfect
White		Opaque	Not determined
Blue			Perfect
Yellow to yellowish green			
Colourless	White-whitish	Transparent-translucent	Very good
Yellow to yellowish brown		Transparent-translucent	

Colourless		Transparent-translucent	None
Brown			Not determined
White			Indistinct
Yellow to orange			Not determined
Blue	Green-greenish		Good
Yellow			Perfect
Bluish green		Transparent	Not determined
Colourless			Perfect
Colourless to white			Not determined
Yellow to yellowish brown		Transparent-translucent	Perfect
			Good
Variety of colours	Colourless	Transparent-translucent	Poor
Green			Perfect
Colourless		Transparent	Perfect
Grey	Grey-black	Opaque	Perfect
Blue			Not determined
Yellow			Not determined
White			Perfect
Colourless to white	White-whitish	Transparent-translucent	Distinct in one direction
Grey	Black	Opaque	Distinct in one direction
Grey	Black	Opaque	Good
Yellow to yellowish brown	Yellow-yellowish	Transparent-translucent	Clear
Reddish brown	White-whitish	Transparent-translucent	Perfect
Brown	Yellow-yellowish	Transparent-translucent	Perfect
Black		Opaque	Clear
White	White-whitish	Transparent-translucent	Perfect
Orange			Good
			Perfect
White		Transparent-translucent	Perfect
Black			Not determined
Blue	Blue-bluish		Perfect
Orange	White-whitish	Transparent-translucent	Distinct in one direction
Black	Brown-brownish	Translucent	Distinct in one direction
Black	Brown-brownish	Opaque	Perfect
Yellow			Not determined
Orange	Yellow-yellowish	Transparent-translucent	Distinct in one direction
Yellow			Perfect
Yellow to yellowish brown		Translucent-opaque	Perfect
Yellow	Yellow-yellowish		
Grey	Black	Opaque	None
Grey	Grey	Opaque	Not determined
Grey		Opaque	Not determined
Green	Yellow-yellowish	Transparent-translucent	Imperfect
Green	Green-greenish		Not determined
White		Translucent-Transparent	Good

Brown			Not determined
Colourless			Not determined
White		Transparent	Not determined
			Not determined
Pink	White-whitish	Transparent	Perfect
Colourless			
Brown	Brown-brownish		Perfect
Violet	White-whitish	Transparent-translucent	Distinct in one direction
Yellow		Transparent	Poor
Black	Brown-brownish	Opaque	Perfect
White		Opaque	None
Violet			Good
Pink			Not determined
Orange		Transparent-translucent	Perfect
Green			
Black		Opaque	Not determined
Brown		Opaque	
Black	Grey	Opaque	Indistinct
Yellow			Good
Colourless to white			Imperfect
Brown			
Red		Transparent	
Red		Translucent	Not determined
White			Good
Green			Not determined
Yellow			Perfect
Blue	Blue-bluish	Translucent	Good
Green	Green-greenish	Transparent-translucent	Not determined
Grey		Translucent	Not determined
Colourless to white	White-whitish		Perfect
Yellow			Not determined
Brown			
White		Translucent	Perfect
Yellow to yellowish green		Transparent	Perfect
Green			Fair
Yellow		Transparent	Not determined
Black	Brown-brownish	Opaque	Not determined
White		Translucent-Sub-translucent	Not determined
Grey	White-whitish	Opaque	Perfect
Greenish blue			Not determined
Yellow to orange	Yellow-yellowish	Translucent-Transparent	Perfect
Orange		Transparent-translucent	
Yellow to yellowish green			Not determined
White			Perfect

Grey	Grey	Opaque	Indistinct
Grey	White-whitish	Transparent	Perfect
Yellow to orange	Yellow-yellowish	Transparent	Perfect
Variety of colours	White-whitish	Transparent	Imperfect
Brown	Brown-brownish		Perfect
Colourless to white			Not determined
Black		Opaque	None
Colourless		Transparent	None
Variety of colours	Colourless	Transparent-translucent	Perfect
Red			Perfect
Grey		Opaque	None
Colourless to white		Transparent-translucent	Not determined
Green		Translucent	Perfect
			Not determined
Brown		Translucent	Perfect
Grey		Opaque	Not determined

LUSTRE,C,20	DENSITY,N	FAMILY,C,30
Sub-metallic	1.45000	
Vitreous	3.32000	Meta-autunite
Opalescent	4.29000	
Metallic	7.22000	
	1.17000	
Metallic	6.58000	
Vitreous	3.00000	Amphibole
	4.32000	Adamite
Resinous	3.73000	Adelite
	1.82000	
Vitreous	2.55000	Feldspar
Vitreous	3.55000	Pyroxene
	3.74000	Aenigmatite
	5.85000	
Adamantine	5.19000	
Adamantine	4.60000	
Adamantine	4.95000	
	2.55000	Cancrinite
Vitreous	2.62000	
	0.00000	Mixite
	3.72000	Mixite
Vitreous	2.53000	Quartz
Pearly	2.90000	
	5.70000	
Metallic	7.40000	Argentite
Vitreous	3.37000	
Metallic	7.07000	
	2.96000	
	3.56000	
Vitreous	3.48000	
Vitreous	3.68000	
Vitreous	2.94000	Melilite
	3.26000	
	1.99000	
Metallic	5.50000	
Sub-metallic	3.95000	Alabandine
Adamantine	6.49000	
Vitreous	2.60000	Feldspar
	2.15000	
	2.21000	
	7.80000	
	4.73000	Apatite
Metallic	8.38000	
Vitreous	3.83000	
Resinous	4.12000	Epidote
Metallic	10.00000	
Vitreous	4.02000	Humite

Metallic	6.16000	Arsenopyrite
Vitreous	2.72000	
	3.52000	
Vitreous	4.31000	Garnet
Vitreous	3.71000	
Metallic	8.19000	
Vitreous	2.97000	
	2.16000	Copiapite
Dull	2.70000	
	2.23000	
	2.68000	Pharmacosiderite
Adamantine	0.00000	
Vitreous	2.60000	Alunite
Vitreous	1.77000	
Vitreous	2.41000	
	2.98000	Brucite
Vitreous	2.19000	
Vitreous	2.19000	
Vitreous	2.55000	Feldspar
Dull	1.00000	
Vitreous	3.08000	Amblygonite
	2.03000	
Pearly	2.77000	Kaolinite-Serpentine
Vitreous	2.53000	Quartz
	2.06000	Zeolite
Vitreous	2.94000	
	1.77000	
Dull	3.03000	Alunite
Resinous	2.29000	
Vitreous	2.22000	Zeolite
	3.94000	Mica
Vitreous	2.81000	
Adamantine	3.82000	
Vitreous	3.95000	
Vitreous	3.13000	
Vitreous	2.80000	
Vitreous	2.66000	Feldspar
Metallic	5.38000	
Vitreous	3.70000	Garnet
	4.15000	
Silky	3.48000	
Metallic	8.69000	
Adamantine	4.87000	
Adamantine	6.38000	Barite
Vitreous	2.98000	
Metallic	5.68000	
Vitreous	2.97000	Dolomite
Adamantine	3.07000	Vivianite

	3.33000	Mica
Vitreous	2.74000	Feldspar
Vitreous	2.56000	Feldspar
Vitreous	1.72000	
	5.06000	
	0.00000	
Vitreous	2.85000	Amphibole
Greasy	2.61000	Kaolinite-Serpentine
Sub-metallic	6.33000	
Metallic	6.68000	Arsenic
Vitreous	3.88000	
	2.80000	
Vitreous	3.10000	Apatite
Vitreous	2.71000	
Silky	1.81000	Halotrichite
Vitreous	2.33000	Rozenite
Metallic	5.33000	
Vitreous	2.60000	Beryl
Vitreous	2.94000	Aragonite
Metallic	5.60000	
Vitreous	2.66000	
	2.23000	
Vitreous	3.13000	
	6.17000	
	2.30000	
Sub-adamantine	3.62000	
Vitreous	3.37000	Amphibole
Metallic	7.20000	
	3.66000	Alunite
	4.66000	Pentlandite
Metallic	4.25000	
	6.28000	Rutile
Metallic	6.20000	
	0.00000	
Vitreous	2.03000	
	4.94000	
	4.43000	
Vitreous	2.76000	Osumilite
Vitreous	2.56000	
Vitreous	3.56000	
Resinous	6.54000	Brackebuschite
Sub-adamantine	6.57000	Descloizite
Metallic	5.72000	Arsenic
Sub-metallic	3.58000	Arseniosiderite
	0.00000	
	4.16000	
Vitreous	3.25000	Crandallite
	3.35000	Crandallite
Metallic	6.35000	Hauchecornite

Metallic	5.30000	
Vitreous	3.87000	
	10.40000	
Metallic	6.07000	Arsenopyrite
Metallic	4.01000	
Metallic	6.18000	
	6.46000	Brackebuschite
	2.54000	
	4.25000	
Vitreous	3.20000	Arthurite
Vitreous	2.02000	
Vitreous	3.70000	
Silky	2.53000	Kaolinite-Serpentine
	0.00000	
Metallic	7.33000	
Sub-metallic	6.61000	
	2.61000	
Greasy	5.60000	
Sub-metallic	3.30000	Astrophyllite
Vitreous	3.76000	
Resinous	6.82000	
	6.59000	
	10.20000	
	14.90000	
	3.23000	
	1.82000	
Vitreous	2.69000	
Vitreous	3.23000	Pyroxene
Silky	3.96000	
	13.70000	
	0.00000	
Metallic	9.98000	Pyrite
Sub-adamantine	4.13000	Adelite
Vitreous	3.05000	Autunite
Metallic	9.57000	
	3.00000	
Metallic	0.00000	
Vitreous	3.29000	Axinite
Adamantine	3.63000	Ludwigite
Vitreous	3.77000	
Vitreous	4.31000	
Vitreous	3.36000	
Greasy	5.73000	
	3.96000	Seidozerite
Vitreous	3.48000	Wöhlerite
Adamantine	4.89000	
Vitreous	2.88000	Gadolinite
Greasy	2.98000	
Silky	3.33000	Carpholite

Metallic	6.32000	
	5.64000	
Metallic	5.64000	
Vitreous	3.06000	Feldspar
Vitreous	2.81000	
Sub-metallic	3.50000	
	2.83000	
Vitreous	4.71000	
Vitreous	2.15000	
	2.92000	
Pearly	2.10000	Manasseite
Vitreous	3.60000	Lazulite
Vitreous	2.56000	
	2.70000	
	2.42000	Vivianite
Vitreous	3.95000	Jaoquinite
	5.68000	Pyrochlore
	4.00000	Pyrochlore
Vitreous	4.40000	
	3.24000	Pharmacosiderite
Adamantine	3.15000	
	2.13000	Zeolite
	6.92000	
	2.85000	
	4.97000	
	3.31000	
Vitreous	4.05000	
	6.55000	
Vitreous	3.66000	
Vitreous	3.62000	Seidozerite
Dull	2.12000	
	2.70000	
Vitreous	3.63000	Meta-autunite
Vitreous	4.78000	
	3.90000	
	3.43000	
Metallic	5.33000	
Dull	2.90000	Kaolinite-Serpentine
	2.40000	Gibbsite
Vitreous	2.71000	
Metallic	0.00000	
	2.53000	
Resinous	5.50000	
Vitreous	2.05000	
	0.00000	
	3.82000	Benitoite
Vitreous	2.77000	
	1.80000	

	4.31000	Alunite
Adamantine	5.14000	
Adamantine	7.86000	
Vitreous	1.92000	
Greasy	0.00000	Smectite
	7.03000	
Vitreous	4.89000	
Vitreous	4.19000	Apatite
Pearly	2.90000	
	5.60000	
Vitreous	3.64000	Benitoite
	6.70000	
Vitreous	3.60000	
Vitreous	2.03000	Ettringite
Vitreous	3.01000	
Vitreous	2.20000	
Metallic	0.00000	
	4.09000	
Vitreous	3.40000	
Vitreous	2.64000	
Vitreous	2.84000	
Vitreous	3.32000	
	4.50000	Melonite
Metallic	6.70000	
	3.03000	Kaolinite-Serpentine
Metallic	4.64000	
Vitreous	3.10000	
Vitreous	2.60000	
Vitreous	2.60000	
Silky	2.20000	
Vitreous	2.84000	
Metallic	6.65000	
Resinous	4.08000	
	16.30000	
Sub-metallic	4.15000	Pyrochlore
	5.96000	
Greasy	2.98000	
Vitreous	4.00000	Beudantite
Vitreous	3.70000	
Vitreous	6.56000	
Vitreous	2.03000	Hexahydrite
	2.75000	
Adamantine	6.27000	
Vitreous	1.95000	Melanterite
Vitreous	3.90000	
Vitreous	2.28000	Zeolite
Adamantine	5.28000	

Metallic	5.92000	
Resinous	4.60000	Stibiconite
Sub-metallic	2.70000	Mica
	2.04000	
	2.32000	
	3.00000	
Vitreous	1.56000	
Sub-adamantine	8.64000	
Greasy	7.72000	
Metallic	9.70000	
Metallic	6.78000	
Vitreous	6.10000	
	0.00000	
Resinous	6.83000	Pyrochlore
	7.38000	Stibiconite
Adamantine	8.51000	
	3.02000	Mica
Metallic	4.95000	
Sub-adamantine	4.02000	Bjarebyite
Dull	3.10000	
Vitreous	7.35000	
	2.25000	
Resinous	3.54000	
Vitreous	2.19000	
	3.07000	
Sub-metallic	0.00000	
	3.66000	
Metallic	7.87000	
	2.97000	
Pearly	5.05000	
Vitreous	1.97000	
Pearly	3.60000	
	5.17000	Ludwigite
	2.68000	
Metallic	6.92000	
Vitreous	2.95000	
Vitreous	2.10000	Melanterite
Vitreous	2.95000	Boracite
Vitreous	1.71000	
Vitreous	2.77000	
	0.00000	
	0.00000	
Pearly	3.47000	
	0.00000	Linnaeite
Metallic	5.07000	
Metallic	8.12000	
Vitreous	2.93000	
	3.60000	
Vitreous	2.14000	

Metallic	6.23000	
Metallic	5.83000	Bournonite
	1.72000	Picromerite
	2.41000	Rozenite
	4.72000	Monazite
	4.45000	Diaspore
Sub-metallic	6.05000	Brackebuschite
	2.73000	
Metallic	10.00000	
Vitreous	2.90000	
	2.88000	Mica
Vitreous	3.67000	Roselite
Vitreous	4.20000	
Vitreous	2.98000	Osumilite
	2.28000	
Sub-metallic	4.72000	
Metallic	4.82000	Pyrite
Vitreous	2.98000	
Vitreous	3.40000	
Metallic	7.59000	Niccolite
	3.10000	
Vitreous	2.45000	Zeolite
	4.12000	
	3.00000	
Metallic	4.50000	Stannite
	3.16000	Kaolinite-Serpentine
Adamantine	3.86000	Apatite
Adamantine	0.00000	
Vitreous	3.97000	
Greasy	3.90000	Rhabdophane
Resinous	6.47000	
Vitreous	3.02000	
Adamantine	4.14000	
	3.76000	
Pearly	2.39000	Brucite
Vitreous	4.24000	
Pearly	2.14000	
	5.51000	
Vitreous	2.33000	
	3.21000	
Vitreous	2.32000	Feldspar
	3.31000	Tourmaline
	2.61000	
Metallic	7.36000	
Earthy	2.33000	
Silky	2.60000	
	2.73000	
Vitreous	6.70000	Periclase

	3.05000	
	3.50000	
Adamantine	4.96000	
Vitreous	2.57000	
Metallic	7.62000	
Vitreous	3.28000	Schoenfliesite
Vitreous	3.32000	
Vitreous	2.55000	
Vitreous	3.42000	
	5.70000	Tapiolite
Vitreous	2.72000	Feldspar
Metallic	10.70000	
Silky	2.26000	
Metallic	8.64000	
Resinous	5.66000	
Vitreous	1.66000	
	3.82000	
Adamantine	3.28000	
Vitreous	3.16000	
Metallic	9.10000	Calaverite
	2.88000	
	2.22000	Copiapite
Pearly	2.53000	
Adamantine	7.46000	
Vitreous	3.75000	Adelite
Vitreous	2.71000	Calcite
Vitreous	2.77000	
	3.51000	
	1.55000	
	0.00000	
	4.07000	Garnet
Vitreous	5.76000	
	3.28000	
Vitreous	2.71000	
Adamantine	7.16000	
Pearly	0.00000	
Adamantine	5.01000	
Vitreous	3.06000	
Vitreous	2.24000	
Vitreous	2.70000	
Vitreous	1.80000	
Vitreous	2.42000	Cancrinite
Metallic	6.28000	
Metallic	6.70000	
	4.41000	
Vitreous	5.10000	
	3.00000	

Vitreous	2.12000	
Vitreous	3.53000	
Vitreous	3.95000	
Silky	2.65000	
Greasy	3.12000	Apatite
	3.05000	Apatite
Vitreous	2.45000	
	6.30000	
Vitreous	2.86000	
Metallic	8.10000	
Vitreous	2.61000	
	5.90000	
Vitreous	5.22000	
Greasy	1.60000	
Pearly	4.70000	
	2.52000	
Silky	2.90000	Carpholite
	2.50000	
Metallic	4.50000	Linnaeite
Greasy	4.29000	
	2.87000	Friedelite
Vitreous	3.01000	Pyroxenoid
	3.10000	Fairfieldite
Adamantine	6.99000	Rutile
	3.21000	
Vitreous	2.74000	
Metallic	4.80000	Pyrite
Vitreous	2.21000	
Vitreous	3.03000	
Vitreous	4.81000	
Vitreous	2.96000	
Sub-metallic	5.88000	Descloizite
Dull	2.95000	Mica
Vitreous	3.97000	Barite
Vitreous	3.10000	Feldspar
	7.22000	
Resinous	4.13000	Pyrochlore
Resinous	4.78000	
Metallic	4.78000	Stannite
	0.00000	
	2.70000	
Adamantine	6.55000	Aragonite
	6.50000	
	2.79000	
	4.45000	
	3.68000	Astrophyllite
Vitreous	2.05000	Zeolite
Sub-metallic	5.12000	

Vitreous	2.28000	Chalcanthite
	2.53000	Quartz
Vitreous	2.29000	
Metallic	5.50000	
	3.65000	
Vitreous	3.31000	
	2.27000	
Metallic	3.83000	
Pearly	2.67000	
Metallic	4.35000	Chalcopyrite
Vitreous	3.22000	Turquoise
Metallic	4.80000	
Metallic	6.60000	
	6.14000	Cuprite
Vitreous	3.49000	Boracite
	6.17000	
Vitreous	3.12000	Chlorite
Adamantine	6.48000	
Vitreous	2.80000	
	3.43000	
	3.69000	
Vitreous	1.77000	Ettringite
	2.54000	
	5.00000	
	0.00000	
Greasy	4.38000	
Vitreous	5.98000	
Resinous	5.30000	Monazite
Metallic	9.72000	
Vitreous	4.87000	Xenotime
	3.14000	Mica
Adamantine	6.30000	
Silky	2.21000	
Resinous	4.30000	
Vitreous	2.64000	
Vitreous	3.19000	Childrenite-Eosphorite Series
Vitreous	3.00000	
Vitreous	2.66000	
	1.67000	
Vitreous	3.10000	Apatite
Resinous	5.55000	
Pearly	3.58000	
	1.98000	Manassesite
Vitreous	2.31000	
Vitreous	3.46000	
	2.69000	
Resinous	6.93000	
Adamantine	6.40000	

Vitreous	3.16000	Humite
Adamantine	6.37000	
	3.14000	
	3.40000	Tourmaline
Metallic	4.50000	Spinel
	7.20000	
Vitreous	3.75000	
Vitreous	2.01000	
	2.53000	Quartz
	2.94000	
	0.00000	
Vitreous	2.27000	
Vitreous	3.27000	
Adamantine	9.06000	
Adamantine	8.09000	
Vitreous	2.53000	Quartz
	2.69000	
	2.31000	
	3.34000	
	3.90000	
Metallic	8.08000	
Adamantine	6.57000	
	2.26000	
	6.95000	
Vitreous	3.28000	
Vitreous	2.63000	Chlorite
	2.53000	Kaolinite-Serpentine
Vitreous	4.33000	
Vitreous	3.19000	Pyroxene
Vitreous	4.07000	Pyroxene
Vitreous	3.28000	
	3.00000	Amphibole
Vitreous	3.17000	Humite
	3.02000	
	3.07000	
Vitreous	2.88000	
Vitreous	2.10000	Zeolite
Metallic	7.46000	
	3.22000	
Vitreous	3.21000	Epidote
Vitreous	3.10000	Mica
Resinous	2.33000	
Metallic	5.34000	Pentlandite
	3.30000	
Metallic	6.33000	Cobaltite
Vitreous	0.00000	
Vitreous	3.39000	
Metallic	5.22000	Spinel

	2.90000	
	2.57000	
Vitreous	2.93000	
Dull	5.10000	
	7.20000	
Vitreous	2.42000	
Vitreous	2.93000	Fairfieldite
Metallic	8.07000	Sphalerite
	2.94000	
Sub-metallic	4.63000	
Metallic	4.50000	
Resinous	7.70000	
	2.84000	
	3.05000	Hydrotalcite
	5.03000	
	3.58000	Boracite
Vitreous	4.33000	Adelite
Vitreous	3.36000	
Pearly	2.58000	Chlorite
Metallic	9.50000	
Pearly	2.08000	Copiapite
Metallic	8.94000	
Vitreous	2.11000	
	6.85000	
Vitreous	2.53000	Cordierite
Greasy	5.61000	
Vitreous	4.29000	Beudantite
Vitreous	4.10000	
	4.64000	
Dull	4.52000	
Sub-metallic	5.44000	Cryptomelane
Vitreous	4.00000	Hematite
Metallic	6.86000	
Metallic	6.89000	Löllingite
Adamantine	5.88000	
Metallic	5.17000	Spinel
Sub-metallic	4.68000	
	2.14000	Zeolite
Metallic	2.87000	
Vitreous	2.78000	Crandallite
	4.10000	
Metallic	5.34000	
Vitreous	2.71000	
	4.46000	Crichtonite
	2.33000	
Vitreous	3.32000	Amphibole
Adamantine	5.99000	
Vitreous	3.34000	Kaolinite-Serpentine
Metallic	6.90000	

Vitreous	3.11000	Amphibole
Vitreous	2.97000	
Vitreous	2.77000	
Vitreous	2.01000	
Metallic	4.36000	Cryptomelane
Vitreous	3.18000	
Metallic	4.03000	
Vitreous	4.70000	
Silky	3.10000	Amphibole
Metallic	5.12000	
Adamantine	6.14000	
Metallic	6.47000	
Pearly	2.08000	Copiapite
Metallic	7.24000	
	0.00000	
Metallic	6.74000	
Vitreous	3.08000	
Sub-vitreous	3.85000	
	13.00000	Spinel
	8.24000	
Vitreous	7.06000	
	4.42000	
	4.88000	
Adamantine	7.40000	
Vitreous	2.80000	
	3.90000	
Vitreous	2.22000	Picromerite
Pearly	3.10000	
Silky	2.74000	
Metallic	5.46000	
Vitreous	3.41000	
Vitreous	3.08000	
Vitreous	2.17000	Zeolite
Metallic	5.76000	
Vitreous	2.84000	
Vitreous	3.31000	Helvite
Metallic	7.36000	
Vitreous	2.97000	
Silky	3.34000	Amphibole
Metallic	7.30000	
Greasy	3.71000	
	2.92000	Osumilite
Vitreous	2.20000	
Vitreous	2.80000	Gadolinite
Dull	7.56000	
Metallic	3.81000	Linnaeite
Vitreous	2.76000	

Sub-vitreous	4.42000	Crichtonite
Silky	3.15000	
Vitreous	2.42000	Cancrinite
Vitreous	2.44000	
	3.84000	
Vitreous	2.50000	
Metallic	5.41000	
	2.60000	
Vitreous	3.10000	
Vitreous	1.85000	
Vitreous	3.70000	Garnet
	5.28000	
Pearly	2.76000	
Adamantine	5.05000	
Resinous	4.53000	
	4.72000	
Metallic	0.00000	
	2.13000	Hydrotalcite
Vitreous	6.24000	Descloizite
Vitreous	2.46000	
Vitreous	3.13000	
	5.03000	
Vitreous	5.42000	
Resinous	2.00000	
Adamantine	3.51000	
Metallic	5.97000	
Vitreous	3.30000	Diaspore
Vitreous	3.41000	
Dull	2.60000	Kaolinite-Serpentine
	3.62000	
Sub-metallic	5.60000	
Adamantine	3.58000	
Vitreous	3.22000	Pyroxene
Vitreous	3.28000	
	2.19000	
	4.20000	
Sub-metallic	0.00000	
Metallic	5.63000	
	4.17000	
Vitreous	2.85000	Dolomite
Sub-metallic	3.27000	
Metallic	7.92000	
Metallic	5.00000	
Vitreous	3.30000	Mckelveyite
Vitreous	3.36000	Pyroxene
	2.00000	
Vitreous	2.16000	
Adamantine	4.14000	

Vitreous	2.48000	
Vitreous	3.03000	Tourmaline
Vitreous	2.96000	Dundasite
Adamantine	6.25000	
	5.55000	
	6.25000	
Silky	3.10000	
Metallic	5.53000	
Vitreous	6.40000	Adelite
Adamantine	6.33000	
	5.80000	
	5.65000	
Vitreous	3.41000	
Vitreous	3.41000	Dundasite
Vitreous	3.90000	
	4.50000	
	3.75000	Crandallite
	3.24000	
	3.34000	Kieserite
Pearly	2.15000	
	9.74000	
	4.34000	
Vitreous	2.93000	
	1.95000	
Vitreous	2.90000	Arthurite
Vitreous	7.14000	
Vitreous	3.00000	Amphibole
Metallic	6.85000	
Vitreous	3.00000	Amphibole
Vitreous	2.77000	Zeolite
Vitreous	2.76000	
Adamantine	8.32000	
Vitreous	2.64000	
Vitreous	2.67000	Osumilite
Vitreous	2.73000	
Vitreous	3.08000	
Pearly	2.44000	
Vitreous	3.03000	Tourmaline
Metallic	7.10000	
Vitreous	2.99000	
Silky	2.52000	
Silky	6.00000	
Dull	6.45000	
	2.60000	Beryl
Vitreous	4.52000	
Metallic	6.30000	
Metallic	7.61000	
Metallic	4.45000	
Pearly	2.11000	Kaolinite-Serpentine

Vitreous	2.68000	
Vitreous	3.05000	
Vitreous	2.98000	Mica
Vitreous	2.55000	
Vitreous	3.35000	Epidote
Vitreous	2.22000	Zeolite
Pearly	2.65000	
Vitreous	1.67000	
Metallic	2.30000	
Vitreous	3.22000	Boracite
	4.21000	Seidozerite
Vitreous	2.47000	
	2.02000	Zeolite
Silky	3.11000	
Metallic	9.59000	Pyrite
	0.00000	
Vitreous	2.35000	
Adamantine	3.18000	Vivianite
Vitreous	2.37000	
Metallic	0.00000	Chalcopyrite
	7.10000	
Metallic	5.18000	Hematite
Vitreous	4.28000	
Vitreous	3.54000	Pyroxene
Vitreous	1.77000	Ettringite
Metallic	7.60000	
	0.00000	
Vitreous	3.44000	
Vitreous	3.05000	
Vitreous	2.66000	
Vitreous	2.74000	
Vitreous	2.55000	
	0.00000	
Vitreous	6.60000	
Adamantine	4.30000	
Vitreous	1.80000	
	3.76000	Adamite
Resinous	0.00000	
	3.25000	
	3.38000	Crandallite
Vitreous	2.05000	
	4.50000	
Vitreous	2.77000	
	2.66000	
Adamantine	0.00000	
	2.45000	
Vitreous	3.08000	Fairfieldite
	1.90000	

Metallic	4.64000	Stannite
	2.74000	
Vitreous	1.92000	Zeolite
Dull	2.92000	Turquoise
Vitreous	4.32000	Olivine
Vitreous	2.43000	
	2.65000	
Pearly	2.74000	
Sub-metallic	7.51000	
Metallic	5.05000	
Vitreous	5.70000	
Vitreous	5.34000	
Vitreous	0.00000	
	5.58000	
Greasy	3.52000	Apatite
	4.20000	
	2.63000	
	0.00000	Mica
	0.00000	
Resinous	3.26000	
Vitreous	2.14000	Zeolite
	3.80000	
	0.00000	Amphibole
Adamantine	4.25000	
Earthy	4.46000	
Vitreous	2.55000	
Dull	3.41000	
	5.20000	
Vitreous	3.51000	Amphibole
	3.79000	
Vitreous	0.00000	Amphibole
	3.29000	Axinite
	3.09000	Pyroxenoid
	3.04000	Carpholite
Sub-metallic	4.63000	
Vitreous	3.54000	Amphibole
Vitreous	3.04000	Amphibole
Vitreous	1.93000	Hexahydrite
Vitreous	3.41000	Amphibole
Metallic	15.39000	
Vitreous	3.44000	Amphibole
Sub-metallic	3.46000	
Metallic	7.21000	Marcasite
Vitreous	2.50000	
Sub-metallic	8.20000	
Vitreous	0.00000	Amphibole
Vitreous	2.79000	

Vitreous	3.60000	
	2.50000	
Metallic	5.95000	
Vitreous	3.44000	
Sub-vitreous	4.69000	
Silky	1.92000	
Adamantine	5.88000	
Greasy	3.43000	
Metallic	4.78000	
Sub-adamantine	7.27000	
	9.05000	
Metallic	5.56000	
	1.09000	
Silky	4.20000	
Metallic	4.76000	Linnaeite
Vitreous	3.78000	
Resinous	3.46000	Crandallite
	0.00000	
	3.05000	
Vitreous	2.18000	
Vitreous	2.98000	
Vitreous	5.93000	
Vitreous	5.93000	
Vitreous	3.10000	Apatite
	2.37000	Apophyllite
	0.00000	Apatite
Vitreous	3.18000	
	2.78000	
Vitreous	7.03000	
	0.00000	
Vitreous	3.27000	Olivine
Silky	2.36000	
Adamantine	5.74000	
Silky	0.00000	
Adamantine	4.55000	
Vitreous	4.10000	Welinite
Metallic	5.88000	
	2.26000	
Vitreous	2.71000	
Vitreous	4.89000	
Metallic	5.07000	Spinel
Sub-vitreous	2.56000	
Pearly	2.49000	Cancrinite
Metallic	0.00000	Niccolite
Vitreous	3.84000	Ludwigite
Vitreous	7.00000	
Metallic	5.05000	Tetrahedrite
Metallic	6.20000	

Vitreous	4.43000	
	4.30000	
Vitreous	3.04000	Friedelite
	6.98000	
Vitreous	3.50000	Autunite
	8.07000	Marcasite
Dull	3.48000	
Metallic	12.50000	
	2.77000	
Sub-metallic	4.80000	Pyrite
Metallic	5.22000	
Vitreous	2.82000	
Metallic	6.74000	
Adamantine	6.67000	Adelite
Vitreous	4.20000	Gadolinite
Vitreous	4.00000	Gadolinite
Dull	4.21000	
Vitreous	3.46000	
Vitreous	4.61000	Spinel
	2.67000	
Vitreous	2.94000	
Vitreous	3.81000	Fairfieldite
	4.08000	Spinel
	2.61000	
Metallic	7.58000	
Metallic	7.04000	
Adamantine	5.40000	Tetrahedrite
Metallic	4.40000	Chalcopyrite
Adamantine	4.62000	Brackebuschite
Vitreous	5.74000	
	2.84000	
Metallic	5.64000	
	3.68000	
Earthy	5.38000	
Vitreous	3.16000	
Vitreous	3.71000	Calcite
Adamantine	0.00000	
Pearly	2.92000	
Sub-vitreous	3.35000	
Vitreous	1.99000	
Dull	2.77000	
Adamantine	6.00000	
Vitreous	3.15000	Amphibole
Metallic	5.61000	
Metallic	5.39000	
Vitreous	3.04000	Melilite
Sub-metallic	4.05000	Ilmenite
	9.26000	

Vitreous	3.62000	Helvite
Metallic	6.40000	
	2.70000	
Vitreous	2.55000	
Resinous	6.30000	
	3.40000	
Metallic	4.47000	
Metallic	5.90000	Cobaltite
	3.62000	
Vitreous	3.68000	
Pearly	3.92000	
Metallic	10.91000	Pyrite
	7.19000	
Vitreous	2.40000	
Metallic	0.00000	
	2.82000	
Vitreous	3.40000	
Vitreous	3.41000	
	2.07000	
Metallic	5.75000	Tetrahedrite
	5.50000	
Vitreous	2.27000	Zeolite
	3.62000	
	2.35000	Cancrinite
Metallic	6.96000	
Vitreous	2.80000	
Vitreous	3.48000	
Metallic	6.06000	Arsenopyrite
	2.33000	
Dull	2.40000	Mica
Vitreous	3.08000	Amphibole
Dull	3.78000	Rosasite
	1.85000	
Vitreous	2.04000	Zeolite
	2.15000	Zeolite
	4.10000	
	3.83000	Brackebuschite
Adamantine	3.30000	Diaspore
Metallic	19.29000	
Metallic	15.47000	
	2.43000	
	3.74000	Garnet
Silky	2.26000	Zeolite
	3.10000	Chlorite
Vitreous	2.21000	Zeolite
Vitreous	3.32000	Crandallite
Vitreous	2.23000	Paravauxite
Vitreous	2.95000	
	3.13000	

	6.80000	
Vitreous	1.98000	
	3.14000	
	3.50000	Mixite
Vitreous	2.00000	
Resinous	3.22000	Crandallite
	4.13000	
Resinous	3.67000	
Vitreous	2.98000	
Silky	2.94000	
Metallic	2.09000	
Metallic	6.22000	
Resinous	3.70000	Rhabdophane
Dull	2.85000	Kaolinite-Serpentine
Adamantine	4.82000	
Metallic	4.05000	Linnaeite
	4.11000	
	3.30000	
Resinous	3.64000	
Vitreous	3.80000	
Vitreous	3.40000	Garnet
Sub-metallic	4.14000	Diaspore
Silky	3.44000	Amphibole
Metallic	5.88000	
Metallic	6.25000	
	0.00000	
Metallic	6.72000	Arsenopyrite
Vitreous	2.68000	
Metallic	5.31000	
Vitreous	3.03000	Melilite
Vitreous	2.70000	
Silky	4.88000	
Vitreous	3.20000	Kieserite
Metallic	7.15000	
Metallic	7.01000	
	4.53000	
Sub-vitreous	2.32000	
Vitreous	2.34000	
Vitreous	4.82000	
	0.00000	
	6.97000	
	3.71000	
Sub-metallic	3.53000	
Vitreous	2.95000	
Pearly	3.35000	
Metallic	6.30000	Tetrahedrite
Vitreous	2.16000	
Metallic	6.39000	

Pearly	2.20000	Kaolinite-Serpentine
Silky	1.89000	Halotrichite
	2.19000	
Vitreous	2.37000	
Metallic	6.73000	
Vitreous	4.30000	Epidote
Vitreous	2.56000	
Vitreous	2.03000	
Vitreous	3.80000	
Vitreous	3.44000	Melilite
Vitreous	2.96000	
Vitreous	2.41000	Zeolite
Vitreous	3.16000	
Adamantine	4.59000	Barite
Vitreous	3.17000	Amphibole
	7.22000	Marcasite
	5.81000	
	3.02000	
Metallic	6.36000	Hauchecornite
	3.02000	
Metallic	3.46000	Pyrite
Sub-metallic	4.84000	
Vitreous	2.44000	Sodalite
	4.87000	Sphalerite
	7.70000	
Metallic	4.35000	
Metallic	5.82000	
Dull	2.00000	Smectite
Vitreous	3.50000	Pyroxene
Metallic	8.91000	
Greasy	5.82000	Apatite
	4.10000	
	2.75000	
Vitreous	3.61000	Autunite
Vitreous	2.60000	Beryl
Vitreous	6.89000	
Vitreous	3.63000	
Vitreous	1.97000	
Vitreous	5.30000	
Vitreous	3.17000	Helvite
Metallic	5.26000	
Vitreous	3.48000	
Sub-metallic	7.70000	
	6.42000	
Vitreous	3.40000	
Metallic	4.47000	
Pearly	2.77000	
	3.40000	Mica
Vitreous	2.52000	

Vitreous	3.34000	
Metallic	7.86000	
Vitreous	3.79000	Lazulite
	4.32000	Spinel
Vitreous	2.95000	
Vitreous	2.08000	Zeolite
Metallic	5.20000	
Metallic	8.41000	
Sub-metallic	5.18000	
Metallic	4.13000	
Metallic	5.73000	
Dull	3.41000	
Vitreous	2.10000	Zeolite
Dull	2.62000	
Vitreous	1.76000	Hexahydrite
Vitreous	1.87000	
	8.94000	Niccolite
	6.30000	
Metallic	7.17000	
	3.84000	
Dull	3.96000	Beudantite
Vitreous	2.67000	
	2.72000	
Vitreous	2.71000	
	2.66000	
	3.88000	Gadolinite
Vitreous	4.83000	Gadolinite
Vitreous	3.65000	Beudantite
Vitreous	3.27000	
Resinous	2.67000	
	4.77000	Stannite
Vitreous	3.91000	
Metallic	6.35000	
	1.42000	
Metallic	3.93000	
Vitreous	2.20000	
Vitreous	4.11000	
Metallic	4.95000	
Metallic	7.91000	Cobaltite
Vitreous	3.13000	Amphibole
Vitreous	2.94000	
Resinous	3.90000	
	3.36000	Gadolinite
Metallic	5.36000	
Metallic	0.00000	
Vitreous	3.05000	
Pearly	2.57000	Vivianite
Dull	2.06000	
	3.38000	

Sub-vitreous	2.45000	
Vitreous	2.97000	
Greasy	4.67000	
Sub-metallic	7.18000	
Greasy	5.10000	
Sub-metallic	4.50000	
Vitreous	2.25000	
Resinous	2.28000	
Vitreous	3.24000	Humite
	2.53000	
	1.71000	
	2.70000	
Vitreous	3.19000	
Vitreous	2.88000	
Adamantine	4.60000	
Adamantine	7.10000	Monazite
Vitreous	2.58000	Feldspar
Vitreous	3.82000	
	3.15000	Astrophyllite
Vitreous	2.17000	
Vitreous	2.15000	
Adamantine	6.80000	
	1.85000	
Vitreous	2.80000	
Vitreous	3.00000	Garnet
Sub-metallic	4.64000	
	0.00000	
Vitreous	2.25000	
	1.84000	
Vitreous	2.50000	Alunite
	2.22000	
	5.00000	
	0.00000	
Pearly	2.06000	Hydrotalcite
Vitreous	4.60000	
Vitreous	3.45000	Garnet
Vitreous	2.37000	Apophyllite
Vitreous	3.08000	Apatite
Greasy	4.75000	
Vitreous	3.02000	Ellestadite
	2.94000	
Pearly	3.50000	
	7.43000	
Sub-metallic	5.16000	
Vitreous	0.92000	
Metallic	4.20000	
Vitreous	1.24000	
Vitreous	4.47000	

	1.80000	
Metallic	7.80000	
	2.26000	Rozenite
Resinous	3.60000	
Dull	2.60000	
Vitreous	2.20000	
Metallic	4.72000	
Sub-metallic	4.20000	
Dull	3.80000	
Vitreous	2.93000	Lovozerite
Metallic	8.47000	Niccolite
	4.39000	
	7.85000	
Metallic	0.00000	
	0.00000	
Vitreous	2.00000	
Vitreous	1.79000	
Vitreous	0.00000	
Metallic	4.67000	Linnaeite
Metallic	7.20000	
Vitreous	3.03000	
Metallic	7.88000	
Vitreous	3.96000	
	12.80000	Pyrite
Vitreous	1.87000	
Resinous	5.69000	
Greasy	2.11000	
Vitreous	2.05000	
Vitreous	5.80000	
Dull	3.27000	
Metallic	11.92000	Cobaltite
Silky	3.09000	
	10.90000	
Metallic	22.42000	
Metallic	19.00000	
Vitreous	3.84000	
Metallic	7.30000	
Adamantine	7.03000	
Metallic	16.50000	
Silky	3.27000	
	10.33000	
Silky	6.67000	
Metallic	4.85000	
Metallic	7.03000	
Metallic	6.47000	
Metallic	4.76000	Spinel
Vitreous	3.24000	Pyroxene

Vitreous	5.43000	
Vitreous	4.01000	
Vitreous	2.71000	Jahnsite
Metallic	6.82000	
	2.67000	
Sub-adamantine	5.10000	
Metallic	5.63000	
Dull	3.57000	
Vitreous	3.60000	
Vitreous	3.87000	
Sub-vitreous	3.66000	
Vitreous	2.90000	Alunite
Metallic	6.50000	
Resinous	3.03000	
	4.41000	Stottite
	2.99000	Melilite
	2.32000	
Sub-metallic	3.94000	
Vitreous	3.29000	
	4.00000	Humite
Vitreous	3.22000	Pyroxene
Vitreous	3.98000	
	3.03000	
Vitreous	3.61000	
Resinous	6.04000	
Vitreous	3.89000	Joaquinite
	3.83000	
Vitreous	3.37000	
Vitreous	3.27000	
	3.44000	Pyroxene
	4.15000	
Vitreous	0.00000	Apatite
Vitreous	3.35000	
Vitreous	3.40000	
Vitreous	2.03000	Chalcanthite
	4.04000	
	3.25000	
Metallic	6.44000	
Dull	0.00000	
Metallic	8.10000	
Metallic	8.30000	
	1.95000	Ettringite
Sub-metallic	3.60000	
	1.65000	
Silky	2.84000	
	3.50000	
	6.77000	

	1.79000	
	2.64000	
Vitreous	3.20000	Amphibole
	1.98000	
	0.00000	Autunite
Vitreous	2.15000	
Vitreous	3.34000	
Vitreous	2.50000	
Vitreous	2.12000	
	2.17000	
Adamantine	0.00000	Linnaeite
Vitreous	2.49000	
	3.40000	Pyrochlore
Vitreous	3.20000	
Vitreous	2.59000	
Metallic	0.00000	
	2.83000	
	3.18000	
	4.03000	
	1.93000	
Vitreous	2.70000	
	3.66000	Pyroxene
Vitreous	3.40000	
Greasy	2.61000	Kaolinite-Serpentine
	4.87000	Hematite
	4.07000	
Silky	2.80000	
Greasy	2.89000	
Metallic	4.56000	
Dull	2.53000	
Metallic	9.10000	
Sub-adamantine	5.83000	
Adamantine	3.42000	
	2.76000	Garnet
Metallic	0.00000	
Metallic	8.08000	Tetradymite
Vitreous	2.84000	Lovozerite
Dull	2.60000	Jahnsite
	0.00000	
	0.00000	
Vitreous	5.95000	
Greasy	3.30000	
	3.07000	
	8.51000	
	3.63000	Beudantite
	2.94000	
Metallic	4.07000	

	6.20000	
	3.18000	
Adamantine	4.68000	
Dull	1.91000	
Greasy	7.08000	
	4.54000	Stannite
	5.80000	
	4.95000	
Metallic	10.01000	
	3.80000	
Metallic	4.42000	
Dull	3.40000	
	6.69000	
	4.88000	
Silky	3.04000	
Vitreous	2.57000	Kieserite
	2.99000	
	2.94000	
Dull	0.00000	
Vitreous	2.60000	
Vitreous	4.00000	Garnet
	2.21000	
Pearly	2.51000	
Sub-adamantine	3.96000	
	3.16000	
Vitreous	3.30000	Mica
Vitreous	3.80000	
	6.82000	
	3.43000	
Metallic	7.22000	Melonite
Vitreous	2.61000	
Earthy	0.00000	
	1.47000	
	4.62000	
	3.28000	
	2.76000	
Adamantine	8.00000	
Metallic	5.99000	
Vitreous	3.76000	Garnet
Vitreous	2.98000	Lovozerite
Vitreous	5.00000	
Metallic	6.48000	
	8.26000	
Pearly	1.98000	
	2.68000	
	2.09000	
	9.14000	
Vitreous	2.44000	

Adamantine	3.30000	
Vitreous	4.17000	
	3.97000	Rosasite
Metallic	13.00000	
Dull	3.00000	
Metallic	0.00000	
Vitreous	2.40000	
	2.09000	
	3.54000	
Silky	2.30000	
Vitreous	3.25000	
	0.00000	
	3.60000	Pyroxene
Metallic	8.43000	Calaverite
Vitreous	2.74000	
Vitreous	3.04000	
Silky	3.33000	Vivianite
	8.26000	
Metallic	8.48000	
	2.60000	
Vitreous	3.30000	Amphibole
Sub-metallic	3.88000	
	1.21000	
Vitreous	2.84000	
Sub-vitreous	3.14000	
	3.30000	
Vitreous	2.17000	
Metallic	8.63000	
	3.38000	Aenigmatite
Vitreous	2.90000	
Metallic	6.99000	
	6.53000	Pyrite
Metallic	6.93000	
Vitreous	3.31000	
Vitreous	2.94000	
	3.91000	
Pearly	2.70000	
Metallic	6.72000	Marcasite
Vitreous	3.00000	Pyroxene
	3.20000	Astrophyllite
Metallic	4.56000	Stannite
Vitreous	6.71000	
	3.02000	
Vitreous	1.83000	
Metallic	8.38000	
	3.12000	Dolomite
Vitreous	8.64000	

Vitreous	2.53000	
Vitreous	3.53000	
Vitreous	3.77000	
Vitreous	2.69000	Feldspar
	2.90000	
Vitreous	3.29000	
	6.07000	
Sub-metallic	3.92000	
Metallic	8.12000	
Adamantine	5.18000	
Sub-metallic	3.44000	Seidozerite
Adamantine	6.92000	
Sub-metallic	4.42000	Crichtonite
	3.03000	
Vitreous	2.83000	
Metallic	0.00000	Niccolite
Vitreous	3.31000	
	2.22000	
Vitreous	1.69000	
Vitreous	2.76000	
Pearly	2.69000	
Vitreous	2.81000	
Resinous	4.50000	
Metallic	4.97000	
Vitreous	2.83000	
	1.91000	
Vitreous	3.28000	
Metallic	0.00000	
Adamantine	5.90000	
Vitreous	2.93000	
Sub-metallic	4.40000	Perovskite
Vitreous	3.33000	
Vitreous	2.44000	Paravauxite
Vitreous	2.20000	Zeolite
Metallic	5.75000	
Adamantine	6.24000	
Metallic	6.00000	Pyrite
	4.52000	
Metallic	4.90000	
Sub-vitreous	3.54000	
	3.16000	
	2.87000	
Vitreous	3.05000	
Resinous	3.45000	
Vitreous	3.10000	Lazulite
Dull	2.38000	Sodalite
Metallic	11.34000	
Metallic	11.96000	
Resinous	6.55000	

Vitreous	1.75000	
Vitreous	3.98000	
Vitreous	2.57000	
Vitreous	2.95000	
Pearly	4.31000	
	2.29000	
Metallic	5.80000	
Vitreous	2.72000	
Vitreous	2.20000	
Vitreous	3.97000	
Sub-metallic	3.85000	
Pearly	2.80000	Mica
	1.83000	
Vitreous	2.47000	
Vitreous	2.96000	
Vitreous	3.85000	Humite
Vitreous	2.95000	Leucophosphite
Vitreous	3.05000	
Vitreous	2.09000	Zeolite
	4.95000	Stibiconite
	6.80000	
Vitreous	2.69000	
Vitreous	3.97000	
Vitreous	3.02000	Tourmaline
	4.60000	
Vitreous	2.41000	
	2.96000	
Metallic	7.06000	
	3.35000	
Vitreous	5.30000	
Greasy	4.26000	
Metallic	4.63000	Crichtonite
Metallic	7.01000	
Metallic	4.80000	Linnaeite
	2.56000	Cancrinite
Sub-metallic	3.66000	
Vitreous	2.92000	
Dull	9.36000	
Resinous	3.34000	
Dull	3.14000	
Vitreous	2.48000	
Adamantine	7.00000	
Vitreous	2.51000	
	2.75000	
Metallic	5.30000	
Metallic	5.00000	
	2.55000	Kaolinite-Serpentine
	0.00000	
Metallic	7.43000	

Vitreous	3.15000	
Vitreous	1.69000	
	3.30000	
	4.77000	Perovskite
Vitreous	2.69000	
Metallic	5.53000	
	3.43000	
Adamantine	7.39000	
	3.27000	
Vitreous	4.23000	
	2.48000	
	2.33000	
	4.41000	Crichtonite
Resinous	2.30000	Lovozerite
Vitreous	2.36000	
	4.45000	
Vitreous	3.15000	
Sub-adamantine	4.40000	
Silky	3.86000	Ludwigite
	4.44000	Perovskite
	4.28000	
	2.66000	Overite
	2.05000	
	4.06000	
Dull	4.38000	Stannite
Metallic	4.60000	
Vitreous	3.51000	
	4.41000	
Vitreous	2.27000	
Vitreous	7.82000	
Silky	3.43000	
	2.50000	
Vitreous	4.86000	
	4.30000	
	6.55000	
	5.49000	
Metallic	5.98000	
	0.00000	
Dull	4.90000	
Vitreous	3.21000	Amphibole
Vitreous	3.17000	Amphibole
	3.18000	Axinite
Pearly	0.00000	
Metallic	4.20000	Spinel
Pearly	2.08000	Copiapite
Silky	3.13000	Amphibole
Metallic	4.44000	Spinel

	3.28000	Amphibole
Vitreous	3.19000	Amphibole
Vitreous	3.27000	Amphibole
Vitreous	3.00000	Calcite
Vitreous	3.32000	Astrophyllite
	3.36000	
	3.30000	Zippeite
Metallic	5.17000	Spinel
Sub-metallic	5.52000	
	3.57000	
Sub-metallic	5.17000	
Vitreous	4.23000	
	9.33000	
	4.00000	
	2.07000	
	7.22000	
Vitreous	4.05000	
Metallic	0.00000	Pyrite
Resinous	4.30000	
Metallic	15.46000	
	2.71000	
Vitreous	1.85000	Melanterite
Vitreous	5.25000	
Pearly	2.89000	Chlorite
Pearly	2.05000	Manasseite
Vitreous	2.93000	
	3.23000	
Vitreous	3.64000	
	3.32000	Axinite
	3.45000	
Resinous	4.21000	
	2.64000	
Metallic	4.56000	Pentlandite
	3.79000	Humite
Sub-metallic	4.33000	
	4.86000	Spinel
	5.28000	
	3.02000	
Vitreous	5.36000	Periclase
Greasy	4.95000	
Vitreous	8.00000	
	7.72000	Tapiolite
	3.13000	Friedelite
	4.29000	Cryptomelane
Adamantine	4.12000	Cryptomelane
Vitreous	3.03000	Variscite
	2.31000	
Vitreous	2.95000	
Metallic	4.92000	Marcasite

	5.41000	
Pearly	3.00000	Mica
Pearly	4.33000	
Vitreous	2.50000	Scapolite
Vitreous	3.66000	
	4.64000	
Metallic	6.23000	
Adamantine	5.68000	
	3.46000	
	4.44000	
Vitreous	1.77000	
	11.51000	Pyrite
Dull	9.64000	
	2.94000	
	5.08000	
Metallic	4.60000	
Metallic	6.99000	
Adamantine	7.12000	
Vitreous	0.00000	
	0.00000	Marcasite
	2.12000	
Pearly	2.33000	
Metallic	7.95000	
Adamantine	5.53000	
Metallic	4.66000	
	2.85000	
	2.11000	
Earthy	2.30000	
	1.87000	
	5.59000	
Pearly	2.98000	
Pearly	3.72000	
Vitreous	3.02000	Rosasite
	3.58000	McKelveyite
Metallic	6.61000	
Pearly	2.60000	
Sub-adamantine	3.70000	
Vitreous	2.72000	Scapolite
Resinous	4.13000	
Vitreous	2.01000	
	5.63000	
Metallic	5.70000	
Vitreous	4.08000	
Sub-metallic	2.90000	
Vitreous	1.90000	Melanterite
Vitreous	2.93000	
Resinous	1.64000	
Metallic	7.72000	Melonite

Resinous	3.61000	
Adamantine	7.24000	
Vitreous	0.00000	
	1.73000	
Metallic	6.36000	
Vitreous	2.32000	
Metallic	14.38000	
	0.00000	
	2.14000	Zeolite
	2.87000	Osumilite
Metallic	10.60000	
Metallic	11.29000	
Vitreous	3.15000	
Vitreous	2.25000	Zeolite
Vitreous	3.16000	Fairfieldite
Silky	1.85000	
	3.54000	Meta-Autunite
Pearly	3.45000	Meta-Autunite
Pearly	3.95000	Meta-Autunite
Pearly	3.70000	Meta-Autunite
Vitreous	2.47000	
Metallic	7.65000	Sphalerite
Vitreous	4.30000	
Pearly	3.35000	
Vitreous	4.04000	Meta-Autunite
Dull	2.94000	
Pearly	3.84000	Meta-Autunite
Pearly	3.33000	
	3.03000	
	4.00000	Meta-Autunite
	3.51000	Meta-Autunite
Pearly	2.45000	
	1.61000	
	0.00000	
Silky	2.68000	
Sub-metallic	0.00000	
Silky	4.67000	
Pearly	2.95000	
Vitreous	3.70000	Meta-Autunite
Adamantine	3.80000	
Adamantine	0.00000	
	4.49000	
	0.00000	
Vitreous	2.54000	
Vitreous	2.35000	
	2.35000	
Resinous	2.40000	
Dull	3.41000	
Vitreous	3.64000	Meta-Autunite

Vitreous	2.12000	
Resinous	3.94000	
	4.90000	
Adamantine	5.25000	
Metallic	9.50000	Pyrite
Vitreous	2.55000	Feldspar
Vitreous	4.30000	Pyrochlore
	2.45000	Cancrinite
Adamantine	5.64000	
	6.06000	
Vitreous	2.46000	Osumilite
Metallic	5.41000	
Earthy	2.83000	
	2.86000	
Sub-adamantine	7.28000	Apatite
Sub-vitreous	4.90000	Gadolinite
Vitreous	2.03000	
Vitreous	2.93000	
Vitreous	2.08000	
Dull	8.90000	
Greasy	3.01000	
Pearly	3.45000	Dolomite
Silky	2.46000	
Vitreous	1.46000	
Pearly	2.32000	
Vitreous	2.84000	
Resinous	3.24000	Arseniosiderite
Vitreous	2.42000	
Dull	3.79000	Mixite
	5.73000	
Metallic	8.28000	
	4.75000	
Vitreous	1.86000	Picromerite
Metallic	3.22000	
Resinous	4.00000	
Metallic	4.62000	
Adamantine	4.72000	
Adamantine	6.60000	
Pearly	7.07000	
Vitreous	4.72000	
	2.90000	
Resinous	4.60000	Monazite
Resinous	4.60000	
Metallic	10.00000	Melonite
Vitreous	2.93000	
Silky	3.15000	
Greasy	5.94000	

	2.38000	
Resinous	3.00000	
Metallic	9.94000	
	3.15000	
Vitreous	3.03000	Amblygonite
	8.10000	Periclase
Vitreous	2.42000	
Metallic	5.66000	
Vitreous	2.46000	
Vitreous	3.08000	
Dull	2.50000	Smectite
Sub-metallic	4.00000	Diaspore
Dull	2.67000	
Vitreous	11.20000	
Metallic	4.36000	
Dull	3.43000	
Vitreous	2.47000	
Vitreous	1.97000	Hexahydrite
Dull	3.21000	Stottite
	1.81000	
Vitreous	2.12000	Zeolite
	2.64000	
Greasy	5.30000	Apatite
Vitreous	1.98000	
Vitreous	2.96000	
Metallic	6.62000	
Vitreous	2.93000	
Metallic	13.71000	
Adamantine	7.72000	
Vitreous	5.90000	Descloizite
	1.48000	
	4.85000	
Silky	2.36000	
	2.12000	
	4.29000	
Vitreous	3.13000	
Vitreous	4.90000	
Adamantine	4.35000	
Sub-vitreous	3.86000	
Vitreous	0.00000	Epidote
Vitreous	3.03000	
	4.30000	
	2.05000	
Pearly	2.43000	
Sub-metallic	4.69000	
	6.47000	
Greasy	2.76000	
Metallic	3.81000	

Vitreous	2.77000	Mica
	3.68000	
	0.00000	
Vitreous	3.20000	
	3.30000	
Dull	2.30000	
Vitreous	2.85000	
Pearly	2.60000	Kaolinite-Serpentine
Resinous	7.02000	
Sub-metallic	4.08000	
Vitreous	3.07000	
Metallic	7.45000	
Vitreous	2.21000	
	2.58000	
	2.35000	
Vitreous	3.51000	
	6.86000	
Pearly	2.77000	
Vitreous	3.93000	
Adamantine	4.14000	
Vitreous	2.78000	
	2.13000	
Greasy	5.55000	
Vitreous	2.05000	
Vitreous	3.55000	Pyroxene
Vitreous	4.04000	Schoenfliesite
Vitreous	3.15000	
Vitreous	2.54000	
Vitreous	2.60000	Alunite
Vitreous	2.50000	
Vitreous	6.10000	Pyrochlore
Vitreous	3.49000	
	3.23000	
Vitreous	0.00000	
Vitreous	3.18000	Alunite
Vitreous	2.20000	Zeolite
Vitreous	3.04000	
Vitreous	1.44000	
Vitreous	3.51000	
Resinous	3.41000	
Vitreous	1.71000	
	2.48000	
Adamantine	5.00000	
Pearly	2.62000	
Metallic	7.69000	
Adamantine	2.56000	
Adamantine	5.88000	

Vitreous	3.01000	
Vitreous	3.03000	
Pearly	2.23000	
	4.62000	
Vitreous	3.46000	
Sub-metallic	4.63000	
Dull	2.84000	
Vitreous	2.55000	
Greasy	3.20000	
Vitreous	3.19000	
Vitreous	1.85000	
Metallic	7.85000	
Vitreous	2.10000	
Metallic	7.02000	
	2.39000	
Metallic	7.78000	Niccolite
Metallic	8.91000	
	1.85000	Picromerite
Metallic	6.50000	
	0.00000	Zippeite
	2.24000	
Vitreous	1.93000	
	2.43000	
Vitreous	2.07000	Hexahydrite
Vitreous	2.36000	
	4.51000	
Metallic	13.44000	Niccolite
	3.19000	Chlorite
	4.75000	Rhabdophane
	3.21000	
Resinous	5.40000	
	3.42000	
Vitreous	3.32000	
	8.00000	Löllingite
	2.73000	
Vitreous	2.10000	
Vitreous	2.27000	
	3.25000	
	1.90000	
Vitreous	1.58000	
Sub-vitreous	2.09000	
Sub-metallic	4.69000	
Dull	2.00000	Smectite
Vitreous	3.18000	Humite
Vitreous	4.20000	
Vitreous	3.43000	
Vitreous	2.42000	

Metallic	7.13000	
Vitreous	3.84000	Dolomite
Vitreous	2.38000	
Vitreous	2.30000	Sodalite
Vitreous	3.70000	Autunite
Metallic	6.70000	
	4.30000	
	4.24000	
Metallic	7.01000	
Metallic	4.30000	
Silky	3.56000	Rosasite
	2.54000	
	4.49000	
	6.40000	
	3.55000	
Vitreous	2.13000	Zeolite
Resinous	2.92000	
	3.38000	
	2.39000	Arthurite
	4.35000	
Vitreous	2.28000	
	2.58000	
Vitreous	3.94000	
Vitreous	2.63000	Feldspar
Vitreous	4.37000	Adamite
Vitreous	3.27000	Fosterite
Sub-adamantine	3.36000	
Vitreous	6.55000	
Vitreous	2.80000	
Metallic	11.20000	
Vitreous	3.29000	Pyroxene
	5.30000	
Vitreous	2.53000	Quartz
	8.48000	
Vitreous	1.99000	Opal
Adamantine	6.64000	Tapiolite
Vitreous	4.77000	
Metallic	6.92000	
Metallic	4.21000	
Resinous	3.05000	
	3.75000	
Resinous	3.49000	
Adamantine	5.46000	
Silky	0.00000	Kaolinite-Serpentine
Vitreous	2.55000	Feldspar
	4.21000	
	0.00000	Joaquinite
Metallic	4.03000	
	4.04000	Alunite

	8.44000	Arsenopyrite
	5.40000	
Metallic	17.80000	
Metallic	22.48000	
Vitreous	2.64000	Osumilite
Vitreous	2.62000	Osumilite
Adamantine	4.96000	Calcite
	0.00000	
	0.00000	
	3.52000	
Silky	3.41000	
	3.67000	
Vitreous	2.53000	Overite
Metallic	6.22000	
	5.00000	
Vitreous	2.62000	
Metallic	0.00000	
	4.03000	Benitoite
Vitreous	2.98000	
Metallic	6.91000	
Vitreous	2.28000	
Vitreous	4.03000	
Metallic	0.00000	
Sub-adamantine	3.22000	
Metallic	11.90000	
Metallic	10.42000	
	10.86000	
	8.15000	
Vitreous	4.33000	
Dull	2.21000	
	3.27000	
	2.90000	
Metallic	11.32000	
Vitreous	3.25000	
Vitreous	5.97000	
Vitreous	2.55000	
Vitreous	3.31000	Feldspar
Vitreous	2.11000	
Metallic	7.10000	
Vitreous	4.55000	
Metallic	6.52000	
Pearly	2.78000	Mica
Metallic	7.70000	
Vitreous	2.71000	
Vitreous	3.31000	
Vitreous	3.39000	
	6.69000	
Sub-adamantine	6.15000	
	3.60000	

Adamantine	6.11000	
Vitreous	3.35000	
Sub-metallic	4.00000	
	2.21000	Zeolite
Sub-metallic	5.04000	
Metallic	7.25000	
Vitreous	3.52000	
	12.98000	
	0.00000	
Vitreous	3.12000	
	3.00000	
	3.07000	Vivianite
Vitreous	3.74000	
Resinous	5.60000	Rutile
Vitreous	2.59000	
Vitreous	2.36000	Paravauxite
Vitreous	2.91000	
Vitreous	3.07000	Amphibole
Vitreous	4.36000	
Metallic	8.40000	
Vitreous	3.09000	
Sub-metallic	2.59000	
Sub-adamantine	5.72000	
Vitreous	2.39000	
	2.96000	Stibiconite
	4.62000	
Vitreous	1.87000	
	0.00000	
Vitreous	0.00000	Zeolite
Vitreous	2.36000	
Adamantine	6.95000	
Metallic	6.54000	
Metallic	5.30000	
Metallic	6.13000	
	3.08000	Kaolinite-Serpentine
Vitreous	2.74000	
Vitreous	4.07000	
Earthy	2.11000	
Metallic	6.80000	
Vitreous	3.51000	
Vitreous	3.79000	Bjarebyite
Dull	2.58000	
	3.06000	Chlorite
Metallic	6.58000	Pyrite
Vitreous	2.33000	
	1.90000	Chalcanthite
Metallic	4.60000	Pentlandite
	8.35000	
Vitreous	4.06000	

	2.64000	
Vitreous	3.56000	Periclase
Adamantine	8.16000	
Pearly	2.14000	
Vitreous	3.32000	Bjarebyite
Metallic	5.82000	Stannite
Adamantine	4.01000	Perovskite
	4.30000	
Vitreous	6.92000	
	7.37000	
Vitreous	2.30000	
Vitreous	2.88000	Lovozerite
Vitreous	3.68000	Pyroxene
Vitreous	3.41000	Mixite
	7.71000	
Dull	9.50000	
Metallic	5.50000	
Metallic	8.70000	
Vitreous	2.68000	
Adamantine	2.80000	Pharmacosiderite
Vitreous	2.28000	
Vitreous	2.93000	
	4.33000	Crandallite
Vitreous	4.04000	
Vitreous	2.20000	Zeolite
Pearly	2.76000	Mica
Resinous	7.01000	
Adamantine	6.13000	
Vitreous	2.62000	
	1.33000	
Vitreous	3.29000	
Vitreous	2.90000	
Vitreous	3.13000	
Vitreous	1.73000	
Vitreous	2.76000	
	4.10000	
Vitreous	4.14000	
Vitreous	0.00000	
Pearly	5.26000	
Vitreous	1.79000	Halotrichite
	5.20000	
Vitreous	2.03000	Picromerite
	2.62000	
Vitreous	3.45000	Epidote
Metallic	4.97000	
Vitreous	3.30000	Pyroxene
Metallic	8.41000	
Metallic	3.88000	
	9.50000	

Vitreous	2.29000	
	4.82000	Stannite
Vitreous	2.37000	
	3.10000	
Metallic	5.54000	
Silky	3.65000	
	8.00000	Cobaltite
Metallic	22.65000	
Metallic	21.44000	
Metallic	9.42000	Rutile
Metallic	7.98000	
Metallic	5.80000	
	2.02000	
Vitreous	4.35000	
Adamantine	4.64000	Pyrochlore
Sub-metallic	6.07000	
Dull	4.01000	Crandallite
Dull	3.64000	Alunite
Greasy	6.60000	Pyrochlore
	7.07000	
	12.40000	
	0.00000	Pyrochlore
	7.20000	
	5.60000	
	3.30000	Kieserite
Dull	2.51000	
Metallic	0.00000	
Resinous	4.93000	
Metallic	6.62000	
Vitreous	2.93000	Zeolite
Metallic	6.30000	
Sub-metallic	4.30000	Euxenite
Metallic	4.50000	Linnaeite
Vitreous	2.78000	
Pearly	2.58000	Mica
Sub-metallic	4.77000	
Pearly	2.23000	Brucite
Vitreous	3.35000	
Metallic	14.88000	
Vitreous	1.76000	
Metallic	0.00000	
	3.75000	
Sub-adamantine	4.23000	Scheelite
Vitreous	9.80000	
Vitreous	2.90000	
Sub-adamantine	7.24000	
	2.96000	Mica
	2.45000	
	2.42000	

Adamantine	3.86000	Cryptomelane
Vitreous	2.14000	
Vitreous	2.89000	
Vitreous	4.31000	
Sub-adamantine	5.83000	
Adamantine	5.55000	
Sub-vitreous	0.00000	
	3.28000	
Pearly	4.85000	
Metallic	4.39000	
Vitreous	2.46000	
Vitreous	4.30000	
Sub-metallic	4.13000	
Vitreous	2.91000	
Vitreous	6.25000	
Pearly	3.18000	Pumpellyite
	3.34000	
Dull	3.69000	
Metallic	0.00000	
Adamantine	5.85000	
Metallic	5.00000	Pyrite
Vitreous	2.12000	Hydrotalcite
Adamantine	5.38000	Descloizite
Greasy	4.48000	Pyrochlore
Pearly	3.25000	Brucite
Metallic	5.06000	Rutile
Adamantine	7.04000	Apatite
Vitreous	3.50000	Garnet
Metallic	4.54000	
Pearly	2.65000	
Pearly	3.06000	Friedelite
Adamantine	5.94000	
	3.68000	
Vitreous	3.61000	
Metallic	4.53000	
Metallic	4.03000	Spinel
Vitreous	3.72000	
	6.42000	
Vitreous	2.65000	Quartz
Greasy	6.07000	
Metallic	6.84000	
	2.15000	
	6.05000	
Silky	2.57000	
	8.89000	
	6.40000	
	2.39000	
	5.75000	
Vitreous	2.56000	

Metallic	5.44000	
	5.60000	
Metallic	6.97000	Löllingite
Vitreous	3.39000	
Metallic	4.37000	
Metallic	3.20000	
Resinous	4.50000	
Silky	0.00000	
Vitreous	2.96000	
Vitreous	2.63000	
	3.40000	
Vitreous	2.21000	
Adamantine	8.47000	
Metallic	3.10000	
Metallic	5.37000	
	2.36000	
Adamantine	2.92000	
Metallic	6.13000	
Resinous	3.56000	
Metallic	4.81000	
Vitreous	3.23000	
Adamantine	3.66000	
Vitreous	2.78000	Feldspar
	2.80000	Hydrotalcite
	1.09000	
	4.35000	
Vitreous	4.27000	
Vitreous	2.84000	
Sub-vitreous	4.35000	
Metallic	4.30000	
Vitreous	2.07000	
Vitreous	4.15000	
Vitreous	4.49000	
Vitreous	4.45000	
Vitreous	1.94000	
Vitreous	2.54000	
	3.97000	Rhabdophane
	3.94000	
Sub-metallic	21.03000	
Silky	2.36000	
Metallic	16.51000	
Vitreous	3.44000	
Vitreous	3.70000	Calcite
Vitreous	3.57000	
Metallic	4.79000	
Vitreous	2.23000	
	3.64000	Aenigmatite
Vitreous	3.90000	Humite
Greasy	2.00000	

Vitreous	3.20000	
Adamantine	0.00000	
Vitreous	2.97000	Amphibole
Metallic	7.53000	
Vitreous	3.32000	Amphibole
	3.90000	
Metallic	2.35000	
Vitreous	1.91000	
Silky	2.64000	
	7.21000	
Adamantine	3.17000	Arseniosiderite
Metallic	5.20000	
Sub-vitreous	3.30000	
Greasy	5.05000	
Resinous	3.44000	
Vitreous	2.60000	Osumilite
	2.02000	
	7.78000	
	2.35000	
Sub-metallic	6.45000	Psilomelane
	0.00000	
Vitreous	4.70000	Stibiconite
Vitreous	2.18000	
	4.20000	
Adamantine	6.86000	Monazite
	4.80000	Chalcopyrite
	4.00000	Rosasite
	2.93000	
Pearly	2.97000	Mica
Vitreous	3.69000	Roselite
Vitreous	3.71000	Fairfieldite
Silky	3.30000	
	2.89000	
Adamantine	2.08000	
Vitreous	2.43000	
Vitreous	1.93000	
	1.89000	
	5.02000	
Dull	5.70000	
Metallic	5.83000	
	2.94000	
	4.39000	
Dull	2.19000	Rozenite
Metallic	0.00000	Arsenopyrite
Vitreous	3.03000	Tourmaline
Metallic	7.74000	
	2.90000	
	7.35000	
	15.08000	

	2.84000	
	10.00000	
Metallic	0.00000	
Metallic	12.20000	
Metallic	0.00000	
Dull	5.70000	
Adamantine	4.23000	Rutile
	6.40000	
Metallic	6.78000	
Earthy	0.00000	
	3.36000	
Vitreous	3.20000	Autunite
Vitreous	2.42000	Cancrinite
Metallic	7.20000	Löllingite
Vitreous	4.30000	
	8.00000	
	3.04000	
Vitreous	2.78000	
Metallic	0.00000	
Metallic	4.45000	
Vitreous	1.51000	
	3.27000	Autunite
Vitreous	4.77000	
Resinous	5.15000	
Pearly	3.20000	
Metallic	5.51000	
Sub-adamantine	0.00000	
Resinous	3.47000	
Vitreous	2.56000	Feldspar
Dull	1.94000	
Resinous	6.62000	
Vitreous	3.31000	
Sub-adamantine	3.38000	
	0.00000	
	1.74000	
Greasy	2.24000	Smectite
Vitreous	3.40000	
Resinous	4.80000	
Vitreous	2.92000	
Sub-vitreous	3.79000	
Greasy	4.08000	
	2.58000	
Metallic	5.10000	
Dull	3.07000	
Dull	1.75000	
Pearly	1.46000	
	2.10000	

Vitreous	3.60000	
Dull	0.00000	Smectite
	6.76000	
Vitreous	2.61000	
Vitreous	1.71000	
	2.98000	
	2.17000	
Vitreous	2.77000	
Metallic	13.52000	
Metallic	4.30000	
Vitreous	2.61000	
Pearly	3.37000	
Silky	2.65000	
Vitreous	6.10000	Scheelite
Vitreous	1.83000	
Vitreous	4.74000	
Adamantine	4.98000	
Metallic	6.74000	
Pearly	6.88000	
Metallic	4.30000	
	1.88000	
	3.48000	Schoenfliesite
Adamantine	4.80000	
	2.70000	
Vitreous	3.11000	
	2.87000	
Vitreous	3.10000	Tourmaline
	0.00000	Garnet
Metallic	7.00000	
	0.00000	
Vitreous	2.55000	
	3.28000	
	8.18000	
Adamantine	5.20000	
Pearly	3.38000	
Vitreous	5.94000	
Adamantine	6.90000	
Adamantine	7.39000	
Vitreous	2.27000	Zeolite
Vitreous	3.27000	Variscite
Sub-vitreous	3.38000	
Adamantine	6.37000	
Vitreous	3.13000	
	2.46000	
Metallic	7.06000	Niccolite
	4.20000	
	6.83000	

Vitreous	2.67000	Overite
Adamantine	4.77000	Segnitite
Vitreous	3.47000	
Metallic	7.04000	Löllingite
Vitreous	2.77000	
Vitreous	4.80000	
	7.50000	
Metallic	5.38000	Bournonite
Vitreous	3.15000	
Vitreous	3.14000	
Metallic	6.08000	
Sub-metallic	5.30000	Crichtonite
Resinous	5.50000	
Vitreous	2.55000	
Vitreous	2.55000	
Dull	2.00000	
Vitreous	3.41000	
Vitreous	3.42000	Aenigmatite
Dull	2.64000	
Greasy	2.61000	Kaolinite-Serpentine
Vitreous	3.07000	
	2.32000	
Metallic	4.72000	
	4.72000	
	8.34000	
Metallic	8.72000	
	4.45000	
Vitreous	4.11000	
Vitreous	2.97000	
Vitreous	3.20000	
Vitreous	2.80000	
	2.32000	
Vitreous	2.60000	
	3.24000	
Dull	3.45000	
Metallic	3.15000	
Vitreous	3.96000	Calcite
	2.28000	
	3.27000	Mica
	2.10000	Chalcanthite
Vitreous	2.90000	
Resinous	3.12000	
Metallic	4.50000	Linnaeite
Pearly	2.94000	
	2.35000	
	2.14000	
	9.30000	
Vitreous	3.23000	Sillimanite
Metallic	10.50000	

	1.08000	
Metallic	5.04000	
Vitreous	3.20000	
Vitreous	2.64000	
Sub-vitreous	6.70000	
Vitreous	2.97000	
Vitreous	3.47000	
Vitreous	2.27000	
Metallic	5.20000	
	2.84000	
Vitreous	2.11000	Manasseite
Metallic	5.07000	
Sub-vitreous	3.64000	
Metallic	6.10000	
Vitreous	1.89000	
	3.13000	Feldspar
	7.78000	
Adamantine	4.88000	
Vitreous	4.30000	Calcite
Earthy	2.50000	
Metallic	4.32000	
Resinous	3.03000	
	11.88000	Niccolite
Resinous	0.00000	Smectite
Vitreous	2.14000	Sodalite
Vitreous	4.70000	
Vitreous	1.68000	
Vitreous	3.58000	Autunite
Dull	2.02000	
	4.10000	
Vitreous	2.16000	Zeolite
Vitreous	2.79000	Pharmacosiderite
Vitreous	3.85000	
	3.30000	
Vitreous	2.90000	Osumilite
	3.84000	
Vitreous	2.51000	
	3.82000	Humite
Vitreous	3.95000	
	9.95000	
Metallic	5.52000	
Silky	2.90000	
Adamantine	6.90000	
Metallic	7.60000	Bournonite
Vitreous	3.09000	
Vitreous	3.14000	
Vitreous	3.15000	

Metallic	10.46000	Pyrite
Vitreous	3.93000	
Vitreous	3.80000	Garnet
Vitreous	4.13000	Calcite
Resinous	3.90000	Sphalerite
Earthy	2.71000	Leucophosphite
Vitreous	3.58000	Spinel
	5.13000	
Adamantine	5.01000	
Vitreous	3.00000	Pyroxene
Vitreous	3.00000	
Adamantine	4.04000	
Sub-metallic	0.00000	
	3.15000	
	1.95000	
Metallic	4.30000	Stannite
Metallic	4.29000	
	8.34000	Pyrochlore
	7.17000	
Dull	2.01000	Rozenite
Vitreous	3.65000	
	2.95000	
Dull	3.10000	
Pearly	2.13000	Zeolite
	4.63000	
Vitreous	3.86000	
Vitreous	1.69000	
Metallic	6.25000	
Vitreous	1.55000	
	2.95000	
Metallic	4.25000	
Metallic	6.00000	
	4.60000	Stibiconite
Dull	2.15000	Smectitie
	2.94000	
Metallic	6.00000	Arsenic
Pearly	3.30000	Stibiconite
Vitreous	5.19000	Pyrochlore
Adamantine	5.98000	
Metallic	9.50000	
Vitreous	7.35000	
Adamantine	5.12000	
Metallic	4.63000	
Pearly	2.16000	Hydrotalcite
Vitreous	2.09000	Zeolite
Metallic	5.29000	Sphalerite
	10.40000	
Resinous	4.61000	

Pearly	2.59000	
Vitreous	4.35000	
Metallic	0.00000	
Metallic	4.96000	
	3.19000	
Sub-adamantine	7.90000	Scheelite
Greasy	3.60000	Stottite
Greasy	3.21000	
	5.23000	
Pearly	3.81000	
	1.90000	
Silky	4.00000	
Vitreous	2.87000	Variscite
	3.67000	
Metallic	6.20000	
Vitreous	2.95000	
Vitreous	3.78000	Aragonite
	0.00000	Joaquinite
	2.81000	
Sub-metallic	5.44000	
Vitreous	2.71000	Dundasite
Greasy	2.25000	
Vitreous	3.68000	
Vitreous	3.84000	
	2.47000	
Sub-metallic	5.25000	
Vitreous	1.71000	
	3.64000	
	13.52000	Niccolite
Vitreous	1.85000	
Metallic	8.00000	
Silky	2.91000	
	9.41000	Niccolite
	2.65000	Chlorite
	0.00000	
Vitreous	2.74000	Osumilite
	2.44000	
Vitreous	2.51000	
Metallic	8.13000	
Adamantine	2.07000	
Metallic	3.86000	
Adamantine	7.00000	
Vitreous	2.68000	
	3.58000	
Vitreous	4.00000	
Silky	3.26000	
Adamantine	6.55000	
Silky	3.30000	

Vitreous	4.00000	
Vitreous	3.50000	Apatite
Sub-vitreous	3.22000	Beudantite
	2.00000	
Vitreous	3.60000	
Vitreous	2.17000	
Vitreous	1.69000	
	4.00000	Uranophane
	2.30000	
Vitreous	4.29000	
	3.33000	
Dull	0.00000	Smectitie
Vitreous	2.54000	
Metallic	8.16000	Calaverite
Vitreous	1.99000	
Vitreous	3.01000	
Sub-vitreous	3.57000	
Vitreous	3.90000	
	4.21000	
Dull	3.89000	
Vitreous	2.60000	
Silky	2.60000	
	2.85000	Kieserite
Vitreous	3.03000	Kieserite
Vitreous	3.60000	
	2.36000	
Vitreous	1.67000	
Vitreous	3.73000	
Vitreous	2.82000	Mica
Metallic	7.80000	
Vitreous	4.72000	
Metallic	0.00000	
Sub-metallic	3.41000	
Metallic	3.93000	
	2.80000	Hydrotalcite
Pearly	2.58000	
	3.20000	Fairfieldite
Metallic	4.24000	
Vitreous	2.06000	
Vitreous	2.75000	
Vitreous	3.30000	
	6.39000	
Resinous	5.40000	
Adamantine	8.45000	
Sub-metallic	7.82000	Tapiolite
	3.92000	
	3.50000	Amphibole

	2.09000	
	2.74000	
	2.36000	
Vitreous	4.14000	
Vitreous	1.88000	
Adamantine	4.88000	Perovskite
Vitreous	3.29000	Amblygonite
Adamantine	5.01000	
Metallic	6.36000	
Vitreous	2.08000	
	3.80000	
	0.00000	
	0.00000	Tetradymite
Adamantine	5.90000	
Metallic	6.25000	
Metallic	7.82000	Tetradymite
	6.50000	Hauchecornite
	10.68000	
	9.45000	
Dull	3.12000	
Metallic	4.59000	Tetrahedrite
Metallic	6.45000	
Vitreous	4.11000	Olivine
Adamantine	8.70000	
Vitreous	2.71000	
Vitreous	2.15000	
	1.58000	
Metallic	0.00000	Pyrite
Metallic	14.67000	
Metallic	7.10000	Tetradymite
Metallic	4.60000	Tetrahedrite
	2.59000	
Vitreous	2.28000	Zeolite
Metallic	0.00000	
Vitreous	3.65000	Stottite
Vitreous	3.21000	
	6.54000	
Greasy	4.30000	
Metallic	5.26000	
Vitreous	3.50000	
	4.30000	
Vitreous	2.66000	
Vitreous	4.00000	Brucite
Vitreous	2.26000	
	0.00000	
Vitreous	2.98000	
Vitreous	2.25000	Zeolite
	4.04000	

Adamantine	7.60000	
Vitreous	9.99000	
Vitreous	7.24000	
Vitreous	6.70000	
Sub-vitreous	3.20000	
Greasy	3.02000	
Vitreous	3.58000	
Vitreous	5.82000	
	3.40000	
Metallic	8.24000	Sphalerite
Vitreous	3.29000	
Vitreous	3.26000	
Vitreous	3.77000	
	2.84000	
Metallic	5.77000	
Vitreous	2.82000	
Dull	1.88000	
Vitreous	2.69000	Leucophosphite
Metallic	5.51000	
	3.29000	Axinite
Vitreous	2.65000	
Sub-adamantine	3.84000	
Vitreous	3.07000	Amphibole
Vitreous	2.69000	
Vitreous	3.45000	
	3.92000	
Metallic	4.17000	
	4.55000	
	5.38000	
Silky	2.58000	Mica
Silky	2.42000	
Sub-metallic	2.96000	
Metallic	3.49000	
Vitreous	2.76000	
	3.42000	
Metallic	10.50000	Cobaltite
Dull	3.51000	
	4.16000	
Metallic	0.00000	
Vitreous	3.49000	
Vitreous	3.22000	Autunite
Vitreous	4.90000	
Vitreous	2.67000	
	2.42000	Smectite
Vitreous	3.03000	Tourmaline
	4.70000	
Vitreous	3.71000	
Adamantine	4.78000	
Vitreous	2.90000	Amphibole

Metallic	5.17000	Spinel
	3.68000	
Vitreous	2.26000	Quartz
Sub-vitreous	6.10000	
Vitreous	2.63000	
Vitreous	3.47000	
Vitreous	3.42000	
Sub-vitreous	3.55000	
Vitreous	3.70000	
	4.80000	
	5.82000	Tapiolite
	3.80000	Tripuhyite
Vitreous	4.20000	
Vitreous	3.05000	
Sub-vitreous	3.55000	Autunite
	7.12000	Pyrite
Metallic	4.67000	Niccolite
Vitreous	3.09000	
Vitreous	2.11000	
Pearly	2.35000	
	6.62000	Linnaeite
Vitreous	3.14000	Amphibole
Vitreous	1.64000	
	5.20000	
Vitreous	6.13000	
Metallic	8.16000	
Metallic	6.15000	Hauchecornite
Greasy	6.58000	
Vitreous	2.30000	
	2.89000	
	15.60000	
Vitreous	3.70000	
Sub-vitreous	2.40000	
	7.75000	
Resinous	5.50000	
	2.51000	
Vitreous	0.00000	
Vitreous	3.60000	Apatite
Vitreous	2.60000	Turquoise
Vitreous	2.83000	
Vitreous	4.73000	
Adamantine	7.38000	
Greasy	3.94000	
Metallic	5.26000	
Vitreous	2.55000	
	2.19000	
Vitreous	3.18000	

Metallic	6.60000	Linnaeite
Adamantine	3.30000	
Metallic	5.16000	
Vitreous	2.42000	
Vitreous	1.96000	
Metallic	6.65000	Cobaltite
Vitreous	3.71000	
	4.77000	Spinel
Metallic	6.44000	
Vitreous	2.79000	
Vitreous	3.60000	
Sub-metallic	4.55000	
Vitreous	2.29000	
	3.50000	
	2.60000	
Silky	2.05000	
Vitreous	3.70000	
	4.03000	
Sub-metallic	7.50000	
	5.75000	
Pearly	3.46000	Autunite
Vitreous	3.83000	
Vitreous	3.90000	
Silky	3.96000	
Vitreous	3.25000	
	2.50000	
Dull	6.36000	
Pearly	3.45000	Autunite
	4.27000	
Resinous	4.77000	Pyrochlore
	9.60000	
	1.33000	
	1.85000	
Vitreous	2.38000	Paravauxite
Vitreous	0.00000	
	2.46000	
	0.00000	
Vitreous	3.40000	Garnet
Vitreous	3.01000	Tourmaline
	8.45000	
Pearly	3.37000	
Metallic	4.45000	Pyrite
Adamantine	5.76000	
Metallic	3.09000	
Resinous	6.88000	Apatite
Vitreous	2.30000	
Vitreous	5.08000	
Adamantine	5.45000	

	4.67000	
Vitreous	2.69000	
	3.62000	
	3.64000	
Vitreous	2.57000	Variscite
	2.52000	
Vitreous	3.58000	
Dull	1.93000	
	2.54000	
Adamantine	5.99000	
Vitreous	2.40000	
Vitreous	3.18000	
Vitreous	2.62000	
Pearly	2.73000	
Metallic	5.92000	
Metallic	5.59000	
	3.00000	
Vitreous	3.46000	
Metallic	5.12000	
	2.15000	
Vitreous	4.05000	
Vitreous	3.33000	
Vitreous	3.42000	
	5.54000	
Vitreous	3.06000	
	0.00000	
Metallic	4.52000	
Vitreous	2.79000	
	3.20000	
Vitreous	2.54000	
Metallic	4.29000	
Vitreous	2.88000	
Metallic	4.50000	Linnaeite
Vitreous	2.46000	
Vitreous	2.17000	Zeolite
Sub-vitreous	2.32000	Cancrinite
Vitreous	4.07000	Schoenfliesite
Vitreous	3.60000	
Vitreous	2.68000	Vivianite
	3.14000	
Greasy	2.97000	
Pearly	3.06000	
Vitreous	3.42000	
Vitreous	2.29000	
Resinous	2.70000	
Metallic	0.00000	
Sub-metallic	4.77000	Ludwigite
Metallic	6.20000	
Sub-metallic	5.30000	

Vitreous	3.20000	
Metallic	7.10000	
Vitreous	3.13000	
	4.64000	Spinel
	0.00000	
Metallic	6.69000	
Adamantine	4.02000	
Adamantine	3.10000	
	3.84000	
Vitreous	3.15000	
Vitreous	2.26000	Zeolite
Metallic	8.23000	
Silky	3.98000	
	5.30000	
	4.21000	
Vitreous	2.72000	
Metallic	5.71000	
Vitreous	2.85000	
Adamantine	5.95000	
Sub-vitreous	3.67000	
Vitreous	2.76000	
Vitreous	1.88000	
	4.24000	
Sub-vitreous	3.35000	
Vitreous	2.36000	
Dull	3.86000	
Vitreous	2.96000	
	2.02000	
Silky	4.10000	
Vitreous	2.34000	
Metallic	6.97000	
	3.75000	Beudantite
Greasy	3.48000	
Metallic	6.10000	
Metallic	6.44000	
Resinous	4.47000	
Vitreous	2.25000	Zeolite
Vitreous	3.22000	Mckelveyite
Sub-adamantine	3.77000	Aenigmatite
Vitreous	3.52000	Roselite
	3.13000	Cancrinite
	1.93000	
Metallic	8.13000	
Vitreous	2.27000	
	6.45000	
Vitreous	2.21000	
Sub-vitreous	2.58000	

Vitreous	3.13000	
Vitreous	2.87000	Arthurite
Vitreous	3.85000	
	3.89000	Schoenfliesite
Sub-metallic	3.54000	
Pearly	6.89000	
Silky	3.24000	
Vitreous	2.60000	
	1.58000	
	2.58000	Overite
	6.96000	
Vitreous	3.89000	
	3.31000	
Vitreous	2.18000	Zeolite
Metallic	6.76000	Cobaltite
Vitreous	2.97000	Amphibole
	5.57000	
Silky	3.42000	
Vitreous	4.29000	Aragonite
Metallic	6.19000	
Metallic	7.12000	
	7.19000	
Sub-vitreous	3.41000	
Sub-vitreous	3.79000	
Sub-metallic	7.18000	
Sub-metallic	6.55000	
Vitreous	2.87000	
	6.80000	
	0.00000	Mica
Vitreous	3.01000	Beudantite
Dull	4.01000	
Vitreous	3.27000	
Resinous	6.50000	Scheelite
Resinous	3.98000	
	5.88000	Pericalse
Sub-metallic	4.69000	
	5.37000	
Adamantine	5.54000	
Dull	2.80000	Fairfieldite
Vitreous	4.40000	
Silky	2.90000	
Metallic	6.45000	
Metallic	7.08000	
Metallic	6.64000	
	1.99000	
	4.65000	
Greasy	2.71000	

Vitreous	5.55000	
	2.70000	Osumilite
Vitreous	3.09000	
	4.89000	
Vitreous	2.88000	
	2.61000	
	5.01000	
	5.59000	
Vitreous	5.85000	
Vitreous	3.96000	
Metallic	4.34000	
Metallic	0.00000	
	3.39000	
	2.18000	
	4.13000	
Greasy	3.65000	Pyrochlore
Dull	4.80000	
	4.91000	Pyrochlore
Sub-metallic	5.70000	
	5.96000	
Vitreous	2.23000	Zeolite
Resinous	0.00000	
	0.00000	
	2.94000	
Pearly	2.01000	
	4.37000	Crandallite
Pearly	2.58000	
	3.02000	
Vitreous	2.57000	
Sub-metallic	7.88000	
Pearly	2.79000	
Dull	3.25000	
Adamantine	4.05000	
	2.75000	
Vitreous	3.39000	Autunite
Vitreous	1.69000	
Vitreous	4.20000	
Metallic	3.86000	
	3.01000	
Metallic	6.90000	
Vitreous	2.02000	Melanterite
Sub-adamantine	5.68000	
Vitreous	2.20000	
Vitreous	2.18000	Copiapite
Pearly	2.61000	

Metallic	5.36000	
Vitreous	2.90000	Mica
Dull	3.66000	Zippeite
Vitreous	4.60000	
Vitreous	3.34000	Astrophyllite
Dull	2.85000	
Resinous	4.71000	
Vitreous	2.90000	Lovozerite
Vitreous	3.55000	Epidote
Vitreous	2.36000	
Metallic	5.15000	
Vitreous	2.87000	
Vitreous	3.15000	
	13.32000	
Vitreous	3.93000	
Dull	2.50000	

FORMULA,C,100
C31H32N4Ni
K2(UO2)(AsO4)2.*8H2O
Sn3O(OH)2Cl2
Ag2S
CH3CONH2
FeSe
Ca2(Mg,Fe+2)5Si8O22(OH)2
Zn2(AsO4)(OH)
CaMg(AsO4)(OH)
MgB6O10.*7H2O
KAlSi3O8
NaFe+3Si2O6
Na2Fe5TiSi6O20
Ni17As6O32
(Ce,Ca,Fe,Th)(Ti,Nb)2(O,OH)6
(Nd,Ce,Ca,Th)(Ti,Nb)2(O,OH)6
(Y,Ca,Fe,Th)(Ti,Nb)2(O,OH)6
(Na,Ca,K)8(Si,Al)12O24(SO4,Cl,CO3)3.H2O

Ca3Si2O4(OH)6
(La,Ca)Cu6(AsO4)3(OH)6.*3H2O
(Y,Ca)Cu6(AsO4)3(OH)6.*3H2O
SiO2
NaCa2Si4O10F
(K2,Ca,Sr)U3O10.*4H2O
Ag4SeS
NiSeO3.*2H2O
PbCuBiS3
(K,Na)Cu7AlSi9O24(OH)6.*3H2O
B - FeO(OH,Cl)
(Mn+2)9Al2Si8O24(OH)8
4Al2O3.H2O
MgCa2Si2O7
Mn4Mg(AsO4)2(OH)4.*4H2O
MgB6O7(OH)6.*2H2O
Cu6Hg3As4S12
MnS
PbSiO3
NaAlSi3O8
Mg5Al12(PO4)8(OH)22.*32H2O
CaMgB2O4Cl.*7H2O
PbBi2Te2S2
Ba5(PO4)3Cl
Cu6As
Mn7(AsO4)2(OH)8
(Ce,Ca,Fe+2)2(Al,Fe+3)3Si3O12(OH)
Ag(1-x)Sb(x)
Mn5(SiO4)2(OH)2

(Co,Fe)AsS
(Al2O3)(SiO2).H2O
NaCaFe+2(Mn,Fe+2,Fe+3,Mg)2(PO4)3
(Fe+2)3Al2(SiO4)3
BaCa(CO3)2
PbTe
Mg2(PO4)(OH,F,O)
Al2/3(Fe+3)4(SO4)6(OH)2.*20H2O
Al
CaAl2(CO3)2(OH)4.*3H2O
KAl4(AsO4)3(OH)4.*6.*5H2O
AlTaO4
K2Al6(SO4)4(OH)12
Al2(SO4)3.*17H2O
(Zn,Ni)Al4(VO3)2(OH)12.*2H2O
(Fe+2,Mg)(OH)2
Fe+3(SO4)(OH).*3H2O
NaFe+3(SO4)2.*6H2O
KAlSi3O8
C12H20O (Variable)
(Li,Na)Al(PO4)(F,OH)
NaB3O3(OH)4
Mg2Al(SiAl)O5(OH)4
SiO2
K2Na2Al4Si4O16.*5H2O
Ca2(Be,Al)Si2O7(OH).H2O
(NH4)2B10O16.*5H2O
(NH4)(Fe+3)3(SO4)2(OH)6
(NH4,K)AlSi2O6
NaAlSi2O6.H2O
(Ba,K)(Fe+2,Mg)3(Si,Al,Fe)4O10(O,OH)2
Ca2Fe+2(PO4)2.*4H2O
TiO2

SrCe(CO3)2(OH).H2O
Al2SiO5
Na2Ca(UO2)(CO3)3.*6H2O
mCaAl2Si2O8 with nNaAlSi3O8 (m/n = 30/70 to 50/50)
AgPbSb3S6
Ca3(Fe+3)2(SiO4)3
Ba(Fe+2)2Si2O7
(Cu,Fe+2)(Fe+3)3(PO4)3(OH)2
(Ru,Os)As2
(Fe+3)4(AsO4)2O3
PbSO4
CaSO4
Cu7S4
Ca(Fe+2,Mg,Mn)(CO3)2
Ni3(AsO4)2.*8H2O

K(Fe+2)3AlSi3O10(OH,F)2
CaAl2Si2O8
(Na,K)AlSi3O8
CaCl2.*6H2O
WAl(O,OH)3
Cu(OH,Cl)2.*3H2O
(Mg,Fe+2)7Si8O22(OH)2
(Mg,Fe+2)3Si2O5(OH)4
(Ag,Cu)16(Sb,As)2S11
Sb
Cu3(SO4)(OH)4
Cu9Si10O29.*11H2O
Ca5(PO4)3F (Highly variable)
(K,Na)3Na(SO4)2
Mn+2Al2(SO4)4.*22H2O
(Co,Mn,Ni)SO4.*4H2O
Fe+2(Fe+3)4(Sb+3)4O12S
Be3Al2Si6O18
CaCO3
Ag(Sb,Bi)S2
K2SO4
(K,NH4)H2PO4
Na2Ca4(PO4)3F
Pb19Sb13S35Cl7
Ca2(SO4)(HPO4).*4H2O
Mn4(Al,Mg)6(SiO4)2(Si3O10)(AsO4,VO4)(OH)6
Na3(Fe+2,Mg)4Fe+3Si8O22(OH)2
Ag2S
Ag(Fe+3)3(SO4)2(OH)6
Ag(Fe,Ni)8S8
AgFe2S3
GeO2
Ag8GeS6
(Cu+2)2(AsO4)(OH).*6H2O
Na2MgB12O20.*8H2O
(Mg,Fe)Ti2O5
(Mn+2)26(As+3)18O50(OH)4(CO3)
BaCa2Al6Si9O30.*2H2O
CaZr2Si6O15.*2.5H2O
KNa4Ca(Mn+2)4(Fe+2)10Al(PO4)12(OH,F)2
Pb2(Fe+2,Zn)(AsO4)2.H2O
PbZn(AsO4)(OH)
As
Ca2(Fe+3)3(AsO4)3O2.*3H2O
Bi2(AsO4)(OH)3
Mn5(AsO4)2(OH)4
(Ca,Sr)Al3(AsO4,PO4)2(OH)5.H2O
(Sr,Ca,Ba)Al3(AsO4,PO4)2(OH,F)5.*5H2O
Ni9BiAsS8

As
As2O3
Pd8(As,Sb)3
FeAsS
Cu3(As,V)S4
(Ag,Cu)16(As,Sb)2S11
Pb2Cu(AsO4)(SO4)(OH)
HAl(UO2)4(AsO4)4.*40H2O
Ca(UO2)4(AsO4)2(OH)4.*6H2O
Cu(Fe+3)2(AsO4,PO4,SO4)2(O,OH)2.*4H2O
Mg2(CO3)(OH)2.*3H2O
Ca3(Ti,Sn)As6Si2Be2O20
Mg3Si2O5(OH)4
(Co,Ni)(1-y)(Mn+4O2)(2-x)(OH)(2-2y+2x).nH2O (with y and x <1)
Pb6Bi2S9
(Nb,Ta,U,Fe,Mn)4O8
KNaCaY2Si6O12(OH)10.*4H2O
(Pb,Ba)(UO2)6(BiO4)(AsO4)2(OH)12.*3H2O
(K,Na)3(Fe,Mn)7Ti2Si8O24(O,OH)7
Cu2Cl(OH)3
Bi8(AsO4)3O5(OH)5
Cu5Se4
(Pd,Hg)3As
(Pd,Pt)3Sn
(Ca,Mn,Sr)3Al6(PO4,SiO4)7.*3H2O
CuAl(SO4)2Cl.*14H2O
Al2(PO4)(OH)3
(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al)2O6
(Zn,Cu)5(CO3)2(OH)6
Cu3Au
(Mn,Ag,Ca)(Mn+4)3O7.*3H2O
AuSb2
CaZn(AsO4)OH
Ca(UO2)2(PO4)2.*10-*12H2O
Tl2O3
(K,Cs)BF4
Ni2Fe to Ni3Fe
Ca2Fe+2Al2BSi4O15(OH) (Ferro-Axinite)
(Mg,Fe+2)2(Fe+3,Ti,Mg)BO5
Cu3(CO3)2(OH)2
BaBe(PO4)(F,O)
Ca2(Fe+2,Mn)Fe+3Si5O14(OH)
ZrO2
Ba(Fe+2,Mn)2TiSi2O7(O,OH)2
Ca3(Zr,Ti)Si2O9
Al5(Sb+5)3O14(OH)2
Ca4B4(BO4)(SiO4)3(OH)3.H2O
(Mg,Fe+2,Fe+3,Mn+2)42Si16O54(OH)40
BaMg2LiAl3Si4O12(OH,F)8

Cu9Ag5HgS8
CuTeO3
Cu(Se,Te)2
BaNa2Al4Si4O16
CuB(OH)4Cl

(Na,K)x(V+4)x(V+5)6-xO15 (x = *0.7)
KCa(Fe+2,Mn+2,Zn,Mg)20(Si,Al)32O76(OH)16.*4-12H2O
Ba4(Ti,Nb)8Si4O28Cl
(NH4)2SiF6
KCa7(Ti,Zr)2Li3Si12,O36F2
Mg6Cr2CO3(OH)16.*4H2O
Fe+2(Fe+3)2(PO4)2(OH)2
Na7AlH2(CO3)4F4
Al3(V+5,V+4)40O100.*90H2O
(Mg,Fe+2)3(PO4)2.*8H2O
(Ba,Sr)4(Fe+2)2Ti2Si8O26.H2O
Ba(Ta,Nb)2(O,OH)7
(Ba,Sr)2(Nb,Ti)2(O,OH)7
BaSO4
BaFe4(AsO4)3O2(OH)5.*5H2O
(Na,Ca)2(V+5)6O16.*3H2O
(Na,K,Ca)2Al2Si7O18.*7H2O
(Fe,Ni)2P
MgCO3.*2H2O
PbFe+2Ge3O8
K3Fe10S14
BaBe2Si2O7
Pb8Mn(Si2O7)3
BaCa(CO3)2
(Na,K)2(Ba,Ca,Sr)2(Ti,Fe)3(SiO4)4(O,OH)2
Al4(SO4)(OH)10.*5H2O
Ca2(SO4)2.H2O
Fe+2(UO2)2(PO4)2.*8H2O
(Ce,La)(CO3)F
(Y,Ce)(CO3)F
(Ba,K,Na)3Ti2Si4O14
Pb3As4S9
(Mg,Mn+2,Fe+2,Zn)3(Si,Al)2O5(OH)4
Al(OH)3
Ca4Be2Al2Si9O26(OH)2
Cu8HgS5, Cu6HgS4, or Cu10Hg3S8
Al(OH)3
PbCu3(AsO4)2(OH)2.H2O
Mg2(UO2)(CO3)3.*18H2O
K2Mg(CO3)2.*4H2O
BaZrSi3O9
Be3(Sc,Al)2Si6O18
Be2(AsO4)(OH).*4H2O

Pb(Cu+2,Fe+3,Al)6(SO4)4(OH)12
Ca(UO2)6O4(OH)6.*8H2O
(Ta,Nb)BO4
Be(OH)2
(Na,Ca0.05)0.3Al2(Si,Al)4O10(OH)2.nH2O
Cu2Se
Cu3(IO3)6.*2H2O
(Sr,Ce,Na,Ca)5(PO4)3(OH)
Mn8Si6O15(OH)10
Pb4(Mn,Fe)Sb6S14
BaTiSi3O9
(Ag,Cu)3(Bi,Pb)7S12
(Ba,Sr)6(Ca,Mn)6Mg(CO3)13
Ca6(Cr,Al)2(SO4)3(OH)12.*26H2O
Fe+2(Fe+3)5(PO4)4(OH)5.*4H2O
Be2(BO3)(OH,F).H2O
(V+3)2TiO5
(Ba,Ca)2(UO2)3(PO4)2(OH)4.*5.5H2O
CaBe(AsO4)(OH)
AlPO4
Mn+2(Mn+3)2(PO4)2(OH)2.*4H2O
Fe+3(OH)3.nH2O (n = *0.0 - *0.25)
SnS2
Pb3(Ag,Cu)5Bi7S16

(Fe+2,Fe+3,Mg)2-3(Si,Al)2O5(OH)4
FeSb2S4
(Li,Na)2CaAl4(PO4)4(OH,F)4
Be4Si2O7(OH)2
Be3Al2Si6O18
Be3SiO4(OH)2.H2O
NaBePO4
Cu2Se
(Ca,Na)3(Mg,Mn)2(AsO4)3
Au4Cu(Te,Pb)
(Ca,Na,U)2(Ti,Nb,Ta)2O6(OH)
Cu10(Fe,Pb)S6
H8[K(H2O)6]4[Ca(H2O)6]8[(Mo+6)32(Fe+3)12(As+5)8O148].*8H2O
PbFe3(AsO4)(SO4)(OH)6
(Mn,Fe,Ca,Mg)3(PO4)2
(Ca,Pb)Bi2(CO3)2O2
(Zn,Fe+2)SO4.*6H2O
Ca2Al2SiO6(OH)2
Pb2AgCl3(F,OH)2
CoSO4.*7H2O

(Y,Dy)2(UO2)4(CO3)4(OH)6.*11H2O
LiAlSi2O6.H2O
Ba(UO2)6O4(OH)6.*4H2O

Ag7(As,Sb)S6
Pb2Sb2O6(O,OH)
K(Mg,Fe)3(Al,Fe)Si3O10(OH,F)2
(NH4,K)H2PO4
Na4B10O16(OH)2.*2H2O
Na4Mn14O27.*9H2O
MgCl2.*6H2O
Bi2O3
BiOCl
Bi
Bi2S3
Bi2(CO3)O2
BiFe2(SiO4)2(OH)
(Bi,Ca)(Ta,Nb)2O6(OH)
Bi(Sb+5,Fe+3)2O7
Bi(Ta,Nb)O4
CaLiAl2(AlBeSi2)O10(OH)2
(Mn,Fe)2O3
(Ba,Sr)(Mn,Fe,Mg)2Al2(PO4)3(OH)3
Fe2(TeO3)3
Pb2Cl(O,OH)2
Na2Mg(SO4)2.*4H2O
Na2Mn5Fe+3Al(PO4)6
Mg3(PO4)2.*8H2O
AlO(OH)
Au5(Cu,Fe)3(Te,Pb)2
Sr2Na2Al2(PO4)F9
AgBiSe2
(Al,Fe+3)7(V+5,V+4,Fe+3)40O100.*37H2O
Pb26Ag10Cu24Cl62(OH)48.*3H2O
Al2(PO4)(OH)3.*4-*5H2O
HK(UO2)SiO4.*1.5H2O
Ni2Fe+3BO5
CuSO4.*3H2O
Pb3Bi2S6
Na3Fe(PO4)(CO3)
CuSO4.*7H2O
Mg3B7O13Cl
Na2B4O5(OH)4.*8H2O
Ca4MgB4O6(OH)6(CO3)2
~CaFe5(PO4)2(OH)11.*3H2O
Pd1+x(As,Pb)2 (x = *0-*0.2)
BaNa4Ti2NbSi4O17(F,OH).Na3PO4
Co3Se4
Cu5FeS4
Pd3SbTe4
Ca(Mn+3)6Si3O16.*7H2O
Cu2Cl(OH)3
MgFe+3(SO4)2OH.*7H2O

Pb5Sb4S11
PbCuSbS3
(NH4)2Mg(SO4)2.*6H2O
(Zn,Mg)SO4.*4H2O
CaTh(PO4)2
CrO(OH)
Pb2(Mn,Fe)(VO4)2.H2O
Na3Mg(PO4)(CO3)
(Pt,Pd,Ni)S
(Ca,Na2)7(Ce,La)2B22O43.*7H2O
(Na,H3O)(Al,Mg,Fe)2(Si,Al)4O10[(OH)2,H2O]
Ca2(Mn+2,Mg)(AsO4)2.*2H2O
(U,Ca,Y,Ce)(Ti,Fe)2O6
KSn2Li3Si12O30
MgHAsO4.*4H2O
Mn+2(Mn+3)6SiO12
(Ni,Fe)S2
NaAl3(PO4)2(OH)4
Ca7Mg(SiO4)4
NiSb
Ca2(CO3)F2
(Sr,Ba,Ca)AlSi6O16.*5H2O
Cr3S4
Na2CaMg(PO4)2
Cu2(Fe,Zn)GeS4

(Ni,Mg,Fe+2)2Al(SiAl)O5(OH)4
(Ce,Ca)5(SiO4,PO4)3(OH,F)
(Y,Ca)5(SiO4,PO4)3(OH,F)
Cu4SO4(OH)6
(Ca,Th,Ce)(PO4).H2O
AgBr
BeO
TiO2
Ca2(Al,Fe)2O5
Mg(OH)2
Ca(IO3)2.H2O
Mg6Fe(CO3)(OH)13.*4H2O
(Ge+2,Fe+2)(Fe+3)2O4
CaH(PO4).*2H2O
NaCaPO4
(NH4)AlSi3O8.*0.*5H2O
Na(Fe+3)3Al6(BO3)3Si6O18(O,F)4
K2Ca(CO3)2
Tl2(Cu,Fe)4Se4
(Fe+3)2(AsO4)(SO4)(OH).*7H2O
Al2(AsO4)(OH)3.*3H2O
Ca2SiO2(OH,F)4
NiO

(Na,Ca)2(Fe+2,Mg)2Al10(PO4)8(OH,O)12.*4H2O
(Na,Ca)3(Sr,Ba,Ce)3(CO3)5
Pb2(Fe+3,Mn+3)Te+4(Al,Si3)O12(OH)2.H2O
Na6(CO3)(SO4)2
Pb5Bi4S11
CaSn(OH)6
(Mn+2,Ca)3Si3O9
Fe+3(SO4)(OH).*2H2O
Cu19Cl4(NO3)2(OH)32.*2H2O
MgSb2O6
mCaAl2Si2O8 with nNaAlSi3O8 (m/n = 70/30 to 90/10)
Pd2SnCu
(Fe+3,Al)25(PO4)17O6(OH)12.*75H2O
Cd
CdSe
Al(OH)2Cl.*4H2O
Ca8(Ti,Fe+2,Fe+3,Mn)6-7(As+3O3)12.*4H2O
Ca(Fe+3,Al)2Ti4O12.*4H2O
Ca2B(AsO4)(OH)4
AuTe2
CaB2O4
CaFe4(SO4)6(OH)2.*19H2O
Ca4Fe+2(Fe+3,Al)4(PO4)6(OH)4.*13H2O
CaTa4O11
CaCu(VO4)(OH)
CaCO3

CaZrSi3O9.*2H2O
Na(Ca,Sr)3Al3(F,OH)16
CaCl2.*Ca(C2H3O2)2.*10H2O
Ca(UO2)3(MoO4)3(OH)2.*11H2O
(Mn+2,Ca)3(Fe+3,Al)2(SiO4)3
Pb5Cu2(SO4)3CO3(OH)6

(Ce,La)2(CO3)3.*4H2O
Cu2Mg2CO3(OH)6.*2H2O
Hg2Cl2
Cu(OH,Cl)2.*2H2O
CaZr3TiO9
Cu4Mn(SO4)2(OH)6.*4H2O
CaNa2P2O7.*4H2O
(Na,K)6Ca5Si12O30(OH,F)4
Mg2(CO3)(HBO3).*5H2O
Na6Ca2Al6Si6O24(CO3)2
Ag8SnS6
Pb4Bi5S11
Ba(Y,Ce)6Si3B6O24F2
Na3Pb2(SO4)3Cl
K4Cu4O2(SO4)4(Na,Cu)Cl

Ca2Mg(CO3)2B2(OH)8.*4H2O
(Ca,Na)(Sr,Ce,Ba)(CO3)2
Fe+2Al2GeO5(OH)2
Cu4Al2(CO3,SO4)(OH)12.*2H2O
Ca5(PO4,CO3)3(F,OH)
Ca5(PO4,CO3)3(OH,F)
KNa4Ca4Si8O18(CO3)4(OH,F).H2O
Ca(Te+4)2Te+6O8
Ca2AlF7.H2O
Tl2S
(Mg,Fe+2,Ti)21(Si,Al)12O28(OH)34
CrN
PbFe2(AsO4)2(OH)2
KMgCl3.*6H2O
K2(UO2)2(VO4)2.*3H2O
KF
MnAl2Si2O6(OH)4
(Ni,Cu)14Al9(SO4,CO3)6(OH)43.*7H2O
Cu(CO,Ni)2S4
Na(Ca,Pb)(Ca,Mn)(Mn,Mg)2(AsO4)3
(Mn,Mg)3Si2O5(OH)4
Ca(Sc,Fe+2)Si3O8(OH)
Ca2(Ni,Mg)(PO4)2.*2H2O
SnO2
NaCrS2
Na2ZrSi3O9.*2H2O
CoS2
Ca(V+4O)Si4O10.*4H2O
Y2(Ca,Gd)2(SiAl)4O10(CO3)3.*4H2O
Ba3Ce2(CO3)5F2
Ca2(Mg,Fe+2,Al)Si2(O,OH)7
Pb(Fe+2,Mn)(VO4)(OH)
K(Mg,Fe+2)(Fe+3,Al)Si4O10(OH)2
SrSO4
BaAl2Si2O8
(Ce,Th)O2

(Ce,Ca,Y)2(Nb,Ta)2O6(OH,F)
(Ce,Ca)9(Mg,Fe)Si7(O,OH,F)28
Cu2CdSnS4
(Ce,Nd)W2O6(OH)3
Cu2Al7(AsO4)4(OH)13.*12H2O
PbCO3
Sb+3Sb+5O4
Na3Ca2(SO4)3(OH)
Cu5(TeO3)2(OH)6.*2H2O
(Cs,K,Na)3(Mn,Fe+2)7(Ti,Nb)2Si8O24(O,OH,F)7
CaAl2Si4O12.*6H2O
(Tl,Pb)23(Sb,As)91S147

Cu+2SO4.*5H2O
SiO2
CuAl4(SO4)(OH)12.*3H2O
Cu2S
CuSO4
Cu+2Se+4O3.*2H2O
Na2Cu(CO3)2.*3H2O
(Zn,Fe+2,Mn+2)(Mn+4)3O7.*3H2O
Cu18Al2(AsO4)3(SO4)3(OH)27.*3H2O
CuFeS2
CuFe6(PO4)4(OH)8.*4H2O
CuSbS2
Tl2(Cu,Fe)6SbS4
Cu2O
Mn3B7O13Cl
(Cu,Fe)4As(Se,S)4
(Fe+2,Mg,Fe+3)5Al(Si3Al)O10(OH,O)8
PbNb2O6
CaAl2SiO4(OH)4
C
Sb+3(Fe+3)2(SiO4)2(OH)
Ca6(Al,Si)2(SO4)2B(OH)4(OH,O)12.*26H2O
K(Ca,Na)2Si4O10(OH,F).H2O
Cu6FeSn2S8
CaMgB2O4Cl2.*7H2O
Cu2Fe2(AsO4)2(OH)4.H2O
Pb4Cu(SO4)2(OH)6
(Ca,Ce,Th)(PO4,SiO4)
RhAs

YAsO4
(Ba,Na)(V+3,Al)2(Si,Al)4O10(OH)2
Pb2V2O7
Na4Ca2(Mg,Zn)3Al8(SiO4)2(SO4)10(OH)10.*40H2O
(Ca,Ce,Th)4(Fe+2,Mg)2(Ti,Fe+3)3Si4O22
CaMnBe2Si5O13(OH)2.*2H2O
Fe+2Al(PO4)(OH)2.H2O
Na5Al3F14
Na2BeSi2O6
AlCl3.*6H2O
Ca5(PO4)3Cl
AgCl
(Fe+2,Mg,Mn)2Al4Si2O10(OH)4
(Mg,Fe+2)4Al2(OH)12(Cl2,CO3).*2H2O
K4MnCl6
(Mn,Mg)3Zn2(AsO4)(OH,O)6
K2Cu(SO4)Cl2
Pb3CuCl2O2(OH)2
PbCu+2(Te+4O3)2.H2O

MgFe+2)5(SiO4)2(F,OH)2
TlHgAsS3
CaCrO4
NaMg3(Cr,Fe+3)6(BO3)3Si6O18(OH)4
FeCr2O4
Cr
BeAl2O4
(Cu,Al)2H2Si2O5(OH)4.nH2O
SiO2
(Mg,Zn)5H2(AsO4)4.*10H2O
Ca3(Ce,Y)Al2(SO4)F13.*10H2O
Ca3(Y,Ce)Al2(SO4)F13.*10H2O
(Y,Er,La)PO4.*2H2O
Hg+1Hg+2(AsO4)
HgS
SiO2
Ca2B5O8Cl(OH)2
(NH4)2(Fe+3,Mn+3)3(SO4)4(OH)3.*3H2O
(Cu,Zn)3(CO3)(OH)4.*4H2O
Cu8Cl2(OH)14.H2O
PbSe
UTe3O9
C
BiVO4
CuSeO3.*2H2O
(Mg,Fe)5Al(Si3Al)O10(OH)8
Mg3Si2O5(OH)4
Cu3AsO4(OH)3
Mg2Si2O6
(Fe+2,Mg)2Si2O6
CaZnSiO4.H2O
Li2(Mg,Fe+2)3Al2Si8O22(OH)2 Mg/(Mg + Fe+2) = 0.1-0.89
(Mg,Fe+2)9(SiO4)4(F,OH)2
(Mg,Fe+2)5Si6O16(OH)2
Ca(Mg,Fe,Mn)B2O5
Na3CaPSiO7
(Na,K,Ca)2-3Al3(Al,Si)2Si13O36.*12H2O
(Co,Fe,Ni)As2
Ca2Cu9(AsO4,SO4)4(O,OH)10.*10H2O
Ca2Al3(SiO4)3(OH)
Ca(Mg,Al)3(Al3Si)O10(OH)2
Mg10(Fe+3)2(CO3)(OH)24.*2H2O

(Co,Fe,Ni)9S8
Co2(UO2)6(SO4)3(OH)10.*16H2O
CoAsS
(Co,Zn)AsO3(OH).H2O
CoSeO3.*2H2O
(Co,Ni,Fe+2)(Cr,Al)2O4

(Fe+3)2Al2(UO2)2(PO4)4(SO4)(OH)2.*20H2O
(Ca,Cu)Al6(PO4)4(OH)8.*4-*5H2O
SiO2
U(SiO4)(1-x)(OH)4x
(Fe,Ni,Co)3C
Ca2B6O11.*5H2O
Ca2(Mg,Fe)(PO4)2.*2H2O
HgTe
CaLiAlF6
(Fe,Mn)(Nb,Ta)2O6
Cu26V2(As,Sn,Sb)6S32
Hg13(Cl,Br)8O9
Na2Ca2Si3O9
(Ni+2)6(Co+3)2(CO3)(OH)16.4H2O
K2(UO2)6O4(OH)6.*8H2O
(Fe,Mg,Mn)3B7O13Cl
CaCu+2(AsO4)(OH)
Cu19Cl4(SO4)(OH)32.*3H2O
LiAl4(Si3Al)O10(OH)8
(Pt,Pd,Ni)S
Fe+2(Fe+3)4(SO4)6(OH)2.*20H2O
Cu
(Fe+3)2(SO4)3.*9H2O
Hg3S2Cl2
(Mg,Fe+3)2Al4Si5O18
(Ce,La)2Ba(CO3)3F2
Pb(Fe+3)3PO4SO4(OH)6
Cu3PO4(OH)3
Cu5(AsO4)2(OH)4
Cu5(AsO4)2(OH)4.H2O
Pb(Mn+4,Mn+2)8O16
Al2O3
Pb2Bi2S5
CoSbS
PbCl2
Fe+2(V+3)2O4
CuS
CaAl2Si3O10.*5-*6H2O
NaFe3S5.*2H2O
CaAl3(PO4)2(OH)5.H2O
Pb2(Cu+2)2(Fe+3)2Si5O17.*6H2O
CuMnO2
Ca3Al2SO4(F,OH)10.*2H2O
(Sr,La,Ce,Y)(Ti,Fe+3,Mn)21O38
SiO2
Na2(Fe+2,Mg)3(Fe+3)2Si8O22(OH)2
PbCrO4
(Fe+2)2Fe+3(SiFe+3)O5(OH)4
Cu7(Tl,Ag)Se4

Na2(Mg,Fe+2)3(Al,Fe+3)2Si8O22(OH)2 Fe+3/(Fe+3 + Al) = 0.3-0.7
Na3AlF6
Na3Li3Al2F12
(NH4)2SiF6
K(Mn+4,Mn+2)8O16
Cu6Al2Sb3O18.*16H2O
CuFe2S3
Pb4Cu4Cl8(OH)8.H2O
(Mg,Fe+2)7Si8O22(OH)2 Mg/(Mg + Fe+2) = *0.30-*0.69
(Cu,Zn)Al
Cu2O
Cu10Bi12S23
Cu+2(Fe+3)4(SO4)6(OH)2.*20H2O
CuIr2S4
AgPbCu2Bi5S10
CuRh2S4
CaCuSi4O10
(H3O)2Cu(UO2)2(SiO4)2.*2H2O
(Cu,Mg)Fe2O4
Cu2(Sb,Tl)
(Cu+2)3(WO4)2(OH)2
Ba4Al3Ti(PO4)4(O,OH)6
Pb(UO2)2(VO4)2.*5H2O
Pb2U5O17.*4H2O
Ca4Si2O7(F,OH)2
(Fe+2)2Te+6O6.*3H2O
K2Cu(SO4)2.*6H2O

(Cu+2)5Al2(Sb+3)3O12(OH).*12H2O
Cu4Al2(SO4)(OH)12.*2H2O
Pb4Fe+2(Sn+4)4(Sb+3)2S16
BaAl2Si2(O,OH)8.H2O
Na(Fe+3)3(PO4)2(OH)4.*2H2O
(Ca,Na2,K2)5Al10Si38O96.*25H2O
Pb(10+x)Sb(14-x)S(31-x)Clx
K2ZrSi6O15
(Fe+2)4Be3(SiO4)3S
CuZn2
CaB2(SiO4)2
Mn2(Fe+2,Mg)5Si8O22(OH)2
CuPtAsS2
(Sr,Ca,Ba)3(Ce,La,Nd)(PO4)(CO3)3-x(OH,F)y
KNa2Li(Mn,Zn)2ZrSi12O30
Na3(SO4)(NO3).H2O

CaBSiO4(OH)
BiO(OH,Cl)
FeCr2S4
K2TiSi6O15

(La,Ce)(Y,U,Fe)(Ti,Fe+3)20(O,OH)38
Mn+2Al6Si4O17(OH)2
(Na,Ca,K)8Al6Si6O24(Cl,SO4,CO3)2-3
NaAl(CO3)(OH)2
(Fe+2,Mn)6(Fe+3,Al)3Si6O20(OH)5
Ca6(CO3)(2-x)(SiO4)x(OH)7(Cl,OH)(1-2x) x = 0.5
CuFe+3O2
(Na,K)10Ca5Al6Si32O80(Cl2,F2,SO4)3.*18H2O
CaSr(V+5)2O6(OH)2.*3H2O
Ca(Fe+3)4(PO4,SO4)2(OH)8.*4-*6H2O
Ca3(Fe+3)2(SiO4)3
Pb2Cu5(UO2)2(SeO3)6(OH)6.*2H2O
(K,Na)Ca2Si3O8(F,OH)
(Mn+2,Zn)(Te+4)2O5
(Fe+3,Fe+2,Ti)7Sb+3O13(OH)
Cu4(UO2)(SeO3)2(OH)6
Ag2AsS2
Mg6(Mn+3)2(CO3)(OH)16.*4H2O
PbZn(VO4)(OH)
Ca3Mn+4(SO4)2(OH)6.*3H2O
CaCu4(SO4)2(OH)6.*3H2O
Pb3(UO2)6H2(PO4)4.*12H2O
Pb2CuCl2(OH)4
(Fe+3)9(PO4)(SO4)(OH).*5H2O
C
Pb2Ag3Sb3S8
AlO(OH)
(K,Ba)(Na,Ca)5(Mn+2,Fe+2,Mg)14Al(PO4)12(OH,F)2
Al2Si2O5(OH)4
Ca2(IO3)2(CrO4)
Cu9S5
As4S3
CaMgSi2O6
CuSiO2(OH)2
(NH4)Mg(PO4).H2O
CuMn14Fe+3(As+3O3)5(SiO4)2(As+5O4)(OH)6
K6(Cu,Fe,Ni)25S26Cl
Cu31S16
Cu2(SO4)O
CaMg(CO3)2
H8V6O16
Cu3As
(Fe,Mg)(Cr,Fe)2O4
NaCaSr3Y(CO3)6.*3H2O
(Mn,Mg)MgSi2O6
Na2HPO4.*2H2O
K2FeCl4.*2H2O
SeO2

Al(OH)3
NaMg3Al6(BO3)3Si6O18(OH)4
BaAl2(CO3)2(OH)4.H2O
BiVO4
Pb2(Fe+3,Al)H(PO4)2(OH)2
Mo(Se,S)2
Fe+2(Fe+3)4(PO4)3(OH)5.*2H2O
Pb2As2S5
PbCu(AsO4)(OH)
Pb3(Zn,Cu+2)3(Te+6O6)(AsO4)(OH)3
Pb2(Cu+2)4Bi(VO4)4(OH)3.*8H2O
Pb2(UO2)3O2(PO4)2.*5H2O
Al7(BO3)(SiO4)3O3
PbAl2(CO3)2(OH)4.H2O
NaAl(AsO4)F
As4S
Ba(Fe+3)3(AsO4)2(OH)5
V+4O(OH)2
(Ni,Fe)SO4.H2O
Mg5(CO3)4(OH)2.*5H2O
Ag3Sb
In(OH)3
Ca2SnAl2Si6O18(OH)2.*2H2O
Ca3(C6H5O7)2.*4H2O
(Mn+2,Fe+2)(Fe+3)2(PO4)2(OH)2.*4H2O
Pb6(As+3)2O7Cl4
Na3(Mg,Fe+2)4AlSi8O22(OH)2 Mg/(Mg + Fe+2) = 0.05-1.0; Fe+3/(Fe+3 + Al) = 0-0.5
Pb9(Cu,Fe)Bi12S28
NaCa2(Mg,Fe+2)5Si7AlO22(OH)2 Mg/(Mg + Fe+2) = 0.5-1.0
BaAl2Si3O10.*4H2O
(Na,K,Ca)2(Mn,Fe)8(Si,Al)12O29(OH)7.*11H2O
(Hg+1)6Cl3O(OH) or (Hg+1)4Cl2O
Ca2ZnBe(PO4)2(PO3OH).*4H2O
KNa3Mg4Si12O30
Na2Mg(CO3)2
ThCa2Si8O20
Ca2B4O7(Cl,OH)2.*2H2O
Na(Li,Al)3Al6(BO3)3Si6O18(OH)4
Tl3AsS3
K2NaAlF6
Na2ZrSi6O15.*3H2O
Pb4Cu(SO4)(OH)8
Pb5(CrO4)2(PO4)2.H2O
Be3Al2Si6O18
(Fe+3)2(TeO3)3.*2H2O
CuBiS2
AgTe
Cu3AsS4
Al2Si2O5(OH)4.*2H2O

K3Na2Ca10Al15(PO4)21(OH)7.*26H2O
Mn+2Al(PO4)(OH)2.H2O
NaLiAl2(Al2Si2)O10(OH)2
NaBeSi3O7(OH)
Ca2(Al,Fe+3)3(SiO4)3(OH)
CaAl2Si6O16.*5H2O
Na2(Nb,Ti)2Si2O9.nH2O
MgSO4.*7H2O
NaFeS2.*2H2O
(Fe+2,Mg,Mn)3B7O13Cl
BaMn2Fe+3OSi2O7(OH)
CuCl2.*2H2O
(K2,Ca,Na2)2Al4Si14O36.*15H2O
(Fe+2,Mg)4(Fe+3,V)2Si6O15(OH,O)8
OsS2
(Mn+2(1-x),Fe+3(x))Al(PO4)(OH)(2-x)O(x)
Na2Si4O9
Co3(AsO4)2.*8H2O
K2Fe+3Cl5.H2O
CuFeSe2
Ag7Pb10Bi15S36
Cr2O3
(Ca,Pb)ZnSiO4

CaFe+3AlSiO6
Ca6Al2(SO4)3(OH)12.*26H2O
CuAgSe
(K,Na)8Cu9(SO4)10(OH)6 (?)
Cu2(AsO4)(OH).*3H2O
BeAlSiO4(OH)
LiAlSiO4
Na4(Ca,Ce)2(Fe+2,Mn+2,Y)ZrSi8O22(OH,Cl)2
NaBeSi3O7(OH)
Na4Ca(SO4)3.*2H2O
Bi4(SiO4)3
(Y,Ca,Ce,U,Th)(Nb,Ta,Ti)2O6
Al3PO4(OH)6.*6H2O
Mn2(AsO4)(OH)
C24H50 (n-tetracosane)
Ba(Ca,Y,Na,K)(CO3)2
(Th,Pb)(1-x)Al3(PO4,SiO4)2(OH)6
Na4B10O17.*7H2O
Pb2(Fe+3)6(Te+4O3)3(Te+6O6)(OH)10.*8H2O
CaB3O5(OH)
(Mn+2,Mg)(Fe+3)2Be2(PO4)4.*6H2O
PbTeO3
K2Ca(CO3)2
Ca2(Mn+2,Fe+2)(PO4)2.*2H2O
(Ni,Mg)4Si6O15(OH)2.*6H2O

Cu3SbS4
Mg3(PO4)2
(Na2,Ca)Al2Si4O12.*8H2O
(Zn,Cu)Al6(PO4)4(OH)8.*4H2O
Fe2SiO4
KNa4Ca4(Si,Al)16O36(OH)4.*6H2O
Ca2(Mg,Mn)2B4O7(OH)6
(K,Na,Ca)4(Fe+2,Fe+3,Mn)2Si8O20(OH,F)
FeWO4
FeSi2
(Y,Er,Ce,Fe)(Nb,Ta,Ti)O4
(Ce,La,Nd)NbO4
(Nd,Ce)NbO4
YNbO4
(Ca,Sr)5(AsO4,PO4)3(OH)
d-Fe+3O(OH)
Ca5H2(AsO4)4.*9H2O
K(Fe+2,Mg)3(Fe+3,Al)Si3O10(OH)2
Fe+3(Fe+3)4(SO4)6O(OH).*20H2O
(Na,K)(Mg,Fe+2)3(Fe+3)6(BO3)3Si6O18(O,OH)4
(Na,K)2Mg(Si,Al)18O36(OH).*9H2O
5Fe2O3.*9H2O
Na2Ca(Mg,Fe+2)4Fe+3Si7AlO22(OH)2   Mg/(Mg + Fe+2) = 0-0.49, Fe+3 > Al
Ca(Zn,Cu)(Fe+3,Zn)(AsO3OH)2(OH)3
Fe2(MoO4)3.*8H2O
Na3Fe+3(SO4)3.*3H2O
Li(Fe+3,Mn+2)PO4
(K,Ca,Na)(W+6,Fe+3)(O,OH)6.*H2O
Ca2(Fe+2,Mg)5Si8O22(OH)2

(Na,Ca)Fe+2(Fe+2,Mn,Fe+3,Mg)2(PO4)3

(Fe+2,Mg)7Si8O22(OH)2   Fe+2/(Fe+2 + Mg) = 0.9-1.0
Ca2Fe+2Al2BSi4O15(OH)
Ca(Fe+2,Ca,Mn)Si2O6
(Fe,Mg)Al2Si2O6(OH)4
FeNb2O6
(Fe+2,Mg)5Al2(Si6Al2)O22(OH)2   Fe+2/(Fe+2 + Mg) = 0.9-1.0
Na2(Fe+2,Mg)3Al2Si8O22(OH)2   Mg/(Mg + Fe+2) = 0-0.49
FeSO4.*6H2O
Ca2(Fe+2,Mg)4Al(Si7Al)O22(OH,F)2 Mg/Mg + Fe+2) = *0-*0.49
Pt2FeNi
NaCa2(Fe+2,Mg)4Al(Si6Al2)O22(OH)2   Mg/(Mg + Fe+2) = 0-0.29
Na2Ca(Fe+2,Mg)5Si8O22(OH)2   Mg/(Mg + Fe+2) = 0-0.49
FeSe2
Fe+2(Fe+3)2(PO4)2(OH)2.*6H2O
Fe+2Ta2O6
Ca2(Fe+2,Mg)3Al2(Si6Al2)O22(OH)2   Mg/(Mg + Fe+2) = 0-0.49
Na6Fe2(SO4)(CO3)4

(Na,Ca,Mn)(Fe+2,Mn)(Fe+2,Fe+3,Mg)Al(PO4)3
NaBF4
FeSi
(Ca,Na)4(Ti,Nb)2Si2O11(F,OH)2
(Ca,Ce,Na)(Nb,Ta,Ti)2(O,OH,F)6
Fe+3SO4(OH).*5H2O
Pb3Cl4(OH).H2O
Na2Ca(Mn,Fe+2)7(PO4)6
(Cu+2)11(VO4)6O2
Pb5(As+3O3)3Cl
Ag3AuSe2
Pb14Ag5Sb21S48
C10H22O3
Pb3Ge(SO4)2(OH)6.*3H2O
Cu(Ni,Co)2S4
Mn3(AsO4)(OH)4
CeAl3(PO4)2(OH)6
(La,Ca)Al3(PO4)2(OH)6
CaMnH2(AsO4)2.*2H2O
Al2(PO4)F2(OH).*7H2O
Mg3(BO3)(F,OH)3
(Ce,La)F3
(La,Ce)F3
Ca5(PO4)3F
KCa4Si8O20(F,OH).*8H2O
Ca5(SiO4,PO4,SO4)3(F,OH,Cl)
CaF2
CaAl(PO4)(OH)2.H2O

Y(Ta,Nb)O4
(Pb,Cu)3(CrO4,AsO4)2(OH)
Mg2SiO4
Ca4Si3O9(OH)2
PbU4O13.*4H2O
(Zn,Al)3(Si,Al)2O5(OH)4
(Ba,Pb)(UO2)2V2O8.*5H2O
(Mn+2)3V+5(SiO4)(O,OH)7
(Pb,Sn+2)6Fe+2(Sn+4)2(Sb+3)2S14
H6(K,Na)3(Al,Fe+3)5(PO4)8.*13H2O
Na2Nb4O11.*9H2O
BaF2
(Zn,Mn+2,Fe+2)(Fe+3,Mn+3)2O4
H2Ca3Be2(PO4)4.*4H2O
(Na,Ca)7(Si,Al)12O24(SO4,CO3,OH,Cl)3.H2O
CoSe
Mg2(Mn+3,Fe+3)(BO5)O2
Pb8Cu+1(As+3O3)2O3Cl5
(Ag,Cu,Fe)12(Sb,As)4S13
AgPbSbS3

Ba2TiSi2O8
Na2(Ti,Fe)8O16
Mn8Si6O15(OH,Cl)10
Pb5Cu5Bi7S18
Mn+2(UO2)2(PO4,VO4)2.*10H2O
FeTe2
Mn+2(Fe+3)4(PO4)3(OH)5
PdBi2
Ca4Si2O6(CO3)(OH,F)2
(Cu,Fe)S2
Pb3Sb8S15
Al2(UO2)(PO4)2(OH)2.*8H2O
(Cu,Ag)6PbS4
PbFe+2(AsO4)(OH)
(Ce,La,Nd,Y)2Fe+2Be2Si2O10
Y2Fe+2Be2Si2O10

NaCaY(F,Cl)6
(Mn,Mg,Zn)8Si3O10(OH)8
ZnAl2O4
Na2ZrSi3O9.*2H2O
Na2(Zr,Zn)2(Be,Li)(PO4)4
Ca2Zn(AsO4)2.*2H2O
(Mn,Fe+2,Mg)(Al,Fe+3)2O4
Na15(SO4)5F4Cl
PbS
PbBi2S4
(Cs,Tl)(Hg,Cu,Zn)6(As,Sb)4S12
CuGaS2
Ba2(Fe+3,Mn+3)(VO4)2(OH)
Pb9Ca5MnSi9O33
(K,Na)2(Mn,Al,Mg)8(Si,Al)12O29(OH)7.*8-9H2O
FeSbBiS4
Ba3NaSi2B7O16(OH)4
Pb(Cu+2,Fe+2)2(AsO4,SO4)2(CO3,H2O)0.7
(Mg,Fe+3)3(PO4)2(OH,O).*1.5H2O
(Ni,Mg,Fe)CO3
Mn5(PO4)2(OH)4
CaAl2(PO4)2(OH)2.H2O
Ca4(Mn+3)(3-x)(BO3)3(CO)3(O,OH)3
Na2Ca(CO3)2.*5H2O
CaAl(OH)F4.H2O
Pb8((As+3)2O5)2OCl6
(Mg,Fe+2)5Al2(Si6Al2)O22(OH)2
Cu8S5
(Ag,Cu,Fe)9(Se,S)8
Ca2Al(SiAl)O7
MgTiO3
(Pt,Pd)4Sb3

Zn4Be3(SiO4)3S
Pb14(Sb,As)6S23
KNaZrSi3O9.*2H2O
Cu2(CO3)(OH)2.*6H2O
Pb16(AsO4)4Cl14O2(OH)2
Cu2(NO3)(OH)3
Cu13Fe2Ge2S16
NiAsS
Na2(Sb,As)8S13.*2H2O
(Mg,Mn)2ZnSiO4(OH)2
AsSbS3
Pt(Sb,Bi)2
Hg4(SO4)N2
Al(OH)3
Pb13(Cu,Ag)(Bi,Sb)9S28
Cu5Si6O17.*7H2O
BaFe+2Si4O10
Fe+2(Fe+3)4(PO4)4(OH)2.*2H2O
Ca2B14O23.*8H2O
(Cu,Zn,Ag)12(As,Sb)4(Se,S)13
Pb3H2(Te+4O3)(Te+6O6)
Ca2Al4Si4O16.*9H2O
CaZrSi2O7
(Na,K,Ca)7-8(Si,Al)12O24(SO4,Cl)1-2
PbCuBi5S9
Na2Ca(SO4)2
CaMnSiO4
(Co,Fe)AsS
(Zn,Cu)10Al6(SO4)3(OH)32.*18H2O
(K,Na)(Fe+3,Al,Mg)2(Si,Al)4O10(OH)2
Na2(Mg,Fe+2)3Al2Si8O22(OH)2
(Cu,Ni)2(CO3)(OH)2
MgC2O4.*2H2O
(Na2,Ca)Al2Si4O12.*6H2O
Na4(Cu,Mg,K2)Al6Si10O32.*12H2O
(Ni,Fe)7S6
(Sr,Ca)2Al(PO4)2(OH)
a-Fe+3O(OH)
Au
(Au,Ag)Hg
KFe+3(SO4)2.*4H2O
Ca3(V,Al,Fe+3)2(SiO4)3
Na2CaAl4Si6O20.*7H2O
(Mn,Mg)5Fe+3(Si3Fe+3)O10(OH)8
CaAl2Si6O16.*5H2O
BaAl3(PO4)(PO3OH)(OH)6
MgAl2(PO4)2(OH)2.*8H2O
K2Ca5(SO4)6.H2O
(Fe+2)3Al4(PO4)4(OH)6.*2H2O

(Cu,Fe)6Hg2S5
Zn(SO4).*7H2O
(Ca,Na)7(Ti,Al)2Si4O15(F,OH)3
(Al,Y)(Cu+2)6(AsO4)3(OH)6.*3H2O
CaB6O10.*5H2O
SrAl3(PO4)2(OH)5.H2O
CuTeO3.H2O
(Fe+2,Mn+2,Ca)3(PO4)2
(Mg,Fe+2)Al3(BO4)(SiO4)O
NaCa(V+5,V+4)6O16.*4H2O
C
Pb9As4S15
(Th,Pb,Ca)PO4.H2O
(Fe+2,Fe+3)2-3Si2O5(OH)4
CdS
Fe+2(Fe+3)2S4
Cr+3O(OH)
K3Na(UO2)(CO3)3.H2O
Na4Ca6(Mn,Fe+2,Mg)19Li2Al8(PO4)24(F,OH)8
NaCa2(Mn+2)5Fe+3(AsO4)6.*2H2O
Ca3Al2(SiO4)3
Mn+3O(OH)
(Fe,Mg)7Si8O22(OH)2
Cu6Hg3Sb4S12
Bi2Se3
C5H3(NH2)N4O
FeSbS
Ca5H2(AsO4)4.*9H2O
Pb(Sb,As)2S4
Ca2BeSi2O7
CuFe+3(SO4)2(OH).*4H2O
Ba(UO2)3(SeO3)2(OH)4.*3H2O
(Zn,Mn+2)SO4.H2O
Fe3Si
PbAgBi3S6
Cr+3O(OH)
CaSO4.*2H2O
NaCa16(Si23Al)O60(OH)5.*15H2O

Pb(Nd,La)(CO3)2(OH).H2O
4((Fe,Ni)S).*3((Mg,Fe+2)(OH)2)
HfSiO4
NaCaMn+2(Fe+2,Fe+3,Mg)2(PO4)3
V2O2(OH)3
CaHAsO4.H2O
Ca(UO2)2Si6O15.*5H2O
(Cu,Hg,Ag)12Sb4(Se,S)13
NaCl
Pb2(UO2)(AsO4)2

Al2Si2O5(OH)4
Fe+2Al2(SO4)4.*22H2O
Mg2[B4O5(OH)4]2.H2O
Be2BO3(OH)
Pb2Cu2Bi4S9
(Pb,Ca,Sr)2(Al,Fe+3)3(SiO4)3(OH)
KNa22(SO4)9(CO3)2Cl
(NH4)2Mg3H4(PO4)4.*8H2O
SrV+4Si2O7
Ca2ZnSi2O7
Ca12Mg4A6(SiO4)4(BO3)3(CO3)5.H2O
(Ba,K)(1-2)(Si,Al)8O16.*6H2O
Ca6(Mn+2,Mg)Be4(SiO4)2(SiO7)2(OH)2
Ba(CrO4,SO4)
NaCa2(Fe+2,Mg)4Fe+3(Al2Si6)O22(OH)2
CoSe2
(Pb,Tl)2AgAs2S5
Ca3SiO5
Ni9Bi(Sb,Bi)S8
(Mg,Mn+2)24Zn18(Fe+3)3(SO4)4(CO3)2(OH)81
MnS2
Mn+2(Mn+3)2O4
(Na,Ca)4-8Al6Si6(O,S)24(SO4,Cl)1-2
CdS
(Fe,Ni)23C6
Cu4Fe5S8
Ni3S2
Na0.3(Mg,Li)3Si4O10(F,OH)2
CaFeSi2O6
Bi7Te3
Pb3Ca2(AsO4)3Cl
(Fe,Cr)(1+x)(Ti,Fe)2S4
Na2Ca3B5O8(SO4)2Cl(OH)2
Ba(UO2)2(AsO4)2.*10-*12H2O
Be3Al2Si6O18
Pb6As2O7Cl4
(Ca,Y)6(Al,Fe+3)Si4B4O20(OH)4
NiCO3.*6H2O
PbZn2(AsO4)2.*2H2O
Mn4Be3(SiO4)3S
a-Fe2O3
(Mn,Mg,Al)15(AsO3)(AsO4)2(OH)23
Pb4(Fe+3)3O8(OH,Cl)
Pb10Zn(CrO4)6(SiO4)2F2
Zn4Si2O7(OH)2.H2O
Cu6SnMoS8
Ca3(V+5,V+4)12O32.*12H2O
K(Zn,Mg,Mn)3(Si3Al)O10(OH)2
Ca2Cu[B(OH)4]2(OH)4

Ca3(Mn+3,Al)2(SiO4)2(OH)4
Cu4Ag3te4
CuFe2(PO4)2(OH)2
FeAl2O4
CaBe(PO4)F
(Na,Ca,K)AlSi2O6.*3H2O
SnS
Ag2Te
Zn(Mn+3)2O4
CoO(OH)
Pb7Sb8S19
Fe+3PO4
(Na,Ca)(2-3)Al3(Al,Si)2Si13O36.*12H2O
CaV6O16.*9H2O
MgSO4.*6H2O
Ca[B(OH)4]2.*2H2O
Ni(Te,Sb)
Pb5(Fe+2)2(VO4)2O4
Pb10AgBi5S18
(Ca,Ce)(Al,Ti,Mg)12O19
PbAl3(AsO4)(SO4)(OH)6
K2SiF6
Na2ZrSi3O9.*3H2O
Ca2B5O9Cl.H2O
Ca2SiO3(OH)2
(Y,Yb,Er)BeSiO4(OH)
(Yb,Y)BeSiO4(OH)
(Pb,Sr)Al3(PO4)(SO4)(OH)6
(Ca,Na)3(Zr,Ti)Si2O7(O,F)2
(Fe+3)2Si2O5(OH)4.*2H2O
Ag2FeSnS4
MnZn2SiO4(OH)2
Cu8Bi12S22
C14H8O2
Mg(Al,Fe,Ti)4O7
(Fe+3)2(SO4)2(OH)2.*7H2O
(Mn,Mg)6Zn3(AsO4)2(SiO4)(OH)8
Ba(Mn+4,Mn+2)8O16
(Rh,Pt,Pd)AsS
Li2(Mg,Fe+2)3Al2Si8O22(OH)2
Mg12(PO3OH,CO3)(PO4)5(OH,O)6
Al6(Al,Ta)(Si,Sb)3BO15(O,OH)2
Ca2(Fe,Mg)B2Si2O10
TiO
PtCuAs
Zn3(PO4)2.*4H2O
Mg3(AsO4)2.*8H2O
Al5(PO4)(SO4)(OH)10
Na(Fe+2,Mn)10(Fe+3,Al)2Si12O31(OH)13

Ca2B5SiO9(OH)5
Ca3Li2Be3(SiO4)3F2
BaCe(CO3)2F
MnWO4
Pb2(UO2)3(AsO4)2(OH)4.*3H2O
(Fe+2,Mg)2(Fe+3,Sn)BO5
Na7K3Mg2(SO4)6(NO3)2.*6H2O
Fe+2C2O4.*2H2O
(Mg,Fe+2)7(SiO4)3(F,OH)2
KMgV5O14.*8H2O
MgB4O5(OH)4.*7H2O
CaMg3(CO3)4
Mn5(PO4)2[PO3(OH)]2.*4H2O
CaBe2(PO4)2
(Pb,Tl)2As5S9
ThSiO4
(K,Ba)Al(Si,Al)3O8
(Ba,Pb,Ca,K)6(B,Si,Al)2(Si,Be)10O28(F,Cl)
(H3,O,K,Ca)3(Fe+2,Mn)(5-6)Ti2Si8(O,OH)31
CaMgB6O8(OH)6.*3H2O
Ca2Al(OH)6(Cl(1-x),(OH)(x)).*3H2O
Pb3(CO3)2(OH)2
Ca2B4O4(OH)7Cl.*7H2O
BaAl2(CO3)2(OH)4.*3H2O
Ca3Al2(SiO4)3-x(OH)4x
Zn2(Mn+3)4O8.H2O
Ni6(Fe+3)2SO4(OH)16.*7H2O
Mg5(CO3)4(OH)2.*4H2O
FeCl3.*6H2O

(H3O)(Fe+3)3(SO4)2(OH)6
CaCl2
Sn3O2(OH)2
Al14(CO3)3(OH)36.nH2O
Mg6Al2(CO3)(OH)16.*4H2O
H2WO4.H2O
(Ca,Mg,Fe+2)3(Fe+3,Al)2(SiO4)3-x(OH)4x
KCa4Si8O20(OH,F).*8H2O
Ca5(PO4)3(OH)
(Ce,La)(CO3)(OH,F)
Ca5(SiO4,SO4)3(OH,Cl,F)
CaBe(PO4)(OH)
Zn5(CO3)2(OH)6
HgS
UO2.*5UO3.*10H2O
H2O - Solid phase at or below *0ÝC
Cu3FeS4
C22H14
Y2(SiO4)(CO3)

CaCO3.*6H2O
Bi4(S,Se)3
(Mn,Zn,Fe)SO4.*4H2O
KBa2Na4CeFe+3Nb2Si8O28.*5H2O
(K,H3O)(Al,Mg,Fe)2(Si,Al)4O10[(OH)2,H2O]
(Na,Ce,Ba)2TiSi3O5(OH)10.nH2O
Fe+2TiO3
(Ti,Nb,Fe+3)3O6
CaFe3(Si2O7)O(OH)
Na12Ca3(Fe+3)2Si12O36
NiTe
Tl6CuAs16S40
Ag2HgS2
PbCu3(Ir,Pt)8S16
(Pb,Ag)4Sn4FeSb2S15
CaMg[B3O3(OH)5]2.*6H2O
MgB3O3(OH)5.*5H2O
Mg2Al4Si5O18
FeIn2S4
In
Ca2Mn7Si10O28(OH)2.*5H2O
Bi(S,Te)
(Ba,K)4(Na,Ca)3Ti3(Si2O7)2(SO4)2O4
Pt(Bi,Sb)2
Ca2B6O6(OH)10.*8H2O
AgI
Mg6(Fe+3)2(OH)16Cl2.*4H2O
K3Na4Mg(Cr+6O4)B24O39(OH).*12H2O
Pb10Cu(CrO4)6(SiO4)2(F,OH)2

(K,La,Ce,Th)(Ca,Na,La)2Si8O20
(Ir,Ru,Rh,Pt)AsS
Ca4MgH2(AsO4)4.*4H2O
(Ir,Ru)As2
(Ir,Os,Ru) (>*80 atomic % Ir)
(Os,Ir)
(UO2)(Mo+6)2O7.*3H2O
Fe
Na2(Ta,Nb)4O11
(Pt,Pd)3(Fe,Cu)
CaMg(PO4)F
Pd11Sb2As2
Pb3Ge(SO4)2O2(OH)2
Mn+2(Fe+3,Mn+3)2O4

(Ta,Nb,Sn,Fe,Mn)4O8
Pb27(Cu,Fe)2(Sb,Bi)19S57
(Mn+2,Fe+2,Mg)(Fe+3,Mn+3)2O4
Na(Al,Fe+3)Si2O6

Pb3Fe+3Si4O12(Cl,OH)
BaAl2(PO4)2(OH)2

CaMn+2(Mg,Fe+2)2(Fe+3)2(PO4)4(OH)2.*8H2O
Ag3CuS2
(Ni+2,Ni+3,Fe)(OH)2(OH,S,H2O) (?)
Pb2Zn2(Fe+3)5(AsO4)5O4
Pb4FeSb6S14
(Mn+4)(5-x)(Mn+2,Fe+3)(1+x)O8(OH)6 x = *0.2
Na3Mn3Ti2Si4O15(OH,F,O)3
NaSr3Al3(F,OH)16
Mn+3(Mn+2)3(AsO4)(OH)6
K(Fe+3)3(SO4)2(OH)6
Pb2+xCux(Sb,Bi)2-xS(Sb > Bi and x = 0.2)
Ca11(SiO4)4O2S
(Fe+3,Mn+2)Sn+4(OH)6
(Ca,Na)2(Be,Al)Si2(O,OH)7
Ca9H2Si6O18(OH)8.*6H2O
(K,Ba)2(Ti,Fe+3)6O13
Al6B5O15(F,OH)3
Mn9(SiO4)4(OH)2
(Na,Ca,Fe+2)(Sc,Mg,Fe+2)Si2O6
Mn3B2O6
(Mg,Fe+2)5Si6O16(OH)2
(Na,K)5(Ba,Ca)4(Fe+2,Mn)15(Ti,Fe+3,Nb,Zr)8(SiO4)15(F,O,OH)10
Pb(W,Fe+3)2(O,OH)7
Ba2NaCe2Fe+2(Ti,Nb)2Si8O26(OH,F).H2O
PbCa2(Mg,Fe+2,Fe+3)5Si6Be2O22(OH)2
CaAlB3O7

Cu(UO2)2(SO4)2(OH)2.*8H2O
CaMn+2Si2O6
Na(Mg,Zn)3Cu(AsO4)3
Ca5(AsO4)3(OH)
Na2Ca(Mg,Fe+2,Mn)7(PO4)6
K(Mn,Fe+3,Fe+2)2(Nb,Ta)(PO4)2O2(H2O,OH)2
MnSO4.*5H2O
(UO2)(CO3).nH2O
Ba4(K,Na)2Ti4Al2Si10O36.*6H2O
Pb14(As,Sb)6S23
MoS2
Bi4TeS2
Bi4(Te,S,Se)3-x
Ca6(Mn+4)2(SO4,CO3)4(OH)12.*26H2O

Ca2Fe+2(Fe+3,Al)2(SiO4)(Si2O7)(OH)2.H2O
Na2Co(SCN)4.*8H2O
Ca2Zn4(Fe+3)8(PO4)9.*16H2O
CaZn2Si2O7.H2O
Pb3Cu2Bi8(S,Se)16

Al(SO4)(OH).*5H2O
Fe+3(As+5)3O9.*6-*8H2O
NaCa2(Mg,Fe+2)4Ti(Si6Al2)O22(OH)2
K4Fe+2(CN6).*3H2O
Fe+2(UO2)2(AsO4)2.*10-*12H2O
MgSO4.KCl.*3H2O
Ca2(Y,Ce)2(SiO4)3(CO3).H2O
K6Al4Si6BO20(OH)4Cl
KHMg2B12O16(OH)10.*4H2O
KHCO3
ZnCr2S4
KAlSiO4
(K,Sr)(2-x)Nb2O6(O,OH).nH2O
K2Sr(SO4)2
KAlSiO4
(Fe,Ni)
Ca2Al2SiO6(OH)2
NaNi4(CO3)3(OH)3.*3H2O

PbAl(UO2)5(PO4,AsO4)2(OH)9.*9.5H2O
NaHSi2O4(OH)2.*2H2O
Fe+3AsO4.*3.5H2O
(Mn+2,Mg)2SiO6
(Mn+3,Al)AlSiO5
Al2Si2O5(OH)4
V2O3
(Fe+3)2(As+3)4(O,OH)9
(Mg,Al)6(BO3)3(OH,Cl)4
(Ce,La,Th)(Ti,Nb)(Al,Fe+3)(Si,P)2O7(OH)4.*3H2O (?)
C24H12
(Mg,Ni)2Si2O5(OH)2 (?)
(Ir,Rh)2S3
Pb(UO2)SiO4.H2O
CaTi2O4(OH)2
Ca3Al2(SiO4)(3-x)(OH)4x
(Mn,Mg)13(Al,Fe+3)4(Sb+5)2Si2O28
Bi2Te2Se
Na6(Mn,H2)TiSi6O18
Ca(Mn+2,Zn)2(Fe+3)3(PO4)4(OH)3.*2H2O
Pb8Al4Si8(SO4)2(CO3)4(OH)8O20
Pd(3-x)Te (x = *0.14-*0.43)

(Yb,Y)2Si2O7

Na(2-x)H(x)ZrSi2O7.nH2O
(Mn+2,Mg,Al)3(Si,Al)2O5(OH)4
Hg36Sb3(Cl,Br)9O28
(Sr,Ce)Al3(AsO4)(SO4)(OH)6
Mn2Cl(OH)3
Mg(Fe+3)2Ti3O10

Pb2(Mn+3)2Si2O9
Na2Si22O41(OH)8.*6H2O
Sb2S2O
Na2B4O6(OH)2.*3H2O
PbSeO4
Cu2(Zn,Fe)SnS4
CaBi(CO3)OF
(Cu,Zn,Cd)3(AsO4)2
(Ti,V,Fe)C
(Na,Ca)3(Ba,Sr,Ce,Ca)3(CO3)5
(Cu,Zn)Al2
K2ZrSi2O7
PbCu3Te+6O4(OH)6
Cu6SnWS8
Na(Fe+3)9(PO4)6(OH)10.*5H2O
MgSO4.H2O
Ca3Si2O7
2(Ca3Si2O7).H2O
(Ta,Nb)(OH)3(O,CO3)
CaY2(CO3)4.*6H2O
Ca3(Zr,Ti)2(Si,Al,Fe+3)3O12
Al3(PO4)2(OH,F)3.*9H2O
(Ca,Mn)4(Fe,Mn)Al4(PO4)6(OH)4.*12H2O
(Fe+2,Mg,Zn)2(Te+4O3)3Na(x)H(2-x).*3H2O
Ca2Cu2Si3O8(OH)4
(Ba,K)(Mg,Mn,Al)3Si2Al2O10(OH)2
(Cu+2,Zn)5Zn(PO4)2(OH)6.H2O
Pb10Bi3As3S19
CaFe+2SiO4
NiTeSe
Ca4(Mn+3)4(Mn+2)2Si4O16(OH)8.*18H2O
(Th,Ca,Pb)H2(UO2)4(PO4)2(OH)8.*7H2O
C6H4(CO)2NH (Phthalimide)
(Sb+3)4O4(OH)2SO4
FeTi6O13.*4H2O (?)
ZnAl2(PO4)2(OH)2.*3H2O

Hg2N(Cl,SO4).nH2O
CuSe
Mg3Cr2(SiO4)3
Na6(Ca,Mn)(Ti,Fe)Si6O18.H2O
(Y,Fe,U)(Ti,Nb,Ta)2(O,OH)6
Pb22Cu4(Bi,Sb)30S69
Bi2MoO6
Na4Mg9Al4Cl12(OH)22
Na3(SO4)F
(NH4)2Ca(SO4)2.H2O
PbTeCl2
ScPO4.*2H2O

Ca2(Fe+3)3O2(AsO4)3.*2H2O
Mn7Zn4(AsO4)2(SiO4)2(OH)8

(Cu,Co)2(CO3)(OH)2
Cu7Hg6
(H,Ca)2Nb2Si2O10(OH,F)2.H2O
PbCu3(Rh,Pt,Ir)8S16
FePO4.*3H2O
Na2Mg(SO4)2.*5H2O

Zn(As+5O3)(OH).H2O
(Fe+3)2(SO4)3.*7H2O
Mg4(Al,Fe+3)6(Si,B)4O21(OH)
Mg2Cl(OH)3.*3.5-*4H2O
NaCrSi2O6
CuAuTe4
K2ZrSi3O9.H2O
Mg3B2O6
Zn3(AsO4)2.*8H2O
Pd(Te,Bi)
Cu5As2
Mg2(PO4)(OH).*3H2O
(Na3Mn4(Fe+3,Al)Si8O22(OH,F)2
(Mn+2,Mg)24Zn3Fe+3(As+3O3)2(As+5O4)3(SiO4)6(OH)18
C13H10 (Fluorene)
KFe+3(SO4)2.H2O
BaSi2O4(OH)2.*2H2O
Mn+2As+5O3(OH).H2O
(NH4,K)2Fe+3Cl5.H2O
(Au,Ag)Te2
NaMg2CrSi3O10
Na2Cu(SO4)2.*2H2O
PbCuBi3S6
CuSe2
NiAs2
Mn(Fe+3)2(PO4)2(OH)2.H2O
(Cu,Zn)5(SO4)2(OH)6.*6H2O

Ba(Fe+2,Mn,Mg)2Al2(PO4)3(OH)3
Na0.35Mg8Al(AlSi7)O20(OH)10
NiSe2
LiAlSi2O6
(K,Na)3(Mn,Fe+2)7(Ti,Nb)2Si8O24(O,OH)7
Cu3SnS4
PbMn+4Te+6O6
Ca(Mg,Mn,Fe)B2O5
MgB3O3(OH)5.*5H2O
Cu14Ag6As7
Ca(Mn,Mg,Fe)(CO3)2
Hg6As2Cl2O9

Na4(Ca,Mn)Si6O14(OH)2
Al2SiO5
(V+3)2Ti3O9
mCaAl2Si2O8 with nNaAlSi3O8 (m/n = 50/50 to 70/30)
(K,Ba,Na)(Ti,Nb)(Si,Al)2(O,OH)7.H2O
NaAl(PO4)F
AgHgAsS3
Fe+2(Fe+3)2(SiO4)2
Bi4(Se,S)3
Cu3(AsO4,PO4)2
Na2(Sr,Ba)2Ti3(SiO4)4(OH,F)2
Pb2(SO4)O
NaMn+2Zn2(Ti,Fe+3)6Ti12O38
(Mn,Mg)9(Fe+3)3(PO4)8(OH)3.*9H2O
K2Mg2(SO4)3
(Co,Ni)As
Cu4(SO4)(OH)6.*2H2O
HCa4Mg2Al4(SO4)8F9.*3H2O
MgCO3.*5H2O
(Ce,La,Nd)2(CO3)3.*8H2O
(La,Ce)2(CO3)3.*8H2O
(Nd,La)2(CO3)3.*8H2O
As2(Se,S)3
CuNiSbS3
Na4CeTiPSi7O22.*5H2O
(NH4)B5O6(OH)4
b-Ca2SiO4
(Cu,Ag)21(Pb,Bi)2S13
PbZnSiO4
(Ca,K)8(Al,Mg,Fe)(Si,Al)10O25(SO4)
(Ca,Na)(Nb,Ti,Fe)O3
(Fe+2)3(Fe+3)6(PO4)4(OH)12
Mn+2(Fe+3)2(PO4)2(OH)2.*8H2O
CaAl2Si4O12.*4H2O
Pb22Sb26S61
PbCl(OH)
RuS2
Ca(IO3)2
CuAsS
(Na,Ca)2Cu5(AsO4)4Cl.*5H2O
(Fe,Ni)Cl2
(Mn,Mg)9Zn4(SO4)2(OH)22.*8H2O
CaAl2Si2O7(OH)2.H2O
(Ca,Fe+2)Fe+3(As+3)3O7.*3H2O
MgAl2(PO4)2(OH)2
(Na,Ca)8(Al,Si)12O24[(SO4),Cl2,(OH)2]
Pb
HgPb2
Pb4(SO4)(CO3)2(OH)2

(NH4,K)Na(SO4).*2H2O
Zn2(AsO4)(OH).H2O
Na2(Si,Al,Be)7(O,OH,F)14
K2Ca2Cu(SO4)4.*2H2O
ZnAs2O4
(Na,K)2CaZr2Si10O26.*5-*6H2O
Pb6(Ag,Cu)2As4S13
K6-7(Mg,Mn+2,Fe+2,Zn)48(Si,Al)72(O,OH)216.*16H2O
K2Mg(SO4)2.*4H2O
Ca(Gd,Dy,Y,Tb)2(UO2)24(CO3)8Si4O12.*60H2O
y-Fe+3O(OH)
K(Li,Al)3(Si,Al)4O10(F,OH)2
(NH4)3H(SO4)2
KAlSi2O6
(Na,Ca)2BeSi2(O,F,OH)7
Mn7(SiO4)3(OH)2
K(Fe+3)2(PO4)2(OH).*2H2O
BaNa4Ti2B2Si10O30
(Ca,Na2,K2)3Al6Si12O36.*18H2O
(Ca,Fe,Na)2(Sb,Ti)2O7
U+6(Nb,Ta)2O8
Li2BeSiO4
Cu2(PO4)(OH)
Ca(Li,Al)3Al6(BO3)3Si6O18(O,OH,F)4
(Ni,Mg)2SiO4
Ca2(UO2)(CO3)3.*11H2O
(Cu+2)3(NO3)(OH)5.*2H2O
Pb3Bi2S6
CaO
CuPbSO4(OH)2
Cu3(MoO4)2(OH)2
(Ba,Sr)(Ti,Cr,Fe,Mg,Zr)21O38
Pb3Cu3Bi7S15
Co+2(Co+3)2S4
(Ca,Na,K)8(Si,Al)12O24(SO4,CO3,Cl,OH)4.H2O
(Fe+2,Mn+2)(Fe+3)2(PO4)2(OH)2
(Cu+2)2Al(AsO4)(OH)4.*4H2O
PbO
LiMn+2PO4
(Al,Li)MnO2(OH)2
Li3PO4
Li(Ta,Nb)3O8
K6Al4Si8O25.*2H2O
NaKCuSi4O10
Pb9As13S28
HgSb4S8
Mg3Si2O5(OH)4
CaY4(CO3)7.*9H2O
FeAs2

Na2Ti2Si2O9.Na3PO4
(NH4)Fe+3,Al)(SO4)2.*12H2O
C
(Ce,Sr,Na,Ca)2(Ti,Nb)2O6
K2Cr2O7

TlAsS2
Na2Ti2Si2O9
Pb7O6Cl2
(Mn,Zn)7(CO3)2(OH)10
CaZnMn+3(As+5O3OH)2(OH)3
NaCa5Zr4Si16O40(OH)11.*8H2O
K2Na6(Be4,Si4O36).*9H2O
(Ca,Ce)(Ti,Fe+3,Cr,Mg)21O38
Na2Ca(Zr,Ti)Si6(O,OH)18
Na12Mg7(SO4)13.*15H2O
Pb2(Cu+2)2Si5O14.*14H2O
(Fe+2,Mg,Mn+2)3(PO4)2.*4H2O
(Fe+2,Pb)(As+5)2O6
Mg2,Fe+3BO5
NaNbO3
Cu2Al2(AsO4)2(OH)4.H2O
(Mn,Ca)(Mg,Fe,Mn)Al(PO4)2(OH).*4H2O
Mg3(PO4)2B2(OH)6.*5H2O
(Sr,Pb)(Fe+3)3(PO4)2(OH)5.*H2O
Cu3AsS4
(Mn+2)4(Mn+3)9Sb+5Si2O24
(Na,Ca)3ZrSi2O7(O,OH,F)2
(Fe+3,Al)24Si4O43(OH)2
BaCa4Si16O36(OH)2.*10H2O
PbTiO3
Ca2(Mn+3)3(SiO4)(Si2O7)(OH)3
(Ca,Na)6(As+5O4)(As+5O3OH)3(PO4,SO4).*15H2O
Fe+3Te2O5(OH)
(Fe,Ni)9S8
Pb4(SO4)(CO3)2(OH)2
Pb3Cu(CrO4)SiO3(OH)4.*2H2O
Pb17(Sb,As)16S41
NaSi7O13(OH)3.*4H2O
y-Fe2O3
(Mg,Fe+2)7Si8O22(OH)2
Na3(Mg,Fe+2)4Fe+3Si8O22(OH)2
Ca2MgAl2BSi4O15(OH)
MgAl2SiO5(OH)2
(Mg,Fe)(Cr,Al)2O4
(Mg+3)4(SO4)6(OH)2.*20H2O
(Mg,Fe+2)7Si8O22(OH)2
Mg(Fe+3)2O4

Ca2(Mg,Fe+2)4Al(Si7Al)O22(OH,F)2
Na2(Mg,Fe+2)3(Fe+3)2Si8O22(OH)2
(K,Na)Ca2(Mg,Fe+2,Al,Fe+3,Ti)5(Si,Al)8O22(OH)2 Mg>Fe+2
MgCO3
(Na,K)4Mg2(Fe+2,Fe+3,Mn)5Ti2Si8O24(O,OH,F)7
(Mg,Mn)3Zn2(AsO4)(OH,O)6
Mg2(UO2)6(SO4)3(OH)10.*16H2O
Fe+2(Fe+3)2O4
Pb(Fe+3,Mn+3)12O19
(Mg,Fe,Mn)2(PO4)F
(Mg,Fe,Mn)(Nb,Ta)2O6
(Mn+2)5(As+3O3)3(OH,Cl)
PdNiAs
Mg3(Fe,Al,Si)2(SiO4)3
Na2Si4O8(OH)2.*4H2O
y-NiSe
(Cu+2)2(CO3)(OH)2
Cu(Pt,Ir)2S4
CaSnSiO5
Au2Bi
Na2SiF6
MnSO4.*7H2O
Pb6(Cu+2)4AlSb+5(SO4)2Cl4O2(OH)16
LiAl2(SiAl0.5B0.5)O5(OH)4
Mg6Al2(CO3)(OH)16.*4H2O
(Fe+3)2(SeO3)3.*6H2O
KNa2Li(Mn,Fe+2)2Ti2Si8O24
Mn3As2O4(OH)4
Ca2Mn+2Al2BSi4O15(OH)
Ca2(Mn+2,Fe+2)Fe+3Si5O14(OH)
(Ca,Na)3(Mn,Mg)2(AsO4)3
(Mn,Mg)3(AsO4)2.*8H2O
(Mn,Pb,Cd)(Cu,Fe)8S8
(Mn,Mg)7(SiO4)3(OH)2
MnO(OH)
(Mn+2,Fe+2)(Cr+3,V+3)2O4
(Mn+2,Fe+2)(Nb,Ta)2O6
K2Mn2(SO4)3
MnO
(Mn+2,Fe+2)7Sb+5As+5O12
Mn+2Ta2O6
(Mn,Fe)(Ta,Nb)2O6
(Mn,Fe)8Si6O15(OH,Cl)10
(Na,K)(Mn+4,Mn+2)8O16.nH2O
Ba[Ti6(V+3)2]O16
AlAsO4.*2H2O
KMg2Al2Ti(PO4)4(OH)3.*15H2O
Zn2(Fe+3)3(AsO4)3(OH)4.*10H2O
FeS2

(Cs,K,H3O)2(UO2)2V2O8.H2O
CaAl2(Al2Si2)O10(OH)2
Pb(Ca,Mn)2Si3O9
3NaAlSi3O8.NaCl
NaFe+2PO4
CaMn2O4
PbAgAsS3
CuI
NaCaMn3Si5O14(OH)
Cu(UO2)3(SeO3)3(OH)2.*7H2O
(NH4)2SO4
(Pt,Pd)(Bi,Te)2
PbO
K(Li,Al,Mn)3(Si,Al)4O10(F,OH)2
Pb3(U+6)8O27.*10H2O
(K,Ca,Sr)(Ti,Cr,Fe,Mg)21O38
AgBiS2
PbFCl
ZnS
CoTe2
NaH(SO4).H2O
CaAl18(PO4)12(OH)20.*28H2O
Ni11As8
Pb2(Fe+3,Zn)4(AsO4)4(OH)3.H2O
(Cu+1)6(Fe+3)2Sn+4S8
Ca12Al14O33
K2CaMg2(Al,Si)36O72.*28H2O
(Ni,Cu+2)Al4(NO3,SO4)2(OH)12.*3H2O
Mg2B12O14(OH)12.*9H2O
CuCrO2
(Mn+2,Fe+2)8Si6O15(OH)8Cl2
(Mn,Mg)19Zn3(AsO3)(AsO4)3(SiO4)3(OH)21
(Mg,Cu)2(CO3)(OH)2

Ba3Na(Ca,U)Y(CO3)6.*3H2O
(Ag,Cu)2S
NaCa5H4(AsO4)5.*4H2O
(Mn+2,Ca)6(V+5,As+5)Si5O18(OH)
3CaAl2Si2O8.CaCO3
(Ce,Ca)5(Si,B)3O12(OH,F).H2O
SiO2 with organic impurity
Mn(Sb+5,Fe+3)O3
Pb2(Fe+3)2Si2O9
Cu2OCl2
Ca[(V+5)2(V+4)2]O10.*5H2O
FeSO4.*7H2O
(Ca,Na)2Be(Si,Al)2(O,OH,F)7
Al2[C6(COO)6].*16H2O
NiTe2

CaFe+2Fe+3(PO4)2(OH)
Pb3Cl2O2
Na(Ca,Mg)2(Fe+3)6(PO4)2(PMo11O39)(OH,Cl)10.*33H2O
NaAl(SO4)2.*11H2O
Pb13CuSb7S24
KHSO4
Hg
(Pd,Pt)(Te,Bi)2
(K,Ca,Na,Ba)7Si23Al9O64.*23H2O
(K,Na)2(Fe,Mg)5Si12O30
Pd11(Sb,As)4
Pd8(Sb,As)3
Ca3Mg(SiO4)2
Na2Ca2Al6Si9O30.*8H2O
Ca2(Fe+2,Mn+2)(PO4)2.*2H2O
Al2(SO4)(OH)4.*5H2O
K2(UO2)2(PO4)2.*6H2O
Ca(UO2)2(PO4)2.*2-*6H2O
Ba(UO2)2(PO4)2.*8H2O
Ca(UO2)2(AsO4)2.*8H2O
HBO2
HgS
CaSrV2O6(OH)2
Ca(UO2)2Si6O15.*nH2O (n<5)
Ba(UO2)2(AsO4)2.*8H2O
CaV6O16.*3H2O
Fe+2(UO2)2(AsO4)2.*8H2O
Co(UO2)2(AsO4)2.*8H2O
(Zn,Fe+3)(Zn,Fe+3,Fe+2)2(AsO4)2.*8(H2 O,OH)
Zn(UO2)2(AsO4)2.*10H2O
Mg(UO2)2(AsO4)2.*4-*8H2O
CaV2O6.*2H2O
Al2(PO4)(VO4).*6H2O
UO3.*1-*2H2O
Na2Fe+3(SO4)2(OH).H2O
Sb2S3
UO4.*2H2O
Mn3(PO4)2.*4H2O
Cu(UO2)2(PO4)2.*8H2O
Ca(UO2)2(V+5)2O8*3H2O
PbU7O22.nH2O (n<12)
U+6(UO2)3(PO4)2(OH)6.*2HO
Al(UO2)2(V+5)2O8(OH).*8H2O
AlPO4.*2H2O
Fe+2Al2(PO4)2(OH)2.*8H2O
(Fe+2)(3-x)(Fe+3)x(PO4)2(OH)x.*(8-x)H2O
K2Na6Fe+2(Fe+3)6(SO4)12O2.*18H2O
Ca(UO2)(CO3)2.*3H2O
Cu(UO2)2(AsO4)2.*8H2O

Ca2B6O6(OH)10.*2H2O
WO3.*2H2O
Cu3AsSe3
AgSbS2
PdBiTe
KAlSi3O8
(Ca,Na)2Ta2O6(O,OH,F)
(Na,Ca,K)7-8(Si,Al)12O24(Cl,SO4,CO3)2-3
(Ag,Cu)I
PbCu4FeBiS6
KCa2AlBe2Si12O30.*0.5H2O
NiS
(Na,K)CaAl6(PO4)4(OH)9.*3H2O
(Al,Fe+3)2(SO4)3
Pb5(AsO4)3Cl

Y2CaBe2Si2O10
VO(SO4).*5H2O
(K,Na)2-3Ca28Zn4Al4Si40O112(OH)16
K3Fe+3(C2O4)3.*3H2O
(Pb+2)2Pb+4O4
(Fe,Mg)3Si4O10(OH)2
CaZn(CO3)2
KAl2(PO4)2(OH,F).*4H2O
Na2SO4.*10H2O
K2SO4.*6KHSO4
K(Ca,Ce)6Si8O22(OH,F)2
Ca2(Fe+3)3(PO4)3O2.*3H2O
K2CuCl4.*2H2O
Bi(Cu+2)6(AsO4)3(OH)6.*3H2O
Pb(UO2)(TeO3)2
(Co,Fe)As
Cu2SnS3
(NH4)2Fe+2(SO4)2.*6H2O
SiC
H4U+4(UO2)3(MoO4)7.*18H2O
MoS2
MoO3
Pb2Cu(AsO4,PO4)(MoO4,CrO4)(OH)
PbSeO3
Pb2Mg2Si2O7(OH)2
Fe+3Cl3

(Ce,La,Nd,Th)PO4
(La,Ce,Nd)PO4

(Pt,Pd)(Te,Bi)2
CaHPO4
Ca4Nb6Si5O24(OH)10.*5-6H2O
(Pb,Ca)3Sb2O8

CaCO3.H2O
H8K2(Tl+3)2(SO4)8.*11H2O
(Au,Sb)2Te3
(K,Na)2(Fe+2,Mn,Mg)5Si8O20(F,OH)4
LiAl(PO4)(OH,F)
CdO

Na4K2Y2Si16O38.*10H2O
PbSn4S5
Ca4MgAl4(PO4)6(OH)4.*12H2O
CaMgSiO4
(Na,Ca)0.3(Al,Mg)2Si4O10(OH)2.nH2O
(V,Fe+3)O(OH)
Sr4Al8(CO3)3(OH,F)26.*10-11H2O
HgO
Cu9Fe9S16
Cu(C2O4).*0.4H2O
(Mg,Zn,Mn)15(SO4)2(OH)26.*8H2O
(Co,Ni,Mn)SO4.*6H2O
NaSb(OH)6
Be2(PO4)(OH).*4H2O
(Ca,Na2,K2)Al2Si10O24.*7H2O
Al3(UO2)(PO4)3(OH)2.*13H2O
(Ba,Ca,Pb)5(AsO4,PO4)3Cl
NiSO4.*7H2O
NaCa2Al2(PO4)2(F,OH)5.*2H2O
(Pb,Fe)3Ge1-xS4
(Na,Ca,Ce)3TiSi2O7(F,OH,O)
Ag2Hg3
Hg2N(Cl,SO4,MoO4,CO3).H2O
Pb(Cu,Zn)VO4(OH)
Na2Mg38Al24(CO3)13(SO4)8(OH)108.*56H2O
Pb(Fe+3)2(VO4)2(OH)2
(Ca,Na2,K2)2Si4O10.*3H2O
(Mg,Ni)11(Fe+3,Cr,Al)3(OH)24(SO4,CO3)3.5.*11H2O
U+4(Mo+6)5O12(OH)10
(Y,Ca,Gd,Dy)B(OH)4(CO3)
Bi2(Cu+2)3(PO4)2O2(OH)2.*2H2O
CaTe+4(CO3)O2
Ba10Ca2MnTiSi10O30(OH,Cl,F)10
Ca2Al2V(SiO4)3(OH)
Al6Si2O13
Al(UO2)3(PO4)2(OH)3.*5.5H2O
(NH4)2Ca(HPO4)2.H2O
NaVO3.*2H2O
(Na,Y)4(Zn,Fe+2)3(Ti,Nb)6O18(F,OH)4
Pb(Cu+2)6O(8-x)(Cl,Br)(2x)   x < or = 0.5
Na2(Ti,Nb)2Si2O9.nH2O
K2Cu3FeS4

KAl2(Si3Al)O10(OH,F)2

(Mg,Fe,Zn)2Al6BeO12
(Cu,Zn,Fe)Sn(OH)6
Mg7(Fe+3)4O13.*10H2O
(Na,Ca,H)2Nb2si2O10(OH,F)2.H2O
NaBaPO4.*9H2O
Na2Ca(PO4)F
Al2Si2O5(OH)4
PbSbO2Cl
Ba4(V+3,Ti)4Si8B2O27Cl(O,OH)2
Ca3(PO4)2.*2(a-Ca2SiO4)
Pb5Au(Sb,Bi)Te2S6
NaHCO3
Na2HPO4
Cu8(SO4)4(CO3)(OH)6.*48H2O
(Li,Na)(Mn+2)4Si5O14(OH)
Cu+1Bi2V+5O6
(Zn,Cu)4(SO4)(OH)6.*4H2O
CaMg4(AsO3)2F4
CuCl
Na2(Ti,Fe+3)Si4(O,F)11
Na2B5O8(OH).*2H2O
Pb6Ca4Si6O21Cl2
Na(Sr,Ba)PO4.*9H2O
Na(V,Cr)Si2O6
FeSn(OH)6
Na2(TiO)SiO4
Na2CO3
NaAl3(SO4)2(OH)6
NaCa4Si8O20F.*8H2O
(Na,Cs)Bi(Ta,Nb,Sb)4O12
NaCu2(SO4)2(OH).H2O
Na(Fe+3,Fe+2)(Fe+3,Al)5(PO4)4(OH)6.*2H2O
Na2Ca(CO3)2
Na(Fe+3)3(SO4)2(OH)6
Na2Al2Si3O10.*2H2O
(Na,Li)Al(PO4)(OH,F)
Na2CO3.*10H2O
(Na,Li)(Mn+2)4Si5O14(OH)
NaMnPO4
Na7(PO4)2F.*19H2O
Na2Si2O5
NaTa3O8
Na6(Fe+2,Mn+2)Al4Si8O26
Ag2Se
(V+5,Fe+3)10O24.*12H2O
Pb4Fe+2(AsO4)2Cl4

Na5Ca4(PO4)4F
NaMgF3
Ca3Si6O15.*7H2O
Cu26V2(Sn,As,Sb)6S32
(Mn,Fe)16Si12O30(OH)14[(As+3)3O6(OH)3]
CaMn6SiO12
(Na,Ca,K)(Nb,Ti)Si2O6(O,OH).*2H2O
(Na,K)AlSiO4
Ni3Si2O5(OH)4
KNa2Li(Fe+2,Mn)2Ti2Si8O24
Mg(HCO3)(OH).*2H2O
Bi(Se,S)
MgHPO4.*3H2O
Pb7(Cu,Ag)2Bi6S17
(NH4)(Mn+2,Mg,Ca)PO4.H2O
NiAs
Ni
(NH4)2(Ni,Mg)(SO4)2.*6H2O
(Ni,Co)As2-3
Ni2(UO2)6(SO4)3(OH)10.*16H2O
(Ni,Cu)Al4[(SO4),(NO3)2](OH)12.*3H2O
NiCl2.*6H2O
Na2(Ni,Mg)(SO4)2.*4H2O

NiSO4.*6H2O
Ca3B6O6(OH)12.*2H2O
(Zn,Mg,Fe+2)(Sn,Zn)2(Al,Fe+3)12O22(OH)2
PtSn
(Ni,Mg,Fe)5Al(Si3Al)O10(OH)8
(U,Ca,Ce)2(PO4)2.*1-2H2O
(Mg,Fe,Mn)S
(Ce,Ca,Th)(Nb,Ti)2(O,OH)6

(K,Na)3(Fe,Mn)6(Nb,Ti)2Si8(O,OH,F)31
Ca14Nb2(Si2O7)4O6F2
NiSb2
Cu2Mg2(PO4)2(OH)2.*5H2O
KNO3
NaNO3
Ba(NO3)2
Ca(NO3)2.*4H2O
Mg(NO3)2.*6H2O
CaB6O9(OH)2.*3H2O
(V+3,Fe+2,Fe+3,Ti)10O14(OH)2
Na0.33(Fe+3)2(Si,Al)4O10((OH)2.*n H2O
Mg3(SiO4)(F,OH)2
CaSnB2O6

(La,Ce)(Sr,Ca)Na2(Na,Mn)(Zn,Mg)Si6O17
Al(OH)3

CuPb3Bi7(Se4,S10)
BaMg(CO3)2
Na3Mg(CO3)2Cl
Na8Al6Si6O24(SO4)
Mg(UO2)2(AsO4)2.*12H2O
(Cu,Ag)21As10
Cu6Zn3As4S12
(Mn+2)x),(Mn+4)1-xO2-2x(OH)2x
Pb2Cu(Pb,Bi)Bi2S7
(Cu,Fe)4S4
Ni2(CO3)(OH)2
Na2Ca(CO3)2
H2Na(Zn,Mg)3(AsO4)3
Pb6H6(Te+4O3)3(Te+6O6)2.*2H2O
H4(K,Na)Cu+2(Fe+2)2(AsO4)(MoO4)5.*12H2O
(K2,Ca)5Al10Si26O72.*30H2O
Ca2(Zn,Mn+2)(Fe+3)4(AsO4)4(OH)6.*6H2O
Sr3(Ti+4,Fe+3)(Si2O6)2(O,OH).*2-3H2O
Zn(Fe+3)2(AsO4)2(OH)2.*4H2O
(Na,Ca)3(Y,Ce,Nd,La)12Si6B2O27F14
Ca10Si18O46.*18H2O
(Ca,Mn)S
Na(Sr,Ba)PO4
mNaAlSi3O8 with nCaAl2Si2O8 (m/n = 90/10 to 70/30)
Cu2(AsO4)(OH)
(Fe,Mg,Mn,Ni)2SiO4
K(Fe+2)2(Nb,Ta)(PO4)2O2.*2H2O
Pb2(SeO4)(SO4)
Na3PO4
(Os,Ru)As2
(Ca,Na)(Mg,Fe+2,Fe+3,Al)Si2O6
Sb8O11Cl2
SiO2
(Pd,Cu)7Se5
SiO2.nH2O
ZnSb2O6
Mn6(Sb+5,Fe+3)2Si2(O,OH)14
Ni2FeAs2
near 2CuFeS2.H2O
Ca2Mn+2(Mn+3)2Si3O10(OH)4
H6Pb10Al20(PO4)12(SO4)5(OH)40.*11H2O
As2S3
U+4U+6Ti4O12(OH)2
Mg3Si2O5(OH)4
KAlSi3O8
BaMn2(Fe+3O)Si2O7(OH)
Ba2NaCe2Fe+2Ti2Si8O26(OH,F).H2O
(Mg,Mn+2)2Mn+3BO5
PbCuAl2(SO4)2(OH)6

(Os,Ru)AsS
TiN
(Ir,Os)   Ir > Os
(Os,Ir,Ru)   Os > *80 atomic %
(K,Na)(Fe+2,Mg)2(Al,Fe+3)3(Si,Al)12O30
(K,Na)(Mg,Fe+2)2(Al,Fe+3)3(Si,Al)12O30
CdCO3
PbGe4O9
Sn2S3
(Mn,Fe+2,Mg)2Al4Si2O10(OH)4
Ni2(CO3)(OH)2.H2O
(Co,Mg)(UO2)2Si2O7.*6H2O
CaMgAl(PO4)2(OH).*4H2O
Ag2Pb7(Sb,Bi)8S20
(NH4)2C2O4.H2O
Ca10Si8B2O29.*12.5H2O
Sb2AsS2
Ba(Sn,Ti)Si3O9
NaCaAlF6.H2O
AgPb2Cu6Bi11S22
(Ca,Li,K,Na)11Li8Be24(PO4)24.*38H2O
CaZrBAl9O18
Pd5(Sn,As)2
(Sr,Ca)(Li,Na)2Al4(PO4)4(OH)4
Pd
Pd2As
Pd2(As,Bi)
Pd17Se15
(K,Na)2Pb(SO4)2
(Mg,Al)2Si4O10(OH).*4H2O
CaMg(PO4)(OH,F)
(Na,Ca,K)2(Mg,Fe,Mn)2(PO4)2
Pd2Sn
CaCuAlSi2O6(OH)3
BaTa4O10(OH)2.*2H2O
Fe+3(SO4)(OH).*2H2O
BaAl2Si2O8
(Fe+3)2(SO4)3.*9H2O
CoSbS
Zn2(AsO4)(OH)
Sb2(Sb,As)2
NaAl2(Si3Al)O10(OH)2
Bi2(Se,S)3
Ca2B5O8(OH)2Cl
Zn3(PO4)2.*4H2O
Na2ZrSi2O7
PbCu3Te+6O4(OH)6
PbCl(OH)
BaCa(CO3)2

(Cu+1)2(Cu+2)2O3
NaAl4(Fe+3)7(PO4)5(P+5(Mo+6)12O40) (OH)16.*56H2O
VO2
Na2Al2Si3O10.*3H2O
Tl(Sb,As)5S8
NiAs2
AsS
Ag3Hg2
UO3.*2H2O
CaZn2(PO4)2.*2H2O
Ca5(SiO4)2(CO3)
(Fe+2)3(AsO4)2.*8H2O
Cu2(OH)3Cl
TeO2
K3Zr2HSi6O18.nH2O
Fe+2Al2(PO4)2(OH)2.*8H2O
CaSiO3
NaCa2(Mg,Fe+2)4Al(Si6Al2)O22(OH)2 Mg/(Mg + Fe+2) = *0.3-*1.0
Ca(Ce,La)2(CO3)3F2
Ni3(Bi,Pb)2S2
(Cu+2)9(AsO4)2(SO4)(OH)10.*7H2O
(K,Na,Ca)(Mn,Al)7Si8O20(OH)8.*2H2O
Pb2(UO2)(PO4)2.*2H2O
Ca2Al4Si4O15(OH)2.*4H2O
Cu2Sb2(O,OH)7
(Mn,Mg)5Sb(As,Si)2O12
Ca3V10O28.*17H2O
VS4
(K,Na)2Ca(Si13Al4)O34.*13H2O
K(Mg,Mn+2)2(Fe+3,Al)2Ti(PO4)4(OH)3.*15H2O
Pb2(As+3)2O5
(Ag,Cu)(Bi,Pb)3S5
CuAs2
(Ag,Cu)16As2S11
Ni3Si2O5(OH)4
NaCa2Si3O8(OH)
(Fe+2,Zn,Mg)2Al6BeO12
Na3Al16(SO4)2(PO4)10(OH)17.*20H2O
PbCuBi11(S,Se)18
Ba2Ca(Fe+2,Mg)2Si6O17
Ba(Mg,Fe+2)2Al2(PO4)3(OH)3
Na4Ti2Si8O22.*5H2O
(Mn+2)5Al(Si3Al)O10(OH)8
(Ni,Co,Cu)Se2
Ca(V+4O)(Si4O10).*4H2O
MgSO4.*5H2O
(Fe,Ni)9S8
(Ag,Cu)4Au(S,Se)4
Ca(Sb+3)4O4(OH)2(SO4)2.*2H2O

Ca3Al7(SiO4)3(PO4)4(OH)3.*16.5H2O
MgO
PbBiO2Cl
K9Na(Ca,Sr)Al12Si24O72.*15H2O
Ba(Mn+2,Fe+2)2(Fe+3)2(PO4)3(OH)3
Cu3SbSe4
CaTiO3
(Ca,Ce,Th)4(Mg,Fe+2)2(Ti,Fe+3)3Si4O22
Hg(5-x)Ag(4+x)Ss(5-x)(Cl,I,Br)(4+x)
(Ni,Fe)8(Si,P)3
LiAlSi4O10
Na5Zr2Si6O18(Cl,OH).*2H2O
Ca(Zn,Mn+2,Fe+2,Mg)Si2O6
(Y,Ce,Nd,Ca)(Cu+2)6(PO4)3(OH)6.*3H2O
PbHgCu3BiSe5
AuAg(S,Se)
U+4Fe+2(Nb,Ta)2O8
Ag3AuTe2
CaHAsO4.*2H2O
K(Fe+3)4(AsO4)3(OH)4.*6-*7H2O
Ca3(AsO4)2.*11H2O
Be2SiO4
PbAl3(AsO4)2(OH)5.H2O
(Cu+2,Zn)6(AsO4,PO4)2(OH)6.H2O
(K,Na,Ca)(1-2)(Si,Al)8O16.*6H2O
KMg3Si3AlO10(F,OH)2
Pb2(CrO4)O
Pb2(CO3)Cl2
Na3(Ca,Ce)PSiO7
(NH4)2HPO4
(Fe+2,Mn+2)3(PO4)2.*3H2O
KCu+2(Fe+3)15(PO4)12(OH)12.*12H2O
Zn2(Fe+2,Mn+2)(PO4)2.*4H2O
MgH(PO4).*7H2O
Fe+3PO4.*2H2O
KCa(H3O)3(UO2)7(PO4)4O4.*8H2O
Al2(UO2)3(PO4)2(OH)6.*10H2O
Ca2(UO2)3O2(PO4)2.*7H2O
Ca(Fe+3)3H(WO4)6.*10H2O
MgAl2(SO4)4.*22H2O
TlFe2S3
K2Mg(SO4)2.*6H2O
H2Ca4Mg(AsO4)4.*11H2O
Ca2(Al,Mn+3,Fe+3)3(SiO4)3(OH)
Tl2Sb6As4S16
(Mg,Fe+2,Ca)(Mg,Fe+2)Si2O6
Bi4Te3
(Mg,Mn+2)2(Mn+3,Sb+3)BO5
Hg5O4Cl2

MgB2O4.*3H2O
Ag2ZnSnS4
Na2Ca(CO3)2.*2H2O
K2(Cu+2)2(SO4)2O
Pb5Sb8S17
(Cu+2)8Si8O22(OH)4.H2O
(Pt,Rh,Ru)AsS
(Ir,Pt)
Pt
PbO2
PbBi2(Se,S)3
Pb16Sb18S43
Ca5H2Si6O18.*6H2O
Pb4Al2(SiO3)7
(Pb,U,Ca)(Ti,Nb)2O6(OH,F)
Pb(Fe+3)4O7
PbAl3(PO4)2(OH)5.H2O
Pb(Fe+3)6(SO4)4(OH)12
(Pb,Ca,U)2Ta2O6(OH)
Pb10(CO3)6O(OH)6 (?)
Pd3Pb2
(Pb,Y,U,Ca)(2-x)Nb2O6(OH)
a-PbTe+4O3
Pb5Si4O8(OH)10
(Cu+2,Fe+2,Zn)SO4.H2O
Mg2(CO3)(OH)2.*0.5H2O
Pd(Bi,Pb)
(Zn,Hg)S
(Fe,Pb)3(Ge,Fe)(1-x)S4
(Cs,Na)2Al2Si4O12.H2O
(Ag,Cu)16Sb2S11
(Y,Ca,Ce,U,Th)(Ti,Nb,Ta)2O6
NiNi2S4
K2Ca2Mg(SO4)4.*2H2O
KLi2AlSi4O10(F,OH)2
(Ca,Fe,Y,Th)(Nb,Ti,Ta,Zr)O4
Ca(OH)2
(Cu+2)4SO4(OH)6.H2O
PdHg
KAl(SO4)2.*12H2O
PbBi2Se2(Te,S)2
(Fe+3)2(TeO3)2SO4.*3H2O
CaMoO4
Hg3ClO
Ca2Al2Si3O10(OH)2
Bi3(AsO4)2O(OH)
Na(Mg2Al)(Si2Al2)O10(OH)2
Mg3B11O15(OH)9
Ca4B10O19.*7H2O

(K,Ba)(Ti,Fe+3)8O16
NaCaB5O7(OH)4.*3H2O
CaAl2(F,OH)8   with F:OH = *5:*3
CaZn2(AsO4)2.H2O
Ba(UO2)3O3(OH)2.*3H2O
Ag3AsS3
Pb(UO2)2(PO4)2.*4H2O
(H3O)4Ca2(UO2)2(PO4)4.*5H2O (?)
Pb31(Cu+2)24Cl62(OH)48
(Fe+3,Fe+2)2(Ti,Fe+3)O5
Mn+2(Fe+3)2(PO4)2(OH)2.*7-*8H2O
(Cu+2)5(PO4)2(OH)4
(Fe+3)2Ti3O9
b-CaSiO3
BiVO4
Ca2MgAl2(SiO4)(Si2O7)(OH)2.H2O
Ca2(Mn+2,Mg)(Al,Mn+3,Fe)2(SiO4)(Si2O7)H2O.*(OH)2
Mn+3PO4
Cu16-18(Fe,Ni)18-19S32
Ag3SbS3
FeS2
Mg6(Fe+3)2CO3(OH)16.*4H2O
PbMn+2(VO4)(OH)
(Ca,Na)2Nb2O6(OH,F)
Mn+2(OH)2
Mn+4O2
Pb5(PO4)3Cl
Mg3Al2(SiO4)3
Mn+2TiO3
Al2Si4O10(OH)2
(Fe,Mn)8Si6O15(OH,Cl)10
Ag3SbS3
(Fe+2,Mn+2,Ca)SiO3
Mn+2SiO3
Fe(1-x)S   x = *0-*0.17
(Mg,Fe+2)2(Ti,Fe+2,Al)O4
Na2Na(Mn+2)2Mg(Al,Fe+2)2(PO4)6
(Fe+2,Mn+2)2(Nb,Ta)2W+6O10
SiO2
Pb4Zn2(SiO4)(Si2O7)(SO4)
PbMn+3O2(OH)
(Fe+3)2(SO4)3.*10H2O
Zn8(Cu+2)4(Te+4O3)3(OH)18
Ca3Mg3(UO2)2(CO3)6(OH)4.*18H2O
PbTe3(Cl,S)2
TlFeS2
Na4(Mn+2)4Si8(O,OH)24.*9H2O
Cu+2(Te+4)2O5
Na(x)Mg(x)Al(2-x)(F,OH)6.H2O

Ag3Pb6Sb11S24
K2Ca(U+6)6O20.*9H2O
NiAs2
(Cu+2,Zn)15(SO4)4(OH)22.*6H2O
Mn+4O2
(Ca,Mn+2)(Mn+4)4O9.*3H2O
CaFe+2(V+5)4)(W+6)8O36.*12H2O
(Na,K,Pb,Li)3(Ta,Nb,Al)11(O,OH)30
Ca3Si2O7
Cu(Fe+3)2(SO4)4.*6H2O
HAl(UO2)PO4(OH)3.*4H2O
Ca2(SO4)CO3.*4H2O
PbWO4
KFe2S3
(Pb,Tl)3As5S10
Ca3(AsO4)2.*10H2O
Ca(UO2)2(V+5)10O28.*16H2O
(Ag,Tl)2Pb8Sb8S21
AsS
Tl5Sb5As8S22
(Mn+2)3(PO4)2.*3H2O
BaTi6(Cr+3)2O16.H2O
NaBSi3O8
Ni6(Fe+3)2(CO3)(OH)16.*4H2O
C20H32O2
Cu5(PO4)2(OH)4
Zn3(As+3O3)2
Ca5(SiO4)2(OH,F)2
Pb(UO2)4(PO4)2(OH)4.*7H2O
(Cu,Zn)11(Ge,As)2Fe4S16
NiSO4.*6H2O
(Mn+2)2Ce(AsO4)(OH)4
(Mn+2,Mg)2(La,Ce,Nd)(AsO4)(OH)4
(Mn+2)2(Nd,Ce,La)(AsO4)(OH)4
Na16[Si4O6(OH)5]2[Si8O15(OH)6](OH)10.*28H2O
(Na,K)2Ca14(Si,Al)24O58(OH)8.*6H2O
(Ce,La)PO4.H2O
(La,Ce)PO4.H2O
Re
KHCa2Si8O19.*5H2O
(Rh,Pt)
(K,Cs)Al4Be4(B,Be)12O28
Mn+2CO3
(Mn+2,Fe+2,Mg,Ca)SiO3
Cu2FeSn3S8
HFe+3(SO4)2.*4H2O
Ca2(Fe+2,Fe+3,Mg,Ti)6(Si,Al)6O20
(Mn+2,Mg)5(SiO4)2(OH)2
Ca3(Fe+3)10(PO4)8(OH,F)12.*nH2O

Ca2(Cu+2)5Sb+5(AsO4)4Cl(OH)6.*6H2O
Pb(U+6)4O13.*4H2O
Na2Ca(Mg,Fe+2)5Si8O22(OH)2
Cu7Te5
Na2(Fe+2,Mg)3(Fe+3)2Si8O22(OH)2
(Mg,Fe+2)2SiO4
K3NaFe+2Cl6
Na6MgB24O40.*22H2O
Ca5Si6O16(OH)2.*2H2O
Fe4N
Ca2(Mn+3)3(PO4)3O2.*3H2O
Pb4Sb6S13
(Fe+2,Mn+2)(Fe+3)4(PO4)3(OH)5
H3(Fe+3)2(Te+4O3)4Cl
Pb2Ca6Mn+2(Si6O18)(SO4)2(OH)2.*4H2O
(Na,K)2(Mg,Fe+2)5Si12O30
Ca2Be(OH)2Al2Si4O13.*2.5H2O
TlCu5SbS2
Fe+2Cl2.*2H2O
(Ba,H2O)(Mn+4,Mn+3)5O10
SnO
(Ca,Fe+2,Mn,Na)2(Sb,Ti)2O6(O,OH,F)
Fe+2(Fe+3)2(SO4)4.*14H2O
Ca2(Ce,La)3(CO3)5F3
BiAsO4
CuInS2
(Cu+2,Zn)2(CO3)(OH)2
Ca(Mn+2,Fe+2,)2Be3(PO4)3(OH)3.*2H2O
K(V+3,Al,Mg)2(AlSi3)O10(OH)2
Ca2(Co+2,Mg)(AsO4)2.*2H2O
Ca2Co(AsO4)2.*2H2O
(Ca,Na)3(Zr,Ti)Si2O8F
Ca3Si3O8(OH)2
S
Ca(V+5)2O6.*4H2O
MgH(AsO4)4.*7H2O
Al(SO4)(OH,F).*5H2O
Cu2(UO2)3(CO3)2O2(OH)2.*4H2O
Pb2Mn(AsO3)2.*2H2O
(Tl,Cu,)Hg(As,Sb)S3
Ca2(Mn+2)2B4O7(OH)6
Y4Fe+2Si4O14F2 (?)
Fe+2SO4.*4H2O
RuAsS
Na(Li,Al)3Al6(BO3)3Si6O18(OH)4
(Bi,Pb)3Te4
CaMn+3Si2O6(OH).*2H2O
Bi2WO6
(Pt,Pd)3Sn

Ca10(Si2O7)2(SiO4)Cl2(OH)2
(Ru,Ni)As
(Ir,Os,Ru)
Ru
(Ir,Os,Ru)
UO2(CO3)
TiO2
Ca(Ta,Nb)2O6
TlCu4Se3
(NH4)Fe+3(SO4)2
Na4Zr2TiO4(CO3)4
HAl(UO2)4(PO4)4.*16H2O
(Na,Ca,K)9(Si,Al)12O24[(OH)2,(SO4),(CO3),(Cl2)]3.nH2O
(Co,Fe)As2
(Mg,Fe+2)Ce2(CO3)4
Pb14(AsO4)2O9Cl4
Ca5(AsO4)2(AsO3OH)2.*4H2O
Ca3Mg(BO3)2(CO3).nH2O
(Pb,Fe)(Bi,Sb)2S4
(Cu,Zn,Fe)3(In,Sn)S4
NH4Cl
Mg(UO2)2(PO4)2.*10H2O
Cu+2(IO3)(OH)

(Fe+3,Y,Fe+2,U,Ce)(Nb,Ta)O4
NaCa(Cu+2)5(PO4)4Cl.*5H2O
Ag4MnSb2S6
(Ca,Ba)Ca8(Fe+2,Mn+2)4Al2(PO4)10(OH)2
Na2(Mn+2,Mn+3)10Si11VO34(OH)4
(K,Na)AlSi3O8
Al2(PO4)(SO4)(OH).*9H2O
(Zn,Fe+2)WO4
Ca(Mn+2)4Si5O14(OH)2.H2O
(Na,Ca,Sr)3(Mn,+2Fe+3)2(Mn+4)2(VO4)4(OH,O)5.*2H2O
9PbO.*2PBO2.CrO3
KB5O6(OH)4.*2H2O
(Ca/*2,Na)0.3(Mg,Fe+2)3(Si,Al)4O10(OH)2.*4H2O

(Mg,Al)8(Al,Si)6O20
CaSb10O10S6
NaCa6Al4Si6O24F
(Fe+2,Mn+2,Mg)3(PO4)2
(Mn+2)2(AsO4)(OH)
(Fe+3)2(AsO4)(SO4)(OH).*5H2O
PbAs2S4
Ca(Y,Th)Al5(SiO4)2(PO4,SO4)2(OH)7.*6H2O
(Al,Fe+3)14(PO4)11SO4(OH)7.*83H2O
H3BO3
KNa2Al4B6O15Cl3.*13H2O

(Fe+2,Mg,Fe+3)2(PO4)(OH)
Na0.3Zn3(Si,Al)4O10(OH)2.*4H2O
Pb2(UO2)5O6(OH)2.*4H2O

Na2CeSi6O14(OH).*5H2O
NaB5O6(OH)4.*3H2O
MnCl2
Al5(OH)13(CO3).*5H2O
Ca7(Si6O18)(CO3).H2O
Ag1.1Hg0.9
Fe+2(Sb+3)2O4
Na21(SO4)7F6Cl
(Mn+2,Fe+2)16Si12(As+3)3O36(OH)17
Ca3Ge+4(SO4)2(OH)6.*3H2O
CaWO4
(NH4)2MgH2(PO4)2.*4H2O
(Ca,Y,Sb,Mn)2(Ti,Ta,Nb,W)2O6(O,OH)
Pb(Te+6,S)O4.H2O
Ag3Pb3Bi9S18
(UO2)TeO3
Fe+2(Fe+3)3(As+3)5O13
Al2(PO4)(VO4).*8H2O
MgSn+4(OH)6
UO3.*2H2O
Na0.3CrS2.H2O
CaZn2(PO4)2.*2H2O
(Fe+2)2ZnMn+2Fe+3(PO4)3(OH)2.*9H2O
Na(Fe+2)3Al6(BO3)3Si6O18(OH)4
Ca3(Ti+4)2((Fe+3)2Si)O12
(Fe,Ni)3P
(V+3)2Ti3O9
NaCa3(UO2)(SO4)(CO3)3F.*10H2O
(Fe+3)(2-x)(V+5,V+4)2O4(OH)4
Hg3(SO4)O2

PbCu+2(Nd,Gd,Sm,Y)(CO3)3(OH).*1.5H2O
(Cu,Zn)7(SO4,CO3)2(OH)10.*3H2O
PbHAsO4
Bi3[(V+5,As,P)O4]2O(OH)
Pb6(IO3)2Cl4O2(OH)2
CaAl2Si3O10.*3H2O
Fe+3AsO4.*2H2O
(Fe+2,Mg)Al2(PO4)2(OH)2
PbSO3
Mn3(PO4)B(OH)6
NaBSi2O5(OH)2
b-NiSe
U(MoO4)2
Pb3Cl3(IO3)O

CaMgFe+3(PO4)2(OH).*4H2O
PbFe3H(AsO4)2(OH)6
(Na,Ca)2(Zr,Ti,Mn)2Si2O7(O,F)2
(Fe,Ni)(Sb,As)2
(Fe,Mg)2Al4Si5O18
Se
Ag5Sb(Se,S)4
PbCuAsS3
MgF2
(Ca,Ce,La,Na)10-12(Fe+2,Mn)(Si,Be)20(O,OH,F)48
Pb9Sb8S21
Pb(Ti,Fe,Mn)21O38
Sb2O3
Al2(PO4)(OH)3.H2O
Cu2(UO2)2V2O8.*6H2O
Mg4Si6O15(OH)2.*6H2O
Na(Mn+2,Ca)2Si3O8(OH)
Ca2(Mg,Al)6(Si,Al,B)6O20
CaMg11(CO3)9(HCO3)4(OH)4.*6H2O
(Mg,Fe+2,Ni)3Si2O5(OH)4
Ca(Cu,Zn)4(SO4)2(OH)6.*3H2O
Mg5(BO3)(Cl,OH)2(OH)5.*4H2O
(Pb,Cd)(Fe,Cu)8S8
(Na,K)6(Mn+2,Fe+2)3Si9O24.*6H2O
Hg4SbO3(OH)3
Pb2Ni3S2
Ca(UO2)6(CO3)5(OH)4.*6H2O
Cu5(SiO3)4(OH)2
(K,Na,Ba)3(Ti,Nb)2Si4O14
V2O5
Ca9Al2(V+4)4(V+5)24O80.*56H2O
(Mn+2)7Al4(SO4)2(OH)22.*8H2O
Na2Ca2(CO3)3
Ca2(Mg,Al)(Cr,Al)2(SiO4)(Si2O7)(OH)2.H2O
Li(Mn+2,Fe+3)PO4
Fe5N2
FeCO3
Na2Fe+3(SO4)2(OH).*3H2O
K(Fe+2)2Al(Al2Si2)O10(F,OH)2
Fe+2SO4.*5H2O
Na3Mn(PO4)(CO3)
MoO3.*2H2O
(Ni,Co)3S4
Cu3Al4(PO4)2(OH)12.*2H2O
Fe+3Al2(PO4)2(OH)3.*7H2O
*3SiO2.H2O
Bi12SiO20
Al2SiO5
Ag

C19H24
TlHgAs3S6
Zn5(OH)8Cl2.H2O
CaV4O9.*5H2O
Al4(Ta,Nb)3(O,OH,F)14
Ca(V+4)2(PO4)2(OH)4.*3H2O
MgAlBO4
H2MnAl(PO4)2(OH).*6H2O
Cu6As4S9
Si2N2O
Mg6(Fe+3)2(CO3)(OH)16.*4H2O
Cu3SbS3
(H3O)2Mg(UO2)2(SiO4)2.*2H2O
CoAs2-3
NaMg2(Fe+3)5(SO4)7(OH)6.*33H2O

(Sr,Ca)Al2Si2O8
Bi2Te+4O5
AgAsS2
ZnCO3
(Co,Ni,Mg,Ca)3(Fe+3,Al)2(AsO4)4.*11H2O
(Fe,Ni)9S11
Na11(Na,Ca)4(Mg,Mn+2)Ti4(Si2O7)2(PO4)4O3F3
PdBi
(K,Ca/2)0.3(Mg2,Al)(Si3Al)O10(OH)2.*5H2O
Na8Al6Si6O24Cl2
(UO2)2SiO4.*2H2O
NaAl(SO4)2.*12H2O
Na(UO2)(PO4).*4H2O
(Na,Ca)3(Fe+3)2(As2O4)(MoO4)6.*15H2O
(H3O)(Na,K)(UO2)SiO4.H2O
(Na2,Ca,K2)4-5(Si,Al)48O96.*25-27H2O
Na2(Fe+3)4(AsO4)3(OH)5.*7H2O
(Na2,Ca)(UO2)2(AsO4)2.*5H2O

Na4(UO2)6(SO4)3(OH)10.*4H2O
(K,Na)2(Li,Fe+2)3(Zr,Ti,Fe+3)Si12O30
Ga(OH)3
Ca2B3O4(OH)4Cl
Mn9(SiO4)4(OH,F)2
Fe+3Te+4O3(OH).H2O
Ag4Pd3Te4
Pb19(Sb,As)20S49
Na4SnBe2Si6O16(OH)4
(K,Na)5Al2(Ta,Nb)22O60
PbCuBi(S,Se)3
(Mg,Fe+2)3(Al,Fe+3)4(PO4)4(OH)6.*2H2O
Cu6Al(SO4)(OH)12Cl.*3H2O
Zn4(PO4)2(OH)2.*3H2O

PtAs2
Cu(OH)2
Mn3Al2(SiO4)3
CoCO3
(Zn,Fe)S
(NH4,K)(Fe+2,Al)2(PO4)2(OH).*2H2O
MgAl2O4
Cu39S28
(Mn,Zn)2Te3O8
LiAlSi2O6
Ca5(SiO4)2(CO3)
Ca2(Fe+3)2O5
(Ti,Zr)O2
Ca4(Mg,Fe,Mn)5(PO4)6
V+4O(SO4).*6H2O
Cu2FeSnS4
Cu8(Fe,Zn)3Sn2S12
Sn2Ta2O7
(Fe,Mn)x(Sn,Ti)6-3x(Ta,Nb)2xO12 where x<1
MgSO4.*4H2O
(Fe+2,Mg,Zn)2Al9(Si,Al)4O22(OH)2
Th(Ca,Na)2K(1-x)Si8O20 (x = *0.2-*0.4)

Na14Ce6Mn+2,Mn+3(Fe+3)2(Zr,Th)(OH)2(PO4)7(Si6O18)2.*3H2O
CaAl2Si7O18.*7H2O
CaFe+3(As+3O2)(As+3Sb+3O5)
(Sr,Ba,Na)2Al(CO3)F5
NaMgFe+3(C2O4)3.*8-*9H2O
Ag5SbS4
H(NH4)Na(PO4).*4H2O
Mn3(AsO4)2.*4H2O
AgFe2S3
Ag2Pb10(Sb,As)12S29
Ag2Sb2(O,OH)7
(Ca/2)0.3Mg3Si4O10(OH)2
Mn+2(Fe+3)2(PO4)2(OH)2.*8H2O
SbAs
Sb+3(Sb+5)2O6(OH)
(Sb+3,Ca)2(Ti,Nb,Ta)2(O,OH)7
SbNbO4
Pd5Sb2
SbTaO4
(Sb+3)2V+4O5
Sb2S3
Mg6Cr2(CO3)(OH)16.*4H2O
NaCa2Al5Si13O36.*14H2O
ZnSe
Pd8As3
(Ce,La,Ca)BSiO5

K(Fe+2,Mg,Fe+3)8(Si,Al)12(O,OH)27
SiO2
SnSb
(Cu+2)5(V+5)2O10
CaSnSi3O9.*2H2O
PbWO4
Fe+2Ge+4(OH)6
(Ca,K,Ba)2(V+5,V+4)8O20.*6H2O
Zn2Cu(AsO4)2
Cu8(AsO4)4(OH)4.*5H2O
Ca2Al2SiO7.*8H2O
Na2(UO2)2V2O8.*6H2O
Fe+3PO4.*2H2O
CaCu+2SiO4.H2O
AgCuS
SrNa2Al4Si4O16
SrCO3
Sr2Ba2(Na,Fe+2)2Ti2Si8O24(O,OH)2.*H2O
SrB8O11(OH)4
(Sr,La,Ce,Ca)4(Fe+2,Fe+3)(Ti,Zr)4Si4O22
(Sr,Ca)Al2(CO3)2(OH)4.H2O
(Sr,Ca)2B14O23.*8H2O
Sr2Ba2(Na,Fe+2)2Ti2Si8O24(O,OH)2.H2O

(Sr,Ca)5(PO4)3(OH,F)
Mn+2(Fe+3)2(PO4)2(OH)2.*6H2O
(Ti,Ta,Fe+3)3O6
(NH4)MgPO4.*6H2O
UO4.*4H2O
Pt(Sb,Bi)
Ca6(Fe+3,Al,Mn+2)2(SO4)2[B(OH)4](OH)12.*25H2O
Ag5-xTe3
Mg2B2O5
(Pd,Ni)Sb
Mg2(Al,Fe+3)3Si3AlO10(OH)8
(Fe,Ni)3Si
KNa2(Fe+2,Mn+2,Al)2Li3Si12O30
Mg3B2(SO4)(OH)8(OH,F)2
Na6(SO4)2FCl
Bi3Te2S
S
Cu3VS4
Pb10(SO4)Cl2O8
Ca2Si2O5(OH)2.H2O
(Mg,Fe+2)3Al4BeSi3O16
Pb(Pb,Ca)(Al,Fe+3,Mg)2(Si,Al)4O10(OH)2(CO3)2
Mn2Al3(SiO4)(Si2O7)(OH)3
Pb4(SO4)(CO3)2(OH)2
MnBO2(OH)

BaV+4Si2O7
Ca5(AsO4)3F
SrAl3(PO4)(SO4)(OH)6
KAl7(NO3)4Cl2(OH)16.*8H2O
NaMn+2MgSn+4Be2Si3O12(OH)
(Ca,K2,Na2)Al2(Si,Al)12O28.6H2O
(Mg,Mn+2)(Al,Fe+3)(SO4)2F.*14H2O
U+6H6(UO2SiO4)6.*30H2O
CaMg(UO2)(CO3)3.*12H2O
NaBe4SbO7
Zn(OH)2
(Ca,Na)0.3(Li,Mg)2(Si,Al)4O10(OH,F)2.*2H2O
(Mn,Fe)3(PO4)2.*7H2O
AuAgTe4
KCl
(Fe+2)3(AsO4)2.*8H2O
(Mn+2,Mg,Ca,Pb)9(As+3O3)(As+5O4)2(OH)9.*2H2O
(Ce,La)Ca(CO3)2F
(Nd,La)Ca(CO3)2F
(Y,Ce)Ca(CO3)2F
K2Ca(SO4)2.H2O
MgBO2(OH)
Mn+2(SO4).H2O
Fe+2SO4.H2O
Mg3Al8BeO16
Ca12Al2Si18O51.*18H2O
CaMg2Cl6.*12H2O

Ca3(Y,Ce)2(Ti,Al,Fe+3)B4Si4O22
KLiMg2Si4O10F2
g-(Fe,Ni)(~32% Ni)
BaSr2(Mn+3)2O2(Si4O12)
(Pd,Cu,Pt)3Sn
(Mn+2,Co)(Mn+4)4O9.H2O
(Mg,Mn+2)2(Mn+3,Fe+3)BO5
Ni6Al2(CO3,OH)(OH)16.*4H2O
Mg3Si4O10(OH)2
Ca2Mg(AsO4)2.*2H2O
Cu9(Fe,Ni)8S16
NaAl(SO4)2.*6H2O
HNa2LiAl(PO4)2(OH)
Na(Mn+2,Mg,Fe+2)12Si12(O,OH)44
(Y,Ce,Ca)(Ta,Ti,Nb)O6

(Y,Ca,Ce)(Ta,Nb,Ti)2(O,OH)6
Ta2O5
(Fe,Mn)(Ta,Nb)2O6
Ba4(Fe+3,Ti,Fe+2,Mg)4(B2Si8O27)O2Clx   Fe+3 > Ti
Na2Ca(Fe+2,Mg)3Al2(Si6Al2)O22(OH)2   Mg/(Mg + Fe+2) = *0-*0.49

(K,NH4)Al3(PO4)3(OH).*9H2O
K2CrO4
NaK(H3O)Al8(Si,Al)16(OH8.*2H2O.*0.42(Ca.Na) (?)
Zn2(PO4)(OH)
FeSO4.*7H2O
SrTiO3
LiFe+3(PO4)(OH)
(Zr,Ti,Ca)O2
PbSnS2
Na2B(OH)4Cl
Cu+2Te+4O3.*2H2O
(Pd,Ag)3Te
Sb2Te3
TeO2
Te
Bi2Te3
Ni9BiTeS8
Pd9Te4
Pd3HgTe3
Y2(CO3)4.*2-*3H2O
(Cu,Fe)12As4S13
CuO
Mn2SiO4
Hg2ClO
Na4ZrSi6O15(OH)2.*H2O
Ca4MgAs2B12O22(OH)12.*12H2O
(NH4)HCO3
Pd(Sb,Bi)Te

AuCu
Bi2Te2S
(Cu,Fe,Ag,Zn)12Sb4S13
(K,Na)AlSiO4
Na2Al2Si3O10.*2H2O
FeNi
Mn+2Sn+4(OH)6
(Ca,Mn+2)(Mg,Fe+2,Mn+3)3(PO4)2(OH,F)2
Tl2(Cu,Fe)4S4
Y3Si3O10(F,OH)
Tl6(Fe,Ni,Cu)25S26Cl
Ca6Si2(CO3)2(SO4)2(OH)12.*24H2O
(Cu+2)5Zn5(As+5Sb+5)2O8(OH)14
Na2SO4
Ni(OH)2
Na2CO3.H2O
Pb(Cu,Zn)2(AsO4)2.*2H2O
NaCaAlF6.H2O
NaCa2Al5Si5O20.*6H2O
Th(Ca,Ce)(CO3)2F2.*3H2O

SnTa2O6
ThO2
Pb3(Sb+3,As+3)O3(OH)Cl2
(Th,U)SiO4
Th(SiO4)(1-x)(OH)4x
(Ca,Th,Mn)3Si4O11F.*6H2O
(Sc,Y)2Si2O7
(Th,U,Ca)Ti2(O,OH)6
Al(UO2)2(PO4)2(OH).*8H2O
HgSe
BaNa2MnTiB2Si6O20
SrAlF4(OH).H2O
CaMg(AsO4)F
Ca5Si2O7(CO3)2
Sn
K2Na(Ca,Mn+2)2TiSi7O19(OH)
Na2B4O5(OH)4.*3H3O
KAl2(PO4)2(OH).*2H2O
Pb22(Cu+1)4(Sb,Bi)30S69
(Ca,Mn+2,Fe+2)3Al2BSi4O15(OH)
K2(Na,Ca)2Li3Be6(PO4)6(OH)2.H2O
(Mn+2)4As+5Si3O12(OH)
(Mn+2)2(Mg,Fe+2)5Si8O22(OH)2
Na3H3(Mn,Ca,Fe)TiSi6(O,OH)18.*2H2O
CaTiSiO5
Ba4(Ti,Fe+3,Fe+2,Mg)4(B2Si8O27)O2Clx
V+3TiO3(OH)
(Cu+2,Zn)16(Te+4O3)(Te+6O4)2Cl(OH)25.*27H2O
H6(Ca,Pb)2(Cu+2,Zn)3(SO4)(Te+4O3)4(Te+6O6)
(NH4,K)Al2(Si3Al)O10(OH)2
Ca5Si6(O,OH)18.*5H2O
6Fe0.9S.*5(Mg,Fe+2)(OH)2
(Mn+2,Ca,Mg)(Mn+4)3O7.H2O
K2Ca4Si7O17(O,OH,F)4
CuCl2
IrSbS
Y4(Si,H)4O12-x(OH)4+2x
(V+3,Fe+3)4Ti3As+3O13(OH)
Cr3C2
Al2SiO4(F,OH)2
Cu+2(UO2)2(PO4)2.*8-*12H2O
(Ce,La)2Al(SiO4)2(OH)
(Mg,Mn)9Zn4(SO4)2(OH)22.*8H2O
(Na,K)xAl6(Si,Al)8O20(OH)10.nH2O
(Ca,K,Na)(Al,Fe+2,Fe+3,Li,Mg,Mn+2)3Al6(BO3)3Si6O18(OH)4
(Fe+2)8(Zr,Y)2Ti3Si3O24
Ba9(Fe+2)2Ti2(SiO3)12(OH,Cl,F)6.*6H2O
AgAsS2
Ca2(Mg,Fe+2)5Si8O22(OH)2

Ni(Fe+3)2O4
Al3(UO2)4(PO4)4(OH)5.*5H2O
SiO2
Pb3Mn+2(As+3O3)2(As+3O2OH)
(K,Na)AlSiO4
CaMn2Be3(SiO4)3
LiFe+2PO4
(Mn+2,Fe+2,Mg,Ca)2(PO4)(F,OH)
(Mn+2,Fe+2)2(PO4)(OH)
Cu+2(As+3)2O4
Fe+2(Sb+5)2O6
(Ca,U+4,Fe+3)(PO4,SO4).*2H2O
(Ce,La,Y,Th)5(Si,B)3(O,OH,F)13
(Y,Ca,La,Fe+2)5(Si,B,Al)3(O,OH,F)13
(UO2)3(AsO4)2.*12H2O
CoSe2
FeS
Al4(PO4)3(OH)3
Na3(CO3)(HCO3).*2H2O
(Ca,Mn)14Si24O58(OH)8.*2H2O
Ni3Se4
Ca2(Mg,Fe+2)3Al2(Si,6Al2)O22(OH)2 Mg/(Mg + Fe+2) = 0.5-1.0
(NH4)Al(SO4)2.*12H2O
PbZnFe+2(AsO4)2.H2O
Pb2Cu(PO4)(SO4)(OH)
BiTe
Ni9Sb2S8
MoO2
Na4AlBeSi4O12Cl
(Na,K)Fe+2Fe+3Si6O15
Pt2FeCu

Na3(Ce,La)4(Ti,Nb)2(SiO4)2(CO3)3O4(OH).*2H2O
SrB6O9(OH)2.*3H2O

WS2
WO3.H2O
NaCa2Al4(CO3)4(OH)8Cl
Na2(Fe+3)3Si8O20(OH)2.*4H2O
Ca5[(As,P)O4]3Cl
CuAl6(PO4)4(OH)8.*4H2O
K(Ca,Na)6(Si,Al)10O22(SO4,CO3,(OH)2).H2O
Mn+2Sn+4(BO3)2
Hg3(Sb,As)S3
Ca1-xYxF2+x
Pb(Sb,As)2S4
Na6Mg2(CO3)4(SO4)

(Ca,Sr)2B5O8(OH)2(OH,Cl)
CaCu5(AsO4)2(CO3)(OH)4.*6H2O

(Cu,Co,Ni)3Se4
Ca(UO2)2V2O8.*5-*8H2O
AgPb3MnSb5S12
NaMg(SO4)F.*2H2O
NaCaB5O6(OH)6.*5H2O
NiSbS
CaCu(UO2)(PO4)2.*4H2O
(Fe+2)2TiO4
Cu3Se2
K2ZrSi3O9.H2O
Na3Sr4ThSi8(O,OH)24
(UO2)MoO4.*4H2O
K3Na8Fe+3(SO4)6(NO3)2.*6H2O
Al(UO2)3(PO4)2O(OH).*7H2O
CaB2O2(OH)4
Ca2Be4(PO4)3(OH)3.*5H2O
(NH4)(UO2)(PO4).*3H2O
Ca(UO2)3(CO3)(OH)6.*3H2O
UO2
(U,Ca,Ce)2(Ta,Nb)2O6(OH,F)
Ba(UO2)2(PO4)2.*12H2O
Ca(UO2)2[SiO3(OH)]2.*5H2O
Ca(UO2)SiO3(OH)2.*5H2O
(UO2)6(SO4)(OH)10.*12H2O
U+6Si7O17
HAl(UO2)4(PO4)4.*40H2O
Bi2U2O9.*3H2O
Ca(UO2)2(AsO4)2.*10H2O
(Ba,Pb,Fe+2)(UO2)2(WO4)(OH)4.*12H2O
(U,Ca,Ce)2(Nb,Ta)2O6(OH,F)

Pd(Bi,Pb)2
CO(NH2)2
C5H4N4O3
Mg(Fe+3)2(PO4)2(OH)2.*8H2O
Ba2CaMgAl2F14
Na2AlSi3O8(OH)
(U+6)2(V+5)6O21.*15H2O
Ca3Cr2(SiO4)3
(Ca,Na)(Mg,Fe+2)3Al5Mg(BO3)3Si6O18(OH,F)4
Ag3AuS2
As4S5
NiS2
Sb2O3
4(Fe,Cu)S.*3(Mg,Al)(OH)2
Pb5(VO4)3Cl
NaAl8V10O38.*30H2O
Cu(UO2)(OH)4
Pb(U+6)7O22.*12H2O

U+6(UO2)3(PO4)2(OH)6.*4H2O
Na6Mg(SO4)4
Al(UO2)2(VO4)2(OH).*11H2O
(H3O,Ba,Ca,K)1.6(UO2)2(V+5)2O8.*4H2O
AlPO4.*2H2O
(Sn,Fe)(O,OH)2
(Na,Ca)Mn(Mn,Fe+2,Fe+3)2(PO4)3
Al11(PO4)9(OH)6.*38H2O
CaCO3
Pb2Cu(CrO4)(PO4)(OH)
Fe+2Al2(PO4)2(OH)2.*6H2O
MnBePO4(OH,F)
Sr2B11O16(OH)5.H2O
Sr2B11O16(OH)5.H2O
Pb2(Sb,As)2S5
(Cu,Hg)11Sn4S16
(d-MnO2)(Mn+4,Fe+3,Ca,Na)(O,OH)2.nH2O
Ba2(Mn+2,Fe+2,Ti)Si2O6(O,OH,Cl,F)2.*3H2O
(Fe+2)4(Fe+3)8(Sb+3)12O32S2
Ca8Al4(Al4Si5)O12(OH)36.*10H2O
BaCu3(VO4)2(OH)2
Ca10Mg2Al4(SiO4)5(Si2O7)2(OH)4
(Cu,Zn)3(PO4)(OH)3.*2H2O
(Ca,Ce)(Nb,Ta,Ti)2O6
Na(Ca,Mn)Al(PO4)(F,OH)3
Ag5Pb8Bi13S30
(Cu,Ni,Co,Fe)S2
NaF
(Mn+2,Ca,Zn)5(AsO4)2[(AsO3)OH]2.*4H2O
CaB2O2(OH)4
Cu10Fe4Sn(As,Sb)S16
(Na,Ca,K)4Ti4AlSi6O23(OH).*2H2O
FeNi2S4
LixAlxSi(3-x)O6
NaCa5Al10(SiO4)3(PO4)5(OH)14.*10H2O (?)
(Na,Ca,K)6(Si,Al)12O24(SO4,CO3,Cl)2-4.nH2O
ZnSn(OH)6
Na3(Ce,La)(PO4)2
(Fe+2)3(PO4)2.*8H2O
Ca5H2(AsO4)4.*5H2O
Na2ZrSi4O11
Ca2Cu(UO2)(CO3)4.*6H2O
Cu3V2O7(OH)2.*2H2O
KCa4[B5O8(OH)]4[B(OH)3]2Cl.*4H2O
K2(Fe+2)5(Fe+3)4(SO4)12.*18H2O
AgBiTe2
(Fe+2,Mg)2Fe+3BO5
(Ni,Co)4(As,Sb)S2
Tl4Hg3Sb2As8S20

CaAlSiO4(OH)
CuTe
Na5Nb3Ti(Si2O7)3O2F2.*2Na3PO4
(Mn+2,Fe+2)(V+3,Cr+3)2O4
U+4(PO4)(OH).*2.5H2O
(Pd,Ni)S
Y4Al2AlSi5O18(OH)5
K2CaZr(SiO3)4
b-(Mg,Fe+2)2SiO4
(Mg,Fe+2)2(PO4)F
CaAl2Si4O12.*2H2O
CoFe
(As,Sb)11S18
(Ce+3,Pb+2,Pb+4)VO4

YVO4
H(Ca,Mn+2,Fe+2)(Fe+3)3(AsO4,PO4)4.*7H2O
PbTl(Cu,Ag)As2S5
Ca4(Mn+2)6(As+5)4O16(OH)8.*18H2O
Bi4(UO2)(AsO4)2O4.*2H2O
BaCa2Si3O9
NaAl3(PO4)2(OH)4.*2H2O
Ca5MgB24O42.*30H2O
Zn3(AsO4)2.*2H2O
(Mg,Ti,Fe+3,Al)2(BO3)O
Al3(PO4)2(OH,F)3.*5H2O
(Bi,Ca)Al3(PO4,SiO4)2(OH)6
Na2MgAlF7
Ca(C2O4).*2H2O
K2(UO2)2(Si2O5)3.*4H2O
Na5(CO3)(HCO3)3
Pb6Bi8(S,Se)18
BaAl3(AsO4)(SO4)(OH)6 (?)
CaHAsO4
TlSbS2
Cu5Te3
Mn6(W,Mg)2Si2(O,OH)14
(Ba,Ca,K2)Al2Si6O16.*6H2O
Sr3Na2Zr(CO3)6.*3H2O
Ca2Sb+5Mg4Fe+3Si4Be2O20
Ca2(Mg,Co)(AsO4)2.*2H2O
Ba4Ca6(Si,Al)20O39(OH)2(SO4)3.nH2O
(Ca,Mg)Mg7(Al,Fe+3)2(SO4)2(OH)18.*12H2O
(Fe,Ni,Co)As
Na2Cu+2(C2O4)2.*2H2O
Pb7(Cu+2)2(SO4)4(SiO4)2(OH)2

CaC2O4.H2O

Ca(Fe+2,Mn+2)Mg2Al2(PO4)4(OH)2.*8H2O

Ca9(Mg,Fe+2)(PO4)6[PO3(OH)]
Fe+2(Fe+3)2(PO4)2(OH)2.*4H2O
Pb3CaAl2Si10O24(OH)6
Mn+2Sn+4(OH)6
NaCa2(Fe+2,Mn+2)4MgFe+3(PO4)6.*2H2O
Pb2(UO2)(CO3)3
Ni5(CO3)4(OH)2.*4-*5H2O
Mg5(BO3)O(OH)5.*2H2O
MgAl(SO4)2F.*18H2O
CaMn+2Fe+3(PO4)2(OH).*2H2O
Ni3Se4
Zn2SiO4
(Ni,Mg)3Si4O10(OH)2
KCaAl3Si3O12.*5H2O
(Co,Ni)SbS
NaCa(Mg,Fe+2)4AlSi8O22(OH)2
Ti(Te+4)3O8
(Mn+2,Mg)14B8(Si,Mg)O22(OH)10Cl
BaCO3
Cu3BiS3
Pb3Bi4(S,Se)9
Mn+2(Sn+4,Ta)Ta2O8
NaCa2(Zr,Nb)Si2O8(O,OH,F)
(Fe+2,Mn+2)2(PO4)(OH)
(Fe,Mn)WO4
(Nb,Ta,W,Ti,Fe,Mn)3O6

a-CaSiO3
(Pb,Ca)U2O7.*2H2O
(Na,K)(Mg,Fe,Al)6(Si,Al)8O20(OH,F)4
CaAl3(PO4)(SO4)(OH)6
(Zn,Mn+2)(Mn+4)3O7.*1-*2H2O
Cu4(SO4)(OH)6.*2H2O
PbMoO4
(Zn,Fe)S
FeO
Ca3U+4(UO2)6(CO3)2(OH)18.*3-*5H2O
Ni3(AsO4)2
Ag3AsS3
Ca4(Fe+3)2(PO4)4(OH)2.*3H2O

YPO4
(Fe+3,Al)(UO2)4(PO4)2(SO4)2(OH).*22H2O
Fe5Si3
Pb3Bi2S6
(Rh,Cu,Ru)3S4
Fe+3(SO4)Cl.*6H2O
(Cu+2)3Te+6O4(OH)4
Ca6Si6O17(OH)2

Ca3Zn3(Te+6O6)2
(Na,K)1.5Mg2(Al,Mg)3(Si,Al)12O30
Ca3Al2F10(OH)2.H2O
Cu9S8
KFe+3(SO4)2
Ca4Al6O12(SO4)
(Mn+2)9Zn6(Sb+5)2Si4O28
Bi5(Fe+3)3(Te+4O3)(Te+6O4)2O9.*9H2O
Pb6CrCl6(O,OH)8

(Y,Dy,Er)4(Ti,Sn)O(SiO4)2(F,OH)6
K(Cr,Ti,Fe,Mg)12O19
PtIn
(Mg,Al,Fe+3)8Si4(O,OH)20
(Mn+2,Mg)5Si8O20(OH)2.*8-*9H2O
(Ba,Sr)2TiMn2(SiO4)2(PO4,SO4)(OH,Cl)
(Y,U,Ce)2(Ti,Nb,Ta)2O6(OH)
(Y,Th,Ca,U)(Ti,Fe+3)2(O,OH)6

(Y,Ce,Nd,Th)(Nb,Ti,Ta)2O6
(Y,U,Fe+2)(Ta,Nb)O4

YW2O6(OH)3
CaAl2Si6O16.*4H2O
Ca2(Fe+3)3(AsO4)4(OH).*12H2O
(K,Ba)NaCa2(Si,Ti)4O11(F,OH).H2O
V(1-x)S.n(Mg,Al)(OH)2
Al12(SO4)5(OH)26.*20H2O
Bi(Fe+3,Al)3(PO4)2(OH)6
Na4(Mn+2)5Si10O24(OH)6.*6H2O
Cu3Al4(PO4)3(OH)9.*4H2O
Ni3(CO3)(OH)4.*4H2O
BiOF
NaLiZrSi6O15
Ca(UO2)(CO3)2.*5H2O
(Zn,Fe+2)2(Te+4O3)3Na(x)H(2-x).nH2O
Ca4Si3O8(OH,F)4.*2H2O
Cu+2(UO2)2(AsO4)2.*10-*16H2O

NaMg(Al,Fe+3)(C2O4)3.*8H2O
Ba2Ce(CO3)3F
beta-(Cu+2)2(V+5)2O7
Zn2AlSi2O5(OH)4.*2H2O (?)
Zn

(Zn,Cu,Fe+2)SO4.*7H2O
(Zn,Mn+2)O
(Zn,Mg,Mn+2)Fe+3(SO4)2(OH).*7H2O
Zn(Fe+3)4(SO4)6(OH)2.*18H2O
Zn3Si4O10(OH)2.*4H2O

Pb9Sb22S42
KLiFe+2Al(AlSi3)O10(F,OH)2
K4(UO2)6(SO4)3(OH)10.*4H2O
ZrSiO4
(K,Na,Ca)3(Mn,Fe+2)7(Zr,Nb)2Si8O27(OH,F)4
(Zr,Ti)(SO4)2.*4H2O
(Ca,Th,Ce)Zr(Ti,Nb)2O7
Na6(Ca,Mn,Fe+2)ZrSi6O18
Ca2Al3(SiO4)3(OH)
Na2Ti(Si,Al)309.nH2O
AgPb4Sb4S10
Al13Si5O20(OH,F)18Cl
K(Fe+2,Mg,Mn+2)13(Si,Al)18O42(OH)14
(Pd,Pt,Au)3(Pb,Sn)
(Fe+2,Mn+2)2(PO4)F
(Fe+3)4(AsO4)3(SO4)(OH).*15H2O

HABITS,C,254
Aggregates of platy crystals up to 3mm in length.
Crystalline coatings, largest crystals about 0.5mm on an edge.
Twinned, platy, hexagonal 1.5mm crystals.
Crystals short to long prismatic.
Granular aggregates, crystals up to 5mm long and 2mm in diameter with hexagonal outline.
Massive.
Crystals commonly long bladed; less frequently short and stout; fibrous or thin columnar aggregates, often radiated, massive,
Crystals varied, commonly elongated, tabular or equant, often in druses of numerous interlocked crystals with wedge-shaped
Crystals rare, elongated, tabular, usually massive.
Poorly developed crystals, elongated, parallel to c and flattened.
Thick tabular crystals, often with green chlorite dust.
Crystals long prismatic, vertically striated or furrowed; terminations blunt or acute; also in groups or tufts of acicular to capillar
Crystals long prismatic, twinning, sometimes lamellar.
Massive; finely crystalline.
Prismatic parallel to [001], up to 10 cm long; also tabular; rarely acicular.
Tabular and prismatic crystals.
Priesmatic or tabular crystals.
Tabular crystals or massive.

Tabular crystals or often massive.
Spherical to rosette-like aggregates up to 3mm in diameter composed of needle-like crystals.
Crystals acicular.
Compact, finely granular, irregular masses, massive, nodules, pebbles.

Crystals tabular with pseudohexagonal section, sector twinning.
Intergrown, rudely dodecahedral crystals with pitted surfaces and mostly rounded edges, also massive.
Crystalline crusts; rarely well-formed crystals ranging from 0.25 to 1.0 mm, elongated or tabular.
Crystals prismatic to acicular; striated parallel to elongation, usually massive.
Usually massive, rarely as platy crystals or laths elongated parallel to c.
Resembles 'limonite'.
Crystals elongate prismatic and striated parallel to a-axis. As massive to radiating twinned columnar aggregates.
Crystals tabular and elongated tabular up to 0.8mm long and 0.1mm wide, showing hexagonal outline. As lens-like or nest-lik
Crystals usually short prismatic, commonly massive, granular, twinning.
Spherical or wart-like aggregates of minute crystals.
Crystals elongated on [001], flattened on {100}, faces of prismatic zone striated parallel to [100], crystals up to 7 mm in length
Xenomorphic grains, rarely in crystals resembling trigonal pyramids.
Crystals cubic or octahedral. Usually massive.
Crystals fibrous; in radiating aggregates.
Commonly tabular, flattened along b-axis, often platy. Twinning very common.
Talc-like crystallites that are 0.1 to 0.2 Ým thick and up to 0.1 mm across.
Dipyramidal crystals.
Platy grains up to 1.0 mm.
Isolated, subhedral, < 0.05mm in diameter grains, rarely up to 0.2mm.
Rarely as sharp, distorted crystals, usually massive, granular.
Crystals slender prismatic or tabular, sometimes as rosette-like aggregates.
Crystals usually tabular, also long prismatic to acicular. Commonly compact massive, bladed or as embedded grains.
Massive and as complex intergrowths.
Crystals slender plate like, deeply striated by twinning; also as unstriated stout platy crystals; sometimes in fan-shaped aggreg

Crystals short prismatic; usually massive, commonly in columnar to hemispherical aggregates.
Massive; as crusts resembling hyalite opal; also stalactitic or as powdery aggregates.
Massive, fibrous, granular and globular aggregates.
Commonly dodecahedrons or trapezohedrons, massive, compact or granular.
Dipyramids.
Crystals rare; cubic or octahedral, commonly massive.
Cleavable masses.
Massive; as thin crusts and coatings.
Elongate lamellar grains.
Chalky masses of fibrous crystals.

Forms rims around crystals of simpsonite and natrotantite.
Rhombohedral, tabular crystals; fibrous, granular, compact, nodular, earthy.
Acicular crystals, capillary, fibrous, granular, reniform, scaly.
Mica-like platelets of hexagonal form, polysynthetic twinning plane parallel to cleavage plane.
Irregular grains, rarely as well-formed rhombohedra up to 1.0 cm; weakly magnetic.
Crystals short to long prismatic, somewhat flattened to nearly square in cross-section; striated, usually columnar or bladed ma
Crystals thick tabular; equant; rarely prismatic.
Short columnar, tabular crystals; compact, granular, spathic.
Pebbles, rounded grains, plates, stratified, drop-shaped, disseminated.
Crystals equant to short prismatic, commonly with rough faces; usually as large cleavable masses; twinning common.
Crystals elongated, maximum length of 5mm, frequently bent.
Crystals pseudohexagonal plates and prismatic crystals; also in foliated aggregates; universally twinned on {001}.
Hexagonal, columnar crystals in druses.
Radial aggregates.
Crystals pyramidal.
Microscopic platy crystals grouped in parallel position; compact and fine-grained granular masses.
Irregular flattened nodules composed of microscopic tabular grains, some with hexagonal outline.

Isolated crystals; druses; also compact, granular, massive.
Massive; flakes.
Crystals tabular; as crust of subparallel crystals and as rosette-like aggregates.
Pyramidal crystals, often striated.

Crystals stout to long prismatic, also as minute pseudo-octahedral crystals with curved faces, tiny disseminated grains.
Prismatic, massive or fibrous aggregates.
Crystals rhombohedral, up to 1cm or more in size; also as clusters of minute pseudocubic crystals; thick crusts and veinlets.
Crystals tabular, usually massive, cleavable, granular or compact; twinning common.
Crystals stout prismatic, striated parallel to elongation; also thick to thin tabular; commonly massive.
Dodecahedral crystals; compact, granular, massive.

Botryoidal aggregates with radial-fibrous structure.
Massive grains or granular aggregates.
Crystals usually tabular, as globular and crystalline encrustations.
Tabular, short prismatic, columnar, needle-shaped crystals; compact, granular, reniform, crusty, earthy.
Tabular, columnar, cube-shaped crystals; spathic, fibrous, compact, botryoidal, granular, massive.
Crystals prismatic or platy (up to 5mm in size); similar to chalcocite in appearance.
Rhombohedral, often twinned crystals, compact, granular.
Needle-shaped, capillary, lamellar crystals; mostly earthy, powdery, reniform, scaly, encrustations and coatings, efflorescenc

Prismatic, massive.
Crystals usually short prismatic, blocky, sometimes orthorhombic or tetragonal in aspect; tabular; commonly massive; cleavab
Acicular aggregates up to 15cm long.
Tabular crystals, chalk-like masses.
Prismatic crystals up to 5mm in length; often curved.
Fibrous and prismatic.
Microcrystalline, foliaceous, scaly, massive, compact, disseminated.
Crystals thin tabular, pseudohexagonal, up to 2 cm accross; subparallel and rosette-like groups; twinning.
Tabular, cube-like crystals; mostly compact, granular-spathic, lamellar, reniform, disseminated.
Crystals thick tabular, short prismatic, or equant; aggregates of fibrous or acicular crystals; as cross-fibre veinlets; granular; as
Spherules of radial fibres.
Hexagonal, short to long columnar, tabular crystals; compact, reniform, nodular, massive, granular.
Crystals thin to thick tabular; pseudohexagonal twins resembling aragonite; massive; as crusts; bladed aggregates; twinning.
Acicular, capillary crystals, fibrous.
Fine-grained.
Crystals platy; usually found as massive aggregates.
Short to long columnar crystals; tabular agg.; loose grains, pebbles.
Acicular or chisel-shaped pseudohexagonal.
As aggregates of thin broad plates; striated.
Thin plates; pseudohexagonal due to cyclic twinning.
Prismatic crystals up to 2 mm in length.

Microscopic; aggregates of acicular crystals.
Very fine-grained powdery masses.
Prismatic, rosettes.
Thick and long columnar, tabular crystals.
Cubic, octahedral, dodecahedral crystals; disseminated, platy, powdery, sooty, reticulated, compact.
Crystals very minute, micaceous, flattened with hexagonal outline; fine-grained masses and coatings.

Minute pseudohexagonal crystals; termination faces usually rough; interpenetration and lamellar twinning present.
Euhedral to subhedral; prismatic grains.
Pseudocubic, small cube-shaped crystals; compact, reniform, botryoidal, massive.
Spherulitic aggregates.
Prismatic well-formed crystals averaging 0.3mm in length; tabular crystals; sometimes forming rosette-like aggregates up to 1
Embedded grains, usually rectangular in outline; commonly with ilmenite overgrowth.
Crystals short prismatic, twinning, lamellar.
Crystals prismatic.
Crystals up to 2 cm in length and in aggregates up to 50 x 50 cm.
Large cleavable masses; well formed crystals.
Flat laths or platelets.
Rosette-like aggregates composed of tabular crystals up to 1.0mm in maximum dimension.
Mostly of crooked shelly form, reniform, compact masses; shelled refraction, mammillated, nodular, platy, compact.
Massive, radial-fibrous aggregates; also as granular pseudomorphs or concretionary.
Ocherous.
Massive, granular.
Reniform crusts and spherical aggregates.
Tabular, six-sided, rhombohedral crystals.
Irregular masses up to 10mm in diameter, occasionally as tabular crystals up to 2 x 20mm, rarely as subhedral crystals up to

Plates and veinlets; fibrous foliated structure.
Very small octahedral crystals, crusts, needles, powdery, fibrous, botryoidal.
As 0.3 to 1.8mm grains with complex polysynthetic twinning observed microscopically.
Compact, granular, radial, short-columnar, tabular crystals.
Tiny grains.
Crystals thin tabular, pseudohexagonal, up to 6cm across, twinning.
Crusts of distorted crystals; often twinned.
Crusts consisting of elongate, tabular crystals up to 0.3mm in maximum dimension.
Fine scales; lichen-like.
Prismatic or as globules and radial fibrous spheres.
As sprays and crusts of acicular crystals; as spherical or flattened aggregates of radiating fibres; fibrous veinlets.
Rhombohedral crystals up to 5mm in size.
Short to long parallel, fibrous, capillary agg.
Platlets usually massive.
Lath-like crystals and plates to 5mm.

Crystals fibrous prismatic; as a powder.
Cubic rystals up to 0.3 mm.
Tabular, scaly, rose-shaped, stellate agg.
Columnar, needle-shaped, capillary, thick-tabular crystals; compact, massive, earthy, granular, as encrustations.
Crystals minute, tabular, mammillary or spherical crystalline aggregates with smooth surface.
As elongated lath-shaped grains.

Single microscopic grains.
Massive,.

Crystals thick tabular, also prismatic to acicular or as thin triangular plates; massive.
Short columnar, thick tabular, needle-shaped crystals; disseminated, granular, massive, compact.
Fine needle-shaped, finely foliaceous crystals; fibrous, scaly, granular, compact, massive, as efflorescences.
Irregular grains up to 0.25 x 0.45mm.
Irregular masses and platy or scaly grains.
Rounded anhedral grains.
Minute prismatic or acicular crystals; drusy crusts; radial-fibrous nodules and encrustations.
Thin- to thick-tabular, scaly clusters, lamellar agg.; earthy, massive.
Crystals less than 1mm, somewhat resembling perovskite.
Crystals minute, tabular to platy, sometimes elongated, dense crusts.
Small plates and grains; anhedral to subhedral; rarely up to 4mm across.
Tabular, wedge-shaped, granular, compact, disseminated.
Crystals prismatic, 1-20mm long and 0.1 - 5mm wide.
Short-prismatic, thick-tabular, massive, earthy, botryoidal, encrustations, coatings.
Grains of isometric and rarely of flattened tabular form up to 1mm x 1.5mm in size.
Crystals short prismatic or platy.
Fine crystalline, mammilliform, radiating fibrous, crusty, massive.
Aggregates of acicular crystals 1.5cm long.
Long stout, prismatic grains.

Crystals stout prismatic, thin tabular, nodules and veins, dense and microcrystalline.
Asbestiform fibres.

Crystals prismatic, rodlike, elongated, isometric in cross-section, striated parallel to elongation, grains up to 2-3mm, twinning p
Intergrowths of 0.5mm, very small short prismatic crystals.
Massive; microcrystalline.
Massive.
Crystals tabular or equant, small flattened oval or rounded aggregates randomly scattered on matrix.

Lathlike crystals.
Aggregates of anhedral plates up to 5cm across cleavage surfaces.
Grains and partly faced crystals 0.8-4mm in size; isometric masses, often with rectangular outline, up to 10cm in size.
Crusts; crystals tabular, sometimes twinned; mammillary or arborescent.
Platy deposits up to 5 x 2 x 0.5 cm.
Massive; in matted or twisted masses of fibres or plates; cross-fibre veinlets.
Crystals prismatic, short, small; massive; powdery crusts.
3-5Mm grains.
As fibres up to 3mm long, platy.
Plates up to 12cm in maximum dimension and up to 5cm thick.
Bipyramidal crystals up to 8mm.
Massive.

Thin-to-thick-tabular, columnar, lamellar crystals; massive, reniform, granular.
Cubic crystals.
Microscopic bladed to fibrous crystals in loose aggregates or radiating clusters. In continuous coatings, velvety with botryoida

Minute nodular with radiating fibrous or acicular structure.
As tabular or acicular crystals up to 1 mm in maximum dimension.
As anhedral irregular grains.
Thin tabular crystals, sometimes prismatic with square cross-section.
Massive; curved lamellar structure.
Small prismatic crystals in druses; granular.
Foliated aggregates.
Microcrystalline, massive; compact to powdery.
Microscopic needles in parallel arrangement.
Crystals thin lozenge-shaped plates.
Tabular.
Massive; fine-grained.
Elongated crystals.
Short prismatic or tabular crystals.
Massive.
Chemical sedimentary rock, oolithic, massive, porous, earthy.
Prismatic; also as radial lamellar or fibrous aggregates.
Irregular grains. Brittle
Very fine, fibrous.
Massive, fine-granular to powdery.
Short prismatic crystals.
Crusts.
Prismatic crystals up to 0.65 mm in length, commonly as anhedral grains.
Acicular crystals.
Fine encrustations and tangled fibrous aggregates of prismatic crystals.

Earthy friable masses.
Prismatic crystals, elongated, occasionally tabular.
Octahedral crystals.
Euhedral to subhedral crystals of pseudo-octahedral habit.

Anhedral.
Veinlets and as tiny isolated crystals.
Prismatic crystals up to 2cm long.
Lamellar or fibrous crystals; usually granular, massive or horn-like.
Polysynthetic twinning common.
Idiomorphic, pyramidal, embedded crystals; no agg.

Flat, unmodified rhombohedral crystals up to 1.25 cm across; as cleavable masses with cleavage faces up to 1 cm across an
Hexagonal prisms, fibrous.
Tabular, small crystals, somewhat elongated and vertically striated.
Crystals 0.1-0.5 mm in diameter.
Found in polished section only.
Thin tabular crystals.
Centimetre-size aggregates of elongated crystals.
Granular, massive. Synthetic crystals similar in habit to quartz.
Tabular, often twinned crystals, up to 0.5 mm in size. In fan-shaped, rosette-like or subparallel aggregates of crystals, and as
Flattened pyramidal to pseudo-octahedral crystals up to 3 mm on edge.
Minute, tabular crystals.
Lath-like crystals; up to 1 mm in length.

Needle-shaped, fibrous, capillary crystals; fibrous, tabular, massive agg.
Massive.
Prismatic or thin tabular crystals, up to 3.0 cm in size.
Hexagonal, columnar, tabular to acicular crystals; tabular, fibrous agg.; compact.
Spherulites 2-3 mm in diameter, or as fibrous crusts up to 2 mm thick.
Tabular to short prismatic crystals; often highly modified. Crystal faces frequently etched or rough.
Thin veinlets and dendritic crusts; disseminated.
Usually massive, rare minute trapezohedrons.
As elongated platy or irregular grains up to 0.2 x 0.05mm.
Octahedral, dodecahedral, large crystals; compact, granular, massive.
Irregular masses; needlelike from a few tenths of a millimetre in diameter to 2 cm in length and 5 mm in diameter. Some need
Crystals rhombohedral sometimespseudocubic.
Pseudocubic, rhombohedral crystals.
Prismatic up to 30 cm long.
Thin crystals, flattened rectangular plates; also as very fine-grained earthy masses, compact.
Crusts of indistinct crystals. Synthetic crystals tabular.

Small crystals. Also massive.
Stalactites and crusts.

Prismatic crystals, pseudo-orthorhombic in appearance, massive.
Tabular crystals, pseudohexagonal. Crystals range in size from microscopic to 2 mm.

Massive; as fine-grained aggregates.
Cryptocrystalline, massive; as crusts, nodular or reniform masses with concentric layering; rarely opaline; pseudomorphous.
Tabular, columnar, pseudohexagonal crystals; compact, lamellar, scaly.
Prismatic crystals, tapered with pyramidal terminations.
Tiny laminae or needles with hexagonal cross-section.
Minute grains, some exhibiting well-defined faces.
Short prismatic crystals. Usually granular and foliated; also fibrous.
Compact, massive, very fine-grained. Also earthy and powdery.
Massive; compact, earthy, columnar to fibrous; as tiny scale-like crystals.
Granular, lamellar, compact, dendritic.
Prismatic crystals, stout to slender or acicular; vertically striated; less commonly dipyramidal. Usually massive, fibrous or fol
Massive, dense to earthy. As fibrous or chalcedonic crusts, and as scaly to lamellar aggregates.
Massive, powdery.
Massive as veinlets, formed by replacement of bismuthotantalite.
Anhedral earthy crusts.
Stout prismatic crystals, often irregular, large. Also massive as stream pebbles.
Thin tabular crystals, pseudohexagonal, up to 2 mm in diameter. As rosettes and dense micaceous aggregates.
Cubic crystals, sometimes highly modified.
Complex crystals steep terminations.
Massive, as microcrystalline crusts.
As thin crystalline coatings.
Short prismatic crystals, often rich in forms and sometimes 5 or more cm in size. Also massive granular or compact.
As anhedral, equant crystals from < 1 mm up to 1 cm in length.
Minute acicular or fibrous crystals; also as flattened aggregates, massive, lamellar and as minute crystalline aggregates.
Microscopic, tabular crystals. Commonly in pisolitic aggregates or disseminated.

Massive.
Anhedral grains. Twinning polysynthetic.
Reniform crusts, platy crystals, wedge-shaped crystals.
Cube-shaped, pseudocubic crystals.
Massive; as botryoidal masses, cryptocrystalline crusts, and veinlets.
Dense microcrystalline pseudomorphic aggregates; also radiating acicular to fibrous.
Clusters of slender prismatic crystals, as veins in associated minerals, and as rosette-like radiating groups.
Concretions composed of minute crystals.
Crystals acicular or long prismatic up to 2.0 cm in length.
Fine-grained aggregates and as crystals up to 0.5 x 2 x 5 mm showing eleven forms.
Usually massive with crystalline structure or fibrous. Rarely in crystals.
Cube-shaped embedded crystals; compact, massive, fibrous nodules.
Compact, columnar, flat-tabular crystals, with dull crust; earthy, powder.
Veins and as dense masses up to 0.5 mm in diameter.

Platy aggregates up to 10 x 8 x 0.2 mm.
Massive; as microscopic rims on trogtalite crystals.
Cube-shaped, cubic octahedral, dodecahedral crystals; compact, platy masses, granular, massive, coatings.
Irregular grains.
As divergent sprays of bladed prismatic crystals, and hemispherules up to 3 mm in diameter.
As crusts of minute intergrown or columnar crystals; powdery.
Short-columnar crystals; granular, botryoidal, compact, bundle-shaped agg.

Long columnar, needle-shaped, striated crystals; fibrous, radial, feather-like agg.; compact, massive.
Prismatic, cogwhel aggregates.
Short prismatic crystals. Usually stalactitic or as crusts.
Earthy or reniform masses.

Massive; microcrystalline.
Striated acicular crystals, sometimes flattened parallel to elongation, in tufts and groups. Also botryoidal or dendritic.
Fine-grained masses.
As minute prisms and rounded grains.
Crystals simple hexagonal plates having only prism and pinacoid faces.
Compact groups of elongated plates up to 0.5 mm long.
Crystals slender prismatic, up to 8.0mm long, 1.0mm wide and 0.2mm thick; stout prismatic; as radial groups and rounded or
Indistinct crystals, embedded grains and masses, rounded detrital grains and pebbles.
Crystals very thin plates less than 1mm in size.
Synthetic crystals are tabular.
Octahedral crystals; compact, massive, granular, crusty.
Crystals cubic, octahedral or pyritohedral; indistinct; nodular masses or crusts with columnar or radial-fibrous structure.
Crystals nearly equant to short prismatic; up to 12cm long and 8cm wide; elongated, pear-shaped; prism zone striated; globul
Rounded grains; twinning.
Thin tabular, columnar, needle-shaped crystals; compact, finely granular, lamellar, disseminated.
Lath-like crystals up to 1mm in radiating aggregates.
Crystals short prismatic; radial-fibrous or granular aggregates; twinning common.
Anhedral grains.
Grains up to 0.1 - 0.2mm.
Embedded grains up to 1-2mm; commonly shows polysynthetic twinning.

Brittle.
Hexagonal crystals up to 2 cm.
Crystals stout prismatic to acicular; tabular; commonly as drusy crusts; groups and aggregates of crystals; massive, granular;
Radial aggregates, hexagonal prisms.
Crystals usually cubic, often with modifying faces; commonly massive, often in crusts and waxy coatings; rarely columnar or fi
Crystals prismatic.
Flat, thin-tabular, pyramidal, crystals.
Platelets, tetragonal in outline.
Crystals usually broad tabular; rarely acicular; usually foliated massive; fibrous, scaly or fine granular.
Crystals anhedral; short to long columnar; also as crystalline crusts.
Massive; foliated or lamellar masses of small flakes flattened.
Massive; as thin rims encrusting tennantite which itself encloses renierite.
Crystals needle-like or prismatic to tabular; also earthy or powdery; foliated.
Microscopic inclusions.
Commonly anhedral to cryptocrystalline; rarely as euhedral crystals up to 0.05mm in size; crystals correspond closely to ortho
Crystals short prismatic.
Microscopic barrel-shaped crystals.
Massive.
Earthy nodules.
Fine grained needles in radial aggregates.
Crystals acicular, radiated; in spherulitic masses; twinning common.
Crystals octahedral, sometimes with cube or dodecahedron modifications.

Prismatic crystals. Hourglass structure with blue core.
Prismatic or in radiating aggregates.

Crystals tabular with uneven and rough faces; usually massive; also as spherical to irregular nodules; reticulated aggregates o
Small cleavable grains and small prisms.
Octahedrons up to 2mm across.
Crystals tabular parallel, acicular, usually rough with rounded edges; commonly massive, cleavable to compact, often with fibr
Crystals usually thick tabular; octahedral; twinning common.
Acicular, sprays, striated crystals.
Massive; very fine-grained.
Tabular crystals, massive, twinning common, typically albite, carlsbad and pericline twinning.
Anhedral grains that exhibit a 'shreddy aggregate texture'; individual grains are polysynthetically twinned.
Acicular, capillary crystals; radial agg., fibrous; reniform, globular, earthy, compact.
Malleable, smooth, flattened grains up to 0.2mm.
Minute crystals showing hexagonal pyramid with horizontal striations and base.
Amorphous grains and small masses.
Well formed crystals up to 3 cm.
Crystals columnar to acicular, elongated, striated on prism faces; tangled fibrous aggregates and radial-fibrous aggregates of
Single crystals pseudotetrahedral, commonly twinned, presenting characteristic cross-like appearance.
Crystals lath-like or bladed and as short to slender prisms striated in direction of elongation; massive, granular, twinning.
Massive; as radial aggregates.
Powdery crusts.
Reniform nodular masses.
0.3 To 0.5mm square to rectangular to hexagonal crystals with inclusions in microlite or as veinlets in microlite.
Fibrous and scaley aggregates.
Columnar, tabular, needle-shaped, rhombohedral, scalenohedral crystals, rich in planes; in druses; coarse to fine-grained, spa

Massive.

Hair-like efflorescences.
Prismatic crystals, platy aggregates.

Prismatic crystals.

Crystals platy; plates commonly twinned, compound; single crystals do not exceed 1.0mm in maximum dimension.
Minute pyramidal crystals.
Tabular, columnar, short acicular crystals; compact, crusty, earthy, massive, encrustations.
Spherules and sheaves of scaly crystals that are subparallel on the perfect basal cleavage.
Single crystals prismatic with faces, small (not more than 0.5mm) pseudo-isometric grains with many faces composed of twinn
Tufted aggregates of lath-like crystals, elongated, flattened, twinned.
Crystals prismatic, elongated, tabular, usually in clusters.
Grains up to 3.0cm in diameter; polysynthetic twinning; twin plane at an angle of 8_ to the less perfect cleavage.
Fibres up to 1mm in rosette-like aggregates; fibres are thin and elongated.
Crystals prismatic, rare; usually massive; lamellar twinning rare.
Crystals usually octahedral; twinning common; spinel twins.
Thin leafy blades; often striated parallel to elongation.
Crystals prismatic; main forms are hexagonal prism and dipyramid.
Crystals imperfect hexagonal prisms with hexagonal pyramid and large basal pinacoid; as crystalline incrustation; crystals ma
Acicular crystals.

Crystals 0.5-3.0mm long, resembling steep rhombohedrons.
Tiny grains.
Pseudohexagonal.
Elongated platelets, fibrous aggregates, acicular crystals.
Well-formed hexagonal prisms; granular massive; globular or reniform; stalactitic; fibrous; oolitic; earthy; as nodular concretio
Crystals short to long prismatic with pyramidal or pinacoidal terminations, sometimes acicular; granular massive; globular or re
Massive.
Botryoidal crusts and tiny sprays of well-formed crystals.
Tufts and bundles of crystals up to 2mm that are elongated and flattened, twinned.
Subhedral to anhedral, 0.005 to 0.5mm, grains with some showing poorly defined rhombohedral and tabular forms.
Flexible fibers several centimetres long.
Minute oriented platelets in kamacite, and as grain boundary precipitates a few microns in diameter.
Crystals usually minute, sometimes up to 1cm long, lath-like, elongated and flattened; as tufted aggregates, radial-fibrous sph
Compact, thick-tabular crystals, coarsely-granular masses, fibrous.
Lamellar crystals, tabular; flabelliform agg.; earthy, powdery, reniform, botryoidal coatings.
Small cubic crystals.
Capillary, fine-fibrous, fibrous bunches, entangled agg.; compact, radiate.
Spherules.
Crystals usually octahedral; commonly massive; compact to granular; twinning.

Massive in compact fibrous aggregates; rosettes of plate-like crystals.
Platelets elongated and flattened; crystals are up to 0.2mm in maximum dimension.
Thin crusts and small spherules, finely fibrous.
Short columnar, pointed-pyramidal, needle-shaped crystals; penetration twins, compact, reniform, shelled, granular, fibrous, m
Anhedral grains from 0.1 to 1mm.
Crystals usually thin hexagonal plates; sometimes with small prism and pyramid faces; also as lamellar masses; twinning com
Massive; as granular intergrowths with other sulfides.
Crystals prismatic, elongated, with dome terminations, often as spherulitic rosettes up to 5mm in diameter.
As coatings, stains and stalactites up to 1 cm long. Rarely as prismatic crystals.
Granular aggregates and tabular grains.
Fibrous.
As granular masses up to 3cm, rarely as crystals up to 3mm long.
Earthy or micaeous scales.
Crystals usually thin to thick tabular, resembling barite, or elongated into lath-like shapes; less commonly equant or pyramidal
Crystals short prismatic with prominent prism faces; also massive, cleavable; carlsbad, manebach and baveno twinning comm
Minute octahedral crystals.

Octahedral crystals.
Pseudo-octahedral crystals up to 7 mm across. Massive or granular.
Anhedral to subhedral grains, intergrown with kesterite.
Crystals bladed, up to 100 microns long, as radiating groups, twinning.
Massive, compact, claylike; as concretions up to 10cm in diameter.
Columnar, tabular, acicular crystals; often twins, cruciform or radiate arrangements, compact,reniform, massive, tabular.
Massive; fine grained.

Crystals up to 0.5mm elongated.
Platy crystals, rossettes.
Cube-shaped, rhombohedral crystals; penetration twins, only in druses; no agg.

Tabular, short-columnar crystals; crusty, reniform, fibrous, granular, scaly, massive, as efflorescences.
Fine fibrous, reniform, botryoidal, mammilliform, crusts, nodules, concretions.
Crystals thin triangular plates, commonly twinned; in spherules; also microcrystalline to fibrous.
Thick tabular, short-columnar, needle-shaped crystals; compact, massive, finely granular, disseminated, earthy, encrustations
Usually as slightly elongated tabular crystals.
Crystals minute, prismatic, also acicular; prism faces commonly rounded or striated.
Fine-grained crusts; crystals are small laths or pseudohexagonal plates.
Commonly tabular, drusy crusts, platy.
Thin-tabular crystals; in druses, also lamellar agg.; massive.
Isometric crystals; octahedral and tetrahedral; often striated; compact, reniform, finely granular, massive.
Crystals short prismatic; as crusts or sheaf-like groups of distinct crystals.
Crystals prismatic, flattened, striated parallel to elongation; also massive, granular, twinning.
Lamellar aggregates up to 3 x 2 x 0.5cm in size; polysynthetic twinning noted under the microscope.
Fibrous, capillary, acicular crystals; bunchy, interlacing.
Subhedral to euhedral crystls ranging from less than 1mm to 1.2cm on edge; dominant form is the positive tetrahedron.

Massive, granular, compact, oolitic, concentrically shelled.
Small tabular crystals; sometimes as spherules up to 5mm.
Anhedral 0.1 - 0.3mm grains.
Thin lamellae, alternating with graphite and perpendicular to the face of graphite.
Lath-shaped crystals; compact masses; powdery.
Hexagonal crystals.
Massive.
Rounded grains.
Crystals flattened long prismatic, less than 15mm long.
Massive; compact earthy to opaline.
1.5Mm prismatic crystals elongated.
Masses up to 5cm across.
Observed only in polished section as individual grains included in ferronickel platinum.

Crystals prismatic, mostly about 0.25mm long, maximum 0.65mm long; occasional narrow rough faces.

Crystals from less than 1mm to several centimetres; also as pseudomorphs after francevillite.
Thin square or rectangual plates up to 0.03 mm.
Pencil-shaped prisms, occasionally twinned. Usually as irregular masses up to 10 cm in size.
Platy, spear-shaped crystals, flattened, elongated.
Equant or pyramidal crystals; short prismatic; platy. Often doubly terminated. Twinned.
Crystals dipyramdal, very minute; rare; commonly as embedded masses.
Crystals subhedral; usually massive, in segregations up to 12cm in diameter.
Crystals rhombohedral; as crystalline crusts and stalactites; deliquescent.
Crystals short to long prismatic.
Compact, cubic, octahedral, crystals, horny crusts, as impregnations.
Tabular crystals, pseudohexagonal. Usually massive, foliated or as thin scales. Twinning common often lamellar.
Aggregates of hexagonal dipyramids.
Crystals rhombohedrons, sometimes in parallel groups.
Needles and matted fibres.
Crystalline encrustations.
Bladed crystals, up to 3cm long, 1cm across, 1mm thick, elongated, flattened; in subparallel groupings.
Octahedral crystals up to 2mm.

Small, short columnar crystals; disseminated, rounded grains, compact, granular.
Subhedral to anhedral grains up to 1mm that may exhibit a bladed or flattened habit.
Finely crystalline.
Pyramidal.
Octahedral crystals; massive, granular, compact, disseminated.

Tabular, pseudohexagonal triplets, striated.
Cryptocrystaline, compact, reniform, botryoidal, massive, earthy, as crusts or encrustations.
Massive, reniform, shelled, disseminated, cryptocrystalline.
Crystals up to 0.5cm in size.

Crystals range from less than 0.5mm to 1cm in size.
Crystals minute, lath-like, elongated, flattened; fan-shaped aggregates or rosettes, as crusts; as spherulites with radial-fibrous

Thin to thick - tabular, cube-shaped, short-columnar, polymorphous crystals; granular, massive, compact, fibrous, earthy, dis
Columnar crystals and druses.

Spherules.
Platy crystals.
No crystals; only compact, finely granular.
Small octahedrons up to 0.2mm.

0.2 To 0.6mm long prismatic crystals that are elongated and striated parallel to c.
Thick-tabular, columnar crystals; often distorted; flakes; lamellar agg.; as dusty crusts, earthy, powdery.
Massive; bladed.
Crystals elongated and tabular; rhombohedral in aspect; isolated crystals, druses, grouped into rosettes.
Crystals short prismatic or tabular; massive, lamellar, twinning common.
Crystals needle-like, minute.
Crystals usually prismatic or tabular, wedge shaped; commonly massive, granular, lamellar aggregates.
Long prismatic.
Crystals varied, usually highly modified, twinning common, lamellar.
Intergrowths in anthophyllite and cummingtonite.
Polysynthetically twinned crystals to 2 mm.

Platy crystals.
Massive.

Long-columnar, thick tabular crystals; often twinned.
Crystals tabular, pseudohexagonal; massive, foliated, or lamellar radiate; twinning.
Platelets 0.1 to 0.2mm in size; aggregates of granular to elongate grains; bundles of fibres up to 5.Mm in length.

Exsolved lamellae and minute crystals, rarely exceeding 4mm in diameter; massive, fine-grained.

Crystals usually having isometric forms such as cubes, octahedrons, pyritohedrons, or combinations of cube and pyritohedron

Minute crystals, resembling erythrite; as crystalline crusts.

Aggreagates of microcrystalline grains.
As minutely crystalline or fibrous crusts, veinlets and botryoidal aggregates.
Irregular grains; synthetic crystals have simple gypsum-like forms, flattened, elongated.
As extremely fine particles; or botryoidal masses.
Elongate tabular crystals.
Short- to long- columnar, tabular crystals, compact, granular, lamellar, massive.
Crystals short prismatic to thin tabular; often in bundles, radiating outward in sheaf-like aggregates; sometimes doubly termina
Massive, granular.
Anhedral grains up to 1cm.
(Ferrocolumbite) thick tabular, short columnar crystals; compact, embedded.
Usually massive; crystals tetrahedral, modified.
Crystals pseudohexagonal plates; curved, radial arranged scales or spherulites measuring from a fraction of a millimetre 3-4 r
Poorly developed stout hexagonal prisms a few tenths of a millimetre in length.

Crystals minute, flattened, twinning common.
Massive, fine grained.
Crystals equant to short prismatic; commonly botryoidal to reniform crusts and masses with radial-fibrous structure.
Radiated groups of acicular crystals, felt-like aggregates; striated in direction of elongation.
Crystals pseudohexagonal plates; curved, radial arranged scales or spherulites measuring from a fraction of a millimetre to 3-
Irregular grains or distorted crystal fragments.
Thin tabular crystals; granular; as crusts.
Octahedral, cube-shaped, tabular crystals; strongly distorted, dendritic, filiform, platy, mossy, ramifying, arborescent, compact
Crystals short prismatic, up to 15mm long, large basal pinacoids and small unequally developed pyramidal faces; pyramidal; r
Minute grains.
Short-columnar, platy crystals; mostly compact, granular, embedded.
Crystals minute, short prismatic with hexagonal dipyramidal terminations; sometimes sceptre-shaped like quartz.
Crystals, rhombohedral, commonly pseudocubic; loosely coherent fine-granular aggregates.
Crystals short prismatic to equant, often rounded, crusts of minute crystals.
Fibrous, massive, porcelaneous.
Fine needle-shaped spherulites; reniform, shelled agg.
Mammilliform, reniform, botryoidal masses; concentrically shelled agg.
Short columnar, fusiform, thick tabular crystals; granular, compact, massive.
Crystals prismatic, commonly elongated to needle-like and capillary forms; often massive, dense, or radiating prismatic, fibrou
Massive; lamellae up to 0.2 x 1.4mm in size.
Usually massive, granular; crystals often flattened, elongated.
Subhedral crystals.
Thin-tabular, foliaceous crystals; mostly compact, finely foliaceous, massive, nodular, platy, powdery.
Bladed crystals up to 0.3mm in length, 0.1mm in width.
Grains up to 0.4mm.
Crystals minute trigonal or pseudotrigonal prisms, rosettes of fibres; commonly massive, nodular masses or spherules with fib
0.05 X 0.5 mm fibres in spherules or as matted aggregates.
Thin, six-sided plates in radiating hemispherical, or spherulitic groupings; earthy coatings.
Crystals short prismatic to acicular; as sprays or cluster; radiated aggregates, as drusy knobby masses, embedded crystals a
Thick tabular crystals.
Crystals usually pseudo-octahedral, rarely pseudocubic, under 4mm in size; massive, stalactitic, spherulitic, crusts and botryo
Fibrous aggregates.
Long-columnar to needle-shaped crystals, sometimes hollow showing longitudinal striation, in druses, also compact.
Pyramidal; globular clusters, fibrous.
Massive, compact.

Prismatic; lathlike; commonly massive, fibrous or granular.
Compact, pseudocubic, short-columnar crystals, granular, spathic, massive.
Crystals dodecahedral, up to 17cm in size.
Massive, crusts or masses with mammillary surface; arborescent; synthetic crystals cubo-octahedral or octahedral.
Massive, fine-grained, often loosely aggregated or porous; less commonly compact and cleavable; botryoidal or radial-fibrous
Columnar trigonal crystals up to 0.05 mm in length.
Crystals thick tabular, elongated, striated, usually massive, twinning common.
Crystals octahedral or cubo-octahedral; parallel overgrowths on bol_ite and pseudobol_ite crystals, sometimes giving regular
Fibrous.
Myrmekitic and dendritic droplike grains.
Octahedral, cubic, dodecahedral crystals; compact, masive granular, earthy, disseminated.
Very thin blades measuring about 1mm in greatest dimension; characteristically show a slight twisting about an axis parallel to
Tabular crystals; granular or as crusts.

Crystals tabular.
Needle-shaped, thick-lamellar crystals; radiating agg.; crusty earthy, powdery, as coatings.
Massive; irregular grains up to about 0.1mm in diameter.
Massive; as fine-grained aggregates.
Massive, as crusts.
Crystals up to 3mm, polysynthetic twinning common.
Microcrystalline powder.
Columnar, needle-shaped crystals; mostly compact, granular, massive, acicular, compact.
Crystals spear-shaped, very small; commonly massive, fine granular, twinning, lamellar.

Crystals tabular; crystalline crusts.

As coatings and spherulitic aggregates.
Fine-fibrous, capillary crystals; bunchy, globular agg.; velvety crusts.
Lamellar-cylindrical, shelly agg.; cylindrical bunches, spheroidal.
Crystals hexagonal prisms up to 1mm long, crude hexagonal plates up to 7mm in diameter; massive, fibrous.
Crystals squat; individual crystals usually less than 0.1mm; often in intergrown aggregates.
Prismatic crystals, always twinned, often cyclic.
Massive.
Short prismatic crystals 0.05 to 0.5mm in size, twinning.
Crystals octahedral or dodecahedral, up to 10cm along edge; massive, granular.
0.05 To 0.2mm botryoidal and spherulitic aggregates and as rims around chromium.
Columnar crystals; granular, compact.
Fibrous of fibro-lamellar.
Tabular 0.2 to 0.3mm grains.
Rhombohedral crystals with rounded edges.
Massive.
Crystals long prismatic; thin tabular, elongated; largest single crystals are 1-2cm long and 3-4mm thick; platy to granular mate

Thick-tabular, short-columnar crystals, compact, granular, reniform, massive, crusty.
Massive, earthy.
Massive, scaly to platy.
Pseudohexagonal grains up to 5mm in diameter.

Massive, as rough cuboidal crystals and as distinct pyramidal crystals.
Long fibres, fibrous masses.
Prismatic crystals often vertically striated.
Crystals acicular to blade-like; radial encrustations and sprays of needle-like crystals.
Acicular crystals.
As fan shaped crystals.
Crystals tabular to equant, usually massive, botryoidal, spherulitic, twinning, contact twins.
Platy crystals.
Intimate intergrowths with metadelrioite forming radial aggregates of fibrous acicular crystals; twinning.
Reniform nodules, globular and masses.
Dodecahedral or trapezohedral crystals, massive, compact.
Crystals elongated, flattened.
Parallel columnar aggregates up to 10-15cm across composed of acicular individuals.
Small euhedral crystals, which are thin plates, octagonal in outline.
Prismatic crystals, often with numerous, commonly forms cruciform twins, rarely as trillings.
Euhedral crystals up to 0.7mm, elongated, flattened.

Platy hexagonal crystals flattened.
Columnar, pyramidal, tabular crystals; radiate agg.; crusty, botryoidal, mammillary, coatings.
Aggregates of hexagonal prisms up to 0.5mm long.
Thin, lamellar and needle-shaped crystals; flabelliform, rose-shaped agg.
Microscopic tablets flattened, striated. Also very fine-grained, compact.
Crystals tabular with square outline, aggregates of thin plates; massive, finely crystalline.
Gel-like and amorphous; botryoidal.
Octahedral, cube-shaped, dodecahedral crystals; often bulbous and striated faces.
Crystals prismatic, sometimes complex; striated parallel to elongation, twinning.
Tabular, wide-columnar, foliaceous, acicular crystals; compact, lamellar, radial, scaly.
Tabular crystals, pseudorhombohedral; traingular striations. Micaceous.
Crystals thin tabular, pseudohexagonal, minute; often in piles of stacked platelets; massive, compact, friable, mealy; twinning
Minute elongated tabular crystals, usually columnar or as fibrous crusts.
Distinct crystals rare, usually massive.
Crystals dipyramidal, usually in groups of minute parallel individuals.
Short-columnar, needle-shaped crystals; compact, granular, tabular, shelled, massive.
Short-columnar crystals; in druses; massive agg.
Minute crystals.
Massive.
Tiny grains, 0.02 - 0.4mm in diameter.
Crystals short prismatic or thick tabular, compact massive, twinning common.
Minute, elongated, somewhat tabular crystals, often striated parallel to elongation.
Coarsely to finely granular, rhombohedral crystals; often curved faces on crystals, saddle-shaped; spathic, massive.
Crystals very minute; maximum size 0.1mm; massive with radiating botryoidal structure; lamellar twinning practically universa
Massive; botryoidal or reniform.
Massive, commonly twinned, strongly magnetic.
Crystals platy, tabular, saucer-shaped, columnar, barrel-shaped, some are hemimorphic; crystals are from 0.005 to 2mm in si
1-3Mm interlocking grains.

Massive; granular.
Acicular prismatic crystals up to 2cm with very steep pyramidal terminations.

Crystals tabular.
Long columnar, longitudinally striated, embedded crystals.
Spherical aggregates of tapering fibres elongated.
Plates up to 0.5mm in diameter.
Bunched aggregates composed of platy crystals up to 0.2mm.
Granular massive.
Botryoidal crusts with radial fibrous structure; massive.
Crystals tabular and somewhat elongated; sometimes striated parallel to elongation, twinning.
Crystals minute with rough rounded faces; crusts and aggregates.
Slightly curved stubby prismatic crystals up to 0.3mm.
Crystals up to 0.4mm in maximum dimension, free standing or in barrel-shaped bundles.
Minute crystals elongated, flattened, striated.
In compact pieces, thin-columnar, needle-shaped, parallel-fibrous.
Small rounded aggregates of radiating crystals, matted crusts.
Crystals oblique pyramidal; prismatic elongated.
Tiny grains.
As crusts or as rosettes of minute flattened crystals.
Six-sided platy crystals, flattened, pseudo-orthorhombic in aspect; crusts and coatings; crystals range from extremely minute
Aggregates of very fine-grained particles.
Globular.
Crystals pyramidal, commonly massive, granular, foliated, twinning, forming hexagonal aggregates.
Small grains, alteration product of indite.
Elongated prismatic crystals up to 5mm in length; prism zone striated.
Knobby, fine-grained nodules.
Radial aggregates.
Small tabular crystals, coarsely foliated masses, thin encrustations.

Fan-shaped aggregates of needle-like crystals up to 1.5cm long and as granular fracture-fillings.
Short prismatic; fibrous.
Prismatic crystals up to 12mm with pyramidal terminations, massive, lamellar twinning, penetration twins.

Crystals dodecahedral, striated parallel to the edges; cubic or octahedral; massive, crusts, sometimes hair-like.
Tabular, crystals up to 2 x 2 x 0.1mm, often aggregates; crystals twinned.
Platy to prismatic crystals to 1mm.
Crystals rhombohedral, up to 17mm in size.
Predominantly as anhedral grains and pebbles; crystals stubby, tetragonal bipyramids up to 3mm.
Foliated masses of hexagonal crystals.
Crystals short to long prismatic, vertically striated; also acicular, rarely flattened as thin tablets; 3-, 6- or 9-sided; hemimorphic
Rhombohedral, anhedral to irregular 0.2 to 1.3mm grains.
Massive, rarely as indistinct crystals.
Crystals thin prismatic, vertically striated, up to 9 x 1.5cm in size, fine-fibrous in fan-shaped aggregates.
Crystals prismatic to fibrous; radiating sprays or tufts, sometimes matted; mirror twinning common, non-repetitive.
Drusy crystalline crusts composed of minute tabular crystals with the plane of flattening approximately normal to the surface o
Hexagonal, short columnar, thick tabular crystals.
Compact microcrystalline masses, fibrous crusts, patches of minute acicular crystals, thin scaly coatings.
Crystals short prismatic, flattened, striated vertically.
Compact granular masses.
Crystals commonly prismatic and terminated by basal pinacoids, tabular, prism zone striated parallel, massive, granular or pri
Tabular, ultramicroscopic in size, compact to mealy masses.

As aggregates and layers of curved and composite crystals.
Crystals short to long prismatic; flattened; coarse radial aggregates; twinning by reflection.
Crystals indistinct; up to 13mm in diameter and 10mm in length; small flakes up to 5mm across.
Crystals tabular, up to 2 x 2 x 0.5cm; finely crystalline to cryptocrystalline; coarsely crystalline-micaceous; spherulitic with radi
Columnar, acicular, transversely striated crystals; compact, platy, radial, bunchy agg.; granular to massive.
Crystals prismatic, always twinned; radiated spherical aggregates; granular; twinning common, cruciform interpenetrant twins.
Crystals rectangular plates, up to 1mm thick and 2cm long, thin lamellar aggregates.
Needle-shaped, crystals, fibrous agg., earthy crusts.
Small clusters of minute, prismatic fibres.
Pseudocubic crystals, up to 4 mm. Often zoned.
Massive; embedded plates up to 2cm in diameter.
Wool-like aggregates; somewhat flattened aggregates of small crystals elongated, centre of aggregates composed of bent, de
Prismatic, in radiating groups. Usually finely fibrous.
As 1-2 cm lathlike aggregates.
Massive; minute grains.
Radiating aggregates.
Grains up to 0.5mm.
Needle-shaped, scaly, lamellar crystals; in bunchy, stellate clusters; earthy encrustations.
Crystals tabular, flattened.
Crystals tabular, up to 1mm in size; usually as microscopic embedded grains.

Crystals long prismatic to thick platy.
Massive, coarse granular.

As 2 to 8 mm long prismatic crystals.
Flattened hexagonal dipyramids, prismatic, usually without terminal faces, occasionally terminated by rhombohedral faces, als
Crystals, granules.
Slightly elongated rectangula tablets. As encrustations.
Short-columnar, thick-tabular, vertically striated crystals; striated crystals; crusts, druses.
Crystals commonly long prismatic; also short and stout prismatic.
Single euhedral crystals up to 3 x 2 x 2cm in size; usually in massive granular aggregates.
Crystals thick to thin tabular of hexagonal or trigonal habit, short to long prismatic, rhombohedral.
Tabular crystals, frequent twin striation.
Thin fibers.
Crystals tetrahedral, minute; also in spherical forms.
Prismatic, tabular crystals; flabelliform agg.; granular.
Shelly, globular, reniform, botryoidal structure.
Tabular or sheaf-like crystals.
Pseudohexagonal tabular crystals.

Massive.
Crystals elongated and terminated by three major faces, crystals up to 0.5mm in length, cleavable masses with bladed fibrous

Prismatic crystals 0.3 - 25mm in size.
Tufts, rosettes, botryoidal masses of fibres, fibres elongated and parallel; individual fibres average about 0.08mm in length an
Thin crusts of crystals.
Microscopic hexagonal plates flattened.
Crystals prismatic to equant; usually lamellar, foliated, fibrous; in radiating masses.
Fibrous.

Massive, fine-grained, more rarely coarse-grained; crystals distinct equant, rare; usually rough with some or all faces curved a
Massive.
Crystals octahedral, twinning common.
Massive, compact.
Thick tabular, short columnar crystals; granular, massive.
Pseudohexagonal tabular crystals.
Fibrous, polysynthetic twinning.

Crystals commonly wedge-shaped; short prismatic, flattened, striated; groups of bladed cyrstals, massive; twinning common.
Grains 0.1-3mm in size; serrated, specular, dendritic with only traces of crystal form.
Columnar, bi-pyramidal crystals; granular, compact.
Euhedral crystals occasionally with bipyramidal terminations.
As irregular grains.

Massive, granular.

Flaky tabular grains; massive.

Crystals thin tabular; in radiating groups.

Subhedral crystallites, tabular to lozenge-shaped crystals to 0.6 mm.
Microcrystalline;.
Crystals short prismatic, cleavable masses; cryptocrystalline; fibrous aggregates; isolated crystals or radiated groups.
Massive.
Crystals dipyramidal, some exhibiting prismatic faces; commonly in small fibres; ocherous powder lining cavities; single fragm
Long bladed crystals; usually fibrous; also massive.

Usually massive, rarely prismatic crystals.
Fibrous to platy crystals.
Massive.
Prismatic crystals, elongated, parallel, aggregates of parallel fibres up to 1cm in length.
Crystals thin to thick tabular, short prismatic, equant; less commonly pyramidal; aggregates of parallel to divergent crystals; m
Usually massive,.
Massive, fibrous; rare prismatic crystals.
Fine acicular and capillary crystals, up to 5-6mm in length, fibrous, unstable in the atmosphere.
Pseudohexagonal, short columnar to acicular crystals; compact, tabular, fibrous, radiating, granular, massive.

Short to long prismatic. Massive. Twinning common.
Long prismatic crystals.
Crystals prismatic; 0.2 - 0.5mm long and up to 0.1mm in cross section, commonly striated longitudinally, penetration twinning

Crystals thin to thick tabular, short prismatic, equant; less commonly pyramidal; large aggregates of parallel to divergent cryst

Small 0.5 to 1mm grains.

Massive; crude crystals.
Crystals minute, tabular; dense crusts.
Grains 0.1 - 3mm in size; serrated, specular, dendritic with only traces of crystal form.
Pseudotetragonal crystals.
Euhedral prismatic crystals. Prism faces striated.
Crusts and masses composed of fine fibres; radial-fibrous, botryoidal, commonly as trillings.
Crystals small, lathlike; tabular, elongated, twinning common.
Crystals pseudorhombohedral; granular crystalline masses.
Anhedral to euhedral crystals.
Crystals small, prismatic, as crusts.
Massive; in xenomorphic grains.
Crystals prismatic, deeply striated, without terminal faces.
Minute prisms.
Fibrous aggregates.
Microscopic grains.
Feathery aggregates of thin, tabular, slightly elongated crystals.
Small rhombohedral or pseudocubic crystals, and as rounded grains.
As rhombic, pseudocubic crystals.
Radiating prismatic crystals.
Crystals small, dipyramidal.
Crystals prismatic, up to 5 x 1mm in size; subparallel or divergent aggregates of prismatic crystals; compact fibrous masses o
Crystals prismatic, elongated, tabular, massive, coarsely granular.
Platy to tabular 0.1 to 7cm crystals.
Crystals short to long prismatic or thin to thick tabular, often complex; massive, compact to coarse granular; globular or renifo
Crystals commonly pseudocubic; tabular, pyramidal, or long and squar prismatic; prism faces vertically striated, often brilliant;

Cubic, octahedral crystals, coarsely to finely granular, spathic, massive, compact, radial, striated.
Balls and radial aggregates of platy, less than 0.2mm crystals; crystals are thin tabular, parallel.

Irregular masses or grains.
Prismatic crystals.
Thick-tabular, prismatic, short-columnar crystals; granular, massive, nodular.
Compact fibrous.
Crystals tabular, pseudohexagonal; microscopic up to 2mm in length; compact crystalline masses.
Massive.
Crystal plates several millimetres in thickness; as impregnations; and as cryptocrystalline veinlets.
Irregular grains up to 1mm.
Crystals thin tabular; somewhat elongated; vertically striated; often bent or warped; often in spherical aggregates; usually mas
Nodular earthy aggregates.
Globules.
Well-formed crystals from 0.1 to 4mm across.
Octahedral crystals; compact, granular, massive.
Composite crystals 0.2 to 3mm, arrowhead-shaped aggregates, crystals tabular.
Stubby prisms.
Massive; embedded grains.

As aggregates with radial texture.
Tetrahedral, cubic, dodecahedral crystals; compact, granular, disseminated, massive.
Crystals prismatic, vertically striated, twinning.

Subhedral to euhedral crystals elongated slightly; grain size of crystals range from less than 0.1mm to 3mm; aggregates of gr
Small xenomorphic grains averaging 0.15mm long, 0.05mm thick.
Tabular crystals; as slender needles; massive and as fibrous aggregates.
Isolated crystals or granular aggregates from 0.2mm to 1.5mm.
Platy crystals.
Massive, minute embedded grains.
As botryoidal crusts and masses with radial fibrous or fine coloumnar structure.
Tiny grains.
Flaky crystals up to 0.2mm in length.
Minute grains.
Crystals commonly short prismatic and pyramidal, rarely thick tabular, striated, often curved.
Tabular crystals.
Submicroscopic grains.
Aggregates and masses of crude, rounded, crystals of indeterminate morphology.
Thick tabular, short columnar crystals; compact, massive, embedded.
Crystals often prismatic; sometimes flattened; usually rough and coarse; commonly massive, compact.

Massive; cryptocrystalline and crystalline.
Acicular crystals; as fibres and bundles, and in radial aggregates.
Crystals usually octahedral, sometimes modified; rarely cubic or dodecahedral; massive, coarse granular to compact, or as ro
Crystals bladed, elongated, twinning common.
Simple tetragonal bipyramids up to 1mm.
Coatings and crystals up to 1mm in maximum dimension.
Massive; fine granular.
Small nodular aggregates of crystals up to 1mm in diameter; crystals hexagonal, barrel-shaped, rarely tabular, and a rhombol
Cubo-octahedral crystals; compact, granular, massive, disseminated, reticulated, platy.
Crystals lath-like, extremely thin platelets or acicular; frequently twisted or bent; vertically striated; massive, compact, fibrous t
As aggregates and as euhedral crystals up to 1 cm.
Massive; minute embedded grains and as exsolution lamellae.
Prismatic crystals. Also as aggregates of needles up to 1 cm or more.
Crystals prismatic or tabular; usually massive, granular or as curved plates.
Tabular or short prismatic crystals; micaeous.
Microscopic grains.
Crystals have four-sided bipyramidal shape; faces striated by alternation of prism and pyramid.
Powdery crusts of minute platy crystals.
As plates flattened and as crystals elongated and parallel.
Rhombohedral crystals up to 0.5mm in length.
Radiating clusters of bladed crystals up to 0.1 mm long.
Sheaves and rosette-like aggregates up to 3 - 10mm in diameter with a radial fibrous structure.
Acicular to stubby hexagonal prisms up to 5 cm long with pyramidal terminations.
Columnar, tabular crystals, rough planes, uneven.
Massive chalk-like.
Acicular crystals up to 2mm in length.
Long columnar, needle-shaped, tabular, fibrous, lamellar, radial.

Crystals usually short prismatic; commonly massive, granular; twinning.
Crystals short prismatic, up to 6-7mm in diameter; embedded grains.
Irregular grains.

Crystals tetrahedral, up to 4.0 x 5.5cm in size; rounded aggregates up to 25cm in diameter.
Crystals tabular, up to 9cm long; usually massive, granular, earthy; twinning common, lamellar.
Orthorhombic crystals from 0.25 to 1mm in size; commonly twinned.
Pulverulent coatings.
Stubby pseudohexagonal tablets with platy structure; lamellar twinning; grooved and striated.
Crystals thick tabular, pyramid zone striated.
Massive.
Crystals octahedral, cubo-octahedral, or pyritohedral; faces commonly striated like pyrite; massive, granular and lamellar.
As groups of small plates; granular; fibrous spherules.
Bunched prismatic crystals forming mats and sprays; individual crystals are up to 2 x 2 x 10mm, not terminated.
Equant subhedral crystals less than 0.5mm in diameter; anhedral grains up to 4mm in maximum dimension.
Tiny grains.
Rosettes of flattened subhedral crystals, rarely as well-formed, 0.2 - 1mm in diameter octahedral crystals.
Crystals tabular, hexagonal in aspect, up to several inches long; massive; chalcedony-like coatings and crusts, stalactitic, con
As fine needles.
As spherules of radial fibres up to 0.2mm or more in length.
Massive, compact, embedded grains.
As euhedral crystals up to 0.5 x 0.2 x 0.05mm.
Rhomb-shaped plates; also as dense masses and small pellets.
Microscopic grains.
As dense chalky spherules up to 3mm in diameter.
Crystals pseudotetragonal bipyramids produced by twinning.
Fibrous to radiating masses with fibres up to 0.1mm in length.

Crystals prismatic; up to 2cm long and 2-6mm thick.
Compact, tabular, columnar crystals, in druses, coarse spathic, reniform, earthy.
Crystals long prismatic, single or in compound aggregates; rarely massive, coarse to fine granular; twinning, penetration and
Crystals short prismatic, striated in the prism zone; massive; twinning; as trillings or cruciform twins.
Massive with radial fibrous structure.
Latlike crystals.
Crystals usually slender prismatic; massive, fibrous, columnar or granular; twinning, simple; lamellar.
Spherules composed of fibres elongated.
Crystals with distorted pyramidal forms.
Crystals pyramidal, tabular, or rhombohedral in aspect; striated vertically; penetration twins common.
Clusters of lath-shaped, fibrous crystals; twinning.
Aggregates and single grains up to 1mm, rarely more than 0.3mm in size; twinning common and often complex, sometimes fo
Warped, lozenge-shaped, tabular crystals up to 1mm.
Compact, earthy, foliaceous, mammilliform, needle-shaped crystals, lamellar.
Sheets, plates, grains, compact, dendritic skeleta; rarely octahedral, cube-like, dodecahedral crystals; feather-shaped, arbore
Fine granular aggregates.
Crystals commonly singly terminated prismatic laths flattened parallel; radiating clusters of crystals and fine-grained crystalline
Dodecahedral crystals rarely exceeding 0.1mm and averaging 0.02mm in diameter; usually anhedral.
Massive, fibrous; in spherules with radiating structure.
Radial aggregates of laths and plates. Tiny pseudohexagonal plates.
Polycrystalline aggregates and as imperfect single crystals up to 2mm in diameter.
Botryoidal, radial-fibrous aggregates and as grains and pebbles.
Crystals rare, minute, prismatic to platy; vertically striated; usually as sheaf-like aggregates.
Crystals thin tabular.
Elongate crystls up to 3mm in maximum dimension in radial aggregates and as blade-like crystals.

Tiny grains showing lamellar twinning.
Massive, granular or fibrous; stalactitic and efflorescent crusts; synthetic crystals stout; prismatic.
Prismatic crystals up to 0.5 mm long.
Hairlike
Crystals long prismatic to needlelike; grouped in radiating globular clusters; average crystals are 0.8mm in length by 0.06mm
Crystals small, rhombohedral, pseudocubic, tabular; rhombohedral faces commonly striated horizontally; rounded grains or pe
Crystals up to 8mm.
Massive
Elongated crystals.
Microscopic bladed crystals.
Thin tabular crystals; lamellar, scaly, compact, massive, earthy, disseminated, dendritic.
Crystals prismatic; large, massive.
Massive, very fine grained, powdery.
Massive; as minute rounded granules usually between 0.1 to 1mm in diameter.
Massive, earthy, rarely short-columnar crystals; mostly as powdery.
Balls of intergrown octahedra with curved faces averaging 0.3mm on an edge; infrequently cubes; tiny grains; strongly magne
Intergrowths of 1mm tabular crystals.
Crusts of fine-grained aggregates, mostly of anhedral grains.
Massive.
Crystals up to 1mm, anhedral grains, lath-like crystals.
Crystals usually dodecahedrons or trapezohedrons; also in combination, or with hexoctahedron; massive, compact, fine or co
Crystals usually wedge or lens-shaped with rounded faces; striated, in dense groups; slender striated prisms.
Fibrous or fibrolamellar, often radiated; twinning very common, simple, lamellar.

Semicompact masses of striated acicular crystals; massive, with fine granular or fibrous texture.
Crusts admixed with other minerals.
Crystals prismatic, commonly twinned, producing butterfly and cruciform twins.
Spherulites and rosettes, rarely as single crystals 0.2 - 0.3mm long, acicular to wedge-shaped.
Isolated anhedral grains, polysynthetically twinned; composition plane parallel.
Crystals tabular.
Crystals short prismatic, pseudocubic, up to 5mm in width.
Tabular crystals and silky masses.
Very fine-grained; efflorescence; easily soluble in cold water.

Tabular grains, sometimes slightly bent; maximum grain size 2 x 2 x 0.5mm.
Massive.
Columnar, compact, coarse-fine grained, earthy, fibrous, massive, scaly.
Lamellar-radiate structure; massive.

As pseudo-octahedral crystals up to 1 mm.
Thin scales.

Massive.
Crystals very minute; as a phase intergrown on a fine scale in parallel orientation with doloresite; massive; finely crystalline.
Crystals rare; short prismatic or equant; fibrous or fine-grained botryoidal coatings.
Crystals needle-like, fractions of a millimeter in size; as spherulitic aggregates; also as single, flake-like grains.
Massive; xenomorphic grains up to 0.3mm in size.
Cube-shaped crystals; coarsely to finely granular, compact, spathic, fibrous, massive.
Crystals tabular; more or less elongated; length does not exceed 0.4mm.

Tabular; ultramicroscopic in size; compact to mealy masses.
Acicular crystals, fibrous.
Fine-grained masses; rarely as platy crystals 0.01 to 0.25mm in size.
Prismatic occasionally double terminated.
Crystals short prismatic to needle-like, without terminal faces; faces curved.
Crystal lath shaped with rounded faces showing characteristic epidote habit; striated vertically.
Tabular to short prismatic hexagonal crystals up to 3" in size, terminated by large basal pinacoids; crystals commonly interpen
Small thin prismatic crystals elongated and striated parallel; synthetic crystals tabular.
Massive.
Massive, granular, or as disseminated grains.
Simple octahedral crystals.
Thick-tabular, thick-columnar crystals; penetration twins.
Crystals stout prismatic, small.
Stubby, less than 1mm, doubly terminated crystals.
Prismatic crystals. Massive, simple lamellar twinning common.
Idiomorphic and radiating crystals; twinning observed.
Found as five small highly modified crystals deposited upon a crystal presumed to be rathite.
Pseudohexagonal crystals.
Crystals commonly tabular; also bipyramidal to short prismtic.
As euhedral crystals, tabular. Rossette clusters.
Crystals octahedral or cubo-octahedral, up to 2.5cm along the octahedral edge; globular aggregates.
Pseudooctahedral crystals; compact, granular, spathic.
Dodecahedral or octahedral crystals; compact, granular agg.
Fine-grained earthy coatings.
Massive; spiky plates a few microns across and up to a millimeter long.
Massive; twinning polysynthetic; observed in polished sections.
Massive, compact.
Massive, very fine-grained; claylike.
Prismatic, massive.
Massive, lamellar; plates up to 6mm wide.
Crystals prismatic; pyramidal to thick tabular; massive, coarse granular.
Microscopic grains.
Crystals steep, spearlike, crystals terminated (some doubly), up to 7cm long.
Crystals tabular; up to 1mm on a side, not more than 0.1mm thick.
Short to long columnar crystals; tabular agg.; loose grains, pebbles.
Acute pyramidal crystals; also tabular. Usually massive.
Tabular or prismatic crystals.
Fine-grained coatings.
Prismatic crystals.
Tetrahedral sometimes octahedral in aspect, rounded aggregates.
Rhombohedral, tabular, lamellar, scaly agg.; rose-shaped clusters, compact, granular, massive, earthy, mammillary, reniform
Thick tabular crystals.
Crystals thin tabular, flattened; lamellar aggregates.
Crystals exhibit triclinic hemihedral symmetry; commonly twinned; crystals vary in length from 0.2 to 10mm; average 0.5mm.
Tabular crystals; fan-shaped aggregates; mammillary, reniform agg., crusts, massive.
Microscopic grains.
Elongated, six-sided platy crystals; aggregates of subparallel to parallel microscopic fibres or blades.
Tabular or short prismatic.
Anhedral masses, rarely euhedral crystals up to 0.2mm.

Aggregates of small grains.
Anhedral grains 0.1 to 0.8 mm across.
Twinned crystals up to 0.4mm.
Massive; fine granular; embedded grains.
Crystals prismatic or tabular; commonly pseudo-orthorhombic in appearance; botryoidal crusts or aggregates with radial-fibro
Aggregates of hexagonal plates.
Massive, fine-grained.
Distorted, pseudocubic crystals; mostly compact, granular.
Crystals octahedral; commonly massive; twinning as fivelings.
Crystals minute, needlelike, hexagonal or pseudohexagonal cross section; massive, microcrystalline; botryoidal and mammilla
Pyramidal, needle-shaped, striated crystals; often distorted, fibrous, satiny agg.
Massive.
Tabular, lamellar, short-columnar, crystals, scaly, spathic, compact,.
Nodular aggregates and coatings of fibres, crystals well-developed laths elongated and flattened.
Crystals thick tabular, rare; usually coarse columnar to fibrous; twinning.
Flattened prismatic crystals up to 0.5mm in maximum dimension.

Crystals tabular, twinning.
Crystals elongated, flattened.
As hexagonal prisms flattened parallel to {0001} or in steep pyramids.
Massive; dense, porcelain-like; also porous or cavernous.
Stalactitic concretions; dense to spongy in texture; synthetic crystals cubo-octahedral and octahedral.
As 0.1 to 1mm crystals and aggregates.
Crystals tabular with pronounced hemimorphic aspect.
Crystals fibrous, radiating.

Spherical aggregates of acicular crystals up to 2mm.
Crystals pseudocubic, rhombohedral, or tabular, sometimes with rough or dull faces; also massive, granular.
Usually tabular crystals; polysynthetic twinning.
Massive; compact.
Grains less than 1mm in diameter.
Crystals varied in habit; usually acute pyramidal or stout prismatic; massive, granular.
Needle-shaped crystals less than 1mm in length, irregular grains, or fine-grained aggregates; rarely as vertically striated colur

Crystals thin to thick tabular, rare; minute embedded grains; twinning, sometimes repeated.
Crystals short prismatic, often with rounded faces; granular aggreages of subhedral crystals.
Thick tabular crystals.
Short prismatic crystals, terminated by a flat pyramid. Usually massive.
Minute grains.
Crystals slender prismatic or acicular, often vertically striated, up to 10cm long; massive, as radiating fibrous aggregates.
Irregular patches up to 0.5 x 1 cm.
Crystals prismatic, pseudohexagonal; also acicular.
Crystals usually tabular.
Well formed, 0.2 to 0.3mm cubo-octahedral crystals.
Irregular to massive, 0.1 to 0.5mm grains, dendritic aggregates, rarely as tarnished plates.
Small tabular and columnar crystals, compact, botryoidal masses.
Crystals prismatic, elongated, flattened, columnar, foliated.
Compact masses of tabular crystals.
Bladed crystals.

Crystals tabular, up to 1.0mm across, attached by one end of symmetry axis, compact nodular masses, chalk-like, earthy, sca
Trisoctahedral or dodecahedral crystals and granular masses.
Platy masses up to 10 x 5 x 1 cm.
Prismatic; tabular.
Crystals tabular, elongated, up to 2-3mm long; striated.
Crystals small, rectangular, with uneven faces; also as tabular masses.
Aggregates of thin, hexagonal-shaped crystals up to 0.2mm in diameter.
Elongated prismatic or playt crystals; rare; capillary or as crusts with fibrous structure; fine-granular to earthy and compact.
Short-columnar crystals.
Crystals elongated parallel to c-axis; thin veinlets and crusts.
Crystals euhedral, tabular to equant, up to 0.5mm, massive.
Compact, chalk-like masses; exceedingly fine-grained and fibrous; diameter of fibres generally less than 0.002mm; earthy.
Crystals short to long prismatic, up to 3.0cm long; also tabular or equant; crystals isolated or grouped; massive, compact, sca
Crystals stout prismatic, crystals range in size from 4 to 25 mm or more; faces delicately etched and exhibit striations.
Crystals prismatic to needle-like; radiating tufts.
Anhedral grains; 0.2mm in maximum dimension.
Crystals prismatic, orthorhombic in aspect; massive; twinning, carlsbad, baveno and manebach.
Massive.
As aggregates of blocky crystals.
Crystals long prismatic or acicular, elongated; massive, compact, fine-grained; radiating or columnar; lamellar-fibrous.
Massive.
Crystals thin to thick tabular, flattened, hexagonal outline, steep pyramidal.
Euhedral, colourless crystals up to 13mm.
Spheres and hemispheres up to 2mm in diameter consisting of radiating fibrous crystals.
Octahedral crystals; usually massive.
Massive; fibrous crusts with botryoidal surface.
Tiny hexagonal crystals.
Rosettes; radiating-columnar agg.; crusty, powdery.
Massive; as crusts.

Thin tabular or rhombohedral crystals. Also earthy, or reniform.
Massive; mealy crusts and disseminated crystalline particles; twinning polysynthetic, complex.
Thin crusts of minute crystals.
Massive.
Massive, foliated, lamellar or fibro-lamellar.
Crystals tabular, minute reticulated intergrowths, twinning polysynthetic, parallel to prism faces.
Small grains.
Well-formed, equant or tabular crystals up to 25mm, may be striated.
Columnar, hexagonal crystals; coarsely granular masses.
Reniform aggregates.
Massive; cleavable aggregates.
Crystals stout prismatic to thick tabular; pseudo-orthorhombic; botryoidal crusts or aggregates with radial fibrous structure; co
Massive, compact to earthy; as crusts, stalactitic, reniform, dense masses; crystals flattened, elongated laths, often tapering t

Crystals commonly minute plates or laths elongated, flattened; thick tabular, short-prismatic.
Very thin flattened six-rayed stellate snow crystals; skeletal hexagonal prisms; compact aggregates of long lath-like crystals o
Massive; lamellar.
Small irregular square or six-sided flakes; minute tabular crystals.
Massive.

Columnar-shaped skerries forming pillars reaching to within half a metre of the water surface.
Massive; as minute grains.
Crystalline aggregates; prismatic, often terminated by truncated pyramids.
Lamellar aggregates, up to 15 x 10 x 3 mm.
Massive.
As granular deposits, crusts and minute crystals.
Thick tabular, platy crystals; massive, granular, compact, rose-shaped clusters.

Prismatic, vertically striated.
Found as anhedral grains up to 1-3mm.
Massive; microscopic inclusions in hessite.
Thin plates, about 0.06 x 0.03 x 0.001 mm in size; also aggregates.
Anhedral grains up to 1mm.
Irregular grains.

Well-developed prismatic crystals up to 2cm in size; also as coarsely crystalline aggregates.
Prismatic crystals up to 10cm long and 1cm in cross section; doubly terminated crystals common; reniform nodular aggregate
Crystals minute hexagonal prisms, single or in clusters; small irregular grains.
Small grains, usually less than 0.2mm, rarely up to 0.5mm.
Massive; embedded grains up to 1mm in size.
Single crystals prismatic or tabular; elongated, from 1-15mm in length and 1-8mm in width; often exhibit 'chisel shape'; rarely

As plates a few millimetres to several centimetres across.
Massive; small rounded grains.
Tabular crystals, short prismatic.
Crystals prismatic, tabular; distinct hemimorphic development; rosettes and parallel groups; scaly or lamellar masses; commo
Platy crystals up to 2-3mm in length.
Single crystals or crystal aggregates.

As anhedral grains.
Massive.
As spherulites up to 1 mm across.
As minute inclusions.

Crystals tabular, flattened, rarely short prismatic.
Fine-grained dense aggregates.
Compact, disseminated, in grains, scales, clumps.
Veinlets and irregular grains up to 0.55mm.

Fibrous spherulites up to 3mm in diameter; crystalline plates.
As small grains.
Fine-grained pseudomorphs after fleischerite.

Prismatic crystals.
As millimetre sized acicular aggregates.
Octahedral crystals; massive, coarse to fine granular.
Only compact, massive, granular, fibrous agg.; nodules, pebbles, cryptocrystalline.

Fine-grained micaceous aggregates of plates.
Crystalline masses up to one inch across.

Crystals commonly well developed, striated parallel to [010]. Frequently as parallel aggregates.
Foliated or irregularly grained masses.
Aggregatesof parrallel fibers.
Tabular crystals up to 0.5 x 0.2 x 0.05mm; elongated.
Long acicular, fine capillary, fragile crystals; radial-fibrous, compact, massive, feather-like.
Radiating groups; collofrom bands.
Prismatic crystals up to 4mm in length, elongated, flattened, twinning rare.
Crystals tabular, minute, elongated; massive, sometimes with radial columnar structure.
As aggregates of barrel-shaped crystals.
Very small, rhombohedral, tabular crystals; mostly compact, powdery, granular, crusty, fibrous.
Lath-shaped crystals.
Pseudo-isometric crystals; irregular grains up to several millimeters across.
As 0.2mm pseudo-octahedral aggregates epitactically grown on wickmanite.

Crystals blade-shaped, small; also as fibrous aggregates.
Finely prismatic to acicular crystals in aggregates.
Elongated hexagonal prisms, up to several inches in length, irregular terminations; crystals are composite with uniaxial outer
Interlocking anhedral 2mm crystals.
Elongate platelets.
Massive.
Radiating sprays of prismatic crystals up to 5cm in length and as intergrowths.
Tabular crystals.
Octahedrals crystals; commonly as microcrystalline, honeycomb, and crust-like aggregates.
Tabular to equant up to 3 mm.
Prismatic.
As grains and lamellar masses.

Thick tabular crystals; spheroidal aggregates; lath-like fibres.
Crystals short prismatic; usually massive, columnar, or as radiating and spherulitic aggregates of fibres and prisms; twinning
Radial aggregates composed of thin platelets flattened, elongated.
Massive anhedral granular material with individual grains less than 8mm in diameter.

Well formed bladed crystals.

Spherulites.
Rosettes.
Thin to thick tabular crystals; globular, reniform masses.
Massive,.
Irregular laminated masses.
Irregular laminated masses.
Tiny embedded crystals.

Flat prismatic to bladed crystals.
Thin crusts of minute needle-like crystals elongated along c-axis.
Rosettes up to 1cm in diameter composed of thin, tabular, bent crystals.
Platy hemimorphic crystals up to 4-5mm across and 0.5mm thick.
Irregular grains and tabular crystals.

Imperfect prismatic crystals from 0.03 to 0.3mm in length.
Powdery coatings.
Crystals short prismatic; massive, compact, as embedded grains; twinning common, simple, lamellar.
As stalactites, encrustations.
Tabular crystals 2mm in size.
Tabular or as massive granular.
Short to prismatic crystals up to 2 cm long.
Grains up to 1-2mm in size.
Minute crystals, often in aggregates; also as fine-granular nodular masses.
Crystals short prismatic, elongated; as fine-crystalline aggregates.
Irregular, slag-like aggregates up to 0.5mm.
Crystals thick prismatic or acicular.
Octahedral crystals.
Single crystals, elongated along the prism up to 15-20mm long; flattened hexagonal tablets up to 22mm in diameter.
Massive, compact; as embedded grains.
As plates and lamellar masses.
0.1Mm diameter grains.
Layers and concretionary growths up to 2mm thick; encrustations on massive material composed of hexagonal prismatic crys

As thin plates.
Spherulitic aggregates from 1.5-2mm across.
As botryoidal coatings and crusts.

(Antigorite) microcrystalline, foliaceous, scaly, massive, compact, disseminated.
Embedded grains up to 0.3mm in size; prismatic.
Spindle-shaped bundles of fibres.
Aggregates of minute needles and small fibres up to 10mm long with individual crystals up to 0.5mm in maximum dimension.
Aggregates of platy crystals.
Crystals usually tabular and somewhat elongated, also equant; minute grains or masses up to 1cm or more in size.
Massive; in plates and prisms.
Slightly elongated to equant grains up to a few tenths of a millimetre across.
Crystals stout prismatic, up to 4mm long, elongated, flattened, lathlike, commonly striated; subparallel crystal aggregates, ros
Crystals flattened; twinning very common.
As small rounded grains.
Usually tabular crystals.
Very thin foils up to 4mm across.
As 0.01 to 2mm crystals; simple, complex and polysynthetic twinning.
Aggregates of crystals up to 2 mm.
As spherical aggregates of pseudohexagonal plates.

Elongated platy and prismatic crystals; polysynthetic twins are common.

Irregular grains.
Irregular platy tablets and laths.
Irregular grains.
Pseudocubic rhombohedral crystals.
Crystals prismatic, elongated; very minute.
Crystals lath-shaped, up to 2.0mm in length.

Crystals prismatic, minute, often in sheaf-like forms; usually massive.
Nodular concretions.
Needle-shaped crystals; radiate-fibrous agg.; disseminated.
Crystals nearly equant; rare; massive; usually as cleavable masses with fibrous structure; twinning.
Prismatic and acicular crystals up to 1mm long; botryoidal.
Massive.
Small plates, usually 0.2-0.3mm in size.
Prismatic crystals; sometimes tabular.
As 0.1-0.3mm skeletal cubic crystals.
As elongated prismatic crystals.
Prismatic crystals up to 1.5mm in maximum dimension.
Ovoids up to 3cm in diameter.
Corroded curved or barrel-shaped crystals up to 0.15mm in maximum dimension with bypyramidal terminations.
Anhedral grains.
Acicular crystals; flattened; usually in spheres or rosette-like groups.
Usually massive, coarse to fine granular; crystals bipyramidal, often highly modified, rare; twinning rare.
Massive; as a replacement of rankinite.
Crystals up to 2mm long with complex penetrative twinning resulting in cross bow-tie twins.
Cryptocrystalline.
Tabular crystals forming loose aggregates or clusters.
Dodecahedrons modified by trapezohedrons.
Nodular masses up to 2 inches in diameter; platelets or irregular thick fragments.
As hemispherules up to 2 mm across; bladed crystals.
Minute hexagonal prisms.
Crystals tabular; zone striated and presents curved aspect because of development of vicinal forms.

Elongate aggregates up to 3 mm.

Massive.
Massive.
Extremely thin crystals up to 0.2mm in diameter and occurs as composite subparallel aggregates up to 0.5mm in diameter.
Earthy masses.

Crystals acicular, in tufts.

Short prismatic crystals elongated along c- axis.
Dense granular or flaky aggregates.
Massive; very minute grains.

Radiated crystals; long prismatic.
Massive; fibrous or radiated crystals; prismatic; also fine granular.
Crystals thin, square to rectangular laths and plates striated; massive, earthy; twinning, contact or penetration.
As crusts; also as rosettes.
Massive, granular; earthy.
Crystals acicular or fibrous; twinning common.
Forms flame-like and vein-like aggregates.
Crystals short prismatic, minute; twinned.

Crystals are rare exhibiting pinacoidal and pyramidal terminations,.

As 1-10 mm nodules.
As 0.005mm cubo-octahedral crystals.
Massive; foliated, platy.

Crystals lath-like or acicular; globular masses with radial-fibrous structure, crusts and tufted aggregates.
Fibrous to coloumnar aggregates; prismatic crystals.
Elongate prismatic grains.
Polycrystalline aggregates.
Equant to slightly elongated grains, 0.02-0.05mm in diameter, enclosed in other ore-forming minerals, or as aggregates.
Crystals elongated, twinned.
Massive, granular and as disseminated grains.
Crystals prismatic, flattened; massive; as crusts with fibrous structure.
Very minute grains.
Fine grains.

Banded aggregates of short prismatic crystals.
Thin curved foliated plates.

Crystals usually short prismatic; tabular to equant; as crusts.
Equidimensional to short prismatic grains up to 6mm long; commonly grains are 3mm or less in length.
As cleavage lamellae up to 2mm in maximum dimension.
Crystals pseudo-octahedral.
Compact, granular, lamellar.
Minute subhedral grains.
Tabular, long-columnar, octahedral crystals; granular, fibrous, platy, crusts, fibrous agg.
Fibrous aggregates.
Crystals up to a few tenths of a millimetre.
Grains up to 0.1mm.
Crystals prismatic, poorly formed, up to 2-3cm in diameter.
Groups of tabular crystals up to 1.0mm in size.

As plates and tabular crystals, and rossette-like aggregates.

Massive; very fine-grained.
Columnar, thick tabular, longitudinally striated crystals; spathic, compact, wide tabular.
Lamellar masses.

Grains up to 0.012mm.
Massive.
Large blocky crystals, often in groups; large cleavable masses, dense granular aggregates.
Massive; fine-grained.
Anhedral masses.

Veinlets, patches.
Bladed crystals; lamellar.
0.1 To 0.2mm long prismatic grains, some with pyramidal terminations and striations parallel to direction of elongation.
Thick tabular, compact, spathic, granular, massive.
Simple prismatic crystals up to 12 x 3 x 2mm.
Fragmentary crystals.
Less than 1mm grains.
Thick tabular to short prismatic crystals from 0.3 - 0.65mm in size.
Foliated plates and sheets; grains 0.5-2mm in diameter.
Spheroidal aggregates up to 0.5mm in diameter composed of crystals up to 0.5mm in length.
Tabular crystals, elongated. Also stellate aggregates and accicular groups.
Crystals prismatic; massive; polysynthetic twinning, rare.
Fine-grained aggregates.
As octahedral-like crystals pseudomorphous after reddingite.
Crystals rare; massive; bedded; as nodular masses; disseminated grains.
Irregual grains and lamellae.
Short-prismatic, tabular crystals; lamellar, fibrous agg.; encrustations.
Occurs as nodules.
Minute short prismatic crystals; stalactitic.
As platy crystals to 5mm across and 0.5mm thick.
Crystals lath-like, platy to thick tabular; as scales; also granular to earthy; twinning.

Euhedral to partially resorbed crystals up to 5mm that are tabular.
Subhedral grains.
Radiating fibrous aggregates up to 1cm and as fan-shaped platy aggregates; plates are about 0.01mm thick and flattened.
Microscopic rhomboidal tables flattened.
Crystals tabular, imperfectly developed; massive, granular; twinning common, polysynthetic.
Minute acicular crystals.
Crystals slender prismatic, vertically striated; sometimes tabular, flattened.
Tabular crystals; also massive.
Small cubic crystals. Complex twinning common.
Botryoidal and mammillary aggregates with radial-fibrous or parallel-fibrous structure.
Wedge-shaped crystals up to 2.0mm in size.
Long-columnar, needle-shaped crystals; compact, fibrous, earthy.
Fibrous; elongated; observed only in polished section.
Crystals thin to thick tabular, elongated, sometimes striated.
Crystals minute; cubic, octahedral, or pyritohedral; as small rounded grains.
Crystals short prismatic; striated and rounded in direction of elongation; radial aggregates.
Crystals tabular or short prismatic, striated; massive, compact to fine granular; radiated; columnar to fibrous; twinning.
As aggregates of fine flakes and as thin crusts.
Massive.
Prismatic and bladed crystals up to 0.5mm, elongated and flattened.
Crystals prismatic, sometimes tabular parallel; subhedral tables; massive, granular.
Fibrous.
Short columnar, tabular, pyramidal crystals; mostly compact, massive, granular masses.
Mostly compact, massive, finely granular.
Crystals rare, usually octahedral, cubic or dodecahedral; commonly massive, as thin plates, wires, dendritic, rounded masses

Pseudohexagonal crystals, thin to thick tabular, prismatic or equant, also massive.

Crystals long prismatic, narrow; stubby; up to 1" in length; fine-grained masses.
Crystals long prismatic, aggregates of crystals in sprays or fans common; crystals vary in length from 1mm to 6cm; maximum
Crystals acicular, deeply striated; in radial aggregates and rosettes.
Crystals lath-like; rarely equant; crusts or cross-fibre veinlets.
Cleavable masses up to 7 x 4 x 0.3 cm.
Crystals prismatic, very minute (0.05mm in diameter); in spherulites about 0.5cm in diameter.
Crystals very thin, blade-shaped, sometimes curled; flat face striated in direction of elongation.
Platy and bladed crystals.
Crystals tabular and elongated, crude crystals and irregular grains intergrown with other salt minerals.
Radial groups of acicular crystals.
Fine-fibrous agg.; globular, reniform, mammillary structure.
Lamellar, pseudo-hexagonal crystals; scaly, compact, finely granular.
Crystals minute pseudohexagonal plates; flattened; granular masses; lamellar twinning common.
Isometric, rounded, embedded crystals; granular agg.
Crystals short prismatic to tabular, pseudotetragonal; also spherulitic. Penetration twins common.
Crystals varied in habit, small, rare; massive granular or as isolated grains; twinning common; contact or interpenetrant.
Crystals usually short prismatic; lamellar or as fine-grained chalk-like masses.
Crystals tabular or wedge-shaped; twinning common.
Thick-tabular crystals; penetration twins.

Minute aggregates occasionally showing pinacoidal faces.
Small, short-columnar, globular.
Stout prismatic crystals up to 25 x 10 cm, striated parrallel to c-axis.

Crystals equant or short prismatic, indistinct with rounded edges, convex or vicinal faces; granular or scaly crusts and films, s
Crystals tabular.
Elongated platy crystals; fibrous.
Massive.
Tabular, radial, fibrous, groups or single crystals; encrustations.
Crystals usually tabular or platy; rarely acicular; sometimes doubly terminated; massive, platy.
As small grains.
Crystals prismatic, without terminal faces; vertically striated.
Octahedral, compact, granular, disseminated.
As euhedral flattened hexagonal prisms.
As aggregates of microscopic crystals.
Short-columnar crystals; in druses; compact, disseminated.
Alteration borders on massicot, and as crusts; synthetic crystals tabular.
Large anhedral or subhedral crystals with rough faces; massive, cleavable.
Massive, compact, botryoidal; fine scales and dendritic.
Crystals elongated, up to 1cm in length; masses up to 5 x 9 cm in size.
Equant, poorly formed crystals up to 0.4mm.
As 1-3mm irregular grains.
As crusts.
Minute crystals; twinning.
Minute elongated needles; columnar to fibrous massive; globular masses of interlaced needles.
Massive; fine to coarse-grained; compact; small scales.
Massive; fibrous radial aggregates 0.5-1mm in diameter.
Compact, fibrous, granular, needle-shaped, nodular, columnar.

Laminated tabular crystals up to 7 x 5 x 0.6cm in size; fine polysynthetic twinning.

Pseudo-cubes and pseudo-cubo-octahedrons up to 0.7mm in size.
As complex cubes or pseudo-cubic twins.
Minute spherical aggregates; synthetic crystals short prismatic.

Crystals tabular or short prismatic with striations parallel; thin veinlets or fine granular.
Crystals acicular, minute.
Compact masses of coarse fibres or blades.
Lath-like crystals or radiating aggregates.
Equant twinned crystals.
Spherules of radiating fibrous crystals.
Granular aggregates, rare prismatic crystals.
As microscopic anhedral grains.
Massive; irregular grains from 0.3 - 30mm in size; pseudomorphs after eudialyte; twinning common, polysynthetic.
Massive; embedded anhedral grains.
Rosettes and fan-shaped aggregates of less than 0.01mm crystals.
Crystals thin to thick tabular, often wedge-shaped; massive, granular.
Crystals elongated; flattened; prominent; twinning; lamellar.
Compact, fine fibrous, radial.
Cubes up to 1.5cm on an edge, but mostly 0.5-1cm; faces lightly striated.
0.2Mm crystals tabular.
As radiating aggregates.
Crystals minute pseudohexagonal tablets; flattened masses and nodules with fibrous to earthy structure.

Massive, fine-grained; more rarely coarse-grained; crystals distinct equant, rare; usually rough, with some or all faces curved
Prismatic crystals.
Prismatic crystals. Also acicular aggregates.
Subangular, platy crystals.
Tiny needle-like crystals, grains range from less than 1mm to 6mm.
Crystals rare; prismatic; irregular grains ranging from a few tenths of a micron up to 0.2mm in size.
As coarse aggregates and compact masses.
Rhombohedral crystals.
Crystals pyramidal to short prismatic, crystals minute, well developed.
Massive, extremely minute feathery lamellae or irregular grains up to 1mm in diameter; also as idiomorphic crystals up to 0.2
Euhedral, tabular crystals, or as pseudohexagonal tabular to micaceous crystals.
Euhedral crystals up to 1mm in length.
Small grains, elongated and striated.
Puttylike laminae.
Massive.
Crystals prismatic, rare; usually massive, fibrous or lamellar.
Crystals short to long prismatic, often tabular; but rarely distinctly terminated; prismatic aggregates; twinning; lamellar.

Tabular pseudohexagonal crystals. Usually massive.
Crystals octahedral rare; usually massive, compact to fine granular.
Crystals tabular; usually as loose scaly aggregates; also granular or as crusts.
Fibrous or fibro-lamellar, often radiated; twinning very common, simple, lamellar.
Crystals minute, octahedral; usually massive, fine granular, twinning common.

Crystals long to short prismatic, often appearing nearly hexagonal in scross section and with rhombohedral-like terminations;
Crystals long prismatic, striated parallel to elongation; massive; fibrous to asbestiform, columnar, or granular; twinning, simple
Short prismatic crystals.
Rhombohedral crystals; compact, reniform, nodular, coarsely granular, spathic, massive.

As rosettes and radial aggregates.
Fine-grained efflorescence.
Octahedral, dodecahedral crystals; compact, massive, coarsely and finely granular, disseminated.
Crystals steep pyramidal, doubly terminated.

Acicular and tabular crystals. Twinning common.
Fine-grained encrustations.
Rounded or oval 0.001 to 0.1mm inclusions.
As minute grains.
Crystals acicular; radiating aggregates; also as spherulites 0.05-0.3mm in diameter.
Massive.
Fibrous, needle-shaped, compact, reniform; botryoidal, nodular, stalactitic, subvitreous, agate-like striated, massive, earthy, d
Granular.
Massive; crystals wedge-shaped up to 3cm in length.
Massive granular and as thin coatings; crystals octahedral up to 0.6mm.
As crusts; synthetic crystals prismatic with basal plane and pyramid.
Fibrous masses and crusts; synthetic crystals tabular, flattened.

Lamellar aggregates and crusts of hexagonal plates.
Massive, foliated; lamellar.
Less than 0.5mm long crystals that are twinned.
Crystals prismatic, usually square in cross section.
Aggregates of platy 1mm crystals.

As minute trapezohedrons. Usually massive.
Massive.
As irregular small grains and veinlets in cubanite.

Columnar crystals; strongly striated, compact, granular, radial, needle-shaped.
Found in polished section as very minute grains.
Crystals thin to thick tabular, short prismatic.
Crystals small tetrahedra.
Crystals octahedral, sometimes modified by dodecahedron or cube; commonly as masses or irregular grains.
Embedded grains, sometimes with crystal outlines.
Crystals short prismatic, equant, or thick tabular; massive; twinning common.
Prismatic with poorly developed faces.
Massive granular, grains range up to 0.3mm in size.
Massive; compact.
Elongate, prismatic crystals up to 3 x 15mm that are deeply striated parallel to their elongation.
Fibrous crusts and porous masses.
Spheres up to 1 mm composed of radiating fibres.

Tabular, short-columnar, acicular, fibrous agg.; massive, compact reniform, nodular, radial, globular, stratified.

As fine-grained aggregates.
Thin tabular, lamellar, pseudohexagonal crystals; compact, scaly, granular-lamellar, disseminated.
Lamellar masses of thin plates; plates show rhombic outlines of the two lesser cleavages.
Crystals prismatic, often coarse; massive, granular; sometimes columnar.
Crystals or grains elongated; form subparallel to radiating aggregates.
Large untwinned crystals flattened, maximum size 5 x 1.5 x 0.5 cm.
Crystals equant to tabular; striated.
Crystals tetrahedral, often modified, cubo-octahedral; isolated crystals and crusts;.
Bladed prismatic crystals up to 0.5mm and as overgrowths on rhodonite.
Millimetre-size crystals; flattened; striated.
Crystals rare, prismatic; crusts and stalactitic; twinning; polysynthetic.
Elongated, sometimes rounded grains.
Massive, earthy to scaly; synthetic crystals tabular.
As druses and pseudohexagonal crystals up to 3 cm across.
Crystals tabular; pseudohexagonal; extensively twinned; very minute crystals.
Massive.
Crystals rare; indistinct acicular or prismatic; vertically striated; up to 25mm long; usually massive, granular.
Crystals tabular; stout pyramidal with small prism faces; rosettes or aggregates of platy crystals; massive, lamellar.
Crystals pyramidal; sceptre-shaped aggregates which are oriented intergrowths of sphalerite with y-zns.
Massive; minute equidimensional or blade-like grains isolated in altaite and as thin irregular rims on pyrrhotite and chalcopyrit
Massive, stalactitic.
Small rosettes of thin tabular crystals and as botryoidal forms.
Small, thin-tabular crystals; mostly compact, finely granular, fibrous.
Crusts of dogtooth to prismatic crystals up to 0.2 mm.
Massive.
Rounded grains.
In groups of needles.
Powdery.
Crystals rhombohedral, aggregates of minute crystals and as random intergrowths of crystals up to 12mm in maximum dimen

Massive, granular and mica-like books.
As 0.1 to 2mm diameter spherules.

Small, less than 0.5mm, hemimorphic crystals and aggregates of crystal plates; crystals are simple in development with maxi
Masses of intergrown crystals 0.2-3mm in diameter.
Radiating fibres from 1-2mm long.
As small grains.
Short-prismatic, thick-columnar, granular, fibrous, radial, massive.
Usually massive; rarely rhombohedral crystals.
Crystals simple cubes (pseudocubes) up to 4mm along edge, rare; complex intergrown rounded aggregates forming thin crus
Porous sponge-like aggregates of small striated crystals in parallel growth, and as thin plates; crystals often somewhat elonga
Crystals prismatic; massive, cleavable.
Plates up to 1 x 0.5 x 1 cm.
Velvety, divergent aggregates of elongated prismatic crystals with striated or rounded prism faces.
Columnar, tabular, needle-shaped crystals; platy, stalactitic agg.; crusts, efflorescences.
Thin tabular crystals or short square pyramids. Also as lamellar aggregates up to several centimetres long.
Crystals prismatic or pyramidal; small and rare; also massive, fine granular, nodular, or as coatings.
Hexagonal lamellae, indistinct laminated particles.

Massive; fibrous.
Columnar or fibrous masses, often radiated.
As minute crystals.
Crusts and fibrous masses; synthetic crystals prismatic or pseudorhombohedral.
Crystals slender prismatic, striated parallel to elongation; massive, fibrous, compact.
Stalactites composed of minute tabular crystals.
Little drops.
Minute grains.
Spheroidal aggregates up to 1 mm across.
Tiny grains.
Grains up to 0.5mm.
Massive.
Massive; compact, granular; natural crystals rare, rounded and pitted, often show polysynthetic twinning; synthetic crystals pri
Acicular crystals; radial, fine-fibrous, semi-globular agg., compact, massive, earthy.
Crystals prismatic to equant; usually lamellar, foliated, or fibrous; in radiating aggregates.
Crystals minute laths; also as microcrystalline masses.
Plates, usually about 0.5-1mm in diameter.
Dehydration pseudomorphs after autunite; morphology same as that species.
Platy crystals flattened with rectangular outline; subparallel aggregates or fan-like groups.
Crystals small thin rectangular plates flattened.
Aggregates up to 1cm in size, showing single faces of the tetrahedron and trigonal tristetrahedron. Slowly soluble in water.
Small, tetrahedral, dodecahedral crystals; powdery, coatings.
Aggregates of fibrous acicular crystals; often as intergrowths with delrioite.
Spherical aggregates; flakes.
Crystals tabular; up to 1mm on a side; not more than 0.1mm thick.
Nodular aggregates and coatings of fibres, crystals are well-developed laths.
Scaly aggregates.
As tabular crystals and crusts.

Less than 0.2mm crystals; platy.
Crystals rectangular plates flattened; crusts or porous interlocking aggregates of thin plates and scales; also as lamellar aggre
Platy to flaky masses and veinlets, twinned, soluble in water.
Microscopic bladed tabular crystals, elongated.
Crystals tabular, elongated, pseudohexagonal aspect.
Coarse to fine crystalline aggregates; crystals prismatic, rare.
Massive, as mammillary coatings.
Pale yellow fibres or elongate tablets.
Micaceous flakes or bladed crystals up to 3mm long, flattened.
Crystals thin tablets, lamellar aggregates, rosettes and sheaflike or subparallel aggregates, dehydration pseudomorphs after t
Commonly compact to microcrystalline masses; pulverulent, thin coatings and films, impregnation in sandstone or limestone;
Prismatic crystals. Commonly massive.
As elongated plates.
Platy crystals.
Crystals minute, thin to thick tabular, slightly elongated or equant; rarely long prismatic; granular, massive; contact twins.
Crystals long prismatic to acicular; subparallel to radial aggregates.
As minute flat elongated crystals.
Minute tabular crystals with hexagonal outline; usually as scaly or granular aggregates.
Fibrous and hair-like, aggregating into pin-cushion clumps.
Crystals rectangular tablets flattened, sometimes pyramidal, terminal faces; micaceous, foliated, or subparallel aggregates of

Crystals prismatic, elongated, fibrous.
Massive.

Crystals thick tabular; often deeply striated; sometimes complex; massive.
Massive, minute grains.
Prismatic, blocky, tabular, massive.
Crystals octahedral, up to 6cm or more in size, often with modifying faces; embedded grains or irregular masses, twinning not
Minute prismatic crystals.
Crystals tetrahedral, rarely cubo-octahedral; crusts and aggregates of distinct crystals; twinning common.

Columnar, hexagonal crystals.
Acicular, capillary crystals in bunches; radiate, fibrous agg.; granular, compact.
As chalcedonic crusts or fibrous spherules.
As incrustations.
Thick-tabular, barrel-shaped, columnar, needle-shaped; botryoidal, reniform agg.; crusty, earthy.

Single and multiple rosettes from 0.2 to 1mm across.
As an efflorescence of minute crystals; also as granular aggregates, spherulites, or mammillary masses.
As platy aggregates.
Minute tabular crystals.
Massive, earthy or powdery.
Microscopic plates or needles; disseminated or in compact aggregates.
Small, 0.5mm, twisted rhombohedral crystals.
Acicular radiating aggregates.
Compact masses, crusts, earthy, fibrous, granular.
Crystals acicular or lath-like; fibrous masses and aggregates.
Massive, cleavable; fine-grained fibrous; compact aggregates form slightly curved, scaly masses.
Crystals thin tabular, pseudo-rhombohedral in aspect, minute; colloidal or fine-grained nodules, crusts, veinlets, and earthy co
Crystals short prismatic or pyramidal; stalactitic.
Needle-like crystals elongated and striated vertically; tufted or radiated aggregates or crusts; compact, in rounded masses wit
Crystals elongated; flattened; most crystal faces are curved; maximum observed size of crystals 3mm long, 1mm wide and 0.
As 0.01-0.05mm grains.
Small elongated grains.
Irregular lamina and minute quasi-euhedral crystals.
Small hexagonal plates.
Colloform; massive;.
Flat, tabular crystals; lamellar, fine-scaly, compact to massive, disseminated.
Efflorescences, encrustations, fibrous, earthy, radial, disseminated.

Very thin scales.
Crystals platy, in foliated aggregates.
Massive, as coatings.

Thick-tabular, short-columnar; rolled grains.

Massive; minute grains, rarely up to 0.2mm in size.
Massive aggregates composed of minute flattened crystals with rough faces and rhombohedral outline; also stalactitic or as c
As mica-like aggregates.
Usually as octahedral crystals; rarely cubic.

Massive; fine-grained.
Cubes.
Massive, as irregular grains.
Tiny grains.
Equant to short prismatic crystals. Usually as large cleavable masses.
Crystals octahedral or cubo-octahedral; also as a powder; penetration twinning reported.

Radiating cluster of needle-like crystals; tabular crystals, arranged in parallel groups.
Massive.
Crystals lath-like, up to 3mm, often in sub-parallel growths; also massive, as subparallel aggregates of coarse plates.
Crystals prismatic, rarely up to 8cm in length; usually massive, granular, or as disseminated grains;.
Compact, earthy, friable masses, massive.
Microscopic bladed crystals.
Spheres and hemispheres up to 1 mm.
Crystals slender prismatic, often twisted or bent; also equant or somewhat flattened; terminal forms commonly striated; vermic
Massive; observed in polished sections as grains and aggregates up to 1mm across and as an intergrowth with haycockite.
Micro-concretionary crusts.
Crystals tabular to platy. Usually as subparallel aggregates of minute crystals.
Granular to fine-grained columnar crystals.
Incrustations consisting of pseudocubic crystals, 0.2-0.3mm on an edge, rarely acicular.
Spherulitic masses, as distinct crystals, and as crusts with a coarse fibrous structure; crystals are singly terminated needles.
Crystals prismatic, vertically striated, minute; usually acicular to fine fibrous, often in cottony aggregates; also compact, proce
As nodules and books of plates flattened and sometimes eongated, up to 0.2mm.
Massive; granular.
Stalactitic and as efflorescent crusts; synthetic crystals short prismatic.
Crystals long prismatic or tabular, vertically striated; columnar, radial-fibrous, or coarsely crystalline.

Long prismatic crystals; also massive.
Crystals dodecahedral, often modified by cube and/or trapezohedron; massive, granular.
Octahedral crystals; spinel twins; cubes and cubo-octahedral crystals.
Columnar, pyramidal crystals; mostly as crusts, botryoidal, mammiform, radiate, coatings.

Crystals elongated and platy; most crystals twinned by roatation.
Matted silky fibres in rosettes up to 2mm in size.
Aggregates and rosettes of flakey crystals.
Fan-shaped, radiating-fibrous, or vermiform aggregates of plates with rectangular outlines of a few microns in size.
Platy crystals.
Clusters and rosettes of tabular crystals to 1 mm.
As crude masses with a crude radiating structure.
Subhedral to euhedral tetragonal crystals.
Irregular, short prismatic crystals up to 1 x 2.5mm; also as irregular grains up to 5mm in diameter, some crystals twinned.
Crystals prismatic.
Rectangular plates.
Powder.
Radiating fibrous aggregates of 2-3mm crystals.
As anhedral grains.
Minute cubes and octahedrons.
Euhedaral crystals are rare; aggregates of platy crystals.
Small, grains, or as aggregates up to 2mm.

Thin to thick tabular, short columnar, pseudohexagonal crystals; thin-lamellar, compact, scaly, globular, massive.

Aggregates of intergrown minute crystals, less commonly as individual plates with hexagonal outline.

Pseudohexagonal, thin-foliaceous crystals; fine-scaly, compact, massive, earthy, loose.
Crystals tabular or prismatic; also lenticular with octagonal or square outline; often in divergent or subparallel groups; twinning
Crystals tabular, elongated, as subparallel aggregates.
Minute grains.
Thin tabular, lamellar crystals; scaly agg.; compact, granular.
Crystals prismatic, elongated; friable crystal aggregates; fibrous veinlets; and as concretionary crystalline masses up to 5 feet
Elongate grains.
As aggregates of fibrous crystals.
Coarse prismatic crystals up to 8 x 4 x 3 mm.
Platy crystals up to 2mm commonly twinned by interpenetration, often polysynthetic.
Aggregates of minute hexagonal plates.
Subhedral to euhedral 0.1-2mm crystals with basal pinacoid and rhombohedron forms found on some crystals; as dendritic ag
Massive, granular.
Crystals short prismatic or tabular, flattened.
Tiny crystals and microcrystalline clusters.
Crystals prismatic, as terminal forms; minute, very rare, usually massive granular.
Crystals from 0.2-3mm and as irregular aggregates up to 1cm in diameter.
Small grains up to 1 x 0.3mm with a fibrous structure.

Single grains and rosette-like intergrowths.

Crystals rhombohedral, often pseudocubic; also tabular or lenticular; as druses or aggregates; usually massive, granular to de
Crystals exhibit prisms truncated by dipyramids.

Crystals pyramidal; also as cross-fibre veinlets and crystalline crusts.
As spheres of compact radiating crystals.
As platy crystals up to 2 cm across, exhibiting polysynthetic twinning.
Crystals usually minute, tabular with hexagonal outline or pseudocubic; as crusts or coatings of tiny crystals; also earthy.
Columnar, acicular, capillary crystals; striated; massive.
Short prismatic crystals; also massive.
As an efflorescence, and as crusts and coatings; synthetic crystals tabular.
Coarse-grained aggregates up to 7mm across.
Crystals rare, stout prismatic, usually granular or as cleavable masses.
Massive; as dense monomineralic aggregates of irregular form; up to 5 x 3cm in size.
Pseudohexagonal, thick-tabular crystals up to 6 x 6 x 4cm; twinning found in synthetic material was not observed.

Platy crystals, 1-5 mm in diameter.
In cubes; also massive granular and as thin plates.
Fibrous; as a coating; and as thin well-developed laths up to several microns in length; laths and fibres are elongated and flat
Clusters of bladed crystals tabular, elongated and striated parallel; also as stout to elongated prismatic crystals.

As irregular 0.01 to 0.5mm grains in aggregates up to 5mm.
Twinned octahedral crystals 0.1-0.5mm in diameter; also as rounded grains.
Crystals needle-like showing repeated twinning with lamellae parallel to cleavage; also finely fibrous.
Minute rounded grains.

Small grains and rarely as less than 1mm dipyramidal crystals.
As foliated masses.
Short-columnar to thick tabular crystals; mostly massive, compact, granular.
Massive.
Short to long columnar crystals; no agg.
Crystals prismatic, deeply striated parallel to c-axis; tufts of radiating needle-like crystals, and as flattened radiated coatings; f
As 1-2mm irregular grains.
Crystals short prismatic, tabular, or equant.
Aggregates of prismatic to bladed crystals with stepped surfaces on the broad faces; individual crystals have dimensions of 0
Radiating and subparallel clusters of crystals up to 0.5mm.
Mostly compact, disseminated, botryoidal, granular, massive, reniform.
Euhedral cubes or intergrown cubes up to 0.1mm in size, sometimes twinned.
As tiny prismatic grains.
Compact, fine granular, massive,.
As fine-grained efflorescences.

Powdery coatings and aggregates of poorly formed crystals; crystals are up to 15mm in length.
Tabular crystallites.

As crusts and coatings.
Massive.
Hexagonal plates up to 5 mm across.
As minute grains.
Massive and as irregular veins.
Coloumnar or acicular crystals;.
Massive.
Prismatic crystals.

As small flakes.
Crystals prismatic, up to 10 mm in length and 1mm in width; crystals twinned.
Irregular grains.
Crystals tabular and elongated; as minute diamond-shaped crystals; more abundantly as thin crusts of crystal aggregates.
Compact skeletal crystals, granular.
Crystals rhombohedral; commonly massive granular; as crusts; twinning common.
Crystals octahedral; twinning.
As an efflorescence; synthetic crystals long prismatic.
As an efflorescence; synthetic crystals long prismatic.
Platy euhedral crystals; also as mammillary coatings plate form commonly elongated; large crystals have hexagonal aspect; s
Subhedral to euhedral hexagonal plates up to 1 mm.
Massive fine-grained; claylike.
Crystals varied in habit, usually highly modified; also as rounded grains.
Crystals thin to thick tabular, flattened; also as thick, lens-like crystals and as parallel growths with cassiterite, calcite and side

Tabular crystals up to 1 cm; sometimes as radial-fibrous aggregates.
Crystals tabular, blocky; as spherules and sheaf-like aggregates.

As circular plates or flattened rhombohedral crystals 0.2-2mm in diameter; some crystals and irregular grains show corrugated
Crystals octahedral.
Columnar, dodecahedral crystals; compact, granular.
Crystals rectangular plates flattened, ranging in size up to 0.5mm on an edge; as crusts or porous interlocking aggregates of t
As irregular aggregates; grains up to 3cm in size.
Crystals up to 0.3mm in size.
Minute platy to wedge-like crystals.
Crystals prismatic to acicular, deeply striated, bundles of parallel unterminated crystals; crystals up to 3mm in length; also as
Fan-shaped groups of crystals from 1-2mm across; as hexagonal tabular single crystals up to 2mm; irregular masses.
As ovoid to irregular nodules up to 2mm in diameter and as cross-fibre veinlets.
Tabular crystals; invariably twinned.

A = 12.249, b = 15.113, c = 6.868 \a = 116.45, \b = 98.58, \g = 85.82.
Tabular crystals.
Crystals prismatic, minute, vertically striated, often rounded; also in hemispherical forms with radiate structure.
Incrustations of platy crystals.
Spherulitic aggregates of acciular crystals.

As pseudotetrahedral twinned crystals up to 4 mm across.
Crystals acicular, blade-shaped, flattened; commonly as radiating aggregates; fibrous interlaced masses; also compact; twinn
As small spherules.
Found as grains and crystals up to 1-2mm in diameter.
Crystals tabular, flattened; usually massive, cleavable, granular, or compact; twinning common; principal twin laws carlsbad, a
Columnar, needle-shaped, tabular crystals in druses; fibrous, reniform, botryoidal, compact, earthy.
(Fayalite) thick tabular, short columnar crystals; granular to massive, granular nodules,.
Thick to thin tabular, < 1mm crytals.
Crystals well-formed, 0.1 to 1.5mm long, elongated; length 10-15 times the width.
As oval grains from 1-3mm in diameter.
Prismatic tabular crystals.
Compact, only granular.
Crystals acicular, elongated, flattened.
Crystals always a-quartz paramorphs; typically dipyramidal; often rounded and rough; enantiomorphous; twinning; esterel law
Massive; as grains up to 0.4mm, twinning polysynthetic.
Veins, nodules, concretions, filling of cavities, disseminated, compact, botryoidal, nodular, reniform.
As small (to 2mm) tetragonal crystals; usually twinned; also as drusy or stalactitic masses.
Massive;.
As fine-grained pebbles with smooth brown crust.
As small laths.
Crystals prismatic to tabular, up to 1mm in length.

Lamellar, columnar, tabular, short-prismatic crystals; powdery.
Prismatic crystals up to 8 x 12mm; prism faces striated parallel.
Massive, finely fibrous.
Short prismatic, massive, twinning common.
Massive; as embedded plates up to 2 cm in diameter.
Very fine-grained mixture with joaquinite.
Thin tablets with rectangular outine; rarely short prismatic; crystals often bent or broken.
Friable aggregates of minute crystals commonly showing hexagonal outline and rarely the development of the rhombohedron

Found only in polished section as one single discrete grain; in polycrystalline intergrowth with irarsite.
As minute octahedral crystals.

Crystals tabular; rarely short prismatic; commonly as cleavage flakes or irregularly flattened grains.
Short prismatic crystals.
Granular; massive.
As crusts of minute rhombohedral crystals.

Observed in polished sections as small laths, commonly twinned, replacing stannite and replaced by cassiterite.
As flakes; polysynthetic twinning common on {001}.
Fibrous rosette-like aggregates.
Radial aggregates of 1 mm acicular crystals.
Crystals minute, platy to lath-like, often as subparallel growths; also massive, as subparallel aggregates of coarse plates.
Acicular crystals; massive.
Usually as lamellar masses, pulverulent; rarely as distinct crystals.
Aggregates of acicular crystals.
As irregular grains up to 0.4 mm.
Small anhedral grains; rarely in crystal form showing trigonal outline; grains commonly less than 2 mm in diameter; aggregate
Crystals slender prismatic, elongated; commonly acutely terminated; prism faces striated parallel to intersection; also massive
Intimate intergrowths with other sulfides.
As well-formed 1 mm crystals.
Only one terminated gem crystal weighing 1.7g known; pseudo-orthorhombic appearance; faces well-developed and large.
As elongate rectangular grains.
Long prismatic crystals, vertically striated.
Usually as small grains, sometimes with radial-fibrous texture.
As 0.005 to 0.4mm grains.
Very minute grains, found only in polished section.
As grains up to 0.5mm.
Microscopic hexagonal micaceous plates, flattened.
Finely fibrous, felt-like, cryptocrystalline.
As anhedral 1mm grains and aggregates up to several cm in diameter.
Massive; as minute grains.
Microscopic, polysynthetically twinned grains.
Crystals approximately equidimensional, usually less than 1mm in length; slightly flattened, well developed, commonly as mic

Crystals prismatic, striated in direction of elongation; twinning rare.
Crystals prismatic, often large and well-formed, resembling topaz; twinning complex, multiple.
Crystals rhombohedral; also equant, pseudocubic, or prismatic; massive, granular; twinning common.
Irregular and subhedral grains.
Sheaflike aggregates of crystals; also as somewhat rounded and striated equant crystals up to 5mm in size.
Crystals stubby prismatic, sometimes striated parallel to long axis; up to 0.5mm long; in diversely oriented aggregates; also a
Massive, compact; also as fine scales.
Massive, lamellar or granular.
Oriented intergrowths with hilgardite.
Crystals tabular, elongated parallel; often as subparallel aggregates or radial groups; twinning common, polysynthetic.
Irregular cleavage masses.
Hexagonal tablets or equant prisms up to 0.5mm in maximum dimension.
Crystals lath-like, also thin tabular; terminations often show pyramid faces at the corners; twinning very common.
As minute pyramidal crystals.

Crystals stout prismatic, striated.
Massive; rare prismatic crystals.
Pseudomorphs after microscopic bladed crystals of montroseite.

Prismatic, terminated crystals up to 3mm in length.
Crystals poorly developed rectangular tablets; usually massive with reniform structure.
Powdery to granular aggregates that replace realgar.
Crystals up to 1 cm long; usually much smaller; always twinned, complex, trillings common.
Crystals tabular, elongated, pseudohexagonal aspect.
Occurs as tabular prismatic crystals twinned by reflection; crystals are flattened and elongated parallel.
Crystals average 2cm in length and 0.5cm across; polysynthetic twinning.
Crystals up to 3 x 1.5 x 1 mm in size.
Crystals rhombohedral, commonly twinned; also massive, granular and as powdery encrustations.
Massive, fine-grained.

Crystals short prismatic to thick tabular; as randomly intergrown, subparallel or radial aggregates.
Crystals commonly tabular; usually massive, cleavable to fibrous; granular and compact; twinning common.
Short to long prismatic crystals; also massive. Twinning common.
Crystals small acute double hexagonal pyramids; occasionally prismatic in appearance; also rhombohedral; lateral faces com

Lathlike crystals less than 1 mm long. Also as fan-like aggregates.
Massive, micaeous.
Crystals prismatic, up to 4mm long, elongated, flattened; acicular crystals without distinct form; rudely radial clusters or tufts o

Massive.
Crystals prismatic; stubby.
Granular crusts, rarely exhibiting minute lath-like crystals with oblique terminations.
Massive very fine-grained mixed with other sulphides.
As rhobic dodecahedral crystals 0.1-1.0 mm diameter.
As 0.2 mm euhedral crystals.
Well formed crystals up to 0.5mm that are flattened.
As tiny bladed crystals.
Massive, lamellar structure.
Crystals thin tabular, flattened and striated; massive compact; twinning.
As small grains.
Needle-shaped, long-columnar crystals; fibrous agg., compact, massive, reniform, radiating.
As minute tabular hexagonal crystals.
Massive chalky material.
Minute grains in bismuth ore.
Massive, crystalline; average grain size 2mm.
As complex crystals.
Massive.
Massive; minute flakes; twinning.
Botryoidal or reniform with radiating column.
Crystals prismatic, elongated parallel to c with dome terminations; minute; often as spherulititc rosettes up to 5mm in diamete
Massive, fine granular or slightly platy; synthetic crystals elongated.
Massive, granular.
Elongate or platy intergrowths.
Aggregates of tabular crystals sometimes elongated; largest crystals are up to 5 x 2 x 0.5mm; crystals are always twinned.

Spherulitic masses of platy crystals.
Octahedral, cubic, and embedded crystals; compact, granular.
Tabular plates about 0.5mm in size.
Radiating-fibrous aggregates up to 2cm in diameter.
Well-formed, spear-shaped crystals up to 1mm in maximum dimension.
Massive; small grains.
Cube and octahedron-shaped crystals; compact, granular, reniform, pseudocubic.
Elongate crystals resembling epidote.
Aggregates of minute prismatic crystals.

Crystals euhedral; small, rare; usually massive, as large cleavable blocky segregations; twinning, polysynthetic.
Irregular grains up to 10mm across.
Mosaic of grains that make up large 'single' crystals.
As radiating clusters and sprays of prismatic hexagonal crystals.
Tabular crystals up to a few tenths of a mm in size.
Fine-grained 10-20mm thick rims on native gold.
Crystals up to 4cm long and 2cm thick.
Commonly massive, fine granular to compact; rarely as small single crystals intimately intergrown with hessite.
Fine needle-shaped, capillary crystals, powdery encrustation; crusts; mammillary, botryoidal, reniform, earthy, powdery.
Crystals usually cubes with diagonally striated faces; also tetrahedral; occasionally granular or earthy.
Acicular, 1.5mm crystals, often in fan-shaped aggregates.
Hexagonal, quartz-like, short-columnar crystals.
Massive to earthy crusts composed of fine-grained aggregates.
Clusters, coatings and spherules consisitng of minute slightly curved crystals.
Short-needled-shaped, thick-tabular crystals; pseudorhombic to pseudocubic polysynthetic twins.
Pseudohexagonal, thin tabular, short-prismatic crystals; coarse scales, lamellar agg.
Large polycrystalline masses, rarely exhibiting crystals faces; anhedral cleavable masses.
Short-columnar, tabular crystals.
Columnar crystals up to 5 x 1 mm and as irregular aggregates.
As 0.5mm crystals.
Crystals octahedral, tabular; often in parallel grouping; massive, granular and coarse fibrous.
Radial aggregates of fibrous crystals.
Crystals short to long prismatic or thick tabular; isolated individuals or in groups; twinning common.
Crystals short prismatic or equant, also skeletal or crustal.
Crystals tabular or stout prismatic; botryoidal crusts and masses with radial-fibrous structure; twinning; common as interpenet
As tiny scales or plates. Also as dense aggregates or coatings.
As prismatic crystals.
Tabular crystals up to 1 mm.
Tabular crystals up to 0.25mm and scaly, radial aggregates; crystals flattened.
Crystals acicular, rarely terminated; as aggregates of fibrous or acicular crystals; as an encrustation or efflorescence; sometin
Crystals pseudohexagonal; twinning common, as penetration twins.
Usually massive or as crusts on other salts; crystals short prismatic.
Tiny needles, mammillary encrustations, or concretions and radial-structured nodules up to 1cm in diameter.
Columnar to prismatic crystals.
Massive; as crystalline aggregates.
Short prismatic crystals.
Foliated masses.
Crystals thin tabular with rectangular outline; rarely short prismatic; crystals often broken or bent; twinning common.
Well-formed crystals up to 1 mm.

Crystals short prismatic, elongated; commonly crystalline or fine granular; nodular with crystalline surface and radial-fibrous st

Crystals short prismatic, elongated; tabular; pyramidal.
Aggregates of imperfect long columnar or acicular crystals up to 3cm long and 1mm across, often cavernous.
Crystals commonly thick tabular, sometimes short prismatic; striated; massive, compact to granular.
Fibrous; often in compact radial aggregates.
Subhedral grains up to 1.1mm on an edge.
Crystals usually cubic, commonly as nuggets or as angular or rounded grains; twinning, polysynthetic.
Grains, limps, lamellar.
Crystals slender prismatic, elongated parallel; often in botryoidal or nodular masses; dense to fibrous; twinning, as penetratior
Thin plates or foliae.
Tabular; heavily striated parallel to elongation; observed in very small amounts in polished section.
Massive; compact.
Massive; as sharply angular platy fragments.
Octahedral crystals with curved faces.
Crystals thick tabular, flattened; usually massive, cleavable.
Massive, compact; also as botryoidal or stalactitic crusts or masses with concentric structure; as minute prismatic crystals with
Crusts or compact masses composed of microscopic hexagonal plates; also as ocherous masses and crusts.
Crystalline masses, rarely as octahedral crystals.

Massive; as very minute grains in aggregates up to 7mm in diameter.
Octahedral crystals; also as small grains.
Occurs as replacement rims and pseudomorphs after altaite.
Irregular to skeletal grains up to 1 x 1 x 0.5mm; crystals are thick tabular and commonly twinned.
Massive, very fine-grained, powdery to vermiform.
Acicular prismatic crystals and spherulitic aggregates.
Massive; as minute grains.
Microscopic stubby tetragonal prisms, dipyramids and irregular grains.
Intergrown with morozeviczite and marcasite.
Rarely cube-shaped crystals; mostly compact, coarsely granular, irregular grains.
Crystals thin tabular, flattened; usually pseudohexagonal, also pseudorhombohedral; triangular striations; massive, compact;
Prismatic, tabular crystals; flabelliform agg.; granular.
Crystals usually octahedral; commonly massive; compact to granular; twinning on {111}.
Usually massive or fibrous to foliated; rarely as small highly modified tabular or elongated crystals; commonly twinned, or poly
Crystals tabular, hexahedral, up to 5cm in diameter; as scaly aggregates and cryptocrystalline masses; as pseudomorphs afte
Prismatic crystals; vertically striated, up to 5 cm long.
As minute hexagonal plates.
Crystals tabular, small, up to 0.2 to 0.5mm; in small grains; as thin films.
Small grains or nuggets with slightly divergent fibrous or columnar structure.
Usually massive, granular or columnar; also stalactitic, and as powdery crusts and coatings; crystals cubic or octahedral.
Euhedral to subhedral lathlike crystals.
Tabular, diamond-shaped crystals, flattened parallel to {010}.
Crystals usually pyramidal; less commonly thin tabular; pyramid faces sometimes striated; as crusts of intergrown crystals; als
Occurs as irregular grains and aggregates.
Tabular, short-columnar crystals; globular, reniform, shelled, flabelliform agg.; compact, granular, crusts.
Platy crystals up to 0.2mm in maximum dimension with rounded faces and edges.
Plate-like grains up to 1mm.
Massive; fine-grained; nodular.
Nodules or irregular masses; soft and chalky to hard and compact; rhombic crystal outline observed under microscope.

As stout rectangular prisms also as rods about 0.05 mm long.
Single crystals rare; acicular; flattened on {100}; commonly as radial aggregates composed of acicular crystals up to 3cm in le
Minute tabular crystals, and as embedded blades or bundles of blades; also massive, fine granular to powdery.
Radiating sprays of prismatic crystals up to 10mm long and 1mm in diameter, also as sheaf-like subparallel aggregates.
As pseudohexagonal platelets, 0.1 to 0.5mm across; flattened; sector twinning invariably present.
Prismatic, fragile, columnar, rhombohedral crystals; compact, massive, dendritic, as coatings, encrustations.
As foliated aggregates of tabular crystals ranging in size from 0.1 to 1.0 mm.
Hexagonal platy crystals up to 0.1 mm; also as crusts.
As a parallel growth upon bolTite.
Tabular crystals, elongated, vertically striated; also long prismatic or acicular.
Prismatic to thick tabular crystals.
Short-columnar, fibrous crystals; radiate-fibrous, reniform-botryoidal agg.
Thin irregular plates with fibrous structure.
As equant grains; twinning lamellar.
Crystals small, often with curved faces; usually tabular, also acicular; striated parallel; also massive, ocherous.
Usually fibrous or as narrowplates. As stellate needle-like clusters. Twinning on {001} and {100} common.
Usually fibrous or as narrowplates. As stellate needle-like clusters. Twinning on {001} and {100} common.
Massive.
As dense coarse-grained aggregates up to 2 cm; also as polysynthetically twinned intergrowths.
Prismatic, thick-tabular, fragile, needle-shaped to capillary crystals; compact, granular, disseminated.
Well developed embedded and octahedral, cube-like, pentagondo-decahedral crystals; cube planes often striated; compact g
Crystals thin to thick tabular, flattened; also fibrous.
Crystals acicular.
Octahedral, granular, disseminated.
Crystals tabular, rhombohedral, or rarely prismatic; commonly massive, foliated, or as thin veinlets.
Radial, fibrous, needle-shaped, capillary, compact, radiate crystal masses; massive,earthy reniform, cone-shaped, loose.
Columnar, barrel-shaped, acicular, ventricular crystals; reniform, botryoidal, compact, massive, crusts, coatings.
Dodecahedrons or trapezohedrons; rounded grains without crystalline boundary, embedded or weathered, loose grains.
Small tabular crystals and embedded grains; also fine scaly.
Lamellar, massive, scaly, tabular crystals.
Tabular, columnar, granular agg.; compact.
Crystals tabular, commonly forming flat rhombs; also lath-like; striated; often sheaf-like aggregates resembling stilbite; twinnin
As discrete embedded grains.
Crystals commonly tabular; usually massive, cleavable to compact, also in embedded grains; twinning lamellar; simple; not co
Thick-tabular to short-columnar crystals; rose-shaped agg., disseminated, compact, granular, massive.
Euhedral grains from 0.1 to 2.3mm.
Irregular crystals; short prismatic or tabular.
As minute platy crystals.
Crystals hexagonal; enantiomorphic; short to long prismatic, rarely sceptred, elongated parallel, faces horizontally striated; te
As euhedral crystals up to 1 cm that are tabular on c-axis and elongated on b-axis.
Crystals tabular, sometimes slightly elongated; striated.
Usually as minute highly modified tabular or short prismatic crystals in aggregates; twinning common.
As crusts or sprays of needle-like crystals.
As bundles of finely acicular crystals elongated parallel to c-axis; fibrous.
Irregular aggregates.
As pseudohexagonal plates, pseudomorphs after an unknown mineral, consisting of bundles of fibres intimately mixed with py
Crystals acicular up to 2mm in length and 0.02 to 0.04mm thick.
Crystals up to 1.5mm.
Octahedral, cubo-octahedral to cubic crystals.

Crystals long prismatic or thick lance-shaped; twinning lamellar.
Crystals small (up to 1mm long), always twinned, flattened, and elongate parallel.
Lentiform, prismatic crystals; compact, finely radiate, granular.
Equant to tabular rhomb-shaped crystals.
As pseudomorphs after groutite crystals; also massive; platy or finely crystalline.
Massive; fine lamellarcrystals.
As radiated and rosette-like aggregates of needles and as crusts.
Massive as water worn pebbles.
Massive; as rounded or irregular grains.
As crusts and radiating tufts of acicular crystals.
As nodules approximately 0.3 mm in diameter and up to 1 mm.
Radial sprays of acicular crystals up to 2mm in length; crystals are elongated parallel.
Crystals commonly thick to thin tabular, slightly elongated and striated parallel; twinning common.
Aggregates of very fine, often curved needles, in grains up to 2mm in size.
Crystals prismatic; striated parallel to elongation; twinning producing polysynthetic pseudo-orthorhombic crystals.
Small rounded, irregular, polycrystalline spherules; also as tiny crystals.
Very fine-grained; as dense, slickensided masses, botryoidal crusts, and films, also as an interstial filling in sandstone.
As minute tabular grains.
Short to long - columnar, needle-shaped crystals; in druses; compact, granular, massive, disseminated, as encrustations.

Crystals octahedral, tabular; often in parallel grouping; massive, granular, and coarse fibrous.
Prismatic or equant crystals.
Crystals stubby prisms with characteristic wedge-shaped ends; always single, never twinned or composite; largest about 2mm
Fine grained aggregates; individual crystallites are hexagonal platelets up to 0.1mm in diameter and 0.02mm thick.
Crystals acicular.
Lancet-shaped crystals to 0.3 x 0.3 x 0.06mm.
Rough crystals 4.7 x 2cm.

Crystals, up to 2 mm long. Lathlike; as crusts and fibrous nodules.
Massive; idiomorphic grains.
Crystals thick tabular; also prismatic, elongated; as fibrous veinlets and crusts, and as twisted tufts.
Crystals prismatic or tabular.
As euhedral pseudohexagonal crystals up to 0.5 mm.
As prismatic elongated crystals.
Irregular rounded deposits 1-2cm in diameter.
Massive; micaeous spherical aggregates.
As aggregates of subparallel needles; as druses.
As aggregates of subparallel needles; as druses.
As tiny inclusions in wolframite and in ca-al rich inclusions in the allende meteorite.
Matted silky fibres in rosettes up to 2mm in size.
Minute grains.
Crystals dodecahedral or tetrahedral, up to 2cm in size.
Lentiform, rhombohedral crystals; often recurved, saddle-shaped agg., compact, granular, spathic, massive, botryoidal.
Columnar, thick-tabular to needle-shaped crystals; compact, granular, massive.
Massive.
Rhombic thin flattened plates; also stalactitic with bladed radiating structure.

As 0.5mm granular crystals; as lenses up to 5cm thick and 20cm in length.
Massive; compact or foliated, also as globules with radial-fibrous structure.

As spheroidal aggregates; rarely as tabular crystals.
Crystals minute pseudohexagonal tables flattened; as subparallel, lamellar aggregates; crystal corners truncated by tiny obliq
Crystals long prismatic, rarely terminated; twinning simple; lamellar.
Massive, compact.
Fibrous aggregates.
Rounded grains.
Massive granular; synthetic crystals short prismatic or thick tabular.
Crystals prismatic, elongated and flattened; up to 3mm long; as nodular masses from 1-9cm in diameter composed of aggreg
Massive, fibrous.
Elongated, thick platy inclusions.
Botryoidal aggregates up to 1cm, radial aggregates, as barrel-shaped crystals, as pseudo-hexagonal platy crystals up to 0.5m
Crystals slender prismatic, striated; massive, fibrous to compact.
As minute elongated slender prismatic crystals; as radial aggregates. Usually as botryoidal crusts.
Tiny stout crystals, usually less than 0.1mm; also as crusts.
As compact masses composed of minute prismatic crystals.; also fibrous.
Flat plates.
Fibrous aggregates, elongated along c-axis.
As minute grains.
Crystals tabular, consist of short flexible fibres.
Cryptocrystalline, botryoidal, reniform, mammilliform, compact, stalactitic, massive, fibrous.
As thin crusts composed of minute crystals.
Powdery, earthy crusts, compact masses, encrustations, coatings.
Crystals thick tabular; cuboidal; as crystal aggregates and crusts; granular; stalactitic.
Similar to parisite; most crystals singly terminated; the two pyramids are striated horizontally.
Thin botryoidal crusts.
Subhedral crystals to rounded grains.
Botryoidal or mammillary crusts with fibrous structure; and as felt-like crusts of microscopic crystals.
Tabular crystals; as thin plates or radiating fibres.
Minute scales, often in stellate groups.
Crystals short prismatic or thick tabular; terminations usually simple; crystal druses and as spherical aggregates; twinning con
Granular masses; distinct crystals not common.
Crystals prismatic or acicular, up to 2 mm long; usually massive with radial-fibrous structure.
Crystals tabular to lath-like; crystals occur in irregular clusters and often are dull and etched.
Crystals equidimensional to platy or acicular; usually less than 0.5mm in diameter; sometimes skeletal; inverts to sulphur at ro
Small glassy kernels embedded in metarossite; synthetic crystals usually elongated and flattened; rarely tabular, lath-like, or n
Crystals short prismatic, small and rare; as fine-grained or fibrous crusts.
Chalky masses; rhomboid tablets.
Platy crystals; rosettes up to 3 mm in diameter.

As small grains and veinlets. Polysynthetic crystals.
Crystals lath-like, elongated and striated, tabular.
Irregular masses.
Crystals tabular, very minute; usually as microcrystalline crusts.
Irregular grains or as aggregates.
Crystals short to long prismatic, vertically striated; also acicular, rarely flattened as thin tablets; 3-, 6- or 9-sided; hemimorphic
Foliated aggregates and as tabular grains up to 0.5mm.
Prismatic crystals elongated and twinned; usually forms spherules up to 1 mm across; rarely as isolated crystals.
Massive, compact, fine-grained.
Single, microscopic.

Crude tabular crystals up to 2mm in length; lamellar twinning common.
Irregular inclusions.
Minute grains.
Minute tabular crystals in rutheniridosmine.

Thin lath-like single crystals up to 3mm in length; elongated, large; microscopic fibrous aggregates; crystals often striated; ofte
Thick-columnar, needle-shaped crystals; often heart-shaped and reniform twins; longitudinal striation, compact, granular, tab
Felted masses of fibrous crystals up to several centimetres in length.
Radiating aggregates.
Powdery.
Minute platy grains upo to 0.01 x 0.001mm, fine grained powdery coatings and chalky aggregates.
Thin plates up to 1 mm on edge, square or rectangular lath-like in shape; plane of flattening uneven, warped or striated; dens
As flattened hexagonal prisms.
Lentiform, disc-shaped crystals; stellate triplets, compact, reniform, botryoidal, fibrous, finely granular, radiate, massive.
Tabular crystals.
Aggregates of thin plates up to 2mm.
Minute flattened rosettes or radiating crystals; crystals elongate parallel and flattened.
Massive; in lens-like bodies.
Fine capillary crystals, up to 1 cm long, in radiating aggregates.
Exsolution-like textures in stannite.
Botryoidal, compact, crusty, earthy, fibrous, skeletal crystals.
Crystals rectangular plates flattened, ranging in size up to 3mm on edge, flattened bipyramids; fan-shaped groups, subparalle
Tiny stout prismatic crystals with pyramidal terminations.

Prismatic crystals with rectangular cross-section.
Crystals very thin, lathlike elongated and flattened.
Crystals prismatic.
As well-formed crystals up to 1 mm.

Prismatic.
As aggregates of microscopic fibers; chalk-like compact masses.
As microscopic tabular crystals, recticular aggregates and fine granular masses.
Radiating lamellar aggregates composed of thin prismatic to tabular crystals flattened and as fibrous to prismatic crystals in ve
As rosettes of acicular crystals. Rosettes up to 2.8 mm in diameter.
Drusy aggregates of platelets up to 0.5 mm long.
Irregular grains up to 0.06 mm long.
Compact, earthy, loose, massive, scaly.

Crystals tabular; usually granular, disseminated.
Long tabular crystals up to 1mm in length elongated parallel.
Crystals nearly equant; irregular masses.
As irregular masses with fibrous structure. Commonly intergrown with graftonite.
Crystals commonly thick tabular and slightly elongated; short prismatic; usually uneven; granular; as spherical forms.
Microscopic prismatic crystals; nodular masses.
Crystals prismatic and deeply striated; terminations often rounded and irregular, occasionally cavernous; parallel groupings; tw
Massive.
Powdery.
Crystals tabular, pseudohexagonal; as plates less than 1mm in diameter; rarely needle-like; commonly as coatings and small
Minute irregular grains forming dense rounded aggregates up to 6-8mm in diameter; rarely as tabular rhombic forms up to 0.0

Elongate grains in radiating aggregates.
Massive; clay-like; as minute micaeous plates.
Less than 1mm prismatic crystals.

Tabular crystals up to 5 x 5 x 1mm, as dense fine-grained aggregates and as irregular grains.
Anhedral to euhedral crystals, up to 1mm in diameter; sugary-textured crystal aggregates; stalactitic and as fine-grained crust
Deliquescent crystalline crusts.
Massive, compact; composed of thin plate-like crystallites across basal plates.
Bundles of thin tabular crystals in subparallel or slightly divergent groups; poorly developed; microscopic lath-like grains.
Crystals up to 1 cm long.
Crystals prismatic; striated parallel.
Minute crystals with pronounced trigonal habit with the suggestion of rhombohedral symmetry.
Massive, granular.
Crystals fine fibrous to needle-like up to 2mm in length.
Pseudooctahedral, tabular, pyramidal and embedded crystals; compact, granular, crusty, as impregnation.
Small indistinct flat crystals; synthetic crystals tabular, single stout rods elongated.
Rough crystals, metamict.
Crystals tabular to scaly, crystals up to 1mm.
Massive, fine granular.
Crystals blade-like, elongated parallel; small micaceous rosettes up to 1mm in diameter.
Druses with crystal aggregates up to 7mm.
Microscopic bladed tabular crystals, elongated; also as rosettes; microcrystalline coatings.
Massive, very fine-grained.
Crystals tabular, elongated, psuedohexagonal, also prismatic; rarely as dense microcrystalline aggregates.
Thin bands, individual grains.
Crystals acicular, tabular, or platy, up to 2.5cm in length; sometimes pseudohexagonal in cross-section; interlocking tufts and
Rosettes, sprays, mats; rarely as lath-shaped single crystals up to 2mm that are elongated and tabular.
Triangular, short to long columnar, acicular crystals; tabular, fibrous, massive, compact, radiating agg. , longitudinally striated
Crystals usually dodecahedrons or trapezohedrons; also in combination, or with hexoctahedron; massive; fine or coarse granu
Crystals rare, often rounded; as plates, tablets, rods, or needles.
Tiny grains.
Tabular, thin, micaceous crystals; fine-scaly agg.; earthy, encrustations.
Crystals minute, up to 0.5mm, twinning.
Crystals thin hexagonal plates, minute; as thin films or crusts.

Acicular crystals up to 0.3 mm long.
Thin tabular crystals in clusters.
Crystals flattened, usually with rhombohedral outline resembling gypsum; faces commonly striated.
As crusts.
Crystals flat-pyramidal, rounded; as crusts and masses, compact to earthy.
Columnar, needle-shaped to capillary crystals; bunchy, radial, fibrous agg.; also compact.
Short-columnar, pyramidal, tabular, needle-shaped crystals; globular agg.; reniform, finely granular, massive.
Massive; compact and granular.
Chisel-shaped or bladed crystals up to 1 mm in length and in fan-shaped aggregates.
Acicular crystals.
Small prismatic crystals, large subhedral crystals, or spherulites composed or radiating fibres.
Massive; as tiny grains.
Radiating-fibrous bundles of crystals, tenths to hundredths of a millimetre long; powdery.
Thin plates.

Crystals long, vertically straited, nearly square in cross-section, up to 1mm in length.
Aggregates and crusts of pseudo-octahedral crystals.
Radiating crystals up to 5 cm; prismatic; also fibrous.
As tiny inclusions in antimony.
As 60-70cm poorly formed crystals that are usually twinned.
Crystals acicular; often hollow and tube-like; felty aggregates or clustered in sheet; also as small glossy globules.
Irregular, 0.005 to 0.08mm aggregates of platy crystals.
Crystals equant; short prismatic to tabular; often striated; twinning very common.
Crystals stubby prismatic to acicular; as fibrous aggregates.
Tetragonal bipyramidal crystals; always forms intricate interpenetration twins.
Tabular prismatic crystals; radial-fibrous, globular agg.; crusts.
Rough crystals and rounded fragments.
Crystals octahedral, up to 3cm along an axis; massive, granular, or as crusts.

Thin plates of pseudohexagonal crystals. Coatings on fractures.
Compact, earthy, massive, nodular masses, porous.
Crystals thick tabular or prismatic; often in aggregates of randomly intergrown crystals.
Massive; as aggregate of irregular veins. Polysynthetic twinning.
Very fine-grained aggregates.
(Antigorite) microcrystalline, foliaceous, scaly, massive, compact, disseminated.
Crystals minute, lath-like, elongated and flattened; as tufts, crusts and rounded masses with satiny surface.
Elastic fibers.
As irregular veins in cubanite.
Fine-grained.

Massive; as embedded grains.
In crusts of radiating fibers; as rosettes.
Crystals slender prismatic, 1 to 2mm long; radiated spherulitic aggregates; compact, granular, fibrous.
Crystals prismatic elongated and up to 5 cm long.
Finely fibrous aggregates of acicular crystals.
Equant and slightly flattened crystals;.
Tabular, hexagonal, millimetre-sized crystals.
Crystals wedge-shaped up to 15mm in maximum dimension, tabular, equant to short prismatic; striated and oscillatory.
Prismatic to radiating fibrous aggregates.
Massive.
Thin coatings.
Rhombohedral, lenticular, often curved, distorted crystals; saddle shaped agg.; coarsely to finely granular, spathic, massive.
Minute needles; fibrous crusts or nodular masses; earthy.

Divergent groups of acicular crystals and as fibrous crusts.
Irregular grains and rectangular blocky crystals up to 2cm.
Tabular crystals up to 0.2mm in length.
Crystals usually octahedra; commonly massive, compact to granular; twinning.
Small spheres with radiating fibrous structure.
Short prismatic crystals. As pseudomorphs after vauxite.
Monomineralic masses of crystals; distinctively punky, light in heft, very porous when dry.
Massive, fine-grained; earthy.
Columnar, prismatic.
Filiform, sheet and curl-shaped, mossy, compact.

Encrustations.

Tabular to lamellar, hexagonal crystals up to 1mm across.
Micaceous plates and hemispherical aggregates of plates.
Tabular crystals; also bipyramidal crystals up to 5 cm long.
Crystals thin to thick tabular, usually square in outline; often in compact, irregular or scaly masses; flattened, nearly circular ro
Massive; rounded grains.
As crystals <3mm, elongated, polysynthetic twinning common.
Found as a single, equant, highly twinned crystal, about 3mm across, on a crystal of binnite; twinned planes.
Crystals lath-like, up to 0.2mm long, and as irregular grains.
Thin, hexagonal plates flattened.
Microscopic, irregular, 0.1mm grains polysynthetically twinned.
As prismatic acicular crystals; as mammillary crusts, fibrous aggregates and earthy masses.
Octahedral crystals; compact, granular, massive, reniform, reticulated.
Minute tabular crystals. As crusts and fine granular coatings.

Tabular crystals and intergrowths up to 2mm.
Crystals equant; tabular, hexagonal aspect.
Small rhombohedral crystals; compact, botryoidal, reniform, finely granular, massive, sinter crusts.
As earthy dense aggregates of fibrous material.
Crystals hexagonal in outline, platy, ranging from 0.05 to 1.25mm in diameter.
Platy masses up to 5mm wide, flattened.
Less than 0.1mm grains.

Seldom isometric crystals; mostly compact, granular agg.
Small pyramidal crystals; mostly compact, crusty, earthy.
Crystals octahedral (synthetic).
Thin plates; foliated and radiating masses.
Pseudohexagonal rystals; as powdery crusts.

Crystals cubic up to 0.5mm in maximum dimension.
Tabular to elongate crystals up to 2 cm; radial fibrous aggregates;.

As efflorescences of compact microcrystals.
Massive; platy.
Crystal intergrowths up to 8mm in size; intergrowths consist of three mutually perpendicular sets of intersecting crystals whos
Crystals up to 0.1mm in diameter and 0.2mm in length.
Crystals prismatic, often anhedral; massive, fine-grained.
Crystals platy, thin; in sheaves and rosettes forming subparallel and radiating aggregate from 0.5 to 1mm across.
As <0.02mm grains forming xenomorphic veins in chalcopyrite.
Crystals equant to thin tabular; always elongate; commonly heavily striated.
Crystals acicular or elongated tabular, up to 10 x 1 x 1cm in size.
As acicular crystals.
Anhedral grains up to 0.01mm across, commonly very finely polysynthetically twinned.
As coarse fibrous masses. Polysynthetic twinning.
Crystals short prismatic or tabular, usually holohedral, less commonly hemimorphic; crystals hexagonal in aspect; prism and t
Crystals tabular, elongated; terminations blunt or lancelike; commonly striated; massive, stalactitic, with platy to columnar stru

Crystals cubic or cubo-octahedral; sometimes highly modified.
Botryoidal aggregates composed of lath-like crystals; radial aggregates of blade-like crystals.
Crystals usually dodecahedrons or trapezohedrons; also in combination, or with hexoctahedron; crystal faces often striated; n
Crystals rare; small spherical masses, crusts with a crystalline surface and a radial internal structure.
Cubic, often twinned crystals, tetrahedral, dodecahedral; coarse to fine-grained, compact, massive, botryoidal.
Earthy.
Octahedral, embedded crystals; granular.
Found in polished section replacing other copper sulphides.
Small cleavable masses.
Wide-tabular, columnar, thick-tabular, spathic.
Crystals anhedral; massive, granular; twinning simple; polysynthetic.
Crystals platy, also as granular aggregates.
Occurs as < 1mm inclusions in pebbles of zirconolite and baddeleyite and in gem gravels.
Massive; as irregular grains and thin veinlets up to 1mm in diameter.
1.5Mm fragments or efflorescences.
Pseudocubic, tetrahedral crystals; compact, finely granular, disseminated, massive.
Massive.
Inclusions forming narrow rims around wodginite.
Massive.
Massive; as powdery efflorescence.
Short and long columnar crystals; often cruciform twins.
Crystals elongate.

Usually as irregula masses; rhobohedral crystals.
Tabular crystals in druses; rose-shaped agg.
Minute equant crystals.
Massive, as grains up to 4 x 1 cm in size.
As xenomorphic grains; synthetic crystals rhombohedral or hexagonal prismatic, with twinning.
Thick tabular, columnar crystals; rose-shaped clusters, compact, disseminated, encrustations.
Crystalline masses and nodules; synthetic crystals short prismatic; twinning repeated, simulating monoclinic symmetry.
As minute aggregates of lathlike crystals.
Crystals thin hexagonal plates; fan-shaped aggregates or rosettes; crystals faintly striated; twinning common.
Plumose; bundles of fibres; observed in polished section as needle-like laths and anhedral grains.
Massive.
Massive; fine-grained; typically pseudomorphous after pectolite.
Minute crystals with steep terminations and as tufts of fibres.

Massive, fine-grained, compact; as crusts, botyroidal, pulverulent.
As anhedral grains and poorly formed octahedra.
Crystals prismatic, sometimes flattened parallel, prism faces vertically straited; twinning, polysynthetic.
Massive; as minute grains.
Crystals prismatic; thin tabular, to thick nearly equant; striated parallel; twinning, polysynthetic.
Radiating fibrous crystals up to 2mm in diameter that are easily split into flexible elastic fibres.
Long columnar, needle-shaped, often longitudinally striated crystals; fibrous, massive.
Massive, foliated, lamellar, fibrous; in micaceous scales.
Tabular, columnar, globular.
Massive; observed only in polished or thin section.
Microscopic, anhedral.
Crystals rhombohedral; up to 5mm in diameter; usually massive, compact.

Platy crystals; fibrous.
Massive, fine granular, usually of submicron size.
Crystals cubic, 0.02 to 0.15mm in size.
Polycrystalline aggregates and platy crystals.
Crystals pyramidal with large faces.
Dipyramidal, tabular.
Pseudo-octahedral crystals up to 1cm in size.
As fibrous foliated masses.
Radiating aggregates.
Platy to fibrous aggregates in spherulites up to 0.5mm in size.
Platy.
Powdery crusts and as plates up to 1.5mm in length.
Crystals pseudo-octahedral, thin to thick tabular, stout prismatic; small spherical aggregates with radial-fibrous structure and c
Small crystals.
Pseudohexagonal prismatic crystals formed by twinning; usually massive, compact.
Aggregates of anhedral crystals up to 1 mm across.
Pointed, fragile, needle-shaped crystals, fibrous, compact, radial.

Small plates, mostly 0.10 - 0.15mm, but up to 2mm in size, fine lamellar structure.
Rounded grains. Lamellar or interpenetration twins.
Lathlike crystals.
Tabular crystals up to 3 x 1 x 0.5mm in size.
As pseudo-orthorhombic bipyramidal crystals.

Poorly formed oval crystals.
Divergent tufts and felted coatings of tiny hair-like or lath-like crystals; laths flattened.

Wedge-shaped; coffin-shaped; tabular.
Crystals acicular, up to 4.0mm long and 0.01mm in diameter; as radial aggregates and thin crusts.
Microscopic masses up to several tenths of a millimetre.
As euhedral crystals, stubby to elongate prismatic.
Massive compact granular aggregates; rarely as hexagonal equant crystals.
Fibrous aggregates.
Microscopic, elongated inclusions in cobaltite and maucherite.
Massive; fine grained.
As blebs to elongated grains.
Aggregates of subhedral grains.
Crystals short to long prismatic.
Crystals usually dodecahedral, cubo-octahedral, or octahedral, ranging up to 3cm in size.
Occurs as a 1mm rim around tsumoite.
Pyramidal, tabular, many-planed crystals; compact, lamellar, massive, granular, reniform, earthy, powdery.
Crystals cubic up to 2.5cm, commonly massive.
Plumose aggregates composed of overlapping platy crystals up to 8mm in length.
Granular; fine-grained; stellate.
Aggregates comprising crystals up to 0.2 mm that are tabular.
Found in veinlets up to 50 mm thick as compact aggregates.
Massive, fibrous.
As acute rhombohedral crystals with modified faces of the basal pinacoid or a hexagonal prism.
Veinlets or masses with fibrous structure; also as embedded masses, sometimes dense porcelaneous or chalky.

Tiny flakes and aggregates.
Massive; short prismatic crystals.
Rhombohedral or pseudocubic crystals.
Forms aggregates of contorted flakes.
Crystals up to 2mm in length elongated and as irregular platy segregations up to 10 mm.

As nodules up to 3 cm in diameter; tabular crystals.
Acicular prisms, crystals up to 0.8mm.
Crystals minute, prismatic; as crusts.
Short prismatic crystals up to 8mm in size.
Bipyramidal crystals up to 1mm.

Crystals up to 5mm, tabular or bladed and elongated.
Tabular; prismatic; lamellar, skeletal.
Cubic-octahedral crystals, massive.
As small imperfect crystals and as spherical aggregates with radial-fibrous structure; earthy.
Short prismatic crystals; commonly colour zoned;.
Crystals thin to thick tabular, pseudohexagonal, minute; twinning very common.

Massive; as fine-grained compact masses.
Crystals tabular or prismatic, often modified and sometimes several centimetres in size; striated parallel to c-axis; twinning co
Fibrous veinlets or masses; also as embedded nodules, sometimes dense or chalk-like.
As stalactitic masses.
Crystals bipyramidal, often distorted; also globular, stalactitic; soluble in water.
Crystals hexagonal or lenticular, small; also as fine-grained aggregates.
Massive.
Massive; as rounded masses.

Prismatic crystals, also as curved plates; polysynthetic twinning.
Crystals tabular, pseudohexagonal, up to 3.5 x 5 x 0.5cm; also as scales and cryptocrystalline aggregates; twinning as penet
Massive; intergrowths or as narrow borders around kamacite.
Equant small grains.
As 0.3 to 0.5mm rounded inclusions; vein-like inclusions up to 12mm long.
Massive, in irregular nodules 1-15 cm across.
As acicular crystals up 1 cm long.
Massive.
Compact, lamellar crystals, massive, scaly.
As druses of minute crystals and as fine crystalline aggregates.
Massive.
Crystals thin tabular or short prismatic; usually as fine-grained or fibrous masses.
Isolated crystals up to 1mm in length and as druses of columnar individuals.
As small seams caryopilite.
As well-formed prismatic crystals.

As indistinct tabular orthorhombic crystals.
As 0.5mm long and 0.02mm wide veinlets and 0.4 to 0.5mm lenticular grains.
Crystals short prismatic or equant, often appearing monoclinic or orthorhombic due to distortion; twinning common, simple an
Massive fibrous. Also as euhedral tabular crystals.
As subhedral to euhedral prismatic crystals.

Minute lath-like crystals; also massive, claylike, pulverulent to compact.
Crystals thick tabular, flattened, twinning, pseudohexagonal.
As tangled platy aggregates; individual plates up to 3 mm.
Crystals short prismatic or equant; commonly rounded and deeply striated; aggregates or crusts.
Well-formed short prismatic to equant crystals up to 1cm in size.
Irregular 0.01 - 2mm grains and as cubes and cubo-octahedral up to 2mm.
Crystals equant or short prismatic up to 1mm; often in druses of interlocking crystals; also in fine granular crystalline masses a
Irregular grains; also rounded or thick tabular isometric crystals 0.01 to 0.2; rarely up to 1.5 mm, some with perfect faces.
Crystals tabular; thin; nearly square outline; commonly striated; usually massive aggregateds of thin molybdenite-like lamellae
Crystals tabular, flattened; as interpenetrating groups of crystals.
Crystals prismatic, up to 1cm long; faces dee;ly etched; as aggregates of intergrown crystals and as crusts.
As rounded to elongate, microscopic grains.
Crystals lath-shaped; twinning perpendicular to the elongation axis is common.
Crystals acicular, or as thin striated plates; also as spherical masses with radial structure, and as pulverulent coatings.
Columnar, short needle-shaped crystals; mostly compact, finely granular, fine tabular, disseminated.
As foliated masses or irregular plates.
Irregular grains.
As microscopic grains.
Microscopic grains.
As thin crystalline to powdery coatings; also as thin fibrous mammillary crusts.
Crystals tetrahedral, often modified by other forms; massive, coarse granular to compact; contact or penetration twins commo
Crystals very thin, elongated, straited laths; as thin scales or curved plates; massive-compact to powdery; twinning common,
Crystals generally short prismatic, highly modified, usually elongated parallel; massive, compact, or as disseminated grains; tw
Crystals prismatic, often flattened; massive aggregates of distorted crystals, also a fine powder.
As 1 to 3.5mm plates.
Crystals acicular, greatly elongated with rhomboidal cross section perpendicular to this direction; cauliflower-shaped nodules;
Massive, compact crystalline.
Irregular, short prismatic, 0.07 to 0.10mm grains.

Irregular grains often with striations on the surface.
Crystals usually indistinct; steep pyramidal with pyramid faces striated horizontally; commonly massive, granular to foliated; a
Tetrahedral, granular to massive.

Found as epitactic overgrowths on natrolite; as euhedral crystals to 0.1mm; as fine silky, fibrous sprays.

Crystals resemble minute wulfenite crystals; prominent pyramid; as minute, rounded, rough-surfaced, globule-like masses.
Clevablemassive, coarse-grained.

Crystals tabular or prismatic; usually compact massive.
Minute aggregates.
Acicular crystals. Usually massive.
Cleavage plates up to 2 mm across.
Crystals tabular, dipyramidal, rarely prismatic; crystals up to several inches in length common; also as crusts and efflorescenc
Less than 1 mm crystals and as less than 0.5 cm crusts sometimes consisting of very fine fibrous crystals.
As a crust or efflorescence; also as clusters of platy needles.
Tabular crystals.
Crystals often resemble cubes; commonly prismatic; also tabular; prism faces striated parallel; also as stalactitic masses and
Acicular, short-columnar, thick-tabular crystals.
Massive; cryptocrystalline.

Crystals short prismatic; subhedral; as irregular masses up to 5 x 10cm; twinning, lamellar.
Crystals commonly cubic or cubo-octahedral; found as embedded grains or crystals; as crystals, often water worn, in alluvial d
As prismatic tabular crystals. Curved faces are common.
Short-columnar, pyramidal, embedded crystals; massive, compact, lamellar, disseminated.
As dense fine-grained aggregates pseudomorphous after thorite; as earthy masses or opaline crusts.
Platy crystals, usually 2 - 5mm, sometimes up to 1cm in length, with rough faces; weakly magnetic.
Prismatic crystals.
Short prismatic crystals up to 2 cm in length.
As micaceous tabular crystals elongated with a maximum length of 1 mm.
Crystals tetrahedral; usually dull, frequently striated; commonly massive, compact granular.
Massive; finely crystalline aggregates up to 5 x 6cm in size.
Small crystals, up to 5mm in diameter; combinations of several prisms.
Crystals often complex, up to 6mm in greatest dimension; sometimes elongated, and flattened; massive; twinning common.
Massive; also as rounded grains or irregular plates; twinning common.
As minute embedded grains; also small rounded grains in placer deposits.
Crystals prismatic, from tenths of a millimetre to several centimetres; often in radiating fibrous aggregates and rosettes up to 3
As a fine-grained powder.
As <0.1mm epitactic overgrowths on leucophosphite with a parting surface developed between the two.
Massive; bladed, in parallel aggregates and radiating fibrous cluster.
Fibrous to platy.
Elongate prismatic crystals up to 3 mm in lenght. Radial sprays.
As 0.2 to 0.4mm grains, rarely up to 1.5mm, in aggregates up to 4 to 6mm in diameter.
Crystals long prismatic to acicular; usually in compact aggregates; twinning common.
As rough crystals and granular aggregates.
Columnar, wedge-shaped, tabular, needle-shaped crystals.
Tabular crystals; also granular.
As a single grain composed of many twinned crystallites.
As spherules or arcuate bands of minute lath shaped crystals.
As thin paint-like films.
As clayey material.
Massive; finely fibrous, granular, or as plates.
Acicular crystals, in radiating fibrous aggregates.
Crystals very minute, thin plates flattened; as nodular masses with concentric layering; stalactitic; columnar to fine fibrous agg
Radiating columnar aggregates.
Fibrous moss-like growths.
As aggregates with a skeletal isometric crystal outline; anhedral inclusions.
Massive.
Small euhedral tabular crystals up to 1.5mm in length.
Pseudohexagonal, 0.1 x 0.3mm crystals, some having spear-like terminations.
Short- to long- columnar crystals with orthorhombic outline, as impregnation; compact massive.
Thin tabular, scaly crystals; also earthy.
Massive, fine-grained.
Massive, granular.

(Elbaite) crystals short to long prismatic, vertically striated; also acicular, rarely flattened as thin tablets; 3-, 6- or 9-sided; hem
As thin laths from a few microns in size.
Euhedral crystals.
Crystals equant or short prismatic; sometimes irregular.
Needle-shaped, fibrous, capillary, radial, compact, asbestos-like.

Crystals octahedral, distorted; commonly massive.
As aggregates of flat triangular or rhombohedral crystals up to 0.2 mm across.
Crystals tabular, pseudohexagonal, as inversion polymorphs after b-tridymite.
Crystals thick tabular with triangular outline.
Massive.
Crystals prismatic, pseudohexagonal, up to 8 x 12mm; twinning, poysynthetic.
Crystals rare; stout prismatic, often with rounded or rough faces; usually massive, cleavable.
As rough crystals; commonly massive.
Crystals prismatic, vertically striated; usually as columnar to parallel-fibrous aggregates; also divergent fibrous; granular.
Crystals short prismatic, often slightly bent.
As microcrystalline aggregates; compact or earthy, nodular.
Acicular to fibrous crystals or radial aggregates.
Acute triangular pyramidal crystals.
Massive, compact.
Thin tabular crystals. Crystals usually composite with uneven faces.
Massive; observed only in polished section.
Massive, compact granular.
Massive, lamellar.
Crystals elongated and flattened; commonly massive, fibrous or columnar, also as thick plates.
Massive; as spherical aggregates.
Crystals euhedral, minute.
Short prismatic. Massive; simple and lamellar twining common.
Crusts, fibrous, lamellar.
Spherulitic crusts or intergrown subparallel crystals.
Tick tabular crystals; as twinned trillings or more complex groups. As crusts.
Irregular aggregates up to 1cm across consisting of tabular crystals up to a few millimetres across.
As free grains but more commonly observed in polished section.
As 0.5 to 1.5mm prismatic or thick tabular crystals.
Massive, compact; twinning.
Crystals prismatic.
Massive; as minute grains.

Acicular crystals, also as spherules.
Prismatic and tabular crystals up to 4cm in length; also as fine-grained nodules.

Massive; as fine scaly or feathery aggregates.
Crystals microscopic, platy; usually massive, earthy to powdery.
Fine-grained aggregates or in small tabular crystals; rarely in macroscopic tabular crystals that form parallel groups.
As millimetre to centimetre-sized fan-shaped aggregates or rosettes of fine fibres.
Prismatic crystals up to 1.5mm in length; also as anhedral masses.
Cryptocrystalline, compact, reniform, massive, conchoidal, botryoidal, crusts, veins, coatings.
Cleavage fragments.
As lamellar intergrowths up to 1.5 cm and as small tabular crystals.
Granular aggregates.

Only two megascopic grains, the larger about 1.5mm in diameter and four microscopic grains have been found; the grains are
Crystals octahedral, sometimes modified with cube faces.

Massive; radiating crystals.
Lamellar crystals; mostly radiating.

Crystals cubic; also as rounded embedded grains.
Crystals tiny scales and laths elongated and flattened; crystal faces dull and somewhat curved; commonly massive, compact
As anhedral grains and subhedral crystals.
Crystals prismatic, flattened, up to 2mm in size.
Crystals usually acicular, greatly elongated; commonly as nodules or lens-like masses of radially oriented or randomly arrang
Compact, granular.
Sprays of prismatic crystals to 1 mm.
Massive; as very fine microscopic exsolution lamellae.
Massive, in small grains or fine granular aggregates; sometimes exhibits fine lamellar twinning.
Platy crystals flattened.
As poorly formed tetragonal crystals up to 3 mm accross. Massive.
Crystals plate-like; also fine-grained crystalline, platy, or foliated aggregates.
Crystals thick tabular, flattened; pseudorhombohedral.
As needle-like crystals.
As radiating-fibrous aggregates of prismatic crystals up to 0.5 to 0.7cm in size.
As concretions composed of radiating fibrous spherulites 2-3mm in diameter, and in sheaf-like growths.
As square tablets; as small rosettes and as lichenlike deposits.
As acicular crystals elongated on [001]; radiating aggregates.
Rarely cube-shaped, octahedral crystals; massive.
Modified octahedral crystals.
Foliated, needle-shaped, scaly, crystals; lamellar.
Crystals prismatic, up to 8mm long, nearly square in cross section; acicular to hair-like; as radiated or tufted aggregates or cru
Crystals prismatic up to 1mm long, elongated, with square or rectangular cross-section; sometimes flattened; crystals often te
As thin felted crusts; as globular aggregates and rosettes of tiny lath-like crystals.
Needle-like crystals.
As fan-like groups of thin rectangular plates and laths flattened, elongated and striated parallel to elongation; sometimes twinn
As half-globular aggregates, sometimes rough and drusy, composed of minute acutely terminated crystals; aggregates do not
Crystals small thin rectangular plates, flattened.
Spherulitic aggregates.
Massive; as octahedral crystals.

Irregular polymimerallic intergrowths up to 4mm.
As 1 x 3mm elongated, prismatic crystals.
As a constituent of bird guano.
Short prismatic crystals up to 2mm.
In irregular grains 0.5 to 3mm, also as indistinct elongated platy forms up to 1.5 x 0.5cm.
Massive; twinning common.
As microcrystalline masses and coatings.
Dodecahedral crystals; granular to massive, as crusts.
Equant, short to long prismatic crystals.
Found in polished section as blebs, and as rims.
Prismatic crystals; sometimes forming cross-like twins.
Crystals octahedral or cubic.
Needle-shaped, tabular, scaly crystals, compact, fibrous, radial, granular.
Massive.
Short-columnar, barrel-shaped crystals; reniform, botryoidal, compact, fibrous.
Crystals wedge-shaped averaging 0.025mm in size.
Rarely as very small crystals tabular; as radial fibrous rosettes and as lamellar masses.
Crystals prismatic, elongated; striated; tabular; pseudohexagonal; commonly as dense microcrystalline aggregates.

As elongated plates.
Massive; as bedded aggregates or anhedral grains.
As crystal plates, flattened.
As platy pseudohexagonal crystals; as fine crusts.
Usually massive, nodule; rare crystals.
Massive; earthy, porous.
Massive, granular.
Massive, compact to porous; also as spherical aggregates with a radial fibrous structure.
Finely fibrous, platy.
Crystals usually wedge-shaped, minute; as irregular aggregates; fibrous; compact; granular.
Crystals minute, tabular, and somewhat elongated; as radial or subparallel aggregates; twinning.
Crystals prismatic; in drusy aggregates; usually massive, granular.
Crystals platy, flattened, elongated; slender prismatic to fibrous; as groups of divergent plates and cross-fibre veins.
Well-formed, platy, rhombic crystals up to 2mm; polysynthetic twinning.
Commonly massive or as disseminated anhedral grains; crystals elongated with prism zone almost equant; faces roughened

As crusts and concretions; massive.
As prismatic hexagonal crystals.
Massive; platy crystals.
Flattened, pseudohexagonal prisms up to 4mm thick.
Lamellar aggregates and as polysynthetic twins with pseudohexagonal outline up to more than 0.5mm in diameter.
Columnar, needle-shaped, pyramidal, thick tabular crystals; compact, granular, massive, radial.
As granular aggregates; short prismatic, thick tabular crystals.
As flat prismatic crystals up to 3 mm long.
Flattened and elongated crystals. Polysynthetically twinned.
Lamellar 0.5mm grains; twinned.
As cubo-octahedral crystals; in irregular masses also as radiating nodular masses.
Crystals minute; usually massive, granular.
Crystals tabular and elongate, in rosette-like aggregates up to 5mm across.
Crystals up to 2 mm in size.
Grains up to 1mm.
As spherulites and in aggregates of fibrous crystals; less commonly as fine prismatic crystals.
Massive; granular to compact.
Well formed hexagonal prisms with heagonal bipyramidal terminations.
Massive.
Usually massive; rare prismatic crystals.

Long-columnar, needle-shaped, tabular, compact, reniform, globular, radial, earthy, powdery.
As acicular radial aggregates.
Grains up to 0.5 x 1 x 1.5cm in size.
As coatings and aggregates of tiny scales; scales are rhomboidal in outline, resembling gypsum, and are striated on the flat s
Massive, compact; scaly crusts and scales with triangular or hexagonal outline; rosette-like, honeycombed, or boxwork-like ag
Plates of elongated outline with angles near 60_ and 120_, sometimes rhomb-like; plates up to 1.5 x 0.5 x 0.05mm in size; as
Crystals octahedral, dodecahedral and in combinations of these; also massive, granular.
Massive; as embedded grains less than 0.3mm in size.
As granular polygonal aggregates and occasionally stubby prisms having diamond-shaped cross section.

Crystals small, thick tabular or pyramidal; usually in groups.

Anhedral to subhedral crystals; rarely euhedral; crystals are from 0.03 to 0.5mm in size and elongated.
As aggregates of prismatic or blade-like to irregular grains.
As plates up to 1.8 x 1.5 x 0.15cm.
As small grains.
As tabular crystallites and aggregates.
As minute irregular masses, rarely in well-formed prismatic crystals up to 0.07mm.
Slender, prismatic, 0.5 to 0.7mm crystals.
Crystals prismatic, hexagonal in cross section; usually terminated by basal pinacoids, sometimes with modifying pyramid face
Anhedral grains in microcrystalline aggregates pseudomorphing olivine fragments.
Short-columnar crystals with longitudinal striation, mostly compact.
Crystals subhedral up to 15mm, sometimes showing octahedral-like faces; twinning lamellar.
As euhedral grains, cubic and octahedron common forms; some grains zoned, consisting of a core of awaruite surrounded by
Crystals prismatic or fibrous, up to 2cm long.
As crystals up to 1 mm.

Massive.
Rosette-like aggregates of thin bladed crystals.
Massive.
As flattened, radial clusters of platy 0.1mm crystals.
Crystals lath-like, up to 2 mm long, elongated and flattened; as subparallel aggregates and radial groupings; commonly twinn
Crystals nearly equant to short prismatic, anhedral to subhedral; grain size ranges from a fraction of a millimetre to 15mm in le
Pyramidal crystals, granular, fibrous.
As aggregates of platy crystals.
As radiating masses of bladed crystals up to 3 x 0.5 x 5mm.
Small, prismatic crystals; granular.
Prismatic; acicular radiating aggregates.
Massive, fine-grained.
Irregular grains and fine-grained masses.
As minute isolated pyramidal crystals; occasionally in small aggregates; also as crystals up to 4 cm.
As small spherulites of radiating crystals.
Crystals acicular to bladed; up to 5cm long.
Crystals prismatic, indistinct; usually massive, fibrous to prismatic, or foliated.
As earthy crusts.
Powdery encrustations or pseudomorphs after pharmacolite or haidingerite.
Irregular grains, rarely prismatic or tabular with striations parallel to their length; grains range from 0.005 to 0.5mm in length.
Massive, compact.
Crystals of indeterminate morphology; up to 2cm in size.
Crystals uniformly penetration twins; small crystals.
Crystals roughly hexagonal in outline elongated parallel; prism faces heavily straited and grooved parallel to base due to oscil
Crystals thick prismatic, up to 3mm in length; resemble monoclinic pyroxenes in development; invariably polysynthetically twin
As stout prismatic crystals.
Crystals prismatic, up to 5cm in length.
Crystals thin hexagonal plates.
Massive; as minute irregularly shaped blebs and stringers disseminated in maucherite.
Aggregates of blue acicular crystals.
Massive, fine granular; fibrous to acicular.

Columnar, tabular crystals, often twinned in heart shape.

As prismatic crystals up to 2 cm long, often twinned.

Crystals rhombohedral, rarely tabular; also coarse granular to earthy.
As prismatic pseudo-orthorhombic crystals up to 2mm in length; elongated; pseudo-orthombic habit is produced by twinning b
Crystals tabular, from 0.2 to 1.5mm in size.
Octahedral crystals.
Masses and plates; parallel; striations.
Thin tabular crystals.
Spheres with radial fibres.
Crystals prismatic, pseudohexagonal; single or in radiating clusters.
As prisms.
Cery fine-grained fibrous aggregates.
Massive.
Small, needle-shaped, columnar crystals; compact, coarsely to finely granular.
Massive; fine grained.
Crystals occur as <1mm trellis-like twinned aggregates twinned by rotation; individual crystals are tabular, flattened.
Crystals cubic or pseudocubic, several millimetres to a side.
Prismatic crystals, thin fibres, blades, acicular prisms and rosettes.
Simple cubes up to 0.5 mm,sometimes modified by the octahedron; may have concave faces.
As fibrous masses.
Dipyramidal; massive; fibrous.
Crystals prismatic to thick tabular; also columnar or acicular; massive.
Massive; resembles molybdenite.
Small grains; radiating grains.
Tabular and prismatic crystals. Complex twinning sometimes present.
Prismatic crystals, vertically striated. Usually as columnar to fibrous aggregates.
Tabular, needle-shaped crystals; lamellar.
Prismatic grains.

Thick-tabular, needle-shaped, fibrous.
As crystalline masses, spherulites and nodules.
As irregular basal cleavage plates.
As small crystals, usually pseudocubic, also tabular. Crystal faces commonly rough, curved or striated.
Botryoidal masses, and soft almost pulverulent coatings.
As well-formed crystals up to 0.5 x 1mm; twinning.
Short-columnar, tabular, octahedral, pyramidal, granular.
Pyramidal, also short prismatic to tabular; often striated. As banded crusts, coloumnar or fibrous.

Small,, striated crystals.
Massive.
Crystals commonly tabular, pseudohexagonal; flattened; rarely pyramidal or lath-like; massive, reniform; twinning common.
Rarely, as distinct crystals; usually as masses and crusts composed of indistinct platy or lath-like crystals, or as fibrous, radiat

Crystals short to long prismatic; also pyramidal or equant; as aggregates of rough crystals; as rosettes.
Earthy.

0.1 To 8.3mm prismatic crystals elongated; with longitudinal straitions.
As minute rims on iridosmine.
As rhombic rectangular prisms or massive aggregates up to 2 x 2cm.
Less than 0.15mm in diameter spherules consisting of radiating needle-like crystals.
Crystals acicular; usually massive, compact; matted, parallel fibrous.

As intergrowths, as single crystals from 0.1 to 0.5mm, and as radiating concentric material.
Massive; occurs interstitially to small equant grains.
As oval or spherical aggregates with radiating fibrous structure.

Crystals short, stubby; crystals do not exceed 0.6mm in length.
Minute crystals.
Crystals pseudo-orthorhombic with twinning.

Crystals prismatic, sometimes doubly terminated up to 1mm long.

As prismatic crystals 6-7 mm long.
As irregular platy grains up to 2 mm across.
As rounded grains.
Anhedral grains, up to 12 x 6 x 3mm in size.
As radiating fibres up to 3cm in length.
Bladed, or mica-like crystals up to 5 cm long. Polysynthetic twinning.

Prismatic crystals.

Crystals short prismatic; tabular; massive, compact, and as irregular grains.

As minute lath-like crystals in irregular masses.
Flat crystals up to 5 x 2 x 10mm.
Gel-like aggregates and as pseudomorphs of kottingite-parasymplesite.

Flaky scaly aggregates, up to 8 mm long.
Fine-grained, massive in relatively pure veinlets.
Massive.
Platy aggregates.
Massive; as poorly crystalline cavity fillings.
Crystals; mostly massive, earthy, globular, stalactitic, crusts, encrustations, coatings.
Massive; fine-grained.
As well-formed pseudohexagonal crystals up to 37 x 35 x 15mm; tabular.
Crystals fibrous, hair-like or needle-like, aggregating into pin-cushion clumps.
Prismatic crystals, hexagonal, terminated by a dipyramid.
Crystals platy; in spherical forms with radiating foliated structure.
Crystals tabular and resemble torbernite.

Natural crystals acicular to fibrous; synthetic crystals hexagonal, prismatic.
As aggregates of small grains.
As anhedral grains; also as encrustations and coatings.
As dense cryptocrystalline aggregates.
As aggregates of ovoid or platy grains.

Massive; columnar.
Mostly granular, compact, spathic, lamellar.
Radiating crystalline aggregates.
Compact massive aggregates.
Fine foliae or lamellae up to 2 x 1.5 x 0.5mm in size.

Crystals slender prismatic, vertically striated; usually massive; or in radial fibrous to columnar aggregates.
Tabular, thin-lamellar, pseudohexagonal crystals.
Coatings.
Short columnar to acicular crystals; rounded, loose grains.
Platy crystals.
As compact, powdery masses; particles are 0.01 to 0.03mm in size, have rounded forms or rhombic sections.
Flattened pseudo-octahedral crystals with twinning common; polysynthetic and as fourlings.
As rounded to irregular deposits up to 1 x 1.5cm.
Columnar to acicular crystals; compact, tabular, radial agg.
As intergrowths of prismatic crystals up to 2mm in length and as polycrystalline plates up to 10 x 6 x 0.5cm.
Crystals long, irregular, lath-shaped, up to 0.02 x 0.5mm long.
Crystals euhedral tetrahedrons, minute; also octahedrons, frequently twinned; less than 1mm to about 5mm in size.
Tabular crystals.
Irregular grains, also as veinlets.
Rough crystals; usually massive.
As nodules up to 3 cm and as cavity fillings after leached sulfides.

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FRACTURE,C,165

Crystals thin to thick tabular occurring singly or in groups.
Hackly fracture.
Sectile, fracture uneven.

Magnetic.
Fracture uneven to subconchoidal, brittle, compact varieties often tough.
Fracture subconchoidal to uneven. Brittle.
Fracture conchoidal to uneven.
Fracture conchoidal.
Brittle.
Fracture uneven, brittle.
Brittle.

Conchoidal fracture.
Conchoidal fracture.
Conchoidal fracture.

Conchoidal, amorphous.

Fracture hackly. Sectile.
Fracture conchoidal. Brittle.
Fracture uneven.

Fracture irregular. Brittle.
Fracture uneven to conchoidal, brittle.
Two cleavages, mutually perpendicular directions.

Brittle.
Brittle. Tarnishes brown.

Brittle. Uneven fracture.

Fracture subconchoidal.
Fracture uneven, brittle.
Conchoidal fracture.

Brittle.

Fracture uneven, brittle.
Fracture conchoidal to earthy; very brittle.

Brittle, splintery, uneven fracture.
Crystals commonly twinned, dipyramidal faces striated horizontally.
Fracture uneven to conchoidal, brittle.

Brittle.

Brittle.
Soft, water soluble.

Fracture irregular.
Brittle, decomposed by water.
Fracture conchoidal, soluble in water.
Uneven, brittle.
Conchoidal, brittle, combustible.
Fracture conchoidal to uneven, brittle.
Brittle. Conchoidal fracture.

Brittle, conchoidal.

Fracture conchoidal, brittle.
Soluble in water.

Conchoidal, uneven.

Brittle.

Fracture splintery; brittle.
Uneven, brittle.

Fracture uneven to conchoidal; brittle.
Fracture conchoidal, brittle.
Conchoidal, brittle.

Cleavage in two directions parallel to fibre length.

Fracture conchoidal, brittle.
Conchoidal, brittle.
Brittle. Uneven fracture.
Sectile.
Brittle.
Soft.

Micaceous.
Brittle.
Fracture uneven, brittle.
Brittle.

Sectile.

Conchoidal or splintery fracture.
Fracture irregular to conchoidal, brittle.
Brittle.
Fracture conchoidal to uneven, brittle.

Conchoidal, brittle.
Fracture conchoidal to uneven, brittle.
Water soluble.
Water-soluble.

Conchoidal, brittle.
Brittle.
Flexible; inelastic; sectile.

Uneven, brittle.
Hackly, sectile, malleable, flexible.

Fracture uneven, brittle.

Fracture conchoidal to uneven; brittle.

Brittle.

Fracture subconchoidal to uneven.

Brittle, shelly.

Conchoidal fracture.

Conchoidal fracture.

Brittle.
Stalactitic.

Brittle.

Fracture uneven, brittle.

Distinct.

Very brittle.
Rhombohedral.
Fibrous structure, soft.

Conchoidal to subconchoidal fracture.

Brittle.
Brittle.
Fracture subconchoidal.

Fracture uneven, brittle.
Conchoidal.
Soft.

Brittle.
Soft.
Fracture uneven to conchoidal to hackly, very brittle.

Malleable.
Conchoidal, brittle.
Fracture conchoidal, brittle.
Brittle, uneven fracture.
Very brittle.
Fracture uneven, brittle.
Brittle.
Cleavage has one distinct, one poor.
Conchoidal fracture.

Flexible.

Cleavage two directions at 90_, hackly fracture, brittle.

Laminae flexible, inelastic, greasy feel.

Less brittle, conchoidal.

Brittle. Fluoresces pale yello under ultraviolet light.
Brittle.
Fracture conchoidal when compact.

Earthy.

Conchoidal fracture.

Fracture subconchoidal; brittle.
Brittle.

Conchoidal fracture.

Weakly fluorescent, orange to brown, under long and short wave uv light.

Conchoidal fracture.

Brittle.
Fracture uneven.

Conchoidal to uneven.

Fracture uneven to subconchoidal. Brittle.

Conchoidal, brittle.

Brittle.

Fracture conchoidal.

Conchoidal fracture.
Dehydrates readily.

Elastic, flexible, soft to brittle.
Solouble in water.

Brittle, malleable.

Conchoidal fracture.

Fracture subconchoidal to uneven.

Conchoidal fracture.
Soft, conchoidal, water-soluble.

Conchoidal fracture, brittle to soft.

Brittle. Fracture conchoidal.

Flexible, brittle.
Brittle to soft, conchoidal.

Fracture conchoidal.
Brittle.

Brittle. Fracture uneven to conchoidal.
Fracture uneven to conchoidal, brittle.
Fracture conchoidal, brittle.

Uneven fracture, brittle.

Brittle.

Fracture conchoidal to uneven; brittle.
Conchoidal fracture.
Fracture uneven to subconchoidal; sectile and ductile.

Subconchoidal fracture.

Plates separable and flexible; sectile.
Fracture conchoidal, brittle.

Distinct; brittle; subconchoidal fracture.
Prismatic.

Fracture conchoidal, brittle, soluble in water.
Tabular.
Cubic, very brittle.

Fracture uneven to conchoidal. Brittle.

Brittle.

Prismatic.
Fracture conchoidal.
Conchoidal fracture.
Prismatic, two directions; brittle.
Brittle.
Fracture uneven to subconchoidal, very brittle.
Fracture uneven, on aggregates conchoidal.

Brittle. Fracture conchoidal.

Fracture uneven.

Fluoresces stron yellowish green in uv light.

Brittle.

Fracture irregular, brittle.
Soft, sectile.
Brittle.
Brittle.

Fracture splintery, breaks into long acute-angled or wedge-shaped pieces; brittle; yields felty mass when ground.
One or more cleavages or partings observed.
Fracture uneven, brittle.
Fracture conchoidal to uneven, brittle.
Slightly elastic; somewhat malleable.
Fracture conchoidal; brittle.

Fracture conchoidal to uneven; brittle.
Fracture uneven to conchoidal; brittle.
Fracture conchoidal.

Imperfect prismatic cleavage or fracture.

Brittle.
Conchoidal, brittle, fusible, water-soluble.
Not brittle, soft.
Cubic, very deliquescent.
Brittle.

Fracture subconchoidal to uneven.

Cleavage - micaceous.

Conchoidal, brittle.

Brittle.

Brittle.

Uneven fracture.

Uneven to conchoidal fracture, brittle.

Fracture uneven, brittle.
Fracture uneven, brittle.

Conchoidal fracture. Brittle.
Uneven fracture.

Conchoidal fracture, brittle.

Brittle.

Brittle, conchoidal, water soluble.
Conchoidal.
Sectile.
Conchoidal, soft.
Very hygroscopic, readily soluble in water.

Thin plates are flexible.
Brittle.
Soft, brittle, uneven.

Fracture subconchoidal, brittle.
Cleavage - 3 mutually perpendicular directions; parallel to laminae perfect, others good to fair; splits easily into very fine recta
Brittle, conchoidal, uneven.
Fracture subconchoidal to uneven.

Uneven.

Cleavage in three directions.

Breaks into fine needles.
Fracture subconchoidal to uneven, brittle.

Fracture uneven, brittle, parting, difficult.
Cleavage coarse in one direction, brittle.

Sometimes a gliding plane, brittle.

Fracture conchoidal, brittle.

Fracture conchoidal to uneven, brittle.
Sectile, flexible, ductile.

Fracture conchoidal, brittle.
Crystals are pale green by daylight and pale purpleish red in artificial light.
Soluble in water.
Very brittle.

Conchoidal.

Fracture conchoidal.

Uneven, brittle.

Conchoidal.
Conchoidal, brittle to soft.
Conchoidal.

Fracture irregular, brittle, octahedral.
Fracture conchoidal.
Cleavage parallel to elongation, brittle.
Splintery, uneven.
Conchoidal.

Soft.

Brittle.
Soft, inelastic, flexible.

Fracture uneven, brittle.
Brittle.
Brittle.
Brittle.

Fracture uneven to subconchoidal, brittle.

Conchoidal fracture.

Uneven.
Laminae brittle.
Cleavage parallel to elongation; prominent cleavage traces either normal or inclined at about 45_ to elongation.

Brittle.

Fracture uneven, brittle.

Fracture conchoidal, brittle.
Conchoidal fracture.

Conchoidal fracture.
Fracture subconchoidal.

Very brittle. Tarnsihes light bronze to golden yellow on exposure.
Brittle.
Brittle.
Fracture subconchoidal to uneven, brittle; friable.
Conchoidal fracture.
(Ferrocolumbite) uneven, brittle.

Micaceous, flexible, inelastic.

Fracture uneven, brittle.

Micaceous, flexible, inelastic.
Fracture conchoidal.

Very ductile, malleable, flexible, sectile, hackly.
Difficult, fracture subconchoidal to uneven, brittle, soluble in water.
Colour fades to grey or black on exposure to light.
Conchoidal, strongly pleochroic.
May be parting, fracture conchoidal, brittle.

Brittle.

Conchoidal, brittle.
Brittle.
Conchoidal, splintery.
Fracture uneven, capillary fibres flexible.

Fracture subconchoidal, somewhat sectile, soluble in water.

Brittle.

Fracture conchoidal, brittle.

Brittle.
Fibrous.
Soft, uneven.
Brittle.
Two cleavages at right angles, brittle.

Brittle, fissile.
Fracture subconchoidal to uneven, brittle.

Fracture conchoidal.

Parting, fracture conchoidal, magnetic.

Brittle, uneven.

Brittle.

Alters to encrustations and ochers of green, orange and bright red.

Parting, brittle.

Brittle.
Brittle.

Soluble in water.

Lamellar, divisible, soft to brittle, malleable.
Fracture uneven, brittle.

Brittle.
Fracture uneven, brittle.

Conchoidal.

Fracture is step-like or uneven.

Fracture uneven, brittle.

Conchoidal.
Plastic.
Fracture uneven, brittle, not magnetic.
Fracture conchoidal.

Fracture subconchoidal. Brittle.
Brittle.

Brittle.

Brittle.

Conchoidal.
Conchoidal, splintery.

Parting or cleavage perpendicular to elongation, splintery fracture.
Fracture conchoidal.
Fracture conchoidal, very brittle.

Conchoidal, brittle.
Fracture conchoidal, brittle.
Conchoidal, brittle.
Brittle.
Fracture conchoidal, brittle.

Conchoidal, brittle.
Fracture subconchoidal to uneven, brittle.
Conchoidal, very brittle.
Very brittle.
Scales flexible, inelastic; masses plastic when moist.
Fracture conchoidal.
Conchoidal fracture, brittle.
Brittle.
Brittle.
Conchoidal, brittle.

Fracture conchoidal, brittle.

Brittle, easily friable.
Fibrous.
Fracture uneven.
Fracture uneven, brittle.

Alters to brownish red on exposure.
Strongly hygroscopic.

Conchoidal, brittle.

Fracture conchoidal, brittle.

Exceedingly brittle.
Brittle.

Conchoidal.

Fracture uneven, brittle.

Fluoresces light blue and phosphoresces yellow-green in uv light.
Fracture uneven, sectile.

Fracture conchoidal.

Cleavage two directions.

Fracture conchoidal to uneven, brittle.
Parting, uneven to subconchoidal fracture.

Irregular fracture, brittle.

Fracture uneven to conchoidal; brittle.
Hackly fracture.
Fracture uneven.
Prismatic, two directions, fracture splintery.
Sectile.
Fracture irregular, brittle.

Two other cleavage planes form angles of 85_ and 95_.
Fracture conchoidal to uneven, brittle.
Uneven to subconchoidal fracture, brittle.
Fracture uneven, brittle.
Fracture earthy.

Fracture uneven to subconchoidal.
Laminae brittle.
Brittle.
Conchoidal, splintery.
Fracture uneven, brittle.
Very brittle, friable.
Non-hygroscopic, water-soluble.

Very brittle, weakly magnetic.
Fracture conchoidal.

Soft.
Deliquescent.

Fracture uneven, brittle.
Brittle.

Sectile, malleable.
Somewhat soluble in water.
Uneven, brittle.
Fracture conchoidal, brittle.
Fracture conchoidal, brittle. Fluoresces pink under ultraviolet light.
Fracture uneven, brittle.
Brittle, lamellar.

Brittle.
Conchoidal, brittle.
Very brittle, in the air dull and crumbly.

Parallel.
Brittle.

Fracture uneven, brittle.

Fracture uneven to conchoidal, brittle.

Conchoidal.

Fracture uneven, brittle.
Conchoidal fracture; brittle.
Uneven, brittle, conchoidal.

Uneven fracture.

Fracture splintery, brittle.

Uneven fracture; brittle.

Fracture uneven to conchoidal, brittle.

Conchoidal.

Very brittle.

Brittle, fracture uneven to subconchoidal.

Conchoidal fracture.

Conchoidal fracture, brittle.

Decomposed by water.
Not brittle.
Fracture uneven, brittle.

Brittle.

Brittle.
Fracture subconchoidal to splintery.

Difficult and imperfect.

Fracture conchoidal to uneven, brittle.
Dipyramidal cleavage; conchoidal fracture.
Fracture conchoidal to uneven, brittle.
Fracture uneven; brittle.

Conchoidal, brittle, shining when heated.

Fracture conchoidal, brittle.

Conchoidal.

Fracture uneven.
Flexible, inelastic, somewhat malleable.

Conchoidal, brittle, weakly magnetic.
Irregular fracture.

Cleavage two directions.

Uneven, brittle.
Fracture subconchoidal to uneven, brittle.

Basal and prismatic.
Fracture uneven. Brittle.

Brittle.
Uneven fracture.
Fracture uneven, brittle.

Very brittle.
Conchoidal, splintery.
Fracture conchoidal; brittle.

Prismatic; brittle.

Fracture conchoidal to uneven, parting, brittle.
Conchoidal fracture, brittle.
Conchoidal fracture.
Cleavage not easily observed.
Conchoidal fracture.

Spathic, brittle to soft.
Flexible.
Conchoidal to uneven fracture. Brittle.

Brittle.
Cleavage prismatic.
Brittle.

Fracture uneven.
Splintery fracture.
Cleavage is one direction parallel to elongation.
Conchoidal fracture.
Conchoidal, brittle, water soluble.

Uneven.

Fracture uneven to conchoidal, brittle.
Fracture conchoidal.
Colour found in polished section only.

Fracture uneven, brittle.
Fracture uneven.
Conchoidal fracture.

Flexible.
Brittle.
Fracture uneven, brittle.

Micaceous, yielding flexible but inelastic lamellae, fracture splintery, sectile.

Tough.

Brittle.
Fracture conchoidal.

Brittle.

Brittle, conchoidal.
Very brittle.
Fracture uneven, brittle.

Fracture uneven to conchoidal; brittle.
Cleavage parallel to elongation.

Parting, fracture uneven, brittle.

Brittle.
Ductile, malleable, flexible, hackly.
Fracture conchoidal, malleable.

Flexible but inelastic.

Fracture porcelaneous.
Fracture conchoidal, brittle.
Fracture splintery.

Brittle, dehydrates readily, soluble in water.

Fracture uneven, brittle.

Parting, brittle.
Uneven to sub-chonchoidal fracture.
Fracture uneven.

Flexible, greasy.
Brittle.
Fracture conchoidal.
Somewhat magnetic.
Brittle.

Fracture conchoidal, brittle.
Uneven to conchoidal fracture.

Parting, sometimes distinct, fracture uneven to conchoidal, brittle.
Fracture uneven, brittle.

Somewhat sectile.

Fracture uneven, brittle.

Conchoidal fracture, very brittle.
Fracture irregular.
Fracture conchoidal, brittle.
Brittle.

Brittle.
Rare cleavage parallel to the tabular plates.

Flexible, inelastic, soft.
Fracture uneven.

Brittle.

Sectile.

Soft to brittle, water soluble.
Conchoidal fracture.

Fracture earthy.
Water-soluble.

Brittle.
Fracture conchoidal.
Uneven fracture. Brittle.
Fracture uneven, brittle.

Brittle.

Brittle, smooth cleavage planes.

Fracture uneven.

Fracture flat conchoidal.

Fracture subconchoidal to uneven, brittle.
Uneven, brittle.
Conchoidal.

Brittle, strongly magnetic.

Not magnetic.

Brittle.
Thin lamellae ductile and elastic.
Fracture subconchoidal, brittle.

Conchoidal, brittle.

Conchoidal fracture.
Cleavage has one perfect; two good but less perfect.

Conchoidal.
Uneven, brittle, shelled separation.
Uneven fracture. Brittle.

Conchoidal, fibrous, brittle.

Conchoidal fracture.

Fracture conchoidal to uneven.
Interrupted, fracture subconchoidal.
Fracture uneven, brittle.

Brittle, sectile.
Fracture uneven, brittle.
Cleavage one parallel to elongation, one inclined; fracture conchoidal to uneven (aggregates).
Soft.
Brittle, fracture uneven.
Brittle.

Fracture conchoidal, soluble in water.

Fracture irregular, brittle.

Subconchoidal fracture.
Fracture conchoidal to irregular; brittle.

Difficult.
Cleavage prismatic.

Very brittle.
Fracture conchoidal; brittle.

Brittle.
Very brittle.

Fracture conchoidal, brittle, weakly magnetic.
Dehydrates rapidly and alters to metahohmannite.
Subconchoidal fracture.

Parting.
Fracture uneven.

Brittle.

Uneven.
Flexible.

Fracture of porcelaneous types nearly even and smooth.

Fracture irregular.
Uneven fracture, brittle.

Fracture irregular; brittle.

Brittle, uneven to subconchoidal fracture.

Subconchoidal fracture (masses), brittle.
Fracture uneven; brittle.
Fracture conchoidal, brittle.
Fracture conchoidal, brittle.
Fracture conchoidal.
Fracture uneven to conchoidal, brittle.

Brittle.

Parallel to elongation of fibres.

Greasy.

Prismatic.

Laminae flexible, inelastic, greasy feel.

Conchoidal, brittle.

Interrupted, fracture subconchoidal.
Very brittle.

Fracture conchoidal, brittle.

Basal, conchoidal fracture.

Very flexible.

Conchoidal, brittle.

Conchoidal, brittle.

Cleavage in two directions, brittle.

Fracture conchoidal.
Fracture flat conchoidal to irregular, brittle.

Brittle.

Polysynthetic twinning.

Brittle, uneven, weathered.
Fracture conchoidal, sectile, flexible.

Brittle.

Difficult; slightly malleable to brittle.

Hackly, malleable, ductile.
Fracture uneven, brittle.

Fracture uneven
.
Conchoidal fracture; brittle.
Uneven to subconchoidal fracture.
Very tenacious, uneven.

Brittle.
Prismatic, fracture subconchoidal, sectile.

Soft.

Brittle.

Conchoidal fracture.

Brittle.
Fracture conchoidal.

Parting.

Uneven fracture.

Parting; fracture uneven to conchoidal; brittle.

Conchoidal.

One-direction, flexible.

Brittle.

Brittle.

Parting; fracture uneven to subconchoidal; brittle.

Infusible, water-soluble.

Brittle.
Fracture sub-conchoidal, brittle.

(Antigorite) conchoidal or splintery fracture.
Conchoidal fracture.

Micaceous; brittle; flexible; almost plastic.

Brittle; weakly elastic.
Brittle.
Very brittle.

Flexible.
Uneven to subconchoidal.

Brittle.

Flexible.
Very brittle; splintery.
Perpendicular to elongation.

Irregular fracture.

Brittle.

Friable.

Brittle.

Conchoidal fracture.

Very brittle.

Fracture conchoidal, brittle.

Soluble in water.

Pronounced parting, well developed.
Brittle.

Parting.

Conchoidal fracture.

A third poor cleavage or fracture at a high angle to the other two.
Micaceous.
Deliquescent.
Fragile.

Water soluble.

Parting.

Conchoidal.

Fracture conchoidal, brittle.
Malleable.

Fracture uneven to conchoidal.

Brittle.

Uneven, brittle.
Brittle.

Basal; soft; flexible, inelastic.

Thin laminae flexible.
Conchoidal fracture.

Fracture conchoidal, brittle.

Brittle.

Sectile.
Micaceous; not brittle.

Splintery fracture.

Brittle.

Two probable cleavages parallel to fibre length; brittle.

Less brittle, in the air dull and crumbly.

Not brittle.
Fracture subconchoidal; brittle.

Brittle.

Cleavage inferred from crystal structure.

Splintery, uneven.
Conchoidal, brittle.
Very malleable; ductile.

Fracture uneven, brittle.
Brittle.

Cleavage lamellae flexible, inelastic and somewhat sectile.

One perfect parallel to flat face, also 2 other fair cleavages across the flat face.

Fracture conchoidal.

Fibrous, brittle.
Soft, laminate elastic, flexible.
Fracture uneven.
Conchoidal.

Brittle.
Parting, very brittle.
Brittle.
Brittle, conchoidal.

Conchoidal fracture.
Brittle.
Conchoidal, brittle.

Easy.
Fracture conchoidal.
Parting.
Brittle to soft.

Conchoidal fracture.
Fracture conchoidal to uneven.
Uneven, brittle.

Brittle to soft.

Interrupted; fracture subconchoidal to uneven.

Fracture conchoidal to uneven.
Conchoidal fracture.

Flexible.

Brittle.
Brittle.

Fracture uneven, brittle.

Soluble in water.

Flexible, readily separates into cleavage lamellae and fibres.

Brittle; fracture conchoidal; altered varieties friable.
Fracture conchoidal, soluble in water.

Micaceous, combines with other easy cleavages to give ready fraying of crystals into fibres; sectile & flexible.
Brittle.
Easy.
Brittle.

Fracture uneven to conchoidal; brittle.

Uneven fracture. Brittle.
Basal.

Conchoidal fracture.
Fracture subconchoidal; brittle.

Strongly magnetic.

Fracture uneven; brittle.
Fracture uneven to conchoidal, brittle.

Fracture uneven; brittle.

Fracture uneven to subconchoidal, brittle, strongly magnetic.

Parting.
Fracture uneven; brittle.

Conchoidal, brittle.

Conchoidal, brittle, magnetic.
Strongly magnetic.

Malleable and sectile.

Soluble in water.

Micaceous, easily fusible.
Laminae flexible, inelastic, greasy feel.

Fracture conchoidal; brittle.

Uneven, brittle.

Fracture uneven to subconchoidal; brittle.

Fracture somewhat fibrous.
Fracture uneven.
Fracture subconchoidal to uneven; brittle.

Conchoidal fracture.
Uneven to subconchoidal fracture; brittle.

Brittle.

Brittle, in damp air weathers easily.

Brittle, friable.

Brittle; fracture uneven to conchoidal.

Fracture conchoidal, brittle.
Fracture conchoidal, brittle.

Fracture uneven; somewhat sectile.
Colour found only in polished sections.
Flexible, inelastic.

Conchoidal fracture.
Fracture uneven, very brittle.
Fracture subconchoidal to uneven, brittle.
Brittle.

Brittle.
Conchoidal fracture.

Brittle.

No good cleavages.
Fracture subconchoidal.
Parallel to elongation.

Conchoidal, brittle.
Conchoidal fracture. Brittle.
Brittle.
Brittle.
Two cleavages, unequal.
Cleavage one direction.
Brittle.
Conchoidal, brittle, water soluble.

Fracture conchoidal; somewhat sectile.
Brittle.

Fracture conchoidal to uneven.

Fracture conchoidal, brittle.

Greasy.

Brittle.
Brittle.
Fracture uneven; brittle.

Micaceous.

Not brittle, thin flakes flexible.
Brittle.
Brittle, fracture conchoidal.
Brittle.

Fluoresces dull green under uv light.

Friable.

Brittle.
Fracture fibrous, soluble in boiling water.

Brittle.

Fluorescesgreen in uv light.

Brittle.
Brittle.
Brittle.

Aggregated clumps fracture in direction of the elongation.

Conchoidal fracture.

Fracture subconchoidal to uneven, brittle.
Fracture conchoidal, brittle.
Uneven, brittle.
Parting, fracture subconchoidal to uneven, brittle.

Fracture conchoidal, brittle.

Conchoidal, brittle.
Brittle.

Brittle, conchoidal.

Brittle.
Conchoidal, water soluble.

Fracture uneven, brittle.

Fracture conchoidal.
Brittle.
Inelastic, flexible, soft, greasy.
Crystals elongated, thin needles or flat plates.

Cleavage has one perfect, another less distinct perpendicular to the first.

Conchoidal, brittle.

Fracture uneven, brittle.

Fracture conchoidal to splintery.

Fracture flat conchoidal; very brittle.

Reported-synthetic; sectile.

Brittle.
Friable, soft, swells in water.
Brittle.

Sectile; flexible, inelastic.

Water soluble.

Fracture conchoidal.
Fracture subconchoidal to uneven; brittle.

Fracture conchoidal, brittle.
Turns light olive green on long exposure to light.
Conchoidal, brittle.

Conchoidal fracture.
Rough fracture.

Brittle.

Elastic, flexible.

Semi-conchoidal fracture.
Fracture conchoidal.
Soft, flexible, greasy.
Brittle.

Flexible, soft, malleable.
Fracture conchoidal.

Fracture conchoidal.
Fracture uneven; brittle.

Basal, prismatic, indistinct.
Fracture conchoidal.
Fracture parallel.

Fracture conchoidal; brittle.

Fracture uneven; brittle.

Fracture conchoidal; brittle.
Brittle.

Fracture conchoidal; brittle.

Fracture conchoidal.
Fracture conchoidal.

Fracture uneven.

Poor hackly fracture; sectile and malleable.

Conchoidal fracture.
Fracture uneven.

Subconchoidal fracture.

Conchoidal to uneven.

Conchoidal.
Fracture splintery to fibrous.

Fracture uneven to subconchoidal; brittle.
Flat conchoidal fracture; very brittle.

Brittle, conchoidal.

Brittle, uneven.

Subconchoidal to conchoidal fracture; brittle.

Poor parallel to elongation.
Weakly magnetic; brittle.
Brittle.

Fracture uneven; very brittle.

Brittle-soft, water soluble.
Fracture conchoidal; slightly sectile, easily soluble in water.

Fracture uneven; sectile; flexible in thin crystals or cleavage flakes; inelastic.
Fracture uneven.

Fracture uneven to subconchoidal; brittle.
Fracture conchoidal; brittle.

Good cleavage parallel to elongation.
Rhombohedral; hackly fracture.
Fracture conchoidal, brittle.
Conchoidal.

Fracture uneven to flat conchoidal; brittle.

Fracture uneven; brittle.

Fracture uneven to conchoidal; brittle.
Conchoidal, brittle.
(Fayalite) conchoidal.

Fracture conchoidal, brittle.
One direction parallel to elongation, brittle.
Conchoidal, brittle.

Fracture conchoidal; brittle.

Conchoidal, brittle.
Fracture conchoidal.

Sectile, soft, flexible.
Conchoidal fracture.
Fibrous parallel elongation. Fibers are flexible.
Brittle, uneven.
Very brittle, weakly magnetic.

Very brittle.

Slightly malleable.

Brittle.
Not brittle.

One cleavage parallel to the elongate axis.
Brittle.
Flexible fibres.

Fracture uneven, brittle.

Uneven fracture.

Malleable and ductile.
Two directions, brittle.

Soft, flexible.

Brittle.
Well-developed.
Fracture conchoidal, brittle.
Fracture uneven, brittle.

Parting, brittle.

Somewhat sectile.

Easy, not brittle.

Fracture conchoidal.

Brittle.
Fracture conchoidal.

Fracture uneven.
Fracture uneven, brittle.

Brittle.
Parting.

Fracture conchoidal to uneven.

Micaceous.
Fracture conchoidal, brittle.
Fracture splintery.
Uneven fracture. Brittle.
Fracture subconchoidal to splintery; brittle.
Massive, as minute grains.

Fracture conchoidal.
Parallel to fibres.
Fracture conchoidal to uneven.
Subconchoidal fracture.
Fracture conchoidal.

Fracture irregular to conchoidal.

Very brittle.

Prismatic, fracture conchoidal.

Brittle.
Brittle.

Parting, fracture conchoidal, brittle.

Conchoidal.
Perpendicular to c-axis.

Conchoidal.

Fracture subconchoidal; brittle.
Subconchoidal fracture.

Brittle.
Parallel to flattening of crystals.
Brittle.

Fracture subconchoidal; slightly sectile to brittle.
Soft.
Fracture uneven; somewhat sectile.

Brittle, conchoidal.
Fracture conchoidal.

Brittle, striated cleavage planes.
Flexible, foliaceous.

Brittle, uneven.

Fracture uneven; brittle.

Brittle; fracture uneven.
Fracture conchoidal.
Fracture uneven, brittle.

Irregular fracture.
Fracture conchoidal; brittle; soluble in water.

Easily soluble in water.

Uneven, brittle.

Fracture uneven to conchoidal. Brittle.

Very brittle.

Fracture uneven.

Fracture conchoidal; brittle.
Cleavage parallel to elongation.
Fracture uneven to conchoidal; brittle.

Fracture hackly; slightly malleable.
Hackly, malleable, ductile.
Brittle.

Irregular fracture.

Fracture of masses uneven to subconchoidal; brittle.

Conchoidal.
Fracture uneven; brittle.
Conchoidal, brittle.
Fracture subconchoidal to uneven.

Conchoidal fracture. Brittle.
Flexible; sectile.

Brittle.
Fracture conchoidal; soluble in water.

Fracture conchoidal.
Uneven.
Conchoidal fracture.

Fracture earthy to conchoidal.

Brittle.
Fracture conchoidal to uneven; brittle.

Hackly fracture; brittle.
Splintery, conchoidal.

Fluoresces intense greenish yellow in short-wave uv light.

Subconchoidal fracture. Brittle.

Conchoidal, brittle.
Fracture conchoidal.

Fracture subconchoidal; brittle.

Fracture uneven; brittle.

Splintery, conchoidal.
Conchoidal, brittle.
Laminae flexible, inelastic.
Fracture conchoidal; brittle.
Conchoidal, brittle.

Brittle.
Uneven, brittle, conchoidal.
Conchoidal, splintery.

Greasy, soft.
Brittle.
Fracture conchoidal; thin plates somewhat flexible.

Brittle.
Brittle, uneven.

Conchoidal to subconchoidal; flat conchoidal to uneven or splintery (massive) ;uneven, hackly or splintery (fibrous); brittle; cry

Thin laminae, flexible.

Brittle.

Brittle.

Uneven fracture; brittle.

Fracture uneven, brittle.

Brittle.
Fracture conchoidal.
Cleavage on three pinacoids and a prism; brittle.

Parting; fracture conchoidal.

Soft to brittle, sectile, decomposes in the light.

Fracture uneven; brittle.

Irregular fracture.

Fracture uneven to subconchoidal; brittle; soluble in water.
Fracture conchoidal to uneven.

Uneven fracture.
Fracture uneven.

Fracture conchoidal.
Brittle.
Uneven.

Fracture conchoidal to fibrous; thin cleavages flexible.

Also a second less well-developed cleavage.
Parting, fracture uneven, brittle.
Fracture uneven, brittle.
Fibrous.

Fracture conchoidal, splintery.
Extremely brittle; tends to break in splintery fragments.

Fracture irregular; brittle.

Very brittle; easily crushed to a greenish yellow powder.

Uneven, brittle.

Uneven to splintery.
Fracture uneven; brittle.
Fracture conchoidal.
Brittle.

Cleavage in two directions at right angles; brittle.

Easy.

Fracture uneven, brittle.

Brittle.

Brittle.

Conchoidal fracture, brittle.

Fracture uneven to conchoidal; brittle.

Uneven, conchoidal.
Uneven fracture.

Conchoidal, brittle.

Conchoidal, soft, water soluble.

Brittle.

Fracture conchoidal, brittle.

Uneven, brittle.
Earthy fracture.

Greasy.

Fracture uneven to subconchoidal.

Fracture subconchoidal to uneven.

Fracture conchoidal; very brittle.

Micaceous; crystals flexible.
Aggregates crumble under light pressure into a fine chalk-like powder.

Fracture conchoidal; brittle.

Brittle, conchoidal.
Brittle; soluble in water.

Fracture uneven; brittle.

Brittle.

Brittle.
Micaceous.
Conchoidal to uneven, splintery.
Fracture uneven to conchoidal; brittle.
Very brittle.

Cleavage lamellae flexible.

Brittle.
Conchoidal fracture.

Brittle, conchoidal.
Splintery, brittle.
Uneven fracture.

Brittle.

Rare.

Brittle.

Parting.
Crystals very flexible.
Colour found in polished section only.
Fracture conchoidal, brittle.
Fracture conchoidal; brittle.
Uneven fracture.
Brittle.
Fracture conchoidal.
Fracture uneven; brittle.

Floats on water, soft.

Uneven to conchoidal fracture.
(Antigorite) conchoidal or splintery fracture.

Brittle; clevage in two directions parallel to elongation.

Uneven fracture; brittle.
Brittle; easily split along the length.

Fracture conchoidal; brittle.

Brittle.

Fracture stepped.

Fracture subconchoidal to uneven.

Fracture surfaces of aggregates rough and subconchoidal.

Brittle.
Ductile, malleable.

Micaceous.
Conchoidal fracture; brittle.
Brittle.

Irregular; brittle.

Laminae flexible; inelastic.

Uneven, brittle.

Distinct cleavage in a few directions.
Fracture conchoidal; brittle.
Brittle.

Basal; fracture subconchoidal to smooth; laminae flexible and elastic.

Colour found in polished section only.

Conchoidal.
Subparallel agragates, divergent clusters.
Fracture conchoidal, soluble in water.
Brittle.

Uneven fracture; brittle.
Fluoresces yellow-green under uv light.

Colour found only in polished section.

Brittle.

Fracture conchoidal; brittle.

Fracture conchoidal; brittle.

Parting sometimes distinct.

Brittle, conchoidal.

Conchoidal.

Brittle.

Conchoidal fracture.

Brittle, conchoidal.
Fracture uneven to subconchoidal.

Conchoidal, splintery.

Brittle.

Fracture irregular.
Soft to brittle, conchoidal.
Soluble in water.

Easy; thin lamellae flexible.
Cleavage parallel to elongation.

Conchoidal fracture.
Fracture subconchoidal; brittle.
Fracture uneven.
Fracture subconchoidal; brittle.

Soft, inelastic, flexible, conchoidal.
Laminae flexible, inelastic; greasy feel.
Brittle.

Elastic.

Malleable.

Brittle to soft.

Fracture subconchoidal to uneven, brittle.

Fracture conchoidal, brittle.

Fracture conchoidal; brittle.

Brittle.

Very brittle.

Brittle, uneven.
Soft.
Fibres flexible.

Subconchoidal to uneven fracture.
Prismatic.

Brittle.
Fracture conchoidal.
One direction.
Very brittle, conchoidal, easily inflammable, burns with blue flame.

Brittle.

Well developed.

Distinct.

Fracture subconchoidal.

Brittle.
Soft-brittle, water soluble.
Fracture uneven, brittle.
Conchoidal fracture; brittle.
May be parting; fracture subconchoidal to splintery; brittle.

Fracture conchoidal.

Fracture splintery.
Fracture conchoidal to uneven; brittle.

Micaceous; foliae flexible, somewhat elastic.

Fracture conchoidal; brittle.

Flexible, greasy, inelastic, very soft.

Soluble in water.
Conchoidal fracture.

Fracture uneven to subconchoidal.

Soluble in water.

Fracture uneven, brittle.

Fracture conchoidal.

Brittle.
Flexible; inelastic; somewhat malleable.
Fracture subconchoidal to irregular; very brittle.
Brittle.
Colour found in polished section only.

Flexible.
Sectile but brittle.
Laminae flexible, inelastic; somewhat sectile.

Fracture uneven to subconchoidal; brittle.
Fracture uneven to conchoidal; brittle; thin fragments flexible and elastic.
Imperfect; fracture uneven to conchoidal; brittle.
Brittle.

Brittle.
Brittle.

Laminae flexible; inelastic.
Conchoidal, brittle.

Parallel to elongation; brittle.
Fracture conchoidal; brittle.

Basal.
Incomplete; fracture uneven to hackly; not brittle.
Basal; conchoidal fracture.
Difficult; somewhat sectile.

Fracture uneven; brittle.
Brittle.

Fracture conchoidal to uneven; brittle.

Conchoidal, brittle.

Brittle.
Metamict. Conchoidal fracture.

Fracture conchoidal to uneven; brittle.
Brittle.
Fracture conchoidal to uneven.
Parting; brittle.

Fracture hackly; ductile, malleable.

Uneven fracture.

Uneven fracture.
Distinct parting normal to elongation.
Parting; brittle.
Uneven to conchoidal fracture.
Conchoidal, brittle.

Conchoidal fracture.

Uneven, conchoidal.
Brittle.

(Elbaite) fracture uneven to conchoidal; brittle.

Conchoidal fracture.
Fracture conchoidal; brittle.
Brittle.

Fracture uneven to subconchoidal; brittle.

Fracture conchoidal; brittle to very brittle.

Fracture subconchoidal; brittle.
Fracture conchoidal; brittle.
Fracture subconchoidal to uneven.
Subconchoidal to uneven fracture.
Fracture subconchoidal to uneven.

Conchoidal fracture; brittle.

Fracture conchoidal to even.

Brittle, conchoidal, water soluble.

Uneven fracture. Brittle.

Bipyramidal; fracture conchoidal; brittle.
Very brittle.

Brittle.

Sectile.

Basal and prismatic.

Uneven fracture.
Conchoidal, brittle.

Fracture uneven and conchoidal.

Brittle.
Fracture conchoidal; brittle.

Soft, elastic, flexible.

Micaceous and distinct.

Brittle, uneven.

Two very poor rectangular cleavages; fracture conchoidal to uneven, brittle.
Micaceous.
Conchoidal fracture.

Fracture uneven; brittle.

Parallel to elongation.
Probable cleavage perpendicular to elongation and others along elongation.
Fluoresces yellow-green under uv light.

Conchoidal, brittle, radio-active.
Irregular fracture.
Not brittle, thin plates flexible.
Brittle.
Fracture conchoidal; brittle.

Fibrous.

Brittle.

Subconchoidal fracture. Brittle.

Fracture irregular.

Two pinacoidal.
Conchoidal, splintery.
Conchoidal fracture. Brittle.

Brittle.

Conchoidal, brittle.

Fracture conchoidal to uneven; friable.

Conchoidal.

Fracture uneven, brittle.
Brittle.
Brittle.

Fracture conchoidal; very brittle.

Very brittle, fracture conchoidal.
Basal.
Uneven and splintery.

Conchoidal fracture.

Brittle.
Brittle.

Conchoidal fracture; brittle.
Fracture uneven, brittle.
Fracture subconchoidal to uneven.

Brittle.

Soft, thin laminae, flexible.

Also a second imperfect cleavage at an angle of 88_ to the first; fracture irregular to conchoidal; brittle.

Brittle; crushes to small splinters.
Fracture conchoidal.
Brittle.

One prominent cleavage and one less prominent are probably pinacoidal.

Brittle.
Fracture conchoidal; brittle.

Conchoidal.
Brittle.

Flexible.

Brittle.

Brittle.

Uneven, brittle.
Brittle.

Fracture uneven.

Prismatic; uneven to subconchoidal fracture.
Parallel to elongation; flexible, inelastic; very brittle.

Fracture uneven.
Brittle.
Fracture uneven, brittle.
Fracture conchoidal.
Fracture conchoidal.
Uneven fracture.
Prismatic.

Very brittle.

Conchoidal.

Fracture subconchoidal to uneven; brittle.

Conchoidal, splintery.

Fracture uneven; brittle.

Brittle.

Brittle.
Fracture uneven to conchoidal; brittle.

Uneven, brittle.

Brittle.

Fracture smooth, conchoidal.

Brittle to soft, conchoidal.
Brittle.

Fracture subconchoidal; brittle.

Fracture splintery to uneven; brittle.

Fracture uneven to conchoidal.
Brittle.
Tough.

Pinacoidal; fracture irregular.

Fracture subconchoidal to uneven; brittle.

Brittle.

Somewhat sectile.

Parting.

Uneven fracture.

Fracture conchoidal; brittle.

One good transverse cleavage; one fair longitudinal cleavage.
Very brittle.

Well developed in one direction, probably basal.

Fracture conchoidal.
Sectile.
Conchoidal, brittle.

Aggregated clumps fracture in direction of the elongation.
Very brittle.

Brittle.

Basal, easily soluble in water.

Brittle.

Brittle.

Fracture uneven.
Soft to brittle, elastic, flexible, foliaceous.
Compact aggregates composed of microscopic crystals.
Conchoidal, brittle.
Brittle.

Fracture conchoidal; brittle.
Fracture granular or conchoidal.
Uneven.

Uneven fracture.
Easy; brittle.

Subconchoidal fracture.

Z,C,	CLASS,C,45	SOURCE,C,45
1	Organic Compounds	Sedimentary rocks
2	Hydrated Arsenates	Sedimentary Uranium Ores
21	Halides	Slags and Clinkers
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
18	Organic Compounds	Slags and Clinkers
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Chain Silicates	Metamorphic rocks
4	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Anhydrous Arsenates	Evaporites
2	Hydrated Borates	Evaporites
4	Ring Silicates	Late stage cavities in Granites or Syenites
4	Chain Silicates	Syenites, Alkali intrusions
2	Chain Silicates	Intermediate to acid Igneous rocks
2	Multiple Oxides	Oxidized Zones, weathering products
4	Oxides	Hydrothermal Ore veins
4	Oxides	Hydrothermal Ore veins
4	Oxides	Pegmatites
4	Silicates	Pegmatites
4	Sheet Silicates	Skarns and Calc-Silicates
	Hydrated Arsenates	Oxidized Zones, weathering products
	Hydrated Arsenates	Oxidized Zones, weathering products
3	Ring Silicates	Many different geological environments
4	Silicates	Syenites, Alkali intrusions
16	Oxides	Oxidized Zones, weathering products
	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
3	Silicates	
8	Hydroxides	Soils
1	Silicates	Metamorphic rocks
18	Oxides	Skarns and Calc-Silicates
2	Silicates	Skarns and Calc-Silicates
2	Hydrated Arsenates	Skarns and Calc-Silicates
8	Hydrated Borates	Evaporites
3	Sulphosalts	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
12	Silicates	Oxidized Zones, weathering products
4	Ring Silicates	Many different geological environments
2	Hydrated Phosphates	Sedimentary Ore deposits
	Hydrated Borates	Evaporites
6	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Phosphates	Metamorphic rocks
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Arsenates	Skarns and Calc-Silicates
2	Orthosilicates	Many different geological environments
2	Native elements and Alloys	Hydrothermal Ore veins
2	Hydrated Sulphates	Skarns and Calc-Silicates

2	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Silicates	Oxidized Zones, weathering products
12	Anhydrous Phosphates	Pegmatites
8	Hydrated Sulphates	Regional Metamorphic rocks
2	Anhydrous Carbonates	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Anhydrous Phosphates	Efflorescences
1	Hydrated Sulphates	Evaporites
4	Native elements and Alloys	Skarns and Calc-Silicates
	Hydrated Carbonates	Sedimentary rocks
1	Hydrated Phosphates	Oxidized Zones, weathering products
	Oxides	Pegmatites
3	Anhydrous Sulphates	Oxidized Zones, weathering products
2	Compound Phosphates	Effloresences
	Hydrated Vanadates	Oxidized Zones, weathering products
12	Hydroxides	Altered Ultramafic rocks
4	Compound Phosphates	Efflorescences
1	Compound Phosphates	Evaporites
4	Ring Silicates	Intermediate to acid Volcanic rocks
	Organic Compounds	
2	Anhydrous Phosphates	Pegmatites
4	Anhydrous Borates	Evaporites
8	Sheet Silicates	Altered Ultramafic rocks
3	Ring Silicates	Many different geological environments
2	Ring Silicates	Late stage cavities in Volcanic rocks
12	Silicates	Intermediate to acid Igneous rocks
12	Hydrated Borates	Evaporites
3	Anhydrous Sulphates	Evaporites
16	Ring Silicates	Regional Metamorphic rocks
16	Ring Silicates	Many different geological environments
2	Sheet Silicates	Regional Metamorphic rocks
1	Hydrated Phosphates	Sedimentary rocks
4	Oxides	Many different geological environments
2	Hydrated Carbonates	Late stage cavities in Granites or Syenites
4	Silicates	Metamorphic rocks
16	Hydrated Carbonates	Sedimentary Uranium Ores
4	Framework Silicates	Many different geological environments
4	Sulphosalts	Hydrothermal Ore veins
8	Orthosilicates	Skarns and Calc-Silicates
4	Silicates	Late stage cavities in Volcanic rocks
4	Anhydrous Phosphates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Altered Ultramafic rocks
1	Anhydrous Arsenates	Fumaroles
4	Anhydrous Sulphates	Oxidized Zones, weathering products
4	Anhydrous Sulphates	Many different geological environments
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Anhydrous Carbonates	Hydrothermal Ore veins
2	Hydrated Arsenates	Oxidized Zones, weathering products

2	Sheet Silicates	Regional Metamorphic rocks
8	Framework Silicates	Basic and Ultrabasic Igneous rocks
4	Framework Silicates	Intermediate-acid Volcanic rocks
1	Halides	Evaporites
10	Tungstates, Molybdates	Pegmatites
	Halides	Fumaroles
4	Chain Silicates	Metamorphic rocks
16	Sheet Silicates	Altered Ultramafic rocks
2	Sulphosalts	Hydrothermal Ore veins
6	Native elements and Alloys	Hydrothermal Ore veins
4	Anhydrous Sulphates	Oxidized Zones, weathering products
	Silicates	Skarns and Calc-Silicates
2	Anhydrous Phosphates	Many different geological environments
1	Anhydrous Sulphates	Evaporites
4	Hydrated Sulphates	Evaporites
4	Hydrated Sulphates	Oxidized Zones, weathering products
4	Antimonites, Arsenites	Oxidized Zones, weathering products
2	Ring Silicates	Pegmatites
4	Anhydrous Carbonates	Many different geological environments
6	Sulphosalts	Hydrothermal Ore veins
4	Anhydrous Sulphates	Effloresences
4	Anhydrous Phosphates	Caves
6	Anhydrous Phosphates	Pegmatites
2	Sulphosalts	Hydrothermal Ore veins
4	Hydrated Sulphates	Caves
2	Silicates	Oxidized Zones, weathering products
2	Chain Silicates	Syenites, Alkali intrusions
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Anhydrous Sulphates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Oxides	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Hydrated Arsenates	Oxidized Zones, weathering products
2	Hydrated Borates	Evaporites
	Oxides	Basic and Ultrabasic Volcanic rocks
1	Compound Arsenate	Oxidized Zones, weathering products
2	Orthosilicates	Hydrothermal Ore veins
2	Silicates	Pegmatites
12	Anhydrous Phosphates	Late stage cavities in Granites or Syenites
2	Hydrated Arsenates	Oxidized Zones, weathering products
4	Anhydrous Arsenates	Oxidized Zones, weathering products
6	Native elements and Alloys	Hydrothermal Ore veins
8	Hydrated Arsenates	Oxidized Zones, weathering products
	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Anhydrous Arsenates	Hydrothermal Ore veins
3	Hydrated Arsenates	Oxidized Zones, weathering products
3	Hydrated Arsenates	Oxidized Zones, weathering products
8	Sulphosalts	Hydrothermal Ore veins

8	Native elements and Alloys	Hydrothermal Ore veins
16	Oxides	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Alluvials deposits
4	Sulphides, Tellurides etc	Many different geological environments
1	Sulphosalts	Oxidized Zones, weathering products
	Sulphosalts	Hydrothermal Ore veins
2	Compound Arsenate	Oxidized Zones, weathering products
2	Hydrated Arsenates	Oxidized Zones, weathering products
	Hydrated Arsenates	Oxidized Zones, weathering products
1	Hydrated Arsenates	Oxidized Zones, weathering products
2	Hydrated Carbonates	Altered Ultramafic rocks
2	Silicates	Regional Metamorphic rocks
4	Sheet Silicates	Altered Ultramafic rocks
	Hydroxides	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
1	Oxides	Pegmatites
16	Silicates	Late stage cavities in Granites or Syenites
4	Compound Arsenate	Oxidized Zones, weathering products
2	Silicates	Syenites, Alkali intrusions
4	Halides	Oxidized Zones, weathering products
1	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Sulphides, Tellurides etc	Alluvial deposits
4	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
4	Hydrated Phosphates	Skarns and Calc-Silicates
1	Compound Sulphates	Oxidized Zones, weathering products
4	Anhydrous Phosphates	Pegmatites
4	Chain Silicates	Basic and Ultrabasic Volcanic rocks
4	Anhydrous Carbonates	Oxidized Zones, weathering products
9	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
	Multiple Oxides	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Oxidized Zones, weathering products
16	Oxides	Skarns and Calc-Silicates
4	Halides	Fumaroles
	Native elements and Alloys	Altered Ultramafic rocks
2	Orthosilicates	Skarns and Calc-Silicates
	Anhydrous Borates	Skarns and Calc-Silicates
2	Anhydrous Carbonates	Oxidized Zones, weathering products
1	Anhydrous Phosphates	Syenites, Alkali intrusions
2	Chain Silicates	Late stage cavities in Granites or Syenites
4	Oxides	Syenites, Alkali intrusions
2	Silicates	Hydrothermal Ore veins
4	Silicates	Skarns and Calc-Silicates
2	Antimonites, Arsenites	Alluvials deposits
1	Orthosilicates	Evaporites
1	Silicates	Altered Ultramafic rocks
4	Silicates	Late stage cavities in Granites or Syenites

1	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Framework Silicates	
2	Anhydrous Borates	Oxidized Zones, weathering products
2	Vanadium Oxysalts	Fumaroles
4	Silicates	Metamorphic rocks
4	Silicates	Pegmatites
1	Halides	Fumaroles
4	Silicates	Syenites, Alkali intrusions
1	Hydrated Carbonates	Altered Ultramafic rocks
2	Anhydrous Phosphates	Late stage cavities in Granites or Syenites
1	Anhydrous Carbonates	Pegmatites
2	Organic Compounds	Oxidized Zones, weathering products
2	Hydrated Phosphates	Sedimentary rocks
2	Silicates	Metamorphic rocks
8	Multiple Oxides	Pegmatites
8	Oxides	Carbonatites
4	Anhydrous Sulphates	Many different geological environments
8	Hydrated Arsenates	Oxidized Zones, weathering products
18	Vanadium Oxysalts	Oxidized Zones, weathering products
2	Framework Silicates	Late stage cavities in Volcanic rocks
3	Native elements and Alloys	Meteorites
4	Hydrated Carbonates	Efflorescences
2	Oxides	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Silicates	Skarns and Calc-Silicates
6	Silicates	Skarns and Calc-Silicates
2	Anhydrous Carbonates	Hydrothermal Ore veins
2	Silicates	Pegmatites
24	Hydrated Sulphates	Sedimentary rocks
12	Hydrated Sulphates	Fumaroles
2	Hydrated Phosphates	Sedimentary Uranium Ores
6	Anhydrous Carbonates	Syenites, Alkali intrusions
6	Anhydrous Carbonates	Pegmatites
4	Silicates	Syenites, Alkali intrusions
4	Sulphosalts	Hydrothermal Ore veins
2	Sheet Silicates	Skarns and Calc-Silicates
		Oxidized Zones, weathering products
4	Silicates	Pegmatites
	Sulphides, Tellurides etc	Pegmatites
4	Hydroxides	Sedimentary rocks
4	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Hydrated Carbonates	Sedimentary Uranium Ores
2	Hydrated Carbonates	Altered Ultramafic rocks
2	Silicates	Intermediate to acid Igneous rocks
2	Ring Silicates	Pegmatites
12	Hydrated Arsenates	Oxidized Zones, weathering products

3	Anhydrous Sulphates	Oxidized Zones, weathering products
4	Oxides	Oxidized Zones, weathering products
4	Anhydrous Borates	Pegmatites
4	Hydroxides	Oxidized Zones, weathering products
1	Sheet Silicates	Hydrothermal Ore veins
32	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Nitrates, Iodates	Oxidized Zones, weathering products
2	Anhydrous Phosphates	Pegmatites
1	Silicates	Metamorphic rocks
2	Sulphosalts	Hydrothermal Ore veins
2	Silicates	Metamorphic rocks
2	Sulphosalts	Hydrothermal Ore veins
3	Anhydrous Carbonates	Hydrothermal Ore veins
8	Hydrated Sulphates	Skarns and Calc-Silicates
4	Hydrated Phosphates	Oxidized Zones, weathering products
1	Hydrated Borates	Skarns and Calc-Silicates
4	Oxides	Regional Metamorphic rocks
18	Hydrated Phosphates	Sedimentary Uranium Ores
4	Anhydrous Arsenates	Skarns and Calc-Silicates
3	Anhydrous Phosphates	Late stage cavities in Volcanic rocks
2	Hydrated Phosphates	Pegmatites
8	Hydroxides	Oxidized Zones, weathering products
1	Sulphides, Tellurides etc	Supergene Zones
1	Sulphosalts	Hydrothermal Ore veins
2 (	Sheet Silicates	Sedimentary rocks
4	Sulphosalts	Hydrothermal Ore veins
4	Anhydrous Phosphates	Pegmatites
4	Silicates	Late stage cavities in Granites or Syenites
2	Ring Silicates	Pegmatites
	Silicates	Pegmatites
12	Anhydrous Phosphates	Pegmatites
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Anhydrous Arsenates	Skarns and Calc-Silicates
	Native elements and Alloys	Hydrothermal Ore veins
8	Multiple Oxides	Pegmatites
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Tungstates, Molybdates	Oxidized Zones, weathering products
3	Compound Arsenate	Oxidized Zones, weathering products
4	Anhydrous Phosphates	Pegmatites
2	Anhydrous Carbonates	Oxidized Zones, weathering products
8	Hydrated Sulphates	Efflorescences
4	Silicates	Skarns and Calc-Silicates
16	Halides	Oxidized Zones, weathering products
4	Compound Phosphates	Oxidized Zones, weathering products
16	Hydrated Carbonates	Sedimentary Uranium Ores
2	Framework Silicates	Pegmatites
2	Oxides	Sedimentary Uranium Ores

8	Sulphosalts	Hydrothermal Ore veins
8	Antimonites, Arsenites	Oxidized Zones, weathering products
2	Sheet Silicates	Many different geological environments
1	Anhydrous Phosphates	Caves
4	Hydrated Borates	Efflorescences
3	Multiple Oxides	Oxidized Zones, weathering products
2	Halides	Evaporites
4	Oxides	Oxidized Zones, weathering products
2	Halides	Oxidized Zones, weathering products
6	Native elements and Alloys	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Carbonates	Oxidized Zones, weathering products
	Silicates	Hydrothermal Ore veins
8	Oxides	Pegmatites
8	Compound Sulphates	Oxidized Zones, weathering products
4	Oxides	Pegmatites
4	Sheet Silicates	Pegmatites
16	Oxides	Intermediate to acid Volcanic rocks
2	Anhydrous Phosphates	Pegmatites
	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
8	Halides	Oxidized Zones, weathering products
2	Hydrated Sulphates	Evaporites
4	Anhydrous Phosphates	Pegmatites
4	Hydrated Phosphates	Pegmatites
4	Hydroxides	Many different geological environments
	Sulphides, Tellurides etc	Oxidized Zones, weathering products
4	Anhydrous Phosphates	Contact Metamorphic rocks
12	Sulphosalts	Hydrothermal Ore veins
	Vanadium Oxysalts	Sedimentary rocks
12	Halides	Oxidized Zones, weathering products
	Hydrated Phosphates	Pegmatites
6	Silicates	Sedimentary Uranium Ores
4	Anhydrous Borates	Oxidized Zones, weathering products
4	Hydrated Sulphates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
2	Compound Phosphates	Syenites, Alkali intrusions
	Hydrated Sulphates	Oxidized Zones, weathering products
4	Anhydrous Borates	Evaporites
4	Hydrated Borates	Evaporites
2	Compound Borates	Skarns and Calc-Silicates
4	Silicates	Pegmatites
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
16	Sulphides, Tellurides etc	Many different geological environments
1	Sulphosalts	Hydrothermal Ore veins
	Silicates	Skarns and Calc-Silicates
1	Halides	Oxidized Zones, weathering products
4	Hydrated Sulphates	Efflooresences

8	Sulphosalts	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Sulphates	Fumaroles
4	Hydrated Sulphates	Oxidized Zones, weathering products
2	Anhydrous Phosphates	Late stage cavities in Granites or Syenites
4	Hydroxides	Alluvial deposits
2	Hydrated Vanadates	Oxidized Zones, weathering products
2	Compound Phosphates	Sedimentary rocks
8	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
1	Hydrated Borates	Evaporites
4	Sheet Silicates	Regional Metamorphic rocks
2	Hydrated Arsenates	Skarns and Calc-Silicates
2	Oxides	Pegmatites
2	Orthosilicates	Pegmatites
8	Hydrated Arsenates	Oxidized Zones, weathering products
8	Silicates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Phosphates	Pegmatites
2	Silicates	Skarns and Calc-Silicates
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Carbonates	
2	Framework Silicates	Late stage cavities in Volcanic rocks
2	Sulphides, Tellurides etc	Meteorites
4	Anhydrous Phosphates	Meteorites
2	Sulphides, Tellurides etc	Stratiform Sulphide deposits
2	Sheet Silicates	Sedimentary rocks
2	Anhydrous Phosphates	Late stage cavities in Granites or Syenites
2	Anhydrous Phosphates	Pegmatites
4	Anhydrous Sulphates	Oxidized Zones, weathering products
3	Hydrated Phosphates	Late stage cavities in Granites or Syenites
4	Halides	Oxidized Zones, weathering products
2	Oxides	Skarns and Calc-Silicates
8	Oxides	Many different geological environments
4	Multiple Oxides	Skarns and Calc-Silicates
1	Hydroxides	Metamorphic rocks
4	Nitrates, Iodates	Evaporites
1	Hydrated Carbonates	Altered Ultramafic rocks
8	Oxides	Oxidized Zones, weathering products
4	Hydrated Phosphates	Caves
4	Anhydrous Phosphates	Meteorites
4	Framework Silicates	Late stage cavities in Granites or Syenites
3	Ring Silicates	Intermediate-acid Volcanic rocks
3	Anhydrous Carbonates	Slags and Clinkers
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Compound Sulphates	Oxidized Zones, weathering products
10	Hydrated Arsenates	Oxidized Zones, weathering products
4	Silicates	Skarns and Calc-Silicates
4	Oxides	Oxidized Zones, weathering products

2	Hydrated Phosphates	Pegmatites
2	Anhydrous Carbonates	Late stage cavities in Granites or Syenites
2	Silicates	Hydrothermal Ore veins
12	Compound Sulphates	Evaporites
	Sulphosalts	Skarns and Calc-Silicates
4	Hydroxides	Skarns and Calc-Silicates
12	Chain Silicates	Metamorphic rocks
2	Hydrated Sulphates	Evaporites
2	Nitrates, Iodates	Oxidized Zones, weathering products
2	Antimonites, Arsenites	Oxidized Zones, weathering products
4	Framework Silicates	Intermediate to acid Igneous rocks
4	Native elements and Alloys	Stratiform Sulphide deposits
12	Hydrated Phosphates	Oxidized Zones, weathering products
2	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
2	Sulphides, Tellurides etc	Sedimentary rocks
	Halides	Evaporites
4	Antimonites, Arsenites	Pegmatites
6	Multiple Oxides	Pegmatites
2	Anhydrous Arsenates	Skarns and Calc-Silicates
2	Native elements and Alloys	Hydrothermal Ore veins
8	Anhydrous Borates	Skarns and Calc-Silicates
1	Hydrated Sulphates	Oxidized Zones, weathering products
	Hydrated Phosphates	Sedimentary rocks
2	Multiple Oxides	Pegmatites
4	Anhydrous Vanadates	Oxidized Zones, weathering products
6	Anhydrous Carbonates	Many different geological environments
2	Silicates	Late stage cavities in Granites or Syenites
	Halides	Skarns and Calc-Silicates
4	Organic Compounds	Slags and Clinkers
	Tungstates, Molybdates	Oxidized Zones, weathering products
8	Orthosilicates	
2	Compound Sulphates	Oxidized Zones, weathering products
4	Hydrated Carbonates	Hydrothermal Ore veins
4	Hydrated Carbonates	Sedimentary rocks
4	Halides	Oxidized Zones, weathering products
	Hydroxides	Oxidized Zones, weathering products
14	Multiple Oxides	Skarns and Calc-Silicates
4	Hydrated Sulphates	Oxidized Zones, weathering products
2	Hydrated Phosphates	
2	Silicates	Pegmatites
12	Compound Borates	Pegmatites
1	Silicates	Syenites, Alkali intrusions
32	Sulphosalts	Hydrothermal Ore veins
	Sulphosalts	Fumaroles
1	Silicates	Pegmatites
4	Anhydrous Sulphates	Oxidized Zones, weathering products
2	Anhydrous Sulphates	Fumaroles

4	Compound Borates	Evaporites
2	Anhydrous Carbonates	Carbonatites
4	Multiple Oxides	Hydrothermal Ore veins
	Compound Sulphates	Oxidized Zones, weathering products
2	Anhydrous Phosphates	Pegmatites
2	Anhydrous Phosphates	Pegmatites
4	Silicates	Syenites, Alkali intrusions
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Halides	Pegmatites
27	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Silicates	Altered Ultramafic rocks
4	Native elements and Alloys	Meteorites
8	Anhydrous Arsenates	Oxidized Zones, weathering products
12	Halides	Evaporites
2	Hydrated Vanadates	Sedimentary Uranium Ores
4	Halides	Fumaroles
8	Silicates	
0.5	Compound Sulphates	Oxidized Zones, weathering products
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Arsenates	Skarns and Calc-Silicates
2	Sheet Silicates	Metamorphic rocks
4	Chain Silicates	Late stage cavities in Granites or Syenites
1	Hydrated Phosphates	Meteorites
2	Oxides	Many different geological environments
3	Sulphides, Tellurides etc	Meteorites
2	Silicates	Syenites, Alkali intrusions
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Silicates	Late stage cavities in Volcanic rocks
4	Silicates	Pegmatites
4	Anhydrous Carbonates	Pegmatites
	Silicates	Skarns and Calc-Silicates
4	Anhydrous Vanadates	Oxidized Zones, weathering products
2	Sheet Silicates	Basic and Ultrabasic Igneous rocks
4	Anhydrous Sulphates	Sedimentary rocks
8	Ring Silicates	Contact Metamorphic rocks
4	Oxides	Syenites, Alkali intrusions
	Multiple Oxides	Pegmatites
6	Silicates	Pegmatites
2	Sulphides, Tellurides etc	Pegmatites
2	Tungstates, Molybdates	Pegmatites
2	Hydrated Arsenates	Oxidized Zones, weathering products
4	Anhydrous Carbonates	Oxidized Zones, weathering products
4	Oxides	Oxidized Zones, weathering products
2	Anhydrous Sulphates	Fumaroles
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
	Silicates	Pegmatites
6	Framework Silicates	Late stage cavities in Volcanic rocks
4	Sulphosalts	Hydrothermal Ore veins

2	Compound Phosphates	Oxidized Zones, weathering products
		Many different geological environments
4	Hydrated Sulphates	Oxidized Zones, weathering products
48	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Sulphates	Fumaroles
4	Selenites, Selenates, Tellurites, Tellurates	Basic and Ultrabasic Volcanic rocks
4	Hydrated Carbonates	Efflorescences
2	Oxides	Oxidized Zones, weathering products
3	Compound Arsenate	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Many different geological environments
1	Hydrated Phosphates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
	Sulphosalts	Syenites, Alkali intrusions
2		Oxidized Zones, weathering products
4	Anhydrous Borates	Evaporites
8	Sulphosalts	Hydrothermal Ore veins
2	Sheet Silicates	Sedimentary rocks
9	Oxides	Oxidized Zones, weathering products
4	Silicates	Altered Ultramafic rocks
168	Native elements and Alloys	Meteorites
	Silicates	Hydrothermal Ore veins
2	Compound Sulphates	Oxidized Zones, weathering products
18	Silicates	Skarns and Calc-Silicates
1	Sulphosalts	Hydrothermal Ore veins
	Hydrated Borates	Evaporites
2	Hydrated Arsenates	Oxidized Zones, weathering products
1	Anhydrous Sulphates	Oxidized Zones, weathering products
4	Anhydrous Phosphates	Pegmatites
4	Native elements and Alloys	Alluvials deposits
4	Anhydrous Arsenates	Late stage cavities in Granites or Syenites
4	Sheet Silicates	Hydrothermal Ore veins
4	Anhydrous Vanadates	Oxidized Zones, weathering products
2	Silicates	Hydrothermal Ore veins
2	Silicates	Late stage cavities in Granites or Syenites
4	Silicates	Pegmatites
8	Hydrated Phosphates	Late stage cavities in Granites or Syenites
2	Halides	Pegmatites
24	Silicates	Syenites, Alkali intrusions
6	Halides	Fumaroles
2	Anhydrous Phosphates	Skarns and Calc-Silicates
4	Halides	Oxidized Zones, weathering products
4;	Sheet Silicates	Regional Metamorphic rocks
	Hydrated Carbonates	Skarns and Calc-Silicates
6	Halides	Fumaroles
2	Anhydrous Arsenates	Skarns and Calc-Silicates
4	Anhydrous Sulphates	Fumaroles
2	Halides	Oxidized Zones, weathering products
12	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products

2	Ring Silicates	Skarns and Calc-Silicates
4	Sulphosalts	Hydrothermal Ore veins
4	Oxides	Sedimentary rocks
3	Ring Silicates	Skarns and Calc-Silicates
8	Multiple Oxides	Basic and Ultrabasic Volcanic rocks
2	Native elements and Alloys	Skarns and Calc-Silicates
4	Multiple Oxides	Pegmatites
	Silicates	Oxidized Zones, weathering products
		Sedimentary rocks
1	Hydrated Arsenates	Oxidized Zones, weathering products
	Hydrated Sulphates	Oxidized Zones, weathering products
8	Hydrated Sulphates	Oxidized Zones, weathering products
4	Hydrated Phosphates	Sedimentary rocks
2	Anhydrous Arsenates	Oxidized Zones, weathering products
3	Sulphides, Tellurides etc	Many different geological environments
3	Silicates	Pegmatites
1		
	Hydrated Sulphates	Caves
66	Hydrated Carbonates	Oxidized Zones, weathering products
1	Halides	Oxidized Zones, weathering products
4	Native elements and Alloys	Hydrothermal Ore veins
8	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Native elements and Alloys	Meteorites
4	Anhydrous Vanadates	Oxidized Zones, weathering products
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Sheet Silicates	Many different geological environments
4	Sheet Silicates	Altered Ultramafic rocks
4	Anhydrous Arsenates	Oxidized Zones, weathering products
8	Chain Silicates	Intermediate to acid Volcanic rocks
8	Chain Silicates	Intermediate-acid Volcanic rocks
4	Silicates	Metamorphic rocks
2	Chain Silicates	Regional Metamorphic rocks
2	Orthosilicates	Skarns and Calc-Silicates
4	Silicates	Altered Ultramafic rocks
	Oxides	
8	Silicates	Pegmatites
1	Framework Silicates	Many different geological environments
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Hydrated Arsenates	Oxidized Zones, weathering products
2	Orthosilicates	Metamorphic rocks
2	Sheet Silicates	Skarns and Calc-Silicates
	Hydrated Carbonates	Altered Ultramafic rocks
4	Sulphides, Tellurides etc	Stratiform Sulphide deposits
	Hydrated Sulphates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Hydrated Arsenates	Oxidized Zones, weathering products
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
8	Multiple Oxides	Basic and Ultrabasic Volcanic rocks

1	Compound Phosphates	Oxidized Zones, weathering products
1	Hydrated Phosphates	Oxidized Zones, weathering products
16	Framework Silicates	Metamorphic rocks
4	Silicates	Sedimentary Uranium Ores
4	Native elements and Alloys	Meteorites
2	Hydrated Borates	Evaporites
1	Hydrated Phosphates	Pegmatites
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Halides	Hydrothermal Ore veins
4	Oxides	Pegmatites
8	Sulphosalts	Hydrothermal Ore veins
4	Oxides	Oxidized Zones, weathering products
2	Silicates	Intermediate to acid Volcanic rocks
1	Hydrated Carbonates	Oxidized Zones, weathering products
2	Multiple Oxides	Oxidized Zones, weathering products
6	Anhydrous Borates	Evaporites
4	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Hydrated Sulphates	Oxidized Zones, weathering products
4	Sheet Silicates	Pegmatites
2	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
1	Hydrated Sulphates	Oxidized Zones, weathering products
4	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
4	Hydrated Sulphates	Effloresences
4	Halides	Sedimentary Ore deposits
4	Silicates	Many different geological environments
2	Anhydrous Carbonates	Syenites, Alkali intrusions
3	Compound Sulphates	Oxidized Zones, weathering products
8	Anhydrous Phosphates	Oxidized Zones, weathering products
1	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Hydrated Arsenates	Oxidized Zones, weathering products
1	Multiple Oxides	Oxidized Zones, weathering products
6	Oxides	Many different geological environments
8	Sulphosalts	Hydrothermal Ore veins
2	Sulphides, Tellurides etc	Stratiform Sulphide deposits
4	Halides	Oxidized Zones, weathering products
8	Oxides	Altered Ultramafic rocks
6	Sulphides, Tellurides etc	Supergene Zones
6	Framework Silicates	Late stage cavities in Volcanic rocks
2	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
3	Hydrated Phosphates	Sedimentary rocks
4	Silicates	Oxidized Zones, weathering products
2	Oxides	Oxidized Zones, weathering products
4	Hydrated Sulphates	Oxidized Zones, weathering products
1	Multiple Oxides	
4	Framework Silicates	Intermediate-acid Volcanic rocks
2	Chain Silicates	Syenites, Alkali intrusions
4	Chromates	Oxidized Zones, weathering products
2	Sheet Silicates	
2	Sulphides, Tellurides etc	Hydrothermal Ore veins

2	Chain Silicates	Regional Metamorphic rocks
2	Halides	Pegmatites
8	Halides	Pegmatites
4	Halides	Fumaroles
1	Multiple Oxides	Oxidized Zones, weathering products
1	Antimonites, Arsenites	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
10	Halides	Oxidized Zones, weathering products
2	Chain Silicates	Regional Metamorphic rocks
10	Native elements and Alloys	Altered Ultramafic rocks
2	Oxides	Oxidized Zones, weathering products
12	Sulphosalts	Hydrothermal Ore veins
1	Hydrated Sulphates	Oxidized Zones, weathering products
8	Sulphides, Tellurides etc	Altered Ultramafic rocks
2	Sulphosalts	Hydrothermal Ore veins
8	Sulphides, Tellurides etc	Altered Ultramafic rocks
4	Silicates	Basic and Ultrabasic Volcanic rocks
2	Silicates	Oxidized Zones, weathering products
8	Multiple Oxides	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Tungstates, Molybdates	Oxidized Zones, weathering products
1	Anhydrous Phosphates	Hydrothermal Ore veins
4	Hydrated Vanadates	Sedimentary Uranium Ores
4	Oxides	Sedimentary Uranium Ores
4	Silicates	Skarns and Calc-Silicates
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Hydrated Sulphates	Fumaroles
1	Antimonites, Arsenites	Oxidized Zones, weathering products
1	Hydrated Sulphates	Oxidized Zones, weathering products
	Sulphosalts	Hydrothermal Ore veins
1	Silicates	Regional Metamorphic rocks
4	Hydrated Phosphates	Pegmatites
1	Framework Silicates	Late stage cavities in Volcanic rocks
1	Sulphosalts	Hydrothermal Ore veins
1	Silicates	Syenites, Alkali intrusions
2	Silicates	Many different geological environments
32	Native elements and Alloys	Stratiform Sulphide deposits
4	Silicates	Skarns and Calc-Silicates
2	Chain Silicates	Metamorphic rocks
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
	Compound Phosphates	Contact Metamorphic rocks
2	Silicates	Late stage cavities in Granites or Syenites
2	Nitrates, Iodates	Evaporites
4	Hydrated Sulphates	Many different geological environments
2	Halides	Oxidized Zones, weathering products
8	Sulphides, Tellurides etc	Meteorites
1	Silicates	Altered Ultramafic rocks

9	Multiple Oxides	Late stage cavities in Granites or Syenites
1	Silicates	Hydrothermal Ore veins
1	Framework Silicates	Intermediate to acid Volcanic rocks
4	Anhydrous Carbonates	Sedimentary rocks
4	Silicates	Regional Metamorphic rocks
8	Hydrated Carbonates	Skarns and Calc-Silicates
3	Oxides	Oxidized Zones, weathering products
1	Silicates	Intermediate-acid Volcanic rocks
8	Vanadium Oxysalts	Efflorescences
	Hydrated Phosphates	Oxidized Zones, weathering products
8	Orthosilicates	Pegmatites
1	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
20	Silicates	Syenites, Alkali intrusions
8	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Antimonites, Arsenites	Oxidized Zones, weathering products
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
3	Hydrated Carbonates	Altered Ultramafic rocks
4	Anhydrous Vanadates	Oxidized Zones, weathering products
2	Hydrated Sulphates	Oxidized Zones, weathering products
8	Hydrated Sulphates	Oxidized Zones, weathering products
6	Hydrated Phosphates	Sedimentary Uranium Ores
1	Halides	Oxidized Zones, weathering products
2	Compound Phosphates	Oxidized Zones, weathering products
8	Native elements and Alloys	Kimberlites and related rocks
8	Sulphosalts	Hydrothermal Ore veins
4	Hydroxides	Many different geological environments
4	Anhydrous Phosphates	Pegmatites
4	Sheet Silicates	Many different geological environments
4	Nitrates, Iodates	Evaporites
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Fumaroles
4	Chain Silicates	Metamorphic rocks
18	Orthosilicates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Caves
3	Antimonites, Arsenites	Skarns and Calc-Silicates
1	Sulphides, Tellurides etc	Meteorites
8	Sulphides, Tellurides etc	Supergene Zones
4	Anhydrous Sulphates	Fumaroles
3	Anhydrous Carbonates	Many different geological environments
1	Oxides	Sedimentary Uranium Ores
16	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Oxides	Basic and Ultrabasic Volcanic rocks
1	Hydrated Carbonates	Syenites, Alkali intrusions
8	Chain Silicates	Skarns and Calc-Silicates
8	Hydrated Phosphates	Pegmatites
	Halides	Evaporites
8	Selenites, Selenates, Tellurites, Tellurates	Fumaroles

2	Hydroxides	Syenites, Alkali intrusions
3	Ring Silicates	Many different geological environments
2	Hydrated Carbonates	Syenites, Alkali intrusions
4	Anhydrous Vanadates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Sedimentary Uranium Ores
4	Hydrated Phosphates	Many different geological environments
8	Sulphosalts	Hydrothermal Ore veins
4	Anhydrous Arsenates	Oxidized Zones, weathering products
1	Compound Arsenate	Oxidized Zones, weathering products
1	Hydrated Vanadates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Sedimentary Uranium Ores
4	Ring Silicates	Regional Metamorphic rocks
4	Hydrated Carbonates	Oxidized Zones, weathering products
4	Anhydrous Arsenates	Late stage cavities in Granites or Syenites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Hydroxides	Sedimentary Uranium Ores
4	Hydrated Sulphates	Carbonatites
	Hydrated Carbonates	Altered Ultramafic rocks
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Hydroxides	Pegmatites
2	Silicates	Pegmatites
4	Organic Compounds	Sedimentary rocks
2	Hydrated Phosphates	Pegmatites
8	Antimonites, Arsenites	Oxidized Zones, weathering products
2	Chain Silicates	Late stage cavities in Granites or Syenites
4	Sulphosalts	Hydrothermal Ore veins
2	Chain Silicates	Many different geological environments
2	Framework Silicates	Late stage cavities in Volcanic rocks
2	Silicates	Late stage cavities in Granites or Syenites
16	Halides	Oxidized Zones, weathering products
1	Hydrated Phosphates	Pegmatites
2	Orthosilicates	Contact Metamorphic rocks
3	Anhydrous Carbonates	Evaporites
2	Silicates	Syenites, Alkali intrusions
	Hydrated Borates	Skarns and Calc-Silicates
3	Ring Silicates	Pegmatites
7	Sulphosalts	Hydrothermal Ore veins
4	Halides	Pegmatites
2	Silicates	Syenites, Alkali intrusions
2	Anhydrous Sulphates	Oxidized Zones, weathering products
1	Compound Phosphates	Oxidized Zones, weathering products
	Orthosilicates	Pegmatites
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
16	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Sulphosalts	Hydrothermal Ore veins
2	Sheet Silicates	Oxidized Zones, weathering products

4	Hydrated Phosphates	Pegmatites
8	Hydrated Phosphates	Pegmatites
4	Sheet Silicates	Metamorphic rocks
8	Silicates	Pegmatites
2	Ring Silicates	Metamorphic rocks
3	Framework Silicates	Late stage cavities in Volcanic rocks
	Silicates	Pegmatites
4	Hydrated Sulphates	Efflioresences
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Anhydrous Borates	Evaporites
4	Silicates	Skarns and Calc-Silicates
2	Halides	Fumaroles
1	Framework Silicates	Late stage cavities in Volcanic rocks
1	Silicates	Skarns and Calc-Silicates
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Hydrated Phosphates	Pegmatites
1	Silicates	Pegmatites
2	Hydrated Arsenates	Oxidized Zones, weathering products
4	Halides	Efflorescences
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Sulphosalts	Pegmatites
6	Oxides	Skarns and Calc-Silicates
48	Silicates	Skarns and Calc-Silicates
	Chain Silicates	Slags and Clinkers
8	Hydrated Sulphates	Skarns and Calc-Silicates
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Anhydrous Sulphates	Fumaroles
4	Hydrated Arsenates	Oxidized Zones, weathering products
4	Silicates	Pegmatites
18	Silicates	Pegmatites
12	Silicates	Syenites, Alkali intrusions
8	Silicates	Syenites, Alkali intrusions
	Hydrated Sulphates	Evaporites
4	Silicates	Oxidized Zones, weathering products
4	Oxides	Pegmatites
	Hydrated Phosphates	Oxidized Zones, weathering products
4	Hydrated Arsenates	Oxidized Zones, weathering products
2	Organic Compounds	Hydrothermal Ore veins
2	Anhydrous Carbonates	Sedimentary rocks
3	Anhydrous Phosphates	Pegmatites
1	Hydrated Borates	Evaporites
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Anhydrous Borates	Evaporites
3	Hydrated Phosphates	Pegmatites
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Anhydrous Carbonates	Slags and Clinkers
1	Hydrated Phosphates	Pegmatites
4	Silicates	Altered Ultramafic rocks

2	Sulphosalts	Hydrothermal Ore veins
2	Anhydrous Phosphates	Meteorites
40	Framework Silicates	Late stage cavities in Volcanic rocks
1	Hydrated Phosphates	Sedimentary rocks
4	Orthosilicates	Intermediate to acid Volcanic rocks
2	Silicates	Late stage cavities in Granites or Syenites
4	Anhydrous Borates	Skarns and Calc-Silicates
1	Silicates	Pegmatites
2	Tungstates, Molybdates	Hydrothermal Ore veins
1	Native elements and Alloys	Alluvial deposits
4	Multiple Oxides	Pegmatites
4	Multiple Oxides	Skarns and Calc-Silicates
4	Multiple Oxides	Pegmatites
4	Multiple Oxides	Late stage cavities in Granites or Syenites
2	Anhydrous Arsenates	Hydrothermal Ore veins
1	Hydroxides	Sedimentary Ore deposits
1	Hydrated Arsenates	Oxidized Zones, weathering products
	Sheet Silicates	Sedimentary Ore deposits
	Hydrated Sulphates	Oxidized Zones, weathering products
3	Ring Silicates	Regional Metamorphic rocks
2	Orthosilicates	Late stage cavities in Volcanic rocks
1	Oxides	Sedimentary Ore deposits
	Chain Silicates	
2	Anhydrous Arsenates	Oxidized Zones, weathering products
	Tungstates, Molybdates	Oxidized Zones, weathering products
6	Hydrated Sulphates	Evaporites
4	Anhydrous Phosphates	Pegmatites
1	Tungstates, Molybdates	Oxidized Zones, weathering products
2	Chain Silicates	Regional Metamorphic rocks
4	Anhydrous Phosphates	Pegmatites
4	Chain Silicates	Metamorphic rocks
2	Ring Silicates	Skarns and Calc-Silicates
2	Chain Silicates	Skarns and Calc-Silicates
8	Silicates	Pegmatites
4	Multiple Oxides	Pegmatites
4	Chain Silicates	Regional Metamorphic rocks
2	Chain Silicates	Regional Metamorphic rocks
8	Hydrated Sulphates	Sedimentary rocks
2	Chain Silicates	Many different geological environments
1	Native elements and Alloys	Alluvials deposits
2	Chain Silicates	
2	Chain Silicates	Skarns and Calc-Silicates
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Hydrated Phosphates	Pegmatites
4	Multiple Oxides	Pegmatites
2	Chain Silicates	Many different geological environments
8	Compound Sulphates	Syenites, Alkali intrusions

	Anhydrous Phosphates	Pegmatites
4	Halides	Fumaroles
	Silicates	Skarns and Calc-Silicates
4	Silicates	Pegmatites
4	Multiple Oxides	Pegmatites
18	Hydrated Sulphates	Oxidized Zones, weathering products
4	Halides	Slags and Clinkers
18	Anhydrous Phosphates	Pegmatites
1	Anhydrous Vanadates	Fumaroles
2	Antimonites, Arsenites	Oxidized Zones, weathering products
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Sulphosalts	Hydrothermal Ore veins
16	Organic Compounds	Slags and Clinkers
2	Hydrated Sulphates	Oxidized Zones, weathering products
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Arsenates	Oxidized Zones, weathering products
3	Anhydrous Phosphates	Pegmatites
3	Anhydrous Phosphates	Sedimentary rocks
2	Hydrated Arsenates	Oxidized Zones, weathering products
8	Hydrated Phosphates	Pegmatites
2	Anhydrous Borates	Skarns and Calc-Silicates
6	Halides	Pegmatites
6	Halides	Pegmatites
2	Anhydrous Phosphates	Many different geological environments
2	Sheet Silicates	Late stage cavities in Volcanic rocks
2	Silicates	Skarns and Calc-Silicates
4	Halides	Many different geological environments
8	Hydrated Phosphates	Pegmatites
4	Multiple Oxides	Alluvial deposits
4	Chromates	Oxidized Zones, weathering products
4	Orthosilicates	Basic and Ultrabasic Volcanic rocks
1	Silicates	Skarns and Calc-Silicates
8	Multiple Oxides	Pegmatites
	Sheet Silicates	Oxidized Zones, weathering products
4	Hydrated Vanadates	Sedimentary Uranium Ores
1	Silicates	Metamorphic rocks
8	Sulphosalts	Hydrothermal Ore veins
6	Hydrated Phosphates	Caves
2	Oxides	Carbonatites
4	Halides	Hydrothermal Ore veins
8	Multiple Oxides	Skarns and Calc-Silicates
2	Hydrated Phosphates	Pegmatites
4	Silicates	Basic and Ultrabasic Volcanic rocks
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Borates	Skarns and Calc-Silicates
2	Antimonites, Arsenites	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins

2	Silicates	Regional Metamorphic rocks
1	Multiple Oxides	Syenites, Alkali intrusions
6	Silicates	Skarns and Calc-Silicates
6	Sulphosalts	Hydrothermal Ore veins
4	Hydrated Phosphates	Late stage cavities in Granites or Syenites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Phosphates	Pegmatites
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Silicates	Skarns and Calc-Silicates
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
7	Hydrated Phosphates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
4	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Orthosilicates	Late stage cavities in Granites or Syenites
2	Orthosilicates	Late stage cavities in Granites or Syenites
3	Halides	Late stage cavities in Granites or Syenites
5	Silicates	Hydrothermal Ore veins
8	Multiple Oxides	Metamorphic rocks
4	Silicates	Late stage cavities in Granites or Syenites
2	Anhydrous Phosphates	Pegmatites
1	Hydrated Arsenates	Oxidized Zones, weathering products
8	Multiple Oxides	Regional Metamorphic rocks
3	Anhydrous Sulphates	Evaporites
4	Sulphides, Tellurides etc	Many different geological environments
4	Sulphosalts	Hydrothermal Ore veins
2	Sulphosalts	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Stratiform Sulphide deposits
	Hydrated Vanadates	Oxidized Zones, weathering products
1	Silicates	Skarns and Calc-Silicates
	Silicates	Metamorphic rocks
4	Sulphosalts	Hydrothermal Ore veins
8	Compound Borates	Evaporites
1	Hydrated Arsenates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Sedimentary rocks
6	Anhydrous Carbonates	Oxidized Zones, weathering products
2	Anhydrous Phosphates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Pegmatites
2	Compound Borates	Hydrothermal Ore veins
4	Hydrated Carbonates	Evaporites
	Halides	Pegmatites
2	Antimonites, Arsenites	Oxidized Zones, weathering products
4	Chain Silicates	Metamorphic rocks
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Silicates	Skarns and Calc-Silicates
6	Oxides	Skarns and Calc-Silicates
8	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks

2	Silicates	Carbonatites
2	Sulphosalts	Hydrothermal Ore veins
4	Silicates	Syenites, Alkali intrusions
	Hydrated Carbonates	Oxidized Zones, weathering products
	Anhydrous Arsenates	Slags and Clinkers
4	Nitrates, Iodates	Oxidized Zones, weathering products
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Sulphides, Tellurides etc	
8	Silicates	Skarns and Calc-Silicates
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Anhydrous Sulphates	Oxidized Zones, weathering products
8	Hydroxides	Sedimentary rocks
2	Sulphosalts	Hydrothermal Ore veins
	Silicates	Skarns and Calc-Silicates
4	Silicates	Regional Metamorphic rocks
4	Hydrated Phosphates	Pegmatites
4	Hydrated Borates	Evaporites
2	Sulphosalts	Hydrothermal Ore veins
1	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Framework Silicates	Late stage cavities in Volcanic rocks
2	Silicates	Basic and Ultrabasic Volcanic rocks
8	Framework Silicates	Intermediate-acid Volcanic rocks
4	Sulphosalts	Hydrothermal Ore veins
4	Anhydrous Sulphates	Evaporites
4	Silicates	Skarns and Calc-Silicates
24	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Hydrated Sulphates	Slags and Clinkers
2	Sheet Silicates	Sedimentary rocks
2	Chain Silicates	Basic and Ultrabasic Volcanic rocks
4	Anhydrous Carbonates	Oxidized Zones, weathering products
4	Organic Compounds	
4	Framework Silicates	Late stage cavities in Volcanic rocks
	Framework Silicates	Late stage cavities in Volcanic rocks
	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Phosphates	Pegmatites
4	Hydroxides	Oxidized Zones, weathering products
4	Native elements and Alloys	Hydrothermal Ore veins
	Native elements and Alloys	Hydrothermal Ore veins
4	Hydrated Sulphates	Efflorescences
8	Orthosilicates	Metamorphic rocks
2	Framework Silicates	Late stage cavities in Volcanic rocks
4	Sheet Silicates	Skarns and Calc-Silicates
2	Framework Silicates	Late stage cavities in Volcanic rocks
3	Anhydrous Phosphates	Sedimentary rocks
1	Hydrated Phosphates	Sedimentary rocks
4	Hydrated Sulphates	Evaporites
2	Hydrated Phosphates	Sedimentary rocks

	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Sulphates	Efflorescences
1	Silicates	Intermediate to acid Volcanic rocks
2	Hydrated Arsenates	Oxidized Zones, weathering products
4	Hydrated Borates	Evaporites
3	Hydrated Phosphates	Pegmatites
10	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Anhydrous Phosphates	Pegmatites
4	Silicates	Pegmatites
4	Vanadium Oxysalts	Sedimentary Ore deposits
4	Native elements and Alloys	Many different geological environments
3	Sulphosalts	Hydrothermal Ore veins
3	Hydrated Phosphates	Sedimentary rocks
4	Sheet Silicates	Regional Metamorphic rocks
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Sulphides, Tellurides etc	Sedimentary rocks
1	Hydroxides	Alluvials deposits
2	Hydrated Carbonates	Pegmatites
8	Anhydrous Phosphates	Pegmatites
12	Anhydrous Arsenates	Oxidized Zones, weathering products
8	Orthosilicates	Skarns and Calc-Silicates
4	Hydroxides	Skarns and Calc-Silicates
2	Chain Silicates	Metamorphic rocks
3	Sulphosalts	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Organic Compounds	Caves
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
5	Hydrated Arsenates	Oxidized Zones, weathering products
1	Sulphosalts	Hydrothermal Ore veins
2	Ring Silicates	Skarns and Calc-Silicates
2	Hydrated Sulphates	Efflorésences
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Hydrated Sulphates	Oxidized Zones, weathering products
4	Native elements and Alloys	Alluvial deposits
1	Sulphosalts	Hydrothermal Ore veins
2	Hydroxides	Alluvials deposits
4	Hydrated Sulphates	Sedimentary rocks
	Silicates	Skarns and Calc-Silicates
2	Hydrated Carbonates	Oxidized Zones, weathering products
1.5	Native elements and Alloys	Altered Ultramafic rocks
4	Silicates	Pegmatites
	Anhydrous Phosphates	Pegmatites
2	Vanadium Oxysalts	Sedimentary Uranium Ores
8	Hydrated Arsenates	Oxidized Zones, weathering products
	Silicates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
4	Halides	Evaporites
2	Anhydrous Arsenates	Oxidized Zones, weathering products

2	Sheet Silicates	Many different geological environments
4	Hydrated Sulphates	Efflorescences
4	Hydrated Borates	Evaporites
8	Anhydrous Borates	Pegmatites
	Sulphosalts	Hydrothermal Ore veins
2	Ring Silicates	Skarns and Calc-Silicates
2	Compound Sulphates	Evaporites
1	Hydrated Phosphates	Caves
4	Silicates	Metamorphic rocks
2	Chain Silicates	Skarns and Calc-Silicates
	Silicates	Skarns and Calc-Silicates
2	Framework Silicates	Late stage cavities in Volcanic rocks
4	Silicates	Skarns and Calc-Silicates
4	Anhydrous Sulphates	Sedimentary rocks
2	Chain Silicates	Many different geological environments
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Sulphosalts	Hydrothermal Ore veins
9	Silicates	Skarns and Calc-Silicates
1	Sulphosalts	Hydrothermal Ore veins
1	Compound Sulphates	Skarns and Calc-Silicates
4	Sulphides, Tellurides etc	Sedimentary rocks
4	Multiple Oxides	Skarns and Calc-Silicates
1	Silicates	Intermediate-acid Volcanic rocks
4	Sulphides, Tellurides etc	Supergene Zones
4	Native elements and Alloys	Meteorites
12	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
3	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
	Sheet Silicates	Sedimentary rocks
4	Chain Silicates	Skarns and Calc-Silicates
6	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Meteorites
4	Compound Sulphates	Evaporites
	Hydrated Arsenates	Intermediate to acid Volcanic rocks
2	Ring Silicates	Pegmatites
	Antimonites, Arsenites	Skarns and Calc-Silicates
	Silicates	Pegmatites
8	Hydrated Carbonates	Oxidized Zones, weathering products
1	Hydrated Arsenates	Oxidized Zones, weathering products
2	Silicates	Many different geological environments
6	Oxides	Many different geological environments
3	Anhydrous Arsenates	Sedimentary Ore deposits
1	Multiple Oxides	Sedimentary rocks
1	Silicates	Oxidized Zones, weathering products
2	Silicates	Oxidized Zones, weathering products
	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Vanadium Oxysalts	Sedimentary Uranium Ores
2	Sheet Silicates	Skarns and Calc-Silicates
1	Anhydrous Borates	Skarns and Calc-Silicates

8	Silicates	Metamorphic rocks
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Phosphates	Oxidized Zones, weathering products
8	Oxides	Regional Metamorphic rocks
4	Anhydrous Phosphates	Pegmatites
12	Framework Silicates	Late stage cavities in Volcanic rocks
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Multiple Oxides	Oxidized Zones, weathering products
3	Hydroxides	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
4	Anhydrous Phosphates	Pegmatites
4	Framework Silicates	Many different geological environments
1	Vanadium Oxysalts	Sedimentary Uranium Ores
8	Hydrated Sulphates	Effloresences
2	Hydrated Borates	Oxidized Zones, weathering products
1	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
1	Anhydrous Vanadates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
2	Multiple Oxides	Skarns and Calc-Silicates
3	Compound Sulphates	Oxidized Zones, weathering products
4	Halides	Fumaroles
6	Silicates	Syenites, Alkali intrusions
4	Hydrated Borates	Evaporites
12	Silicates	Skarns and Calc-Silicates
4	Orthosilicates	Pegmatites
4	Orthosilicates	Late stage cavities in Granites or Syenites
3	Compound Phosphates	Oxidized Zones, weathering products
4	Silicates	Late stage cavities in Granites or Syenites
4	Silicates	Many different geological environments
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Silicates	Skarns and Calc-Silicates
	Sulphosalts	Hydrothermal Ore veins
2	Organic Compounds	Slags and Clinkers
18	Multiple Oxides	Metamorphic rocks
2	Hydrated Sulphates	Oxidized Zones, weathering products
8	Compound Arsenate	Skarns and Calc-Silicates
1	Multiple Oxides	Many different geological environments
4	Sulphides, Tellurides etc	Altered Ultramafic rocks
4	Chain Silicates	Contact Metamorphic rocks
6	Anhydrous Phosphates	Altered Ultramafic rocks
4	Ring Silicates	Pegmatites
2	Orthosilicates	Pegmatites
4	Oxides	Metamorphic rocks
	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
4	Hydrated Phosphates	Oxidized Zones, weathering products
2	Hydrated Arsenates	Skarns and Calc-Silicates
	Compound Phosphates	Evaporites
1	Silicates	Skarns and Calc-Silicates

4	Silicates	Evaporites
8	Silicates	Skarns and Calc-Silicates
3	Anhydrous Carbonates	Skarns and Calc-Silicates
2	Tungstates, Molybdates	Hydrothermal Ore veins
2	Hydrated Arsenates	Oxidized Zones, weathering products
2	Anhydrous Borates	Skarns and Calc-Silicates
3	Compound Sulphates	Evaporites
4	Organic Compounds	Sedimentary rocks
4	Orthosilicates	Skarns and Calc-Silicates
2	Vanadium Oxysalts	Efflorescences
2	Hydrated Borates	Slags and Clinkers
3	Anhydrous Carbonates	Many different geological environments
4	Hydrated Phosphates	Pegmatites
4	Anhydrous Phosphates	Late stage cavities in Granites or Syenites
8	Sulphosalts	Hydrothermal Ore veins
4	Silicates	Alluvial deposits
4	Framework Silicates	Many different geological environments
2	Multiple Oxides	Skarns and Calc-Silicates
1	Silicates	Pegmatites
2	Hydrated Borates	Evaporites
8	Hydroxides	Skarns and Calc-Silicates
3	Anhydrous Carbonates	Oxidized Zones, weathering products
8	Hydrated Borates	Evaporites
2	Hydrated Carbonates	Carbonatites
8	Orthosilicates	Skarns and Calc-Silicates
2	Multiple Oxides	Oxidized Zones, weathering products
	Hydrated Sulphates	Oxidized Zones, weathering products
2	Hydrated Carbonates	Altered Ultramafic rocks
2	Halides	Oxidized Zones, weathering products
3	Hydrated Sulphates	Oxidized Zones, weathering products
2	Halides	Evaporites
4	Hydroxides	Oxidized Zones, weathering products
	Hydrated Carbonates	Sedimentary rocks
3	Hydrated Carbonates	Altered Ultramafic rocks
2	Tungstates, Molybdates	Oxidized Zones, weathering products
	Orthosilicates	Basic and Ultrabasic Volcanic rocks
2	Sheet Silicates	Late stage cavities in Volcanic rocks
2	Anhydrous Phosphates	Many different geological environments
6	Anhydrous Carbonates	Carbonatites
1	Silicates	Skarns and Calc-Silicates
4	Anhydrous Phosphates	Pegmatites
2	Anhydrous Carbonates	Oxidized Zones, weathering products
12	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Oxides	Oxidized Zones, weathering products
4	Oxides	
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Organic Compounds	Sedimentary Ore deposits
2	Silicates	Pegmatites

4	Hydrated Carbonates	
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Sulphates	Oxidized Zones, weathering products
3	Silicates	Pegmatites
	Sheet Silicates	Many different geological environments
1	Silicates	Pegmatites
6	Oxides	Many different geological environments
2	Oxides	Pegmatites
4	Silicates	Skarns and Calc-Silicates
1	Silicates	Syenites, Alkali intrusions
	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Sulphosalts	Hydrothermal Ore veins
2	Sulphosalts	Hydrothermal Ore veins
	Sulphosalts	Basic and Ultrabasic Volcanic rocks
	Sulphosalts	Hydrothermal Ore veins
4	Hydrated Borates	Evaporites
2	Hydrated Borates	Evaporites
2	Silicates	Slags and Clinkers
8	Sulphides, Tellurides etc	Pegmatites
2	Native elements and Alloys	Late stage cavities in Granites or Syenites
1	Silicates	Metamorphic rocks
9	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Silicates	Pegmatites
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Borates	Evaporites
2	Halides	Oxidized Zones, weathering products
1	Hydroxides	Altered Ultramafic rocks
3	Chromates	Evaporites
1	Chromates	Oxidized Zones, weathering products
2	Silicates	Contact Metamorphic rocks
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Hydrated Arsenates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Native elements and Alloys	Alluvials deposits
2	Native elements and Alloys	Alluvial deposits
3	Tungstates, Molybdates	Late stage cavities in Granites or Syenites
2	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
6	Multiple Oxides	Pegmatites
1	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
4	Anhydrous Phosphates	Carbonatites
8	Sulphosalts	Alluvials deposits
4	Anhydrous Sulphates	Oxidized Zones, weathering products
	Oxides	Skarns and Calc-Silicates
1	Oxides	Pegmatites
1	Sulphosalts	Hydrothermal Ore veins
8	Oxides	Skarns and Calc-Silicates
4	Chain Silicates	Altered Ultramafic rocks

1	Silicates	Skarns and Calc-Silicates
1	Anhydrous Phosphates	Sedimentary rocks
2	Hydrated Phosphates	Pegmatites
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Hydroxides	Basic and Ultrabasic Volcanic rocks
1	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
4	Hydroxides	Supergene Zones
4	Silicates	Syenites, Alkali intrusions
4	Halides	Pegmatites
8	Anhydrous Arsenates	Skarns and Calc-Silicates
3	Anhydrous Sulphates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
2	Silicates	Skarns and Calc-Silicates
4	Hydroxides	Hydrothermal Ore veins
64	Framework Silicates	Basic and Ultrabasic Volcanic rocks
1	Silicates	Skarns and Calc-Silicates
1	Multiple Oxides	Carbonatites
2	Anhydrous Borates	Pegmatites
	Orthosilicates	Skarns and Calc-Silicates
4	Chain Silicates	Late stage cavities in Granites or Syenites
2	Anhydrous Borates	Skarns and Calc-Silicates
8	Silicates	Altered Ultramafic rocks
2	Silicates	Late stage cavities in Granites or Syenites
8	Tungstates, Molybdates	Oxidized Zones, weathering products
2	Silicates	Basic and Ultrabasic Volcanic rocks
2	Silicates	Skarns and Calc-Silicates
4	Anhydrous Borates	Intermediate to acid Igneous rocks
1	Hydrated Sulphates	Oxidized Zones, weathering products
4	Chain Silicates	Skarns and Calc-Silicates
4	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Anhydrous Arsenates	Oxidized Zones, weathering products
3	Anhydrous Phosphates	Metamorphic rocks
2	Hydrated Phosphates	Pegmatites
2	Hydrated Sulphates	Effloresences
4	Hydrated Carbonates	Sedimentary Uranium Ores
4	Silicates	Basic and Ultrabasic Volcanic rocks
2	Sulphosalts	Hydrothermal Ore veins
	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Compound Sulphates	Oxidized Zones, weathering products
4	Sheet Silicates	Skarns and Calc-Silicates
	Organic Compounds	
2	Hydrated Phosphates	Pegmatites
4	Silicates	Skarns and Calc-Silicates
2	Sulphosalts	Hydrothermal Ore veins

4	Compound Phosphates	Efflorescences
4	Hydrated Arsenates	Oxidized Zones, weathering products
2	Chain Silicates	Basic and Ultrabasic Volcanic rocks
	Organic Compounds	Skarns and Calc-Silicates
8	Hydrated Arsenates	Oxidized Zones, weathering products
16	Hydrated Sulphates	Evaporites
4	Silicates	Pegmatites
2	Silicates	Pegmatites
	Hydrated Borates	Evaporites
4	Anhydrous Carbonates	
8	Sulphides, Tellurides etc	Metamorphic rocks
54	Silicates	Basic and Ultrabasic Volcanic rocks
8		Alluvial deposits
3	Anhydrous Sulphates	Evaporites
2	Silicates	Basic and Ultrabasic Volcanic rocks
54	Native elements and Alloys	Meteorites
4	Silicates	Skarns and Calc-Silicates
1	Hydrated Carbonates	Oxidized Zones, weathering products
2	Compound Phosphates	Pegmatites
4	Silicates	Evaporites
16	Hydrated Arsenates	Oxidized Zones, weathering products
4	Chain Silicates	Skarns and Calc-Silicates
4	Ring Silicates	Regional Metamorphic rocks
16	Sheet Silicates	Altered Ultramafic rocks
6	Oxides	Oxidized Zones, weathering products
6	Multiple Oxides	Pegmatites
	Anhydrous Borates	Skarns and Calc-Silicates
	Silicates	Pegmatites
2	Organic Compounds	
	Silicates	Altered Ultramafic rocks
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Silicates	Sedimentary Uranium Ores
4	Multiple Oxides	Pegmatites
8	Orthosilicates	Skarns and Calc-Silicates
2	Silicates	Skarns and Calc-Silicates
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Silicates	Syenites, Alkali intrusions
2	Hydrated Phosphates	Pegmatites
	Anhydrous Sulphates	Oxidized Zones, weathering products
7	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
2	Silicates	Pegmatites
	Silicates	Syenites, Alkali intrusions
2	Sheet Silicates	Altered Ultramafic rocks
2	Multiple Oxides	Oxidized Zones, weathering products
3	Compound Arsenate	Oxidized Zones, weathering products
4	Halides	Evaporites
2	Multiple Oxides	Basic and Ultrabasic Volcanic rocks

4	Silicates	Skarns and Calc-Silicates
	Silicates	Evaporites
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Hydrated Borates	Evaporites
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Carbonates	Pegmatites
6	Anhydrous Arsenates	Oxidized Zones, weathering products
8	Native elements and Alloys	Skarns and Calc-Silicates
2	Anhydrous Carbonates	Carbonatites
4	Native elements and Alloys	Altered Ultramafic rocks
16	Silicates	Syenites, Alkali intrusions
8	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Phosphates	Many different geological environments
4	Hydrated Sulphates	Sedimentary rocks
8	Silicates	Skarns and Calc-Silicates
2	Silicates	Skarns and Calc-Silicates
1	Hydroxides	Pegmatites
4	Hydrated Carbonates	Basic and Ultrabasic Volcanic rocks
8	Orthosilicates	Carbonatites
2	Hydrated Phosphates	Sedimentary rocks
2	Hydrated Phosphates	Pegmatites
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Silicates	Contact Metamorphic rocks
2	Sheet Silicates	Metamorphic rocks
4	Hydrated Phosphates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
4	Orthosilicates	Intermediate-acid Volcanic rocks
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Silicates	Skarns and Calc-Silicates
6	Hydrated Phosphates	Pegmatites
4	Organic Compounds	Slags and Clinkers
4	Anhydrous Sulphates	Oxidized Zones, weathering products
	Oxides	Sedimentary rocks
2	Hydrated Phosphates	Sedimentary rocks
18	Hydrated Sulphates	Evaporites
6	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Hydrated Sulphates	Carbonatites
4	Silicates	Pegmatites
4	Multiple Oxides	Pegmatites
12	Sulphosalts	Pegmatites
4	Tungstates, Molybdates	Oxidized Zones, weathering products
	Halides	Evaporites
12	Anhydrous Sulphates	Syenites, Alkali intrusions
2	Hydrated Sulphates	Evaporites
1	Halides	Oxidized Zones, weathering products
4	Hydrated Phosphates	Sedimentary rocks

12	Hydrated Arsenates	Pegmatites
4	Silicates	Skarns and Calc-Silicates
4	Anhydrous Carbonates	Oxidized Zones, weathering products
4	Native elements and Alloys	Oxidized Zones, weathering products
18	Silicates	Syenites, Alkali intrusions
	Sulphides, Tellurides etc	Late stage cavities in Granites or Syenites
4	Hydrated Sulphates	Evaporites
8	Antimonites, Arsenites	Oxidized Zones, weathering products
4	Hydrated Sulphates	Oxidized Zones, weathering products
4	Silicates	Contact Metamorphic rocks
	Halides	Skarns and Calc-Silicates
4	Chain Silicates	Meteorites
	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Silicates	Syenites, Alkali intrusions
2	Anhydrous Borates	Skarns and Calc-Silicates
2	Hydrated Arsenates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
42	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Compound Phosphates	Syenites, Alkali intrusions
2	Chain Silicates	Regional Metamorphic rocks
2	Silicates	Skarns and Calc-Silicates
4	Organic Compounds	Slags and Clinkers
2	Hydrated Sulphates	Evaporites
4	Silicates	Metamorphic rocks
8	Hydrated Arsenates	
4	Halides	Fumaroles
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
32	Silicates	Meteorites
2	Hydrated Sulphates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Phosphates	Pegmatites
2	Hydrated Sulphates	Oxidized Zones, weathering products
2	Anhydrous Phosphates	Sedimentary rocks
2	Silicates	Skarns and Calc-Silicates
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Chain Silicates	Late stage cavities in Granites or Syenites
	Silicates	Pegmatites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
24	Anhydrous Borates	Skarns and Calc-Silicates
2	Hydrated Borates	Evaporites
28	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Anhydrous Carbonates	Hydrothermal Ore veins
2	Halides	Oxidized Zones, weathering products

4	Silicates	Syenites, Alkali intrusions
4	Hydrated Sulphates	Regional Metamorphic rocks
18	Multiple Oxides	Regional Metamorphic rocks
4	Framework Silicates	Basic and Ultrabasic Volcanic rocks
	Silicates	Syenites, Alkali intrusions
4	Anhydrous Phosphates	Pegmatites
4	Sulphosalts	Hydrothermal Ore veins
2	Silicates	Metamorphic rocks
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Silicates	Syenites, Alkali intrusions
4	Anhydrous Sulphates	Oxidized Zones, weathering products
3	Multiple Oxides	Late stage cavities in Granites or Syenites
4	Hydrated Phosphates	Pegmatites
4	Anhydrous Sulphates	Evaporites
	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Hydrated Sulphates	Oxidized Zones, weathering products
1	Hydrated Sulphates	Effloresences
4	Hydrated Carbonates	Efflorescences
4	Hydrated Carbonates	Oxidized Zones, weathering products
4	Hydrated Carbonates	Pegmatites
4	Hydrated Carbonates	Sedimentary rocks
4	Sulphides, Tellurides etc	Slags and Clinkers
4	Sulphosalts	Hydrothermal Ore veins
4	Silicates	Pegmatites
4	Anhydrous Borates	Evaporites
4	Silicates	Skarns and Calc-Silicates
10	Sulphosalts	Hydrothermal Ore veins
8	Silicates	Skarns and Calc-Silicates
2	Silicates	Skarns and Calc-Silicates
4	Oxides	Carbonatites
4	Anhydrous Phosphates	Oxidized Zones, weathering products
1	Hydrated Phosphates	Pegmatites
4	Framework Silicates	Late stage cavities in Volcanic rocks
2	Sulphosalts	Hydrothermal Ore veins
4	Halides	Slags and Clinkers
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Nitrates, Iodates	Evaporites
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Hydrated Arsenates	Oxidized Zones, weathering products
3	Halides	Meteorites
2	Hydrated Sulphates	Oxidized Zones, weathering products
4	Silicates	Metamorphic rocks
10	Antimonites, Arsenites	Oxidized Zones, weathering products
2	Anhydrous Phosphates	Pegmatites
1	Silicates	Skarns and Calc-Silicates
4	Native elements and Alloys	Oxidized Zones, weathering products
	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
8	Compound Sulphates	Oxidized Zones, weathering products

4	Hydrated Sulphates	Caves
8	Hydrated Arsenates	Oxidized Zones, weathering products
1	Silicates	Syenites, Alkali intrusions
4	Hydrated Sulphates	Oxidized Zones, weathering products
4	Antimonites, Arsenites	Oxidized Zones, weathering products
2	Silicates	Syenites, Alkali intrusions
	Sulphosalts	Hydrothermal Ore veins
1	Silicates	Skarns and Calc-Silicates
4	Hydrated Sulphates	Evaporites
2	Silicates	Oxidized Zones, weathering products
4	Hydroxides	Oxidized Zones, weathering products
1	Sheet Silicates	Pegmatites
2	Anhydrous Sulphates	Slags and Clinkers
16	Framework Silicates	Basic and Ultrabasic Volcanic rocks
4	Silicates	Pegmatites
2	Orthosilicates	Skarns and Calc-Silicates
4	Hydrated Phosphates	Pegmatites
2	Silicates	Syenites, Alkali intrusions
3	Framework Silicates	Late stage cavities in Volcanic rocks
8	Multiple Oxides	Pegmatites
1	Multiple Oxides	Pegmatites
2	Silicates	Skarns and Calc-Silicates
4	Anhydrous Phosphates	Oxidized Zones, weathering products
3	Ring Silicates	Pegmatites
4	Orthosilicates	Altered Ultramafic rocks
8	Hydrated Carbonates	Oxidized Zones, weathering products
1	Nitrates, Iodates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
4	Oxides	Skarns and Calc-Silicates
2	Anhydrous Sulphates	Oxidized Zones, weathering products
2	Tungstates, Molybdates	Oxidized Zones, weathering products
3	Multiple Oxides	Altered Ultramafic rocks
	Sulphosalts	Hydrothermal Ore veins
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
6	Framework Silicates	Skarns and Calc-Silicates
4	Anhydrous Phosphates	Pegmatites
4	Hydrated Arsenates	Oxidized Zones, weathering products
2	Oxides	Oxidized Zones, weathering products
4	Anhydrous Phosphates	Pegmatites
2	Hydroxides	Pegmatites
2	Anhydrous Phosphates	Pegmatites
4	Multiple Oxides	Late stage cavities in Granites or Syenites
2	Silicates	Syenites, Alkali intrusions
2	Silicates	Fumaroles
4	Sulphosalts	Hydrothermal Ore veins
8	Sulphosalts	Hydrothermal Ore veins
2	Sheet Silicates	Altered Ultramafic rocks
	Hydrated Carbonates	Pegmatites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins

2	Silicates	Syenites, Alkali intrusions
4	Hydrated Sulphates	Oxidized Zones, weathering products
4	Native elements and Alloys	Meteorites
1	Oxides	Slags and Clinkers
4	Chromates	Evaporites
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Silicates	Late stage cavities in Granites or Syenites
2	Halides	Oxidized Zones, weathering products
4	Anhydrous Carbonates	Skarns and Calc-Silicates
4	Anhydrous Arsenates	Oxidized Zones, weathering products
	Silicates	Altered Ultramafic rocks
8	Silicates	Pegmatites
3	Multiple Oxides	Intermediate to acid Volcanic rocks
2	Silicates	Syenites, Alkali intrusions
3	Hydrated Sulphates	Evaporites
4	Silicates	Hydrothermal Ore veins
2	Hydrated Phosphates	Oxidized Zones, weathering products
9	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Anhydrous Borates	Skarns and Calc-Silicates
1	Oxides	Carbonatites
2	Hydrated Arsenates	Intermediate-acid Volcanic rocks
8	Hydrated Phosphates	Pegmatites
2	Hydrated Phosphates	Evaporites
3		
2	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
3	Silicates	Skarns and Calc-Silicates
4	Silicates	Late stage cavities in Granites or Syenites
4	Silicates	Late stage cavities in Granites or Syenites
4	Silicates	Metamorphic rocks
1	Oxides	Syenites, Alkali intrusions
2	Silicates	Basic and Ultrabasic Volcanic rocks
6	Compound Arsenate	Oxidized Zones, weathering products
16	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
8	Compound Sulphates	Oxidized Zones, weathering products
4	Silicates	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
	Silicates	Evaporites
	Oxides	Oxidized Zones, weathering products
4	Chain Silicates	Metamorphic rocks
2	Chain Silicates	Syenites, Alkali intrusions
2	Ring Silicates	Skarns and Calc-Silicates
	Sheet Silicates	Regional Metamorphic rocks
8	Oxides	Basic and Ultrabasic Volcanic rocks
1	Hydrated Sulphates	Oxidized Zones, weathering products
2	Silicates	Metamorphic rocks
8	Oxides	Skarns and Calc-Silicates

2	Chain Silicates	Many different geological environments
2	Chain Silicates	Syenites, Alkali intrusions
2	Chain Silicates	Skarns and Calc-Silicates
6	Anhydrous Carbonates	Many different geological environments
2	Silicates	Syenites, Alkali intrusions
2	Anhydrous Arsenates	Oxidized Zones, weathering products
	Hydrated Sulphates	Effloresences
8	Oxides	Basic and Ultrabasic Volcanic rocks
2	Multiple Oxides	Skarns and Calc-Silicates
16	Anhydrous Phosphates	Pegmatites
4	Multiple Oxides	Pegmatites
16	Antimonites, Arsenites	Skarns and Calc-Silicates
6	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
8	Silicates	Meteorites
2	Silicates	Evaporites
9	Sulphides, Tellurides etc	Basic and Ultrabasic Igneous rocks
4	Anhydrous Carbonates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Altered Ultramafic rocks
4	Silicates	Skarns and Calc-Silicates
8	Native elements and Alloys	Hydrothermal Ore veins
3	Halides	Fumaroles
4	Hydrated Sulphates	Oxidized Zones, weathering products
2	Compound Sulphates	Oxidized Zones, weathering products
2	Sheet Silicates	Pegmatites
1	Hydrated Carbonates	Skarns and Calc-Silicates
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Silicates	Syenites, Alkali intrusions
4	Antimonites, Arsenites	Skarns and Calc-Silicates
2	Orthosilicates	Pegmatites
2	Silicates	Skarns and Calc-Silicates
8	Anhydrous Arsenates	Skarns and Calc-Silicates
4	Hydrated Arsenates	Skarns and Calc-Silicates
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Orthosilicates	Skarns and Calc-Silicates
8	Hydroxides	Oxidized Zones, weathering products
8	Oxides	Hydrothermal Ore veins
4	Oxides	Late stage cavities in Granites or Syenites
4	Anhydrous Sulphates	Fumaroles
4	Oxides	Skarns and Calc-Silicates
4	Antimonites, Arsenites	Skarns and Calc-Silicates
4	Multiple Oxides	Pegmatites
2	Multiple Oxides	Pegmatites
2	Silicates	Skarns and Calc-Silicates
1	Multiple Oxides	Oxidized Zones, weathering products
4	Multiple Oxides	Hydrothermal Ore veins
8	Hydrated Arsenates	Oxidized Zones, weathering products
4	Hydrated Phosphates	Sedimentary rocks
2	Hydrated Arsenates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Sedimentary rocks

2	Vanadium Oxysalts	Oxidized Zones, weathering products
4	Sheet Silicates	Regional Metamorphic rocks
2	Silicates	Skarns and Calc-Silicates
2	Silicates	Metamorphic rocks
4	Anhydrous Phosphates	Sedimentary rocks
4	Oxides	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
4	Halides	Oxidized Zones, weathering products
2	Chain Silicates	Skarns and Calc-Silicates
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Anhydrous Sulphates	Fumaroles
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Oxides	Oxidized Zones, weathering products
1	Silicates	Pegmatites
	Multiple Oxides	Sedimentary Uranium Ores
1	Multiple Oxides	Altered Ultramafic rocks
12	Sulphosalts	Hydrothermal Ore veins
2	Halides	Oxidized Zones, weathering products
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Sulphates	Fumaroles
2	Hydrated Phosphates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Hydrated Arsenates	Oxidized Zones, weathering products
	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Oxides	Skarns and Calc-Silicates
1	Framework Silicates	Late stage cavities in Volcanic rocks
4	Nitrates, Iodates	Caves
6	Hydrated Borates	Skarns and Calc-Silicates
3	Oxides	Alluvials deposits
	Silicates	Hydrothermal Ore veins
12	Silicates	Skarns and Calc-Silicates
4	Anhydrous Carbonates	Oxidized Zones, weathering products
6	Hydrated Carbonates	Sedimentary Uranium Ores
32	Sulphides, Tellurides etc	Supergene Zones
2	Hydrated Arsenates	Oxidized Zones, weathering products
4	Silicates	Hydrothermal Ore veins
2	Framework Silicates	Metamorphic rocks
	Silicates	Pegmatites
4	Silicates	Fumaroles
2	Oxides	Skarns and Calc-Silicates
4	Silicates	Oxidized Zones, weathering products
8	Halides	Fumaroles
1	Hydrated Vanadates	Sedimentary rocks
4	Hydrated Sulphates	Oxidized Zones, weathering products
8	Silicates	Pegmatites
16	Organic Compounds	Sedimentary rocks
1	Sulphides, Tellurides etc	Hydrothermal Ore veins

4	Anhydrous Phosphates	Pegmatites
4	Halides	Oxidized Zones, weathering products
	Hydrated Phosphates	Oxidized Zones, weathering products
4	Hydrated Sulphates	Oxidized Zones, weathering products
1	Sulphosalts	Hydrothermal Ore veins
16	Anhydrous Sulphates	Fumaroles
1	Native elements and Alloys	Hydrothermal Ore veins
1	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
1	Framework Silicates	Intermediate to acid Volcanic rocks
	Orthosilicates	Meteorites
18	Sulphides, Tellurides etc	Alluvial deposits
12	Sulphides, Tellurides etc	Alluvials deposits
4	Silicates	Hydrothermal Ore veins
8	Framework Silicates	Late stage cavities in Volcanic rocks
1	Hydrated Phosphates	Pegmatites
4	Hydrated Sulphates	Oxidized Zones, weathering products
1	Hydrated Phosphates	Pegmatites
1	Hydrated Phosphates	Pegmatites
4	Hydrated Phosphates	Oxidized Zones, weathering products
2	Hydrated Arsenates	Oxidized Zones, weathering products
24	Anhydrous Borates	Evaporites
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Vanadates	Efflorescences
	Silicates	Evaporites
2	Hydrated Arsenates	Oxidized Zones, weathering products
2	Organic Compounds	Sedimentary rocks
1	Hydrated Arsenates	Oxidized Zones, weathering products
	Hydrated Arsenates	Oxidized Zones, weathering products
1	Hydrated Arsenates	Oxidized Zones, weathering products
2	Hydrated Arsenates	Oxidized Zones, weathering products
1	Hydrated Arsenates	Oxidized Zones, weathering products
2	Organic Compounds	Sedimentary Uranium Ores
4	Hydrated Vanadates	Altered Ultramafic rocks
32	Oxides	Oxidized Zones, weathering products
2	Hydrated Sulphates	Evaporites
	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Oxides	Oxidized Zones, weathering products
8	Hydrated Phosphates	Pegmatites
1	Hydrated Phosphates	Oxidized Zones, weathering products
4	Compound Borates	Sedimentary Uranium Ores
	Oxides	Oxidized Zones, weathering products
32	Hydrated Phosphates	Pegmatites
2	Hydrated Vanadates	Supergene Zones
4	Hydrated Phosphates	Many different geological environments
2	Hydrated Phosphates	Pegmatites
	Hydrated Phosphates	Pegmatites
1	Hydrated Sulphates	Evaporites
4	Hydrated Carbonates	Oxidized Zones, weathering products
2	Hydrated Arsenates	Oxidized Zones, weathering products

1	Hydrated Borates	Evaporites
	Tungstates, Molybdates	Oxidized Zones, weathering products
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Sulphosalts	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Framework Silicates	Intermediate-acid Volcanic rocks
8	Oxides	Pegmatites
3	Framework Silicates	Contact Metamorphic rocks
4	Halides	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
2	Orthosilicates	Pegmatites
9	Sulphides, Tellurides etc	Basic and Ultrabasic Igneous rocks
2	Hydrated Phosphates	Sedimentary rocks
6	Anhydrous Sulphates	Fumaroles
4	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Silicates	Pegmatites
4	Hydrated Sulphates	Efflorescences
1	Silicates	Skarns and Calc-Silicates
	Organic Compounds	Oxidized Zones, weathering products
4	Oxides	Oxidized Zones, weathering products
	Silicates	Hydrothermal Ore veins
3	Anhydrous Carbonates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Sedimentary rocks
4	Hydrated Sulphates	Evaporites
	Anhydrous Sulphates	Fumaroles
16	Silicates	Skarns and Calc-Silicates
8	Hydrated Phosphates	Pegmatites
2	Halides	Fumaroles
2	Hydrated Arsenates	Oxidized Zones, weathering products
3	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
12	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Hydrated Sulphates	Efflorescences
2	Native elements and Alloys	Meteorites
	Tungstates, Molybdates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Oxides	Pegmatites
4	Tungstates, Molybdates	Oxidized Zones, weathering products
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
	Silicates	Skarns and Calc-Silicates
2	Halides	Fumaroles
4	Anhydrous Phosphates	Alluvial deposits
4	Anhydrous Phosphates	Many different geological environments
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Phosphates	Caves
	Silicates	Pegmatites
	Antimonites, Arsenites	Skarns and Calc-Silicates

9	Hydrated Carbonates	Sedimentary rocks
	Hydrated Sulphates	Oxidized Zones, weathering products
12	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Silicates	Intermediate to acid Volcanic rocks
2	Anhydrous Phosphates	Pegmatites
4	Oxides	Oxidized Zones, weathering products
2	Silicates	Syenites, Alkali intrusions
	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Phosphates	Many different geological environments
4	Silicates	Skarns and Calc-Silicates
1	Sheet Silicates	Many different geological environments
4	Hydroxides	Sedimentary rocks
	Hydrated Carbonates	Carbonatites
4	Oxides	Skarns and Calc-Silicates
1	Sulphides, Tellurides etc	Basic and Ultrabasic Igneous rocks
1	Organic Compounds	Caves
2	Hydrated Sulphates	Oxidized Zones, weathering products
8	Hydrated Sulphates	Effloresences
4	Hydroxides	Oxidized Zones, weathering products
12	Hydrated Phosphates	Pegmatites
4	Framework Silicates	Late stage cavities in Volcanic rocks
16	Hydrated Phosphates	Pegmatites
2	Anhydrous Phosphates	Skarns and Calc-Silicates
4	Hydrated Sulphates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Pegmatites
8	Sulphosalts	Hydrothermal Ore veins
4	Silicates	Pegmatites
10	Native elements and Alloys	Oxidized Zones, weathering products
8	Compound Sulphates	Oxidized Zones, weathering products
4	Anhydrous Vanadates	Oxidized Zones, weathering products
0.5	Compound Sulphates	Basic and Ultrabasic Volcanic rocks
1	Anhydrous Vanadates	Sedimentary Uranium Ores
8	Silicates	Carbonatites
1	Hydrated Sulphate-Carbonate	Oxidized Zones, weathering products
4	Oxides	Oxidized Zones, weathering products
8	Anhydrous Carbonates	Pegmatites
4	Hydrated Phosphates	Oxidized Zones, weathering products
8	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
1	Silicates	Contact Metamorphic rocks
2	Chain Silicates	Hydrothermal Ore veins
3	Silicates	Skarns and Calc-Silicates
8	Hydrated Phosphates	Pegmatites
2	Hydrated Phosphates	Caves
12	Hydrated Vanadates	Efflorescences
8	Oxides	Pegmatites
4	Halides	Oxidized Zones, weathering products
	Silicates	Late stage cavities in Granites or Syenites
1	Sulphides, Tellurides etc	Syenites, Alkali intrusions

4	Sheet Silicates	Many different geological environments
6	Multiple Oxides	Pegmatites
	Hydroxides	Skarns and Calc-Silicates
	Oxides	Altered Ultramafic rocks
8		
4	Hydrated Phosphates	Pegmatites
16	Anhydrous Phosphates	Syenites, Alkali intrusions
4	Sheet Silicates	Hydrothermal Ore veins
4	Halides	Oxidized Zones, weathering products
2	Silicates	Skarns and Calc-Silicates
	Silicates	Skarns and Calc-Silicates
1	Sulphosalts	Hydrothermal Ore veins
4	Anhydrous Carbonates	Sedimentary rocks
2	Anhydrous Phosphates	Sedimentary rocks
2	Compound Sulphates	Altered Ultramafic rocks
1	Silicates	Supergene Zones
2	Oxides	Oxidized Zones, weathering products
2	Hydrated Sulphates	Oxidized Zones, weathering products
15	Antimonites, Arsenites	Skarns and Calc-Silicates
4	Halides	Oxidized Zones, weathering products
4	Silicates	Carbonatites
2	Hydrated Borates	Evaporites
2	Silicates	Skarns and Calc-Silicates
4	Hydrated Phosphates	Syenites, Alkali intrusions
4	Chain Silicates	Basic and Ultrabasic Igneous rocks
4	Hydroxides	Oxidized Zones, weathering products
2	Silicates	Pegmatites
4	Anhydrous Carbonates	Late stage cavities in Granites or Syenites
3	Anhydrous Sulphates	Effloresences
2	Sheet Silicates	Skarns and Calc-Silicates
4	Multiple Oxides	Pegmatites
2	Hydrated Sulphates	Oxidized Zones, weathering products
4	Hydrated Phosphates	Pegmatites
	Anhydrous Carbonates	Hydrothermal Ore veins
3	Anhydrous Sulphates	Oxidized Zones, weathering products
8	Framework Silicates	Late stage cavities in Volcanic rocks
2	Anhydrous Phosphates	Pegmatites
4	Hydrated Carbonates	Evaporites
	Chain Silicates	Syenites, Alkali intrusions
4	Anhydrous Phosphates	Pegmatites
56	Hydrated Phosphates	Pegmatites
4	Silicates	Syenites, Alkali intrusions
	Multiple Oxides	Pegmatites
2	Silicates	Syenites, Alkali intrusions
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
6	Oxides	Sedimentary Uranium Ores
1	Anhydrous Arsenates	Slags and Clinkers

2	Anhydrous Phosphates	Pegmatites
4	Halides	Sedimentary rocks
1	Silicates	Skarns and Calc-Silicates
1	Sulphosalts	Hydrothermal Ore veins
	Silicates	Skarns and Calc-Silicates
8	Silicates	Hydrothermal Ore veins
4	Silicates	Pegmatites
8	Silicates	Syenites, Alkali intrusions
4	Sheet Silicates	Altered Ultramafic rocks
8	Silicates	Syenites, Alkali intrusions
4	Hydrated Carbonates	Altered Ultramafic rocks
6	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Hydrated Phosphates	Caves
8	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Phosphates	Caves
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Native elements and Alloys	Hydrothermal Ore veins
4	Hydrated Sulphates	Oxidized Zones, weathering products
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Hydrated Sulphates	Efflorescences
	Compound Sulphates	Oxidized Zones, weathering products
2	Halides	Fumaroles
2	Hydrated Sulphates	Effloresences
8	Hydrated Sulphates	Oxidized Zones, weathering products
	Hydrated Borates	Skarns and Calc-Silicates
3	Multiple Oxides	Pegmatites
2	Native elements and Alloys	Hydrothermal Ore veins
1	Sheet Silicates	Altered Ultramafic rocks
3	Hydrated Phosphates	Oxidized Zones, weathering products
	Sulphides, Tellurides etc	Meteorites
4	Multiple Oxides	Hydrothermal Ore veins
1	Silicates	Late stage cavities in Granites or Syenites
4	Silicates	Carbonatites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Phosphates	Oxidized Zones, weathering products
4	Nitrates, Iodates	Efflorescences
2	Nitrates, Iodates	Evaporites
4	Nitrates, Iodates	Evaporites
4	Nitrates, Iodates	Effloresences
2	Nitrates, Iodates	Efflorescences
4	Hydrated Borates	Altered Ultramafic rocks
1	Multiple Oxides	Hydrothermal Ore veins
1	Sheet Silicates	Oxidized Zones, weathering products
4	Orthosilicates	Skarns and Calc-Silicates
3	Anhydrous Borates	Syenites, Alkali intrusions
4	Silicates	Syenites, Alkali intrusions
2	Hydroxides	Late stage cavities in Granites or Syenites

2	Sulphosalts	
3	Anhydrous Carbonates	Many different geological environments
16	Anhydrous Carbonates	Evaporites
1	Framework Silicates	Intermediate-acid Volcanic rocks
2	Hydrated Arsenates	Oxidized Zones, weathering products
12	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Sulphosalts	Hydrothermal Ore veins
12	Oxides	Many different geological environments
4	Sulphosalts	Hydrothermal Ore veins
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Carbonates	Oxidized Zones, weathering products
4	Anhydrous Carbonates	Carbonatites
4	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Compound Arsenate	Oxidized Zones, weathering products
1	Framework Silicates	Late stage cavities in Volcanic rocks
	Hydrated Arsenates	Oxidized Zones, weathering products
2	Silicates	Altered Ultramafic rocks
2	Hydrated Arsenates	Oxidized Zones, weathering products
1	Silicates	Late stage cavities in Granites or Syenites
1	Framework Silicates	Late stage cavities in Volcanic rocks
4	Sulphides, Tellurides etc	Meteorites
2	Anhydrous Phosphates	Pegmatites
2	Framework Silicates	Many different geological environments
4	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Orthosilicates	Many different geological environments
2	Hydrated Phosphates	Pegmatites
4	Compound Sulphates	Oxidized Zones, weathering products
16	Anhydrous Phosphates	Pegmatites
2	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Chain Silicates	Regional Metamorphic rocks
1	Halides	Oxidized Zones, weathering products
3	Framework Silicates	Many different geological environments
8	Sulphides, Tellurides etc	Oxidized Zones, weathering products
	Silicates	Many different geological environments
2	Antimonites, Arsenites	Intermediate to acid Volcanic rocks
1	Silicates	Skarns and Calc-Silicates
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Silicates	Hydrothermal Ore veins
0.3	Compound Phosphates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Multiple Oxides	Syenites, Alkali intrusions
	Sheet Silicates	Altered Ultramafic rocks
4	Framework Silicates	Many different geological environments
4	Silicates	Skarns and Calc-Silicates
	Silicates	Altered Ultramafic rocks
16	Anhydrous Borates	Skarns and Calc-Silicates
3	Anhydrous Sulphates	Oxidized Zones, weathering products

4	Sulphides, Tellurides etc	Alluvials deposits
4	Native elements and Alloys	Meteorites
4	Native elements and Alloys	Alluvial deposits
2	Native elements and Alloys	Basic and Ultrabasic Igneous rocks
2	Orthosilicates	Intermediate-acid Volcanic rocks
2	Orthosilicates	Late stage cavities in Granites or Syenites
6	Anhydrous Carbonates	Oxidized Zones, weathering products
2	Oxides	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Supergene Zones
	Silicates	Hydrothermal Ore veins
8	Hydrated Carbonates	Oxidized Zones, weathering products
4	Silicates	Sedimentary Uranium Ores
8	Hydrated Phosphates	Pegmatites
4	Sulphosalts	Hydrothermal Ore veins
2	Organic Compounds	Caves
	Silicates	Skarns and Calc-Silicates
2	Sulphosalts	Hydrothermal Ore veins
2	Silicates	Skarns and Calc-Silicates
16	Halides	Pegmatites
2	Sulphosalts	Hydrothermal Ore veins
1	Hydrated Phosphates	Pegmatites
2	Oxides	
	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Hydrated Phosphates	Pegmatites
4	Native elements and Alloys	Alluvials deposits
18	Sulphides, Tellurides etc	Hydrothermal Ore veins
20	Sulphides, Tellurides etc	Basic and Ultrabasic Igneous rocks
2	Sulphides, Tellurides etc	Alluvial deposits
3	Anhydrous Sulphates	Fumaroles
4	Sheet Silicates	Altered Ultramafic rocks
4	Anhydrous Phosphates	Hydrothermal Ore veins
32	Anhydrous Phosphates	Meteorites
4	Native elements and Alloys	Hydrothermal Ore veins
4	Silicates	Metamorphic rocks
3	Multiple Oxides	Pegmatites
8	Hydrated Sulphates	Oxidized Zones, weathering products
4	Framework Silicates	Sedimentary rocks
12	Hydrated Sulphates	Evaporites
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Arsenates	Oxidized Zones, weathering products
1	Sulphides, Tellurides etc	Stratiform Sulphide deposits
4	Sheet Silicates	Regional Metamorphic rocks
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Anhydrous Borates	Evaporites
1	Hydrated Phosphates	Oxidized Zones, weathering products
2	Silicates	Syenites, Alkali intrusions
3	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Halides	Oxidized Zones, weathering products
3	Anhydrous Carbonates	Mississippi Valley-type Ore deposits

16	Oxides	Oxidized Zones, weathering products
	Compound Phosphates	Pegmatites
4	Oxides	Oxidized Zones, weathering products
8	Framework Silicates	Pegmatites
4	Sulphosalts	Hydrothermal Ore veins
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
16	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Native elements and Alloys	Oxidized Zones, weathering products
32	Oxides	Sedimentary Uranium Ores
4	Hydrated Phosphates	Pegmatites
8	Silicates	Skarns and Calc-Silicates
2	Hydrated Arsenates	Oxidized Zones, weathering products
8	Halides	Oxidized Zones, weathering products
4	Oxides	Oxidized Zones, weathering products
4	Silicates	Pegmatites
1	Hydrated Phosphates	Pegmatites
12	Chain Silicates	Skarns and Calc-Silicates
2	Chain Silicates	Many different geological environments
3	Anhydrous Carbonates	Pegmatites
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Hydrated Sulphates	Oxidized Zones, weathering products
	Silicates	Sedimentary Ore deposits
2	Hydrated Phosphates	Pegmatites
8	Silicates	Regional Metamorphic rocks
8	Antimonites, Arsenites	Oxidized Zones, weathering products
8	Antimonites, Arsenites	Skarns and Calc-Silicates
2	Vanadium Oxysalts	Sedimentary rocks
8	Sulphides, Tellurides etc	Oxidized Zones, weathering products
	Framework Silicates	Late stage cavities in Volcanic rocks
4	Hydrated Phosphates	Pegmatites
4	Antimonites, Arsenites	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
10	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Sulphosalts	Hydrothermal Ore veins
	Sheet Silicates	Oxidized Zones, weathering products
2	Chain Silicates	Many different geological environments
9	Multiple Oxides	Pegmatites
2	Hydrated Phosphates	Sedimentary Ore deposits
2	Sulphosalts	Hydrothermal Ore veins
4	Silicates	Skarns and Calc-Silicates
2	Anhydrous Phosphates	Sedimentary rocks
	Silicates	Pegmatites
4	Sheet Silicates	Regional Metamorphic rocks
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Silicates	Late stage cavities in Volcanic rocks
	Hydrated Sulphates	Efflorescences
4	Sulphides, Tellurides etc	Basic and Ultrabasic Igneous rocks
18	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Sulphates	Sedimentary rocks

1	Silicates	Pegmatites
4	Oxides	Regional Metamorphic rocks
4	Halides	Skarns and Calc-Silicates
1	Silicates	Pegmatites
2	Anhydrous Phosphates	Pegmatites
2	Sulphosalts	Hydrothermal Ore veins
4	Oxides	Metamorphic rocks
2	Silicates	Intermediate to acid Volcanic rocks
2	Halides	Oxidized Zones, weathering products
	Native elements and Alloys	Meteorites
2	Silicates	Pegmatites
2	Silicates	Syenites, Alkali intrusions
	Chain Silicates	Skarns and Calc-Silicates
2	Hydrated Phosphates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
1	Multiple Oxides	Pegmatites
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Arsenates	Oxidized Zones, weathering products
8	Hydrated Arsenates	Oxidized Zones, weathering products
2	Hydrated Arsenates	Oxidized Zones, weathering products
18	Silicates	Pegmatites
1	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Hydrated Arsenates	Oxidized Zones, weathering products
2	Framework Silicates	Late stage cavities in Volcanic rocks
2	Sheet Silicates	Metamorphic rocks
4	Chromates	Oxidized Zones, weathering products
4	Anhydrous Carbonates	Oxidized Zones, weathering products
8	Silicates	Pegmatites
4	Anhydrous Phosphates	Caves
4	Hydrated Phosphates	Pegmatites
2	Hydrated Phosphates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Oxidized Zones, weathering products
8	Hydrated Phosphates	Oxidized Zones, weathering products
4	Hydrated Phosphates	Pegmatites
6	Hydrated Phosphates	Oxidized Zones, weathering products
4	Hydrated Phosphates	Oxidized Zones, weathering products
8	Hydrated Phosphates	Oxidized Zones, weathering products
3	Tungstates, Molybdates	Hydrothermal Ore veins
4	Hydrated Sulphates	Metamorphic rocks
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Hydrated Sulphates	Evaporites
	Hydrated Arsenates	Oxidized Zones, weathering products
2	Ring Silicates	Metamorphic rocks
8	Sulphosalts	Hydrothermal Ore veins
4	Chain Silicates	Intermediate-acid Volcanic rocks
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Borates	Skarns and Calc-Silicates
4	Halides	Oxidized Zones, weathering products

4	Hydrated Borates	Evaporites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Hydrated Carbonates	Evaporites
4	Anhydrous Sulphates	Fumaroles
4	Sulphosalts	Hydrothermal Ore veins
4	Silicates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Native elements and Alloys	Alluvials deposits
4	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
2	Oxides	Oxidized Zones, weathering products
8	Sulphosalts	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
4	Silicates	Skarns and Calc-Silicates
	Silicates	Metamorphic rocks
	Multiple Oxides	Syenites, Alkali intrusions
42	Oxides	Skarns and Calc-Silicates
3	Hydrated Phosphates	Oxidized Zones, weathering products
3	Anhydrous Sulphates	Oxidized Zones, weathering products
	Multiple Oxides	Alluvial deposits
	Anhydrous Carbonates	Oxidized Zones, weathering products
	Native elements and Alloys	Hydrothermal Ore veins
8	Multiple Oxides	Late stage cavities in Granites or Syenites
12	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
10	Silicates	Oxidized Zones, weathering products
4	Hydrated Sulphates	Oxidized Zones, weathering products
4	Hydrated Carbonates	Basic and Ultrabasic Volcanic rocks
	Native elements and Alloys	Hydrothermal Ore veins
24	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Framework Silicates	Pegmatites
16	Sulphosalts	Hydrothermal Ore veins
4	Multiple Oxides	Pegmatites
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Hydrated Sulphates	Sedimentary rocks
2	Sheet Silicates	Carbonatites
	Multiple Oxides	Pegmatites
1	Hydroxides	Skarns and Calc-Silicates
4	Hydrated Sulphates	Oxidized Zones, weathering products
1	Native elements and Alloys	Alluvials deposits
4	Hydrated Sulphates	Efflorescences
3	Sulphosalts	Hydrothermal Ore veins
4	Compound Sulphates	Oxidized Zones, weathering products
4	Tungstates, Molybdates	Oxidized Zones, weathering products
24	Halides	Oxidized Zones, weathering products
2	Sheet Silicates	Many different geological environments
2	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Sheet Silicates	Metamorphic rocks
4	Anhydrous Borates	Evaporites
	Hydrated Borates	Evaporites

1	Multiple Oxides	Intermediate to acid Volcanic rocks
4	Hydrated Borates	Evaporites
4	Halides	Carbonatites
8	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Multiple Oxides	Sedimentary Uranium Ores
6	Sulphosalts	Hydrothermal Ore veins
	Hydrated Phosphates	Oxidized Zones, weathering products
	Hydrated Phosphates	Oxidized Zones, weathering products
	Halides	Oxidized Zones, weathering products
4	Oxides	Intermediate-acid Volcanic rocks
2	Hydrated Phosphates	Pegmatites
2	Hydrated Phosphates	Oxidized Zones, weathering products
	Multiple Oxides	Oxidized Zones, weathering products
24	Chain Silicates	Skarns and Calc-Silicates
4	Anhydrous Vanadates	Oxidized Zones, weathering products
2	Silicates	Many different geological environments
4	Silicates	Metamorphic rocks
4	Anhydrous Phosphates	Pegmatites
	Sulphides, Tellurides etc	Hydrothermal Ore veins
6	Sulphosalts	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Many different geological environments
3	Hydrated Carbonates	Altered Ultramafic rocks
4	Anhydrous Vanadates	Oxidized Zones, weathering products
8	Multiple Oxides	Pegmatites
1	Hydroxides	Hydrothermal Ore veins
2	Oxides	Oxidized Zones, weathering products
2	Anhydrous Phosphates	Oxidized Zones, weathering products
8	Orthosilicates	Altered Ultramafic rocks
6	Oxides	Regional Metamorphic rocks
4	Sheet Silicates	Regional Metamorphic rocks
	Silicates	Metamorphic rocks
4	Sulphosalts	Hydrothermal Ore veins
14	Chain Silicates	Basic and Ultrabasic Volcanic rocks
14	Chain Silicates	Metamorphic rocks
64	Sulphides, Tellurides etc	Basic and Ultrabasic Igneous rocks
8	Oxides	Skarns and Calc-Silicates
2	Anhydrous Phosphates	Pegmatites
4	Tungstates, Molybdates	Pegmatites
3	Framework Silicates	Many different geological environments
2	Silicates	Oxidized Zones, weathering products
4	Oxides	Skarns and Calc-Silicates
2	Hydrated Sulphates	Evaporites
1	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
8	Hydrated Carbonates	Efflorescences
1	Sulphides, Tellurides etc	Oxidized Zones, weathering products
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Silicates	Pegmatites
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
8	Halides	Many different geological environments

4	Sulphosalts	Hydrothermal Ore veins
4	Multiple Oxides	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Sulphates	Oxidized Zones, weathering products
4	Oxides	Oxidized Zones, weathering products
	Multiple Oxides	Oxidized Zones, weathering products
4	Vanadium Oxysalts	Oxidized Zones, weathering products
2	Multiple Oxides	Alluvial deposits
4	Silicates	Skarns and Calc-Silicates
2	Hydrated Sulphates	Oxidized Zones, weathering products
14	Hydrated Phosphates	Pegmatites
8	Compound Sulphates	Sedimentary rocks
4	Tungstates, Molybdates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Late stage cavities in Granites or Syenites
2	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Arsenates	Oxidized Zones, weathering products
	Vanadium Oxysalts	Sedimentary Uranium Ores
4	Sulphosalts	Hydrothermal Ore veins
16	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
4	Hydrated Phosphates	Pegmatites
	Multiple Oxides	Basic and Ultrabasic Volcanic rocks
4	Framework Silicates	Sedimentary rocks
3	Hydrated Carbonates	Oxidized Zones, weathering products
4	Organic Compounds	
2	Anhydrous Phosphates	Oxidized Zones, weathering products
4	Antimonites, Arsenites	Oxidized Zones, weathering products
2	Silicates	Skarns and Calc-Silicates
6	Hydrated Phosphates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
4	Hydrated Sulphates	Oxidized Zones, weathering products
2	Anhydrous Arsenates	Limestone
2	Anhydrous Arsenates	Skarns and Calc-Silicates
2	Anhydrous Arsenates	Skarns and Calc-Silicates
8	Silicates	Syenites, Alkali intrusions
1	Silicates	Basic and Ultrabasic Volcanic rocks
3	Hydrated Phosphates	Pegmatites
3	Hydrated Phosphates	Oxidized Zones, weathering products
2	Native elements and Alloys	Meteorites
1	Silicates	Skarns and Calc-Silicates
4	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
1	Silicates	Pegmatites
6	Anhydrous Carbonates	Many different geological environments
10	Chain Silicates	Metamorphic rocks
3	Sulphosalts	Hydrothermal Ore veins
7	Hydrated Sulphates	Efflorescences
2	Silicates	Basic and Ultrabasic Volcanic rocks
4	Orthosilicates	Regional Metamorphic rocks
	Hydrated Phosphates	Oxidized Zones, weathering products

4	Hydrated Arsenates	Hydrothermal Ore veins
9	Multiple Oxides	Sedimentary Uranium Ores
2	Chain Silicates	Skarns and Calc-Silicates
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Chain Silicates	Syenites, Alkali intrusions
8	Orthosilicates	Meteorites
6	Halides	Evaporites
1	Hydrated Borates	Evaporites
4	Silicates	Skarns and Calc-Silicates
1	Native elements and Alloys	Meteorites
8	Hydrated Phosphates	Pegmatites
1	Sulphosalts	Hydrothermal Ore veins
4	Hydrated Phosphates	Many different geological environments
1	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Silicates	Skarns and Calc-Silicates
2	Orthosilicates	Meteorites
	Silicates	Pegmatites
2	Sulphosalts	Syenites, Alkali intrusions
2	Halides	Evaporites
2	Multiple Oxides	Oxidized Zones, weathering products
1	Oxides	Oxidized Zones, weathering products
8	Antimonites, Arsenites	Oxidized Zones, weathering products
1	Hydrated Sulphates	Effloresences
9	Anhydrous Carbonates	Syenites, Alkali intrusions
4	Anhydrous Arsenates	Intermediate to acid Volcanic rocks
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Carbonates	Heavy mineral sands
4	Hydrated Phosphates	Pegmatites
2	Sheet Silicates	Sedimentary Uranium Ores
2	Hydrated Arsenates	Oxidized Zones, weathering products
1	Hydrated Arsenates	Oxidized Zones, weathering products
4	Silicates	Syenites, Alkali intrusions
2	Silicates	Skarns and Calc-Silicates
32	Native elements and Alloys	Fumaroles
2	Hydrated Vanadates	Sedimentary Uranium Ores
8	Hydrated Arsenates	Oxidized Zones, weathering products
8	Hydrated Sulphates	Slags and Clinkers
1	Hydrated Carbonates	Oxidized Zones, weathering products
	Hydrated Arsenates	Skarns and Calc-Silicates
8	Sulphosalts	Hydrothermal Ore veins
4	Anhydrous Borates	Skarns and Calc-Silicates
	Silicates	Pegmatites
4	Hydrated Sulphates	Efflorescences
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Ring Silicates	Late stage cavities in Granites or Syenites
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Silicates	Skarns and Calc-Silicates
4	Tungstates, Molybdates	Hydrothermal Ore veins
1	Native elements and Alloys	Basic and Ultrabasic Igneous rocks

4	Silicates	Skarns and Calc-Silicates
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
2	Native elements and Alloys	Alluvials deposits
	Native elements and Alloys	
2	Anhydrous Carbonates	Sedimentary Uranium Ores
2	Oxides	Many different geological environments
4	Multiple Oxides	Pegmatites
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Anhydrous Sulphates	Caves
4	Anhydrous Carbonates	Carbonatites
	Hydrated Phosphates	Sedimentary Uranium Ores
14	Framework Silicates	Late stage cavities in Volcanic rocks
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Carbonates	Hydrothermal Ore veins
4	Anhydrous Arsenates	Skarns and Calc-Silicates
4	Hydrated Arsenates	Oxidized Zones, weathering products
16	Compound Borates	Skarns and Calc-Silicates
1	Sulphosalts	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Halides	Fumaroles
2	Hydrated Phosphates	Sedimentary Uranium Ores
4	Nitrates, Iodates	Oxidized Zones, weathering products
	Multiple Oxides	Pegmatites
8	Hydrated Phosphates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Phosphates	Pegmatites
1	Silicates	Hydrothermal Ore veins
4	Framework Silicates	Pegmatites
	Compound Phosphates	Sedimentary rocks
2	Tungstates, Molybdates	Hydrothermal Ore veins
4	Chain Silicates	Metamorphic rocks
	Hydrated Vanadates	Sedimentary Ore deposits
6	Chromates	Oxidized Zones, weathering products
4	Hydrated Borates	Evaporites
	Sheet Silicates	Oxidized Zones, weathering products
4	Silicates	Altered Ultramafic rocks
4	Sulphides, Tellurides etc	Skarns and Calc-Silicates
4	Silicates	Basic and Ultrabasic Volcanic rocks
2	Anhydrous Phosphates	Pegmatites
16	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Compound Arsenate	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
4	Silicates	Intermediate-acid Volcanic rocks
10	Compound Phosphates	Caves
4	Anhydrous Borates	Efflorescences
	Hydrated Borates	Sedimentary rocks

6	Anhydrous Phosphates	Sedimentary rocks
	Sheet Silicates	Oxidized Zones, weathering products
2	Oxides	Sedimentary Uranium Ores
2	Silicates	Pegmatites
8	Hydrated Borates	Evaporites
3	Halides	Fumaroles
4	Hydrated Carbonates	Sedimentary rocks
2	Silicates	Skarns and Calc-Silicates
2	Native elements and Alloys	Oxidized Zones, weathering products
4	Antimonites, Arsenites	Oxidized Zones, weathering products
	Anhydrous Sulphates	Evaporites
2	Silicates	Skarns and Calc-Silicates
2	Hydrated Sulphates	Oxidized Zones, weathering products
4	Tungstates, Molybdates	Skarns and Calc-Silicates
8	Hydrated Phosphates	Caves
	Multiple Oxides	Pegmatites
16	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
8	Sulphosalts	Hydrothermal Ore veins
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Antimonites, Arsenites	Oxidized Zones, weathering products
18	Compound Phosphates	Oxidized Zones, weathering products
4	Hydroxides	Skarns and Calc-Silicates
32	Oxides	Sedimentary Uranium Ores
	Sulphides, Tellurides etc	Meteorites
12	Hydrated Phosphates	Oxidized Zones, weathering products
4	Hydrated Phosphates	Pegmatites
3	Ring Silicates	Pegmatites
8	Orthosilicates	Skarns and Calc-Silicates
8	Native elements and Alloys	Meteorites
4	Oxides	Regional Metamorphic rocks
4	Compound Sulphates	Oxidized Zones, weathering products
2	Hydrated Vanadates	Sedimentary Ore deposits
3	Anhydrous Sulphates	Supergene Zones
4	Hydrated Carbonates	Oxidized Zones, weathering products
1	Hydrated Sulphate-Carbonate	Oxidized Zones, weathering products
2	Anhydrous Arsenates	Oxidized Zones, weathering products
2	Anhydrous Vanadates	Oxidized Zones, weathering products
1	Nitrates, Iodates	Oxidized Zones, weathering products
4	Framework Silicates	Late stage cavities in Volcanic rocks
8	Hydrated Arsenates	Oxidized Zones, weathering products
2	Anhydrous Phosphates	Pegmatites
2	Anhydrous Sulphates	Oxidized Zones, weathering products
4	Compound Phosphates	Oxidized Zones, weathering products
2	Silicates	Evaporites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Tungstates, Molybdates	Supergene Zones
8	Nitrates, Iodates	Oxidized Zones, weathering products

8	Hydrated Phosphates	Pegmatites
3	Compound Arsenate	Oxidized Zones, weathering products
4	Silicates	Pegmatites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Silicates	Pegmatites
3	Native elements and Alloys	Sedimentary Uranium Ores
4	Sulphosalts	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
2	Halides	Sedimentary rocks
2	Silicates	Late stage cavities in Granites or Syenites
4	Sulphosalts	Hydrothermal Ore veins
3	Multiple Oxides	Alluvial deposits
16	Oxides	Oxidized Zones, weathering products
4	Hydrated Phosphates	Oxidized Zones, weathering products
2	Hydrated Vanadates	Oxidized Zones, weathering products
4	Sheet Silicates	Altered Ultramafic rocks
2	Chain Silicates	Syenites, Alkali intrusions
	Silicates	Skarns and Calc-Silicates
3	Hydrated Carbonates	
16	Sheet Silicates	Altered Ultramafic rocks
1	Hydrated Sulphates	Oxidized Zones, weathering products
	Hydrated Borates	Skarns and Calc-Silicates
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
6	Silicates	Pegmatites
2	Antimonites, Arsenites	Oxidized Zones, weathering products
3	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
	Hydrated Carbonates	Oxidized Zones, weathering products
4	Silicates	Oxidized Zones, weathering products
4	Silicates	Pegmatites
2	Vanadium Oxysalts	Fumaroles
4	Vanadium Oxysalts	Sedimentary Ore deposits
3	Hydrated Sulphates	Oxidized Zones, weathering products
2	Anhydrous Carbonates	Sedimentary rocks
4	Silicates	Basic and Ultrabasic Volcanic rocks
4	Anhydrous Phosphates	Pegmatites
	Native elements and Alloys	Fumaroles
6	Anhydrous Carbonates	Many different geological environments
4	Hydrated Sulphates	Oxidized Zones, weathering products
1	Sheet Silicates	
2	Hydrated Sulphates	Efflorescences
2	Compound Phosphates	Pegmatites
16	Tungstates, Molybdates	Oxidized Zones, weathering products
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Hydrated Phosphates	Oxidized Zones, weathering products
1	Hydrated Phosphates	Hydrothermal Ore veins
1	Silicates	Sedimentary rocks
12	Silicates	Oxidized Zones, weathering products
4	Orthosilicates	Regional Metamorphic rocks
4	Native elements and Alloys	Oxidized Zones, weathering products

8	Organic Compounds	Slags and Clinkers
4	Sulphosalts	Hydrothermal Ore veins
3	Halides	Slags and Clinkers
4	Vanadium Oxysalts	Fumaroles
1	Oxides	Pegmatites
2	Compound Phosphates	Sedimentary Uranium Ores
4	Anhydrous Borates	Skarns and Calc-Silicates
2	Hydrated Phosphates	Pegmatites
2	Sulphosalts	Hydrothermal Ore veins
4	Native elements and Alloys	Meteorites
	Hydrated Carbonates	Skarns and Calc-Silicates
8	Sulphosalts	Syenites, Alkali intrusions
2	Silicates	Oxs, weathering products
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Anhydrous Sulphates	Oxidized Zones, weathering products
4	Framework Silicates	
8	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
24	Sulphosalts	Hydrothermal Ore veins
6	Anhydrous Carbonates	Oxidized Zones, weathering products
2	Hydrated Arsenates	Oxidized Zones, weathering products
1	Sulphides, Tellurides etc	Supergene Zones
2	Silicates	Syenites, Alkali intrusions
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Sheet Silicates	Altered Ultramafic rocks
2	Framework Silicates	Syenites, Alkali intrusions
	Silicates	Pegmatites
4	Hydrated Sulphates	Evaporites
2	Hydrated Phosphates	Sedimentary rocks
4	Compound Arsenate	Oxidized Zones, weathering products
8	Silicates	Oxidized Zones, weathering products
1	Framework Silicates	Late stage cavities in Volcanic rocks
	Hydrated Arsenates	Oxidized Zones, weathering products
1	Hydrated Arsenates	Oxidized Zones, weathering products
	Hydrated Sulphates	Effloresences
2	Orthosilicates	Pegmatites
8	Hydroxides	Oxidized Zones, weathering products
4	Anhydrous Borates	Skarns and Calc-Silicates
2	Orthosilicates	Skarns and Calc-Silicates
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Sulphosalts	Skarns and Calc-Silicates
4	Silicates	Syenites, Alkali intrusions
1	Multiple Oxides	Pegmatites
4	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Phosphates	Pegmatites
2	Hydrated Sulphates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Oxidized Zones, weathering products

4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydroxides	Altered Ultramafic rocks
8	Hydrated Sulphates	Many different geological environments
6	Anhydrous Carbonates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Many different geological environments
4	Hydrated Phosphates	Oxidized Zones, weathering products
8	Oxides	Many different geological environments
18	Sulphides, Tellurides etc	Stratiform Sulphide deposits
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Chain Silicates	Pegmatites
4	Silicates	Skarns and Calc-Silicates
4	Oxides	Slags and Clinkers
4	Oxides	Alluvials deposits
8	Anhydrous Phosphates	Meteorites
8	Hydrated Sulphates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Multiple Oxides	Pegmatites
1	Multiple Oxides	Pegmatites
4	Hydrated Sulphates	Efflorescences
2	Orthosilicates	Metamorphic rocks
2	Silicates	Syenites, Alkali intrusions
3	Silicates	Pegmatites
8	Framework Silicates	Late stage cavities in Volcanic rocks
16	Antimonites, Arsenites	Skarns and Calc-Silicates
4	Anhydrous Carbonates	Contact Metamorphic rocks
6	Chromates	Sedimentary rocks
4	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Phosphates	Caves
	Hydrated Arsenates	Skarns and Calc-Silicates
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
8	Antimonites, Arsenites	Oxidized Zones, weathering products
2	Sheet Silicates	Altered Ultramafic rocks
2	Hydrated Phosphates	Pegmatites
6	Native elements and Alloys	Hydrothermal Ore veins
8	Antimonites, Arsenites	Oxidized Zones, weathering products
8	Multiple Oxides	Pegmatites
4	Oxides	Pegmatites
12	Native elements and Alloys	Hydrothermal Ore veins
4	Oxides	Pegmatites
4	Vanadium Oxysalts	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Hydrated Carbonates	Altered Ultramafic rocks
2	Framework Silicates	Late stage cavities in Volcanic rocks
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
3	Sulphides, Tellurides etc	Basic and Ultrabasic Igneous rocks
3	Silicates	Skarns and Calc-Silicates

	Sheet Silicates	Regional Metamorphic rocks
2	Silicates	Metamorphic rocks
	Sulphides, Tellurides etc	Alluvial deposits
4	Vanadium Oxysalts	Fumaroles
4	Silicates	Skarns and Calc-Silicates
4	Tungstates, Molybdates	Oxidized Zones, weathering products
4	Hydroxides	Oxidized Zones, weathering products
2	Vanadium Oxysalts	Sedimentary Ore deposits
2	Anhydrous Arsenates	Oxidized Zones, weathering products
6	Hydrated Arsenates	Oxidized Zones, weathering products
3	Silicates	Skarns and Calc-Silicates
16	Hydrated Vanadates	Sedimentary Uranium Ores
8	Hydrated Phosphates	Many different geological environments
4	Silicates	Skarns and Calc-Silicates
4	Sulphides, Tellurides etc	Supergene Zones
4	Silicates	Altered Ultramafic rocks
4	Anhydrous Carbonates	Limestone
2	Silicates	
	Anhydrous Borates	Evaporites
	Silicates	Carbonatites
4	Hydrated Carbonates	Carbonatites
4	Hydrated Borates	Evaporites
1	Silicates	Late stage cavities in Granites or Syenites
2	Anhydrous Phosphates	Altered Ultramafic rocks
4	Hydrated Phosphates	Pegmatites
2	Oxides	Pegmatites
2	Hydrated Phosphates	Caves
2	Oxides	Sedimentary Uranium Ores
2	Sulphides, Tellurides etc	Basic and Ultrabasic Igneous rocks
2	Hydrated Sulphates	Oxidized Zones, weathering products
7	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Borates	Skarns and Calc-Silicates
2	Sulphides, Tellurides etc	Basic and Ultrabasic Igneous rocks
2	Sheet Silicates	Hydrothermal Ore veins
	Native elements and Alloys	Meteorites
2	Orthosilicates	Syenites, Alkali intrusions
4	Compound Borates	Evaporites
4	Anhydrous Sulphates	Evaporites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
128	Native elements and Alloys	Fumaroles
1	Sulphides, Tellurides etc	Limestone
2	Anhydrous Sulphates	Oxidized Zones, weathering products
8	Silicates	Basic and Ultrabasic Igneous rocks
4	Silicates	Regional Metamorphic rocks
2	Silicates	Oxidized Zones, weathering products
1	Silicates	Sedimentary Ore deposits
	Compound Sulphates	Oxidized Zones, weathering products
8	Anhydrous Borates	Skarns and Calc-Silicates

4	Silicates	Metamorphic rocks
2	Anhydrous Arsenates	Skarns and Calc-Silicates
3	Compound Phosphates	Oxidized Zones, weathering products
6	Nitrates, Iodates	Caves
4	Silicates	Skarns and Calc-Silicates
4	Framework Silicates	Late stage cavities in Volcanic rocks
1	Hydrated Sulphates	Altered Ultramafic rocks
6	Silicates	Sedimentary Uranium Ores
2	Hydrated Carbonates	Efflouresences
2	Antimonites, Arsenites	Skarns and Calc-Silicates
20	Hydroxides	Oxidized Zones, weathering products
2	Sheet Silicates	Pegmatites
4	Hydrated Phosphates	Pegmatites
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Halides	Evaporites
1	Hydrated Arsenates	Oxidized Zones, weathering products
4	Hydrated Arsenates	Skarns and Calc-Silicates
2	Anhydrous Carbonates	Pegmatites
2	Anhydrous Carbonates	Oxidized Zones, weathering products
2	Anhydrous Carbonates	Pegmatites
2	Hydrated Sulphates	Fumaroles
2	Anhydrous Borates	Altered Ultramafic rocks
4	Hydrated Sulphates	Efflorescences
4	Hydrated Sulphates	Oxidized Zones, weathering products
2	Multiple Oxides	Skarns and Calc-Silicates
	Silicates	Late stage cavities in Volcanic rocks
	Halides	Evaporites
	Silicates	Pegmatites
2	Sheet Silicates	Pegmatites
32	Native elements and Alloys	Meteorites
2	Silicates	Hydrothermal Ore veins
	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
3	Multiple Oxides	Oxidized Zones, weathering products
24	Anhydrous Borates	Skarns and Calc-Silicates
3	Hydrated Carbonates	Oxidized Zones, weathering products
4	Sheet Silicates	Metamorphic rocks
1	Hydrated Arsenates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
4	Hydrated Sulphates	Oxidized Zones, weathering products
4	Anhydrous Phosphates	Pegmatites
1	Silicates	Metamorphic rocks
4	Multiple Oxides	Pegmatites
	Multiple Oxides	Alluvials deposits
6	Multiple Oxides	Pegmatites
2	Multiple Oxides	Pegmatites
2	Silicates	Limestone
2	Chain Silicates	Syenites, Alkali intrusions

12	Hydrated Phosphates	Caves
4	Oxides	Evaporites
	Sheet Silicates	Sedimentary rocks
2	Anhydrous Phosphates	Oxidized Zones, weathering products
	Hydrated Sulphates	Efflorescences
1	Oxides	Syenites, Alkali intrusions
1	Anhydrous Phosphates	Pegmatites
4	Oxides	Skarns and Calc-Silicates
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Borates	Evaporites
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Oxides	Oxidized Zones, weathering products
3	Native elements and Alloys	Hydrothermal Ore veins
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
6	Sulphides, Tellurides etc	Hydrothermal Ore veins
	Hydrated Carbonates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
4	Oxides	Oxidized Zones, weathering products
4	Orthosilicates	Skarns and Calc-Silicates
4	Halides	Oxidized Zones, weathering products
4	Silicates	Syenites, Alkali intrusions
2	Hydrated Borates	Evaporites
8	Anhydrous Carbonates	Sedimentary rocks
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Native elements and Alloys	Hydrothermal Ore veins
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Sulphosalts	Hydrothermal Ore veins
32	Silicates	Basic and Ultrabasic Volcanic rocks
4	Framework Silicates	Syenites, Alkali intrusions
1	Native elements and Alloys	Meteorites
1	Hydroxides	Pegmatites
4	Anhydrous Phosphates	Hydrothermal Ore veins
1	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
6	Silicates	Pegmatites
1	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Silicates	Skarns and Calc-Silicates
2	Anhydrous Arsenates	Oxidized Zones, weathering products
8	Anhydrous Sulphates	Evaporites
1	Hydroxides	Altered Ultramafic rocks
4	Hydrated Carbonates	Evaporites
	Hydrated Arsenates	Oxidized Zones, weathering products
4	Halides	Pegmatites
4	Framework Silicates	Late stage cavities in Volcanic rocks
3	Hydrated Carbonates	Syenites, Alkali intrusions

4	Oxides	Pegmatites
4	Oxides	Pegmatites
1	Antimonites, Arsenites	Oxidized Zones, weathering products
4	Silicates	Pegmatites
4	Silicates	Oxidized Zones, weathering products
	Silicates	Skarns and Calc-Silicates
2	Silicates	Pegmatites
	Oxides	Late stage cavities in Granites or Syenites
8	Hydrated Phosphates	Pegmatites
4	Native elements and Alloys	Hydrothermal Ore veins
1	Silicates	Pegmatites
6	Halides	Oxidized Zones, weathering products
4	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Silicates	Skarns and Calc-Silicates
8	Native elements and Alloys	Hydrothermal Ore veins
2	Silicates	Contact Metamorphic rocks
9	Hydrated Borates	Evaporites
4	Hydrated Phosphates	Pegmatites
2	Sulphosalts	Hydrothermal Ore veins
2	Ring Silicates	Skarns and Calc-Silicates
1	Anhydrous Phosphates	Pegmatites
4	Silicates	Hydrothermal Ore veins
2	Chain Silicates	Skarns and Calc-Silicates
1	Silicates	Pegmatites
4	Orthosilicates	Many different geological environments
8	Silicates	Metamorphic rocks
1	Oxides	Metamorphic rocks
	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Sheet Silicates	Intermediate to acid Volcanic rocks
4	Silicates	Skarns and Calc-Silicates
	Native elements and Alloys	Altered Ultramafic rocks
3	Multiple Oxides	Oxidized Zones, weathering products
4	Silicates	Contact Metamorphic rocks
2	Halides	Fumaroles
4	Sulphides, Tellurides etc	Basic and Ultrabasic Volcanic rocks
1	Silicates	Pegmatites
2	Antimonites, Arsenites	Hydrothermal Ore veins
4	Native elements and Alloys	Basic and Ultrabasic Volcanic rocks
4	Hydrated Sulphates	Pegmatites
2	Hydrated Phosphates	Many different geological environments
4	Silicates	Pegmatites
2	Hydrated Sulphates	Oxidized Zones, weathering products
2	Sheet Silicates	Intermediate-acid Volcanic rocks
3	Ring Silicates	Pegmatites
6	Silicates	Basic and Ultrabasic Volcanic rocks
3	Silicates	Skarns and Calc-Silicates
18	Sulphosalts	Hydrothermal Ore veins
2	Chain Silicates	Metamorphic rocks

8	Oxides	Oxidized Zones, weathering products
1	Hydrated Phosphates	Pegmatites
32	Framework Silicates	Basic and Ultrabasic Volcanic rocks
2	Antimonites, Arsenites	Skarns and Calc-Silicates
18	Silicates	Intermediate to acid Volcanic rocks
16	Silicates	Skarns and Calc-Silicates
4	Anhydrous Phosphates	Pegmatites
8	Anhydrous Phosphates	Pegmatites
16	Anhydrous Phosphates	Pegmatites
4	Antimonites, Arsenites	Oxidized Zones, weathering products
3	Antimonites, Arsenites	Hydrothermal Ore veins
3	Compound Phosphates	Oxidized Zones, weathering products
2	Silicates	Pegmatites
2	Silicates	Skarns and Calc-Silicates
1	Hydrated Arsenates	Oxidized Zones, weathering products
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
12	Sulphides, Tellurides etc	Meteorites
	Anhydrous Phosphates	Pegmatites
4	Hydrated Carbonates	Evaporites
1	Silicates	Skarns and Calc-Silicates
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Compound Sulphates	Many different geological environments
4	Hydrated Sulphates	Efflorescences
2	Hydrated Arsenates	Oxidized Zones, weathering products
2	Compound Phosphates	Oxidized Zones, weathering products
6	Sulphides, Tellurides etc	Skarns and Calc-Silicates
1	Sulphosalts	Regional Metamorphic rocks
4	Oxides	Skarns and Calc-Silicates
2	Silicates	Syenites, Alkali intrusions
8	Silicates	Basic and Ultrabasic Volcanic rocks
2	Native elements and Alloys	Alluvial deposits
2	Silicates	Pegmatites
4	Hydrated Borates	Evaporites
2	Sulphides, Tellurides etc	Skarns and Calc-Silicates
4	Oxides	Oxidized Zones, weathering products
2	Anhydrous Carbonates	Hydrothermal Ore veins
	Silicates	Syenites, Alkali intrusions
2	Anhydrous Arsenates	Skarns and Calc-Silicates
1	Hydrated Phosphates	Many different geological environments
2	Silicates	Skarns and Calc-Silicates
3	Anhydrous Borates	Pegmatites
1	Sulphosalts	Hydrothermal Ore veins
2	Halides	Pegmatites
8	Sulphosalts	Skarns and Calc-Silicates
8	Compound Sulphates	Evaporites
1	Anhydrous Borates	Evaporites
4	Hydrated Arsenates	Oxidized Zones, weathering products

8	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Vanadium Oxysalts	Sedimentary Uranium Ores
2	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Sulphates	Evaporites
2	Hydrated Borates	Evaporites
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Hydrated Phosphates	Late stage cavities in Granites or Syenites
8	Oxides	Basic and Ultrabasic Volcanic rocks
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Silicates	Pegmatites
	Silicates	Syenites, Alkali intrusions
4	Tungstates, Molybdates	Oxidized Zones, weathering products
3	Compound Sulphates	Oxidized Zones, weathering products
4	Hydrated Phosphates	Pegmatites
	Anhydrous Borates	Skarns and Calc-Silicates
8	Hydrated Phosphates	Pegmatites
2	Hydrated Phosphates	Oxidized Zones, weathering products
4	Hydrated Carbonates	Oxidized Zones, weathering products
4	Oxides	Many different geological environments
8	Multiple Oxides	Pegmatites
2	Hydrated Phosphates	Oxidized Zones, weathering products
2	Silicates	Pegmatites
4	Silicates	Pegmatites
	Hydrated Sulphates	Oxidized Zones, weathering products
4	Silicates	Pegmatites
1	Hydrated Phosphates	Pegmatites
	Multiple Oxides	Oxidized Zones, weathering products
2	Hydrated Arsenates	Oxidized Zones, weathering products
2	Tungstates, Molybdates	Oxidized Zones, weathering products
8	Multiple Oxides	Pegmatites
12	Native elements and Alloys	Basic and Ultrabasic Igneous rocks
2	Organic Compounds	Caves
4	Organic Compounds	Caves
1	Hydrated Phosphates	Supergene Zones
	Halides	Hydrothermal Ore veins
2	Silicates	Syenites, Alkali intrusions
	Vanadium Oxysalts	Sedimentary Uranium Ores
8	Orthosilicates	Skarns and Calc-Silicates
3	Ring Silicates	Pegmatites
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Sulphides, Tellurides etc	Alluvials deposits
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Oxides	Oxidized Zones, weathering products
3/2	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Vanadates	Oxidized Zones, weathering products
1	Organic Compounds	Oxidized Zones, weathering products
2	Oxides	Sedimentary Uranium Ores
36	Oxides	Sedimentary Uranium Ores

4	Hydrated Phosphates	Pegmatites
2	Anhydrous Sulphates	Evaporites
4	Hydrated Vanadates	Sedimentary Uranium Ores
4 (	Hydrated Vanadates	Oxidized Zones, weathering products
16	Hydrated Phosphates	Oxidized Zones, weathering products
2	Oxides	Pegmatites
	Anhydrous Phosphates	Pegmatites
4	Hydrated Phosphates	Sedimentary rocks
12	Anhydrous Carbonates	Skarns and Calc-Silicates
4	Compound Phosphates	Oxidized Zones, weathering products
2	Hydrated Phosphates	Pegmatites
4	Anhydrous Phosphates	Pegmatites
4	Hydrated Borates	Evaporites
4	Hydrated Borates	Evaporites
8	Sulphosalts	Hydrothermal Ore veins
1	Sulphosalts	Hydrothermal Ore veins
4	Hydroxides	Sedimentary Ore deposits
6	Silicates	Skarns and Calc-Silicates
1	Antimonites, Arsenites	Hydrothermal Ore veins
1	Silicates	Late stage cavities in Volcanic rocks
4	Anhydrous Vanadates	Oxidized Zones, weathering products
4	Silicates	Metamorphic rocks
4	Hydrated Phosphates	Oxidized Zones, weathering products
4	Oxides	Pegmatites
2	Anhydrous Phosphates	Carbonatites
1	Sulphosalts	Skarns and Calc-Silicates
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Halides	Syenites, Alkali intrusions
4	Hydrated Arsenates	Oxidized Zones, weathering products
4	Anhydrous Borates	Skarns and Calc-Silicates
2	Sulphosalts	Hydrothermal Ore veins
3	Silicates	Syenites, Alkali intrusions
8	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Silicates	Intermediate-acid Volcanic rocks
2	Framework Silicates	Sedimentary rocks
1	Framework Silicas, Alkali intrusions	P6*322
4	Hydroxides	Oxidized Zones, weathering products
8	Anhydrous Phosphates	Syenites, Alkali intrusions
2	Hydrated Phosphates	Many different geological environments
3	Hydrated Arsenates	Oxidized Zones, weathering products
4	Silicates	Contact Metamorphic rocks
16	Hydrated Carbonates	Oxidized Zones, weathering products
2	Organic Compounds	Oxidized Zones, weathering products
8	Hydrated Borates	Evaporites
16	Hydrated Sulphates	Efflorescences
	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Borates	Skarns and Calc-Silicates
18	Sulphosalts	Basic and Ultrabasic Volcanic rocks
4	Sulphosalts	Hydrothermal Ore veins

4	Silicates	Altered Ultramafic rocks
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Silicates	Syenites, Alkali intrusions
8	Oxides	Hydrothermal Ore veins
6	Hydrated Phosphates	Pegmatites
8	Sulphides, Tellurides etc	Intermediate to acid Volcanic rocks
1	Silicates	Syenites, Alkali intrusions
2	Silicates	Basic and Ultrabasic Volcanic rocks
8	Silicates	Meteorites
16	Anhydrous Phosphates	Many different geological environments
8	Framework Silicates	Late stage cavities in Volcanic rocks
1	Native elements and Alloys	Altered Ultramafic rocks
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Anhydrous Vanadates	Oxidized Zones, weathering products
4	Anhydrous Vanadates	Oxidized Zones, weathering products
	Hydrated Arsenates	Oxidized Zones, weathering products
2	Sulphosalts	Hydrothermal Ore veins
2	Hydrated Arsenates	Oxidized Zones, weathering products
1	Hydrated Arsenates	Oxidized Zones, weathering products
2	Silicates	Skarns and Calc-Silicates
4	Hydrated Phosphates	Many different geological environments
	Hydrated Borates	Evaporites
4	Hydrated Arsenates	Oxidized Zones, weathering products
4	Anhydrous Borates	Skarns and Calc-Silicates
4	Hydrated Phosphates	Oxidized Zones, weathering products
3	Anhydrous Phosphates	Pegmatites
4	Halides	Skarns and Calc-Silicates
8	Organic Compounds	Sedimentary rocks
16	Silicates	Oxidized Zones, weathering products
2	Anhydrous Carbonates	Evaporites
4	Sulphosalts	Hydrothermal Ore veins
3	Compound Arsenate	Oxidized Zones, weathering products
4	Anhydrous Arsenates	Oxidized Zones, weathering products
4	Sulphosalts	Hydrothermal Ore veins
54	Sulphides, Tellurides etc	Supergene Zones
1	Silicates	Late stage cavities in Volcanic rocks
2	Framework Silicates	Late stage cavities in Volcanic rocks
1	Hydrated Carbonates	Syenites, Alkali intrusions
2	Silicates	Skarns and Calc-Silicates
2	Hydrated Arsenates	Oxidized Zones, weathering products
1	Framework Silicates	Skarns and Calc-Silicates
2	Hydrated Carbonates	Skarns and Calc-Silicates
4	Sulphides, Tellurides etc	Hydrothermal Ore veins
1	Organic Compounds	Oxidized Zones, weathering products
4	Compound Sulphates	Oxidized Zones, weathering products
8	Organic Compounds	Sedimentary rocks
2	Hydrated Phosphates	Pegmatites

21	Anhydrous Phosphates	Many different geological environments
2	Hydrated Phosphates	Pegmatites
2	Silicates	Oxidized Zones, weathering products
4	Hydroxides	Skarns and Calc-Silicates
4	Hydrated Phosphates	Sedimentary rocks
2	Anhydrous Carbonates	Oxidized Zones, weathering products
2	Hydrated Carbonates	Oxidized Zones, weathering products
4	Hydrated Borates	Skarns and Calc-Silicates
1	Hydrated Sulphates	Efflorescences
8	Hydrated Phosphates	Pegmatites
2	Sulphides, Tellurides etc	Altered Ultramafic rocks
18	Silicates	Many different geological environments
4	Silicates	Basic and Ultrabasic Volcanic rocks
2	Framework Silicates	Late stage cavities in Volcanic rocks
	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Chain Silicates	Metamorphic rocks
8	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
4	Anhydrous Borates	Skarns and Calc-Silicates
4	Anhydrous Carbonates	Hydrothermal Ore veins
4	Sulphosalts	Hydrothermal Ore veins
	Sulphosalts	Altered Ultramafic rocks
1	Multiple Oxides	Pegmatites
4	Silicates	Syenites, Alkali intrusions
16	Anhydrous Phosphates	Pegmatites
2	Tungstates, Molybdates	Skarns and Calc-Silicates
2	Multiple Oxides	
6	Chain Silicates	Skarns and Calc-Silicates
6	Multiple Oxides	Oxidized Zones, weathering products
2	Sheet Silicates	Late stage cavities in Volcanic rocks
3	Compound Phosphates	Many different geological environments
2	Multiple Oxides	Oxidized Zones, weathering products
2	Hydrated Sulphates	Oxidized Zones, weathering products
4	Tungstates, Molybdates	Oxidized Zones, weathering products
2	Sulphides, Tellurides etc	Hydrothermal Ore veins
4	Oxides	Basic and Ultrabasic Volcanic rocks
2	Hydrated Carbonates	Oxidized Zones, weathering products
4	Anhydrous Arsenates	Oxidized Zones, weathering products
8	Sulphosalts	Hydrothermal Ore veins
	Hydrated Phosphates	Pegmatites
4	Anhydrous Phosphates	Many different geological environments
1	Compound Phosphates	Oxidized Zones, weathering products
2	Native elements and Alloys	Alluvial deposits
4	Sulphosalts	Skarns and Calc-Silicates
16	Sulphides, Tellurides etc	Altered Ultramafic rocks
4	Hydrated Sulphates	Oxidized Zones, weathering products
12	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
1	Silicates	Skarns and Calc-Silicates

2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Orthosilicates	Meteorites
4	Halides	Oxidized Zones, weathering products
3	Sulphides, Tellurides etc	Hydrothermal Ore veins
2	Anhydrous Sulphates	Oxidized Zones, weathering products
	Anhydrous Sulphates	Skarns and Calc-Silicates
1	Silicates	Skarns and Calc-Silicates
	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
2	Halides	Oxidized Zones, weathering products
4	Silicates	Syenites, Alkali intrusions
2	Multiple Oxides	Kimberlites and related rocks
	Native elements and Alloys	Basic and Ultrabasic Igneous rocks
4	Silicates	Regional Metamorphic rocks
2	Silicates	Syenites, Alkali intrusions
2	Silicates	Metamorphic rocks
	Multiple Oxides	Pegmatites
	Multiple Oxides	Pegmatites
6	Multiple Oxides	Pegmatites
	Oxides	Pegmatites
2	Tungstates, Molybdates	Oxidized Zones, weathering products
2	Framework Silicates	Late stage cavities in Volcanic rocks
	Hydrated Phosphates	Oxidized Zones, weathering products
1 (	Silicates	Syenites, Alkali intrusions
	Hydroxides	Hydrothermal Ore veins
	Hydrated Sulphates	Evaporites
3	Anhydrous Phosphates	Pegmatites
9	Silicates	Syenites, Alkali intrusions
6	Hydrated Phosphates	Oxidized Zones, weathering products
2	Hydrated Carbonates	Oxidized Zones, weathering products
2	Halides	Hydrothermal Ore veins
8	Silicates	Late stage cavities in Granites or Syenites
4	Hydrated Carbonates	Sedimentary Uranium Ores
2	Selenites, Selenates, Tellurites, Tellurates	Oxidized Zones, weathering products
3	Silicates	Late stage cavities in Volcanic rocks
2	Hydrated Arsenates	Oxidized Zones, weathering products
6	Organic Compounds	Sedimentary Ore deposits
1	Anhydrous Carbonates	Skarns and Calc-Silicates
2	Anhydrous Vanadates	Fumaroles
	Silicates	Oxidized Zones, weathering products
2	Native elements and Alloys	Oxidized Zones, weathering products
	Hydrated Sulphates	Oxidized Zones, weathering products
2	Oxides	Oxidized Zones, weathering products
4	Hydrated Sulphates	Oxidized Zones, weathering products
1	Hydrated Sulphates	Oxidized Zones, weathering products
	Silicates	Skarns and Calc-Silicates

	Sulphosalts	Hydrothermal Ore veins
4	Sheet Silicates	Pegmatites
	Hydrated Sulphates	Oxidized Zones, weathering products
4	Orthosilicates	Many different geological environments
	Silicates	Syenites, Alkali intrusions
8	Hydrated Sulphates	Oxidized Zones, weathering products
8	Multiple Oxides	Regional Metamorphic rocks
3	Silicates	Pegmatites
4	Ring Silicates	Metamorphic rocks
6	Silicates	Syenites, Alkali intrusions
1	Sulphosalts	Hydrothermal Ore veins
4	Silicates	Hydrothermal Ore veins
3	Silicates	Metamorphic rocks
1	Native elements and Alloys	Hydrothermal Ore veins
8	Anhydrous Phosphates	Pegmatites
8	Compound Arsenate	Oxidized Zones, weathering products

SPACE,C,70	CRCLASS,C,70
P-lattice	
P4/ncc; P4/nmm (Pseudo)	4/mmm
R\3m, R3m or R32	\3m, 3m or 32
P2*1/n	2/m
R3c	3m
P6*3/mmc	6/m2/m2/m
C2/m	2/m
Pnnm	2/m2/m2/m
P2*12*12*1	222
P2*1/c	2/m
C1	1
C2/c	2/m
P\1	\1
C2/m or C2 or Cm	2/m or 2 or m
Pmnb	2/m2/m2/m
	2/m2/m2/m
Pbnm	2/m2/m2/m
P6*3/mmc or P6*3mc	6/m2/m2/m
P2*1	2
C6*222 or C6*422	622
P1 or P\1	1 or \1
Cmmm	2/m2/m2/m
P2*1/n	2/m
Pbnm	2/m2/m2/m
P1 or P\1	1 or \1
I4/m	4/m
P\1 or P1	\1 or 1
P6*122 or P6*1	622 or 6
P\42*1m	\42m
P2*1/c	2/m
Pbca	2/m2/m2/m
R\3 or R3	\3, 3
Fm3m	m3m
	2/m
C\1	\1
P6*3/m	6/m
P6*3/mmc (pseudohex.)	6/m2/m2/m (pseudohex.)
P2*1/a	2/m
P2*1/m	2/m
P2*1/a	2/m

P22*12*1	222
C2/c	2/m
Ia3d	4/m\32/m
C\1 or C1	\1 or 1
Fm3m	m3m
Pna2*1	mm2
P\1	\1
Fm3m and Pm3m	4/m\32/m
P\43m	\43m
R3m or R\3m	3m or \3m
P\1	\1
R3m	3m
P\1	\1
	2/m
C\1	\1
P\1	\1
C2/c	2/m
C1	1
C6*222 or C6*422	622
I2	2
I4/mmm	4/m2/m2/m
C2/c	2/m
R3m	3m
I4*1/a	4/m
Ia3d	4/m\32/m
C2/c, Cc, Pnmn	2/m, m, 2/m2/m2/m
P\1	\1
I4/amd	4/m2/m2/m
Pmcn	2/m2/m2/m
Pnnm	2/m2/m2/m
R\3, R3	\3, 3
C\1	\1
Pmma	2/m2/m2/m
Ia3d	4/m\32/m
P2*1/c	2/m
B22*12	222
Pnnm or Pnn2	2/m2/m2/m or mm2
P\1	\1
Pbnm	2/m2/m2/m
Amma	2/m2/m2/m
Pnma	2/m2/m2/m
R\3	\3
I2/m	2/m

P\1	\1
C\1	\1
P32	32
	2/m
Pnma	2/m2/m2/m
Cm	m
C2/m	2/m
R\3m	\3m
Pnam	2/m2/m2/m
P63/m	6m
P\3m	\32/m
P2*1/c	2/m
P2*1/n	2/m
P4*2/mbc	4/m2/m2/m
P6/mmc	6/m2/m2/m
Pmcn	2/m2/m2/m
P\1	\1
Pmcn	2/m2/m2/m
I\42d (syn.)	\42m
Cc	m
Pnmm	2/m2/m2/m
C2/m	2/m
Im3m	4/m3\2/m
R3m	3m
Fm3m	4/m\32/m
Pmmn	2/m2/m2/m
P4*2/mnm	4/m2/m2/m
Pna2 (syn.)	mm2
P2*1/a	2/m
	2/m2/m2/m
P\3	\3
P6cc or P6/mcc	6mm
C2/m, Cm, or C2	2/m, m, or 2
C2/c	2/m
P2*1/m	2/m
P2*12*12*1	222
R\3m	\32/m
A2/a	2/m
P2*12*12*1	222
R3m	3m
R\3m or R3m	\32/m or 3m
P4/mmm	4/m2/m2/m

Fd3m	4/m\32/m
P-lattice	
P2*1/c	2/m
P\43m	\43m
C2/m	2/m
P2*1/m	2/m
P4*2/n	4/m
P2*1/c	2/m
C2	2
P3c	3m
A2/m	2/m
C2/m, Cm or C2	2/m, m, or 2
Pcan	2/m2/m2/m
I4/mmm, I4mm, I422, I\4m2	4/m2/m2/m, 4mm, 422, \42m
Im3m, I432, Im3, or I23	4/m\32/m, 432, 2/m\3, or 23
P\1	\1
Pmcn	2/m2/m2/m
P2*1/a	2/m
P6/mmm	6/m2/m2/m
Fm3m	4/m\32/m
P1	1
C2/m	2/m
C2/c	2/m
B22*12	222
Pmmm	2/m2/m2/m
P\1	\1
Pa3	m3
P2*12*12*1	222
I4/mmm	4/m2/m2/m
Ia3	m3
Pnma	2/m2/m2/m
Fm3m	4/m\32/m
P\1	\1
Pbam	2/m2/m2/m
P2*1/a	2/m
I4/amd	4/m2/m2/m
P\1	\1
P2*1/c	2/m
P2*1/m	2/m
P2*1/a	2/m
C2/m	2/m
P2*1/c	2/m
Pnnm	2/m2/m2/m
Ccca	2/m2/m2/m

P222, Pmm2, or Pmmm	222, mm2, or 2/m2/m2/m
Pmcn	2/m2/m2/m
I4*1/amd	4/m2/m2/m
Ibc2 or Ibcm	mm2 or 2/m2/m2/m
P4/n	4/m
C2/m	2/m
A2/a	2/m
I4*1/a	4/m
R\3m	\32/m
C2/c	2/m
P2*1/c	2/m
Cc or C2/c	m or 2/m
C2/m	2/m
Ccmm, Cc2m or Ccm21	2/m2/m2/m or mm2
Fd3m	4/m\32/m
Fd3m	4/m\32/m
I\42m	\42m
P2/m	2/m
Amma	2/m2/m2/m
P\62m	\6m2
P2*1 or P2*1/m	2 or 2/m
I4/mmm	4/m2/m2/m
Pn2*1a or Pnma	mm2 or 2/m2/m2/m
R\3c	\32/m
P2*1	2
C2/m, C2	2/m, 2
I-lattice	
P2*1/m	2/m
C\62c	\6m2
C\62c	\6m2
Ima2	mm2
P\1	\1
Amma or Am2a	2/m2/m2/m or mm2
P2*1/a	2/m
A2/a	2/m
P2*1/a	2/m
P2*1/a	2/m
P\6m2	\6m2
P6/mcc	6/m2/m2/m

R3m	3m
Pn2*1a	mm2
I4*1/amd	4/m2/m2/m
P2*12*12*1	222
C2/m	2/m
P4*2/m	4/m
P\1	\1
	6/m
P2*1/a	2/m
P\6c2	\6m2
C2/m	2/m
R3	\3
Probably P6*3/mmc	6/m2/m2/m (?)
C2/c	2/m
P321	32
C2/c, C/c, P2*1/c, P2/c or Pc	2/m or m
P2*1/c	2/m
P2*1/c	2/m
P3*121 or P3*221	32
P2*1	2
Immm	
P\3m1	\32/m
P2*1/m	2/m
Pnam	2/m2/m2/m
Imaa or Iaa2	2/m2/m2/m or mm2
Ccm2*1	mm2
P6/mmc	6/m2/m2/m
P2*1/n	2/m
Fm3m	4/m\32/m
Ia3d	4/m\32/m
Fd3m	4/m\32/m
Immm	2/m2/m2/m
C2/m	2/m
R\3m	\32/m
P2*1/c	2/m
I4/mmm	4/m2/m2/m
C2/c	2/m
I\43m	\43m (syn.)
Fd3m	4/m\32/m
P2*1/c	2/m
C2ma, Cm2B or Cmma	mm2 or 2/m2/m2/m
P2*1	2
Pnmn or Pn2n	2/m2/m2/m or mm2

C222*1	222
Fd3m	4/m\32/m
Cm, C2/c, C3*112 or C3*212	m (1M polymorph), 2/m (2M polymorph), 32 (3T polymorph)
I\42d	\42m
P2*1/c	2/m
C2/m	2/m
P2*1/c	2/m
P4/nmm	4/m2/m2/m
R\3m	\32/m
Pbnm	2/m2/m2/m
I4/mmm	4/m2/m2/m
Fd3m	4/m\32/m
Fd3m	4/m32/m
Pcmn or Pcn2*1	2/m2/m2/m or mm2
C2/c	2/m
Ia3	2/m\3
P2*1/m	2/m
P2*1/a	2/m
P2*1/n	2/n
P2*1/c	2/m
Amam	2/m2/m2/m
P2*1/c	2/m
P\3m	\32/m
Pm3m	4/m\32/m
P2*1	2
Pbam	2/m2/m2/m
Cc	m
Bbmm	2/m2/m2/m
P2*1/m	2/m
Pca2*1	mm2
A2/a	2/m
C2/m	2/m
Ibmm or Ibm2	2/m2/m2/m or mm2
Fd3m	4/m\32/m
Fm3m	4/m\32/m
P21/m	2/m
P2*1/n	2/m

P2*1/a	2/m
Pn2*1m	mm2
P2*1/a	2/m
P2*1/n	2/m
P2*1	2
Pbnm	2/m2/m2/m
P2*1/m	2/m
P2*1/m	2/m
P4*2/m	4/m
C2/c	2/m
P2*1/c	2/m
I2/m	2/m
P6/mcc	6/m2/m2/m
Pbca	2/m2/m2/m
I4*1/acd	4/m2/m2/m
Pa3, pyrite structure	2/m\3
P2*1/n	2/m
P2nn	mm2
P6*3/mmc	6/m2/m2/m
Pbcn	2/m2/m2/m
P2*1/m	2/m
I2/m	2/m
P2*1/a	2/m
I4*1md or I\4d2	4mm or \4m2
P6*3/m	6/m
P6*3/m	6/m
P2*1/a	2/m
P6*222	622
Fm3m	4/m\32/m
P6*3mc	6mm
Pcab	2/m2/m2/m
Ibmm (Pcmn, syn.)	2/m2/m2/m
P\3m	\32/m
P2*1/c	2/m
P\3 or P3	\3 or 3
Fd3m	4/m\32/m
I2/a	2/m
Pmn2*1	mm2
P2*1 or P2*1/m	2 or 2/m
R3m	3m
R\3m	\32/m
I4/mmm	4/m2/m2/m
Pmnm, P2*122*1, Pma2, or Pmn2*1	2/m2/m2/m, 222, or mm2
P\1	\1
Fm3m	4/m\32/m

C2/c	2/m
P6*3/mmc	6/m2/m2/m
C-centered	
Bbmm	2/m2/m2/m
R\3	\3
P\1	\1
P2*1/m	2/m
P6*3/mmc	6/m2/m2/m
P4*2/mnm	4/m2/m2/m
C\1	\1
Pmmm	2/m2/m2/m
P6/mmm	6/m2/m2/m
P6*3/mmc	6/m2/m2/m
P6*3mc	6mm
Pn3	2/m\3
I\4	\4
C2/m or C2	2/m or 2
P6*3 or P6*3/m	6 or 6/m
P2*12*12*1	222
R\3c	\32/m
P6*3/mmc	6/m2/m2/m
C2/m	2/m
P2*1/a (syn.)	2/m
Ia3d	4/m\32/m
Pmn2*1	mm2
P2*122*1	222
C2/c	2/m
I4/mmm	4/m2/m2/m
I4*1/acd	4/mmm
C2	2
Pa	m
C2/m	2/m
Primitive	2/m
P6*3	6
Im3m	4/m\32/m
P2/m; C2/m	2/m
P3	3
P2*1/m	2/m
I4	4

	2/m
Pmc2*1	mm2
C\1	\1
P6*3/m	6/m
P6*3/m	6/m
P4/mbm	4/m2/m2/m
C2/c	2/m
C\1 or C1	\1 or 1
R3	3
Cm	m
Fm3m	4/m\32/m (syn.)
Amaa	2/m2/m2/m
Pcna	2/m2/m2/m
P2*1/a	2/m
Fm3m	4/m\32/m
Ccca	2/m2/m2/m
Fd3m	4/m\32/m
P2*1/c	2/m
C-centred	
C\1	\1
P\1	\1
P4*2/mnm	4/m2/m2/m
R\3m	\32/m
P6*3/mmc	6/m2/m2/m
Pa3	2/m\3
Pcmn	2/m2/m2/m
Ccm2*1 or Ccmm	mm2 or 2/m2/m2/m
C2/m, Cm, or C2	2/m, m, or 2
Pnam or Pna2*1	2/m2/m2/m or mm2
C2/m	2/m
Pbnm	2/m2/m2/m
I2*1/c	2/m
Fm3m	4/m\32/m
	4/m\32/m
R3c	3m
I\42m	\42m
P2*1 or P2*1/m	2 or 2/m
P\1	\1
Pmcn	2/m2/m2/m
Pbn2*1	mm2
P6*3/m	6/m
Pbcn	2/m2/m2/m
R\3m	\32/m
P1	1

P\1	\1
C6*222 or C6*422	
P2*1	2
P2*1/c	2/m
Pmnb	2/m2/m2/m
P2*12*12*1	222
P\1	\1
R\3m	\32/m
I\42d	\42m
P\1	\1
Pnam	2/m2/m2/m
Pca2*1	mm2
I\43m	\43m
R3m	3m
I4*1/a	4/m
P6/mmm	6/m2/m2/m
P31c	3m
P\4m2	\4m2
Pbca	2/m2/m2/m
P2*1/m	2/m
P\1 or P1	\1 or 1
P2*1/n	2/m
Pnma	2/m2/m2/m
I4*1/amd	4/m2/m2/m
C2/c	2/m
P2*1/a	2/m
C2/m	2/m
P2*1ab	mm2
Bba2 (pseudocell)	
P4/mnc	4/m2/m2/m
Fdd2	mm2
R\3c	\32/m
P6*3/m (hex.); P2*1/a (mono.)	6/m (hex.); 2/m (mono.)
Fm3m	4/m\32/m
P\1; C2/c	\1; 2/m
P6/mcm, P6cm or P\6c2	6/m2/m2/m, 6mm or \6m2
R\3c	\3m
C2/m	2/m
Pnma	2/m2/m2/m
P2*1/m	2/m

P2*1/c	2/m
P2*1/n	2/m
I4*1/amd	4/m2/m2/m
R3m	3m
Fd3m	4/m\32/m
Im3m	4/m\32/m
Pmnb	2/m2/m2/m
P\1	\1
Fd3	2/m\3
A2/a or Aa	2/m or m
P2*1/c	2/m
P3*121 or P3*221	32
C6*222 or C6*422	622
P1	1
P6/mmc (?)	6/m2/m2/m
Fm3m	4/m\32/m
Pa3	2/m\3
P6*3/mmc	6/m2/m2/m
I2/a (syn.)	2/m
P2*1/n	2/m
C2/m	2/m
A2/m	2/m
P2*1/a	2/m
P2*1/c	2/m
P2*1/c	2/m
Aa	m
P2/m	2/m
P2*1/c	2/m
C2/c	2/m
P2/c	2/m
Cm	m
P2*1/n	2/m
P*/a	2/m
P2*1/m	2/m
C2/m	2/m
R\3c	\32/m
Fm3m	4/m32/m
Pca2*1	mm2
P\1	\1
P2*1/n	2/m
Fd3m	4/m\32/m

P\1	\1
C2/c	2/m
I4/amd	4/m2/m2/m
Pnma	2/m2/m2/m
P2*1/a	2/m
P\1	\1
F\43m	\43m
P\3c	\32/m
Pcan	2/m2/m2/m
P\43m	\43m
Pnnm or Pnn2	2/m2/m2/m or mm2
P3*2 21 or P3*1 21	32
Pnmn	2/m2/m2/m
R3c or R\3c	3m or \32/m
P2*12*12*1	222
P\62c	\6m2
P2*1/a	2/m
P4*2/mmc	4/m2/m2/m
P\1	\1
Fm3m	4/m\32/m
P\3c	\32/m
I2*13 (Im3m, syn.)	23 (4/m\32/m, syn.)
Cccm	2/m2/m2/m
P6*3/mmc	6/m2/m2/m
R3m	3m
Pbca	2/m2/m2/m
P\1	\1
P2*1/a	2/m
I4/m	4/m
R\3c	\32/m
Pbnm	2/m2/m2/m
Pmn2*1	mm2
Pnam	2/m2/m2/m
Fd3m	4/m\32/m
P6*3/mmc	6/m2/m2/m
Primitive	
P1 or P\1	1 or \1
R-lattice (hex.)	
	2/m2/m2/m
A2/m	2/m
C2/c	2/m
R\3	\3
P4*12*12 or P4*32*12	422
C2/m	2/m
P2*1/n	2/m
Cm	m
I4/mmm	4/m2/m2/m

C2/m	2/m
P2*1/n	2/m
Ia3d	4/m\32/m
Fm3m	4/m\32/m
I2/m	2/m
Primitive	
Pcmn	2/m2/m2/m
I4/mmm	4/m2/m2/m
C2/m	2/m
Pn3m	4/m\32/m
C2/m	2/m
P\1	\1
Fd3m	4/m\32/m
C2/m or Cn	2/m or m
Fd3m	4/m\32/m
P4/nnc	4/m2/m2/m
P\1	\1
Fd3m	4/m\32/m
P2*1/m	2/m
Pcan	2/m2/m2/m
Pna2*1	mm2
P2*1/c	2/m
P2*1/a	2/m
Pmmb	2/m2/m2/m
P\1	\1
P4*12*12*1 or P4*32*12	422
C2/m	2/m
P2, Pm or P2/m	2, m or 2/m
P\1	\1
P\43n	\43m
Pnam	2/m2/m2/m
C2/m	2/m
Amam, Ama2, or A2am	2/m2/m2/m or mm2
R3m, R\3m or R32	3m, \32/m or 32
P6/mcc	6/m2/m2/m
P2*1/m	2/m
P2*1/c	2/m
P4/nmm	4/m2/m2/m
Fd3m	4/m\32/m
P\1	\1

R\3	\3
P2*1/m	2/m
P6*3	6
Imam	2/m2/m2/m
P2*1/a	2/m
Pna2*1 or Pnam	mm2 or 2/m2/m2/m
R\3m	\32/m
Pnmm	2/m2/m2/m
Ia or I2/a	m or 2/m
Ia3d	4/m32/m
P1 or P\1	1 or \1
P4*2/nbc	4/m2/m2/m
P2*1/m	2/m
Pn2*1m	mm2
P2/a	2/m
R3m or R\3m	3m or \32/m
Pnam	2/m2/m2/m
P\62c	\6m2
P2*1/c	2/m
Bmmb	2/m2/m2/m
P4mm	4mm
P-lattice	0
Fd3m	4/m\32/m
Cmma	2/m2/m2/m
Pbnm	2/m2/m2/m
C2/c	2/m
Cc	m
P2*1/c	2/m
Fm3m	4/m\32/m
Pnma	2/m2/m2/m
C2/c	2/m
R\3	\3
Pmn21	mm2
R3	3
Pm3m	4/m\32/m
C2/m	2/m
R\3	\3
C2/m	2/m
I\43d	\43m
P4/nnm	4/m4/m4/m
P1	1
Pbca	2/m2/m2/m
P4/mbc (synthetic)	4/m2/m2/m

P\1	\1
R3m	3m
Pbmm	2/m2/m2/m
I4*1/amd	4/m2/m2/m
P2*1/a	2/m
P6*3/mmc	6/m2/m2/m
C2/c	2/m
P2*1/m	2/m
P2*12*12*1	2/m2/m2/m
P6/mmm	6/m2/m2/m
P2*1/m	2/m
Pcmn	2/m2/m2/m
Pbmm	2/m2/m2/m
C2/c	2/m
R-lattice	
I2/c	2/m
C2/c	2/m
Pmm2	mm2
Im3	2/m\3
P2*1/a	2/m
P2*1/c	2/m
C2/m	2/m
Pnma	2/m2/m2/m
C2/m	2/m
P2*12*12; P\42*1m	222 (orthorhombic), \42m (tetragonal)
I2/a or Ia	2/m or m
Ia3d	4/m\32/m
P1 or P\1	1 or \1
P6/mcc	6/m2/m2/m
R\3	\3
I422	422
R3m	3m
P-lattice	
Fm3m (syn.)	4/m\32/m
Pb2*1m	mm2
P2*1/a	2/m
P2*1/m	2/m
P\1	\1
Pnam	2/m2/m2/m
Pmnm or Pmn2	2/m2/m2/m, mm2
Pnm2*1	mm2

	Bbam (pseudocell)
C2/c or Cc	2/m or m
Pnam	2/m2/m2/m
P2*1/m	2/m
C2/m or Cm	2/m or m
P2*12*12*1	222
C2/c	2/m
Pca2*1	mm2
C2/m or C2	2/m or 2
Pbmn	2/m2/m2/m
P6*3/mmc	6/m2/m2/m
Pmmn or Pm2*1n	2/m2/m2/m or mm2
Pa3	2/m\3
A2/a or Aa	2/m or m
I2/m	2/m
Pnma (Pmnb, syn.)	2/m2/m2/m
Pm3m	4/m\32/m
B2/m or Bm	2/m or m
R\3c	\3m
B2*1/m	2/m
C2/c	2/m
P6*3/mmc	6/m2/m2/m
Pmmn	2/m2/m/2/m
P2*12*12*1	222
P2*1/a	2/m
R\3	\3
R\3m	\32/m
C2/c	2/m
I\43d	\43m
Pcan (Pcmn, syn.)	2/m2/m2/m
Pnnm	2/m2/m2/m
P2*1/a (?)	2/m
P6*3mc	6/m2/m2/m
R\32	\32/m
P\1	\1
P2*1/a	2/m
P6*222	622
P\1	\1
P6*3/mmc	6/m2/m2/m
P\1	\1
Pncn	2/m2/m2/m

I\42m	\42m
P2*1/n	2/m
Fd3m	4/m\32/m
P\1	\1
Pbnm	2/m2/m2/m
C\1	\1
Pbam	2/m2/m2/m
P\1	\1
P2/c	2/m
P4/mmm	4/m2/m2/m
I4*1/a	4/m
I2	2
I2	2
I2	2
P6*3/m	6/m
P\1	\1
P\1	\1
R3m	3m
Immm	2/m2/m2/m
C2, Cm or C2/m	
P\3	\3
Pmnb	2/m2/m2/m
C2/m	2/m
I2/a	2/m
Pnma	2/m2/m2/m
P\1	\1
P\1	\1
Ccca	2/m2/m2/m
Pcan	2/m2/m2/m
Pnma	2/m2/m2/m
C2/m	2/m
C2/c	2/m
C2/m	2/m
C2/m	2/m
C2/m	2/m
Pnnm	2/m2/m2/m
P\1 or P1	\1 or 1
Pcan	2/m2/m2/m
C2/m	2/m
Fd3	2/m\3

P2*1/n	2/m
Cmcm	2/m2/m2/m
P2*13	23
P1 or P\1	1 or \1
Pcan	2/m2/m2/m
R3 or R\3	3 or \3
P2*1/a	2/m
R\3	\3
P\1	\1
P6*3	6
I4*132	432
P2*1/n	2/m
Fdd2	mm2
P6*3/mmc	6/m2/m2/m
Fd3m, but possibly F\43m	4/m\32/m or \43m
Pnma	2/m2/m2/m
R\3m	\32/m
R\32m	\32/m
P\1	\1
Fddd	2/m2/m2/m
P6*3/m	6/m
P\3c (P6*3/mmc, syn.)	\32/m (6/m2/m2/m, syn.)
P\3c1	\32/m
P6*3/m	6/m
P4/mnc	4/m2/m2/m
P6*3/m	6/m
Fm3m	4/m\32/m
A2*122	222
I4*1/a	4/m
P2*1/c	2/m
Pbnm	2/m2/m2/m
P2*1/m	2/m
Bbmm or Bbm2	2/m2/m2/m or mm2
Pcan	2/m2/m2/m
P3	3
P\1	\1
R3c or R\3c	3m or \32/m
Fm3m	4/m\32/m
Fd3m	4/m\32/m
P2*1/a	2/m
P\3m1, P3m1 or P321	\3m, 3m or 32
P6/mmc	6/m2/m2/m
Pbam or Pba2	2/m2/m2/m or mm2
C2, Cm or C2/m	2, m or 2/m
I\43m	\43m
P2*1/a	2/m

P4bm	4mm
C2, Cm or C2/m	2, m or 2/m
C2/m	2/m
Pb2*1m	mm2
Pnam	2/m2/m2/m
Pnnm	2/m2/m2/m
Bbmm	2/m2/m2/m
C2/m	2/m
Bm2*1b, Bmmb or B2mb	mm2 or 2/m2/m2/m
Pa3	2/m\3 (syn.)
C2/c	2/m
P\1	\1
Cm, C2 or C2/m	m, 2 or 2/m
P2*1ma	mm2
P21/c	2/m
P2*1/a	2/m
Pnnm	2/m2/m2/m
Fd3m	4/m\32/m
P2*1nb	mm2
I4*1/amd	4/m2/m2/m
P-lattice	
Fd3m	4/m\32/m
P3m	3m
Fm3m	4/m\32/m
Pnam	2/m2/m2/m
I\43m	\43m
I\42d	\42m
P2*1/m	2/m
P3	3
A2/a	2/m
C2/c	2/m
Pbna	2/m2/m2/m
R\3m	\32/m
P2*12*12*1	
P2/m, P2, or Pm	2/m, 2, or m
P-lattice	
I2/a	2/m
P2*1/c	2/m
Pnma	2/m2/m2/m
F\43m	\43m
Fm3m	4/m\32/m
P\42*1m	\42m
R\3	\3
P4*12*12	422

P\43n	\43m
P2*1/m	2/m
P2*1nb	mm2
P2*1/c	2/m
P2*12*12*1	222
P\43n	\43m
P2*13	23
	0
Bbam	2/m2/m2/m
P2*1/a	2/m
Pa3	m3
F\43m	\43m
P2*1/n	2/m
P2*1/n	2/m
P4/ncc	4/m2/m2/m
Cmm2, C222, or Cmmm	mm2, 222, or 2/m2/m2/m
P2*1/c	2/m
I\43m	\43m
P2*1/c	2/m
C2/m	2/m
P6*3mc	6mm
Pnma	2/m2/m2/m
C2/c	2/m
Pbnm	2/m2/m2/m
Cmmm	2/m2/m2/m
C2/m	2/m
C2/m	2/m
P2*1/a	2/m
C2/c	2/m
P6*3/mmc	6/m2/m2/m
Pnmm, Pnm2*1, or Pn2*1m	2/m2/m2/m or mm2
C-lattice	
P2*1/m	2/m
Pbnm	2/m2/m2/m
Fm3m	4/m\32/m
Im3m	4/m\32/m
P2*1/c	2/m
Ia3d	4/m\32/m
P2*1 or P2*1/m	2 or 2/m
R\3m	\32/m
P\1	\1
C2/c	2/m
P1 or P\1	1 or \1

P2*12*12*1	222
P6*3/*	6/m or 6/m2/m2/m
P2*1/n	2/m
R\3m	\32/m
Pcmm	2/m2/m2/m
P2*1/c	2/m
Pbnm	2/m2/m2/m
C2/m	2/m
P6*3/mmc	6/m2/m2/m
R3m	3m
P6*222	622
C6*3mc	6mm
Fd3m	4/m\32/m
R\3m	\32/m
P\62c	\6m2
P2*1/a\3	2/m\3
Pcab	2/m2/m2/m
Ia3d	4/m\32/m
Pbnm	2/m2/m2/m
C2/m	2/m
R3	3
Pbnm	2/m2/m2/m
P2*1/n	2/m
P2*1/n	2/m
P2*1/n	2/m
P2*1/a	2/m
P\42*1m	\42m
P2*1/m	2/m
Pncm	2/m2/m2/m
A2/a	2/m
Fm3m	4/m\32/m
Bbmm, Bb2*1m, or Bbm2	2/m2/m2/m or mm2
Pnnm	2/m2/m2/m
A2/a	2/m
P6*1	6
Pmcn	2/m2/m2/m
I4*1/amd	4/m2/m2/m
I2*1/a	2/m
C2/m	2/m
Pcnb	2/m2/m2/m
Probably P2/c	2/m
I\43m (probably)	\43m
Fm3m	4/m\32/m
P\1	\1

Am	m
P2	2
P2/c	2/m
Pbca	2/m2/m2/m
Pbnm	2/m2/m2/m
P2*1/m	2/m
P6*3/m	6/m
P\1	\1
Ama2	mm2
P\42*1m	\42m
	R\3m
P2*1	2
Pcmn	2/m2/m2/m
Pnma	2/m2/m2/m
C2/m	2/m
Pmnn	2/m2/m2/m
P\1	\1
R3m	3m
P4/mmm	4/m2/m2/m
6/mmm	6/m2/m2/m
Pa3	2/m\3
I4*1/amd	4/m2/m2/m
P43n	43m
F\43m	\43m
F-lattice	
P-lattice	
R32	32
C2/m	2/m
C2/c	2/m
R\3m	\32/m
P6*3/m	6/m
I2/m	2/m
C2/c	2/m
P6/mmc	6/m2/m2/m
P2/a	2/m
C2/c	2/m
P1 or P\1	1 or \1
P\43n	\43m
R\3c	\32/m
R3	3
P4mm	4mm
P\1	\1
Imm2	mm2
Pnam or Pna2*1	2/m2/m2/m or mm2
C2/m	2/m
P\1	\1

I4*1/acd	4/m2/m2/m
P2*1/n	2/m
Fd3m	4/m\32/m
P2*1/a	2/m
R\3m	\32/m
Pbnm	2/m2/m2/m
P2*1/c	2/m
I4*1/amd	4/m2/m2/m
R\3m	\32/m
C2/c	2/m
Pmnb	2/m2/m2/m
Cm	m
P2/m	2/m
A2/a	2/m
P2/a	2/m
P6*3/mmc	6/m2/m2/m
P2*1/m	2/m
Bbmm or Bbm2	2/m2/m2/m or mm2
P6*3/mmc	6/m2/m2/m
R\3m	\32/m
Fm3m	4/m\32/m
R\3m	\32/m
Aa	m
P2*1/a	2/m
P2*1/a	2/m (syn)
P2*1/a	2/m (syn)
R\3m	\32/m
P\1	\1
P2*1/c	2/m
A2/m	2/m
P2*1/a	2/m
R\3m (18R), P\62m, or P\6m2 (5H)	\32/m (18R), \6m2 (5H)
P\1	\1
Abma	2/m2/m2/m
I2/m	2/m
Pa3	2/m\3
Pnma	2/m2/m2/m
P321, P3m1, or P\3m1	
Pmcn	2/m2/m2/m
P2*1/a	2/m
Fm3m	4/m\32/m
R32, R3m, or R\3m	32, 3m or \32/m
Pnma	2/m2/m2/m
I2/m	2/m
P\1 or P1	\1 or 1

P2*1/c	2/m
I4*132	432
P2/c	2/m
P2*1/m	2/m
P2/m	2/m
R\3	\3
I2/a	2/m
Pnma	2/m2/m2/m
P\1	\1
P\1	\1
R32	32
C2/c	2/m
P2*1/a	2/m
Pbca	2/m2/m2/m
P2*1/n	2/m
C2/m	2/m
I\1	\1
P\1	\1
P2/c	2/m
P2*1	2
I2/a	2/m
P\1	\1
Ia3d	4/m\32/m
I4*1/amd	4/m2/m2/m
P2*1/c	2/m
C2/m	2/m
R3m	3m
Pnnm	2/m2/m2/m
P4/mnc	4/m2/m2/m
R-lattice	
P2/m	2/m
P4/mnc	4/m2/m2/m
P6*3/m	6/m
P\62c	\6m2
P6*3/m	6/m
P2*1/a	2/m
C2/m	2/m
P6*3/mmc	6/m2/m2/m
P-lattice	
P\1 or P1	\1 or 1

C2/c or Cc	2/m or m
R\3m	\32/m
P2*1/n	2/n
P6*3/mcm	6/m2/m2/m
C2/c	2/m
R\3	\3
	4/m2/m2/m
Pbnm	2/m2/m2/m
Pnnm or Pnn2	2/m2/m2/m or mm2
P6*3/mmc	6/m2/m2/m
P2*1/n	2/m
P2*1/c	2/m
P-lattice	
A2/a	2/m
P2*1/a	2/m
P6/mcc	6/m2/m2/m
Fd3m	4/m\32/m
I4/mmm	4/m2/m2/m
P\1	\1
P\3m, P3m1, or P321	\32/m, 3m, or 32
P1	1
Pa\3	2/m\3
P2*1/a	2/m
P6*3mc	6mm
P31c	3m
P1	1
P4/mcc	4/m2/m2/m
P2*1/c (syn)	2/m
Fm3m	4/m\32/m
P6*3/mmc	6/m2/m2/m
	4/m\32/m
P6*3/m or P6*3	6/m or 6
P4*232	432
C2/c	2/m
Fd3m	4/m\32/m
Pnma	2/m2/m2/m
P4*2/nnm	4/m2/m2/m
Pcan	2/m2/m2/m
	2/m2/m2/m or mm2
Fd3m	4/m\32/m
C2/c	2/m

P\62c	\6m2
P\1	\1
P2/a	2/m
I4*1/amd	4/m2/m2/m
P1	1
P2*1/a	2/m
P2*1/n	2/m
C2/m	2/m
C-lattice	
R3	3
Pbnm	2/m2/m2/m
I\42m	\42m
P4*2/n	4/m
C222*1	222
C2/m	2/m
P6*3/m	6/m
Pbnm or Pbn2*1	2/m2/m2/m or mm2
C2/c	2/m
Pmmn	2/m2/m2/m
Pbca	2/m2/m2/m
	2/m, Cm or C2
Fd3m	4/m\32/m
C2	2
P2/a	2/m
Cmma	2/m2/m2/m
P\1	\1
C2/c	2/m
C2/c	2/m
P6*3/m or P6*3	6/m or 6
Pb2*1m	mm2
P\1	\1
P-lattice	
B22*12	222
P2*1/m	2/m
R\3m	\3
R\3m	\32/m
P6*3/m	6/m
C2/m	2/m
P4*2/n	4/m
Pcmm, Pcm2 or Pc2m	2/m2/m2/m or mm2
Bbm2	mm2
C2/m	2/m

P2*1/n	2/m
P2*1 or P2*1/m	2 or 2/m
C2/m	2/m
P4*2/n	4/m
C2/m	2/m
Pmnb	2/m2/m2/m
P\42*1c	\42m
C2/c	2/m
P2*1/a	2/m
Fd3m	4/m\32/m
P6*322	622
Fd3m	4/m\32/m
R\3m	\32/m
P6*3	6
I-lattice	
P6*3	6
P1 or P\1	1 or \1
Pnmb	2/m2/m2/m
P2*1/c	2/m
Pnnm	2/m2/m2/m
Cm	m
R\3c	\32/m
P2*12*12*1	222
P2*1/c or P2/c	2/m
Pbcn	2/m2/m2/m
P2*1/a	2/m
Ia3d	4/m\32/m
C2/m	2/m
R\3m, R3m, or R32	\32/m, 3m, or 32
R\3m	\32/m
P2*1/a	2/m
R\3	\3
C2/m	2/m
P\1 (?)	\1
P6*3	6
C-lattice	
R\3m	\32/m
Pnam	2/m2/m2/m
Bbmm	2/m2/m2/m

C222*1	222
P\1	\1
P2*1/c	2/m
Pnma	2/m2/m2/m
I\42m	\42m
P4/nmm	4/m2/m2/m
I2, Im or I2/m	2, m or 2/m
Fm3m	4/m\32/m
P6*3mc	6mm
I4/mcm	4/m2/m2/m
Fddd	2/m2/m2/m
F-lattice	
A2/*	2/m
C2/c	2/m
Imam or Ima2	2/m2/m2/m or mm2
P2*1/m	2/m
I-lattice	
Ia2d	4/m\32/m
P-lattice	
C2	2
P6*3 or P6*3/m	6 or 6/m
P2*1/m	2/m
C2/m	2/m
P2*1/c	2/m
P6*322	622
Pmnb	2/m2/m2/m
P\3m1	\32/m
P6*3/mmc, P63mc, or P\62c	6/m2/m2/m, 6mm, or \62m
P2*1/n	2/m
Pca2*1	mm2
P6*3/mcm	6/m2/m2/m
P-lattice	
Probably C6*3/mmc	6/m2/m2/m
P6*3/mmc	6/m2/m2/m
Ia3d	4/m\32/m
Pbam or Pba2	2/m2/m2/m or mm2
Pnmm	2/m2/m2/m
Cmca	2/m2/m2/m
P2*1/m or P2*1	2/m or 2
P2*1/m or P2*1	2/m or 2
Pmmm, Pnm2, or P222	2/m2/m2/m, mm2, or 222
P2*12*12*1	222

Cmca	2/m2/m2/m
Im3m, I432, or I\43m	4/m\32/m, 432, or \43m
P-lattice	
P2*1/c	2/m
P\1	\1
P2*1/n	2/m
Cmcm	2/m2/m2/m
C2/c	2/m
P2*1/a	2/m
Pnmn	2/m2/m2/m
C2/m	2/m
P6*3/mmc	6/m2/m2/m
P2*1/c	2/m
C2/m	2/m
P6*322	622
Pna2*1	mm2
P2*1/m	2/m
P2*1/a	2/m
P2*1	2
Pmnb	2/m2/m2/m
Pma2	mm2
P2*1/c	2/m
Pmc2*1	mm2
Pa3	2/m\3
P2*13	23
Pbna	2/m2/m2/m
P2*1/c	2/m
P/1	\1
Pnnm	2/m2/m2/m
C2/c	2/m
I\42m	\42m
C-lattice	
P\1	\1
R/3	\3
Pm3m, P432, or P\43m	4/m\32/m, 432, or \43m

Pcab	2/m2/m2/m
P\1	\1
C\1	\1
I2/m	2/m
C2/c	2/m
Aa	m
P2*1/b	2/m
R\3m	\32/m
P2*1/a	2/m
C2/m	2Democratic Republic of Congo
C2/m	2/m
R\3	\3
Pmna	2/m2/m2/m
P2*13	23
Pmc2*1	mm2
P2*1/a	2/m
Pbnb	2/m2/m2/m
Pbnb	2/m2/m2/m
Pbnb	2/m2/m2/m
P2*1/n	2/m
P2*12*12*1	222
Pmmm	2/m2/m2/m
P2*1/a	2/m
P2*1/n	2/m
Pnam	2/m2/m2/m
P2*1	2
Pcmn	2/m2/m2/m
Pbma	2/m2/m2/m
P\1	\1
Cm	m
C2/m	2/m
Pnam	2/m2/m2/m
Pa3	2/m\3
P2*1/n	2/m
P2*12*12*1	222
R\3m	\32/m
P2*1/c	2/m
Ccmm	2/m2/m2/m
P2*1/c	2/m
P\43m	\43m
Fm3m	4/m\32/m
I4/mmm	4/m2/m2/m
P2*1/a	2/m

P2*12*12*1	222
P2*1/c	2/m
P\3m1	\32/m
Fmmm	2/m2/m2/m
P2*1/a	2/m
C2/m	2/m
P2*1/m	2/m
C2/m	2/m
Pnnm or Pnn2	2/m2/m2/m or mm2
Amam	2/m2/m2/m
C2/m, C2/c, or Cm	2/m or m
P1 or P\1	1 or \1
I4*1/a	4/m
P2*12*12	222
P2*1/a	2/m
P2*1/n	2/m
C2/m	2/m
R3m	3m
Fd3m	4/m\32/m
P\31m	\32/m
Pn	m
Pnnm	2/m2/m2/m
R3m	3m
Pbnm (synthetic)	2/m2/m2/m
Bba2	mm2
Pc2*1n	mm2
Bbmm	2/m2/m2/m
Fm3m	4/m\32/m
P2*1/m	2/m
P2*1/n	2/m
R3 or R\3	3 or \3
P2*1am	mm2
Fd3m	4/m\32/m
P\6m2	\6m2
P4*12*12	422
I2/a	2/m
P4/nmm	4/m2/m2/m
Pmnb	2/m2/m2/m
C2/m	2/m
Pmn2*1	mm2
P2*1/c	2/m
P\1	\1
P2*1	2
A2/a	2/m
Cm, C-lattice	C-centred
Pb2m, Pbm2, Pbmm	mm2 or 2/m2/m2/m
Pnnm	2/m2/m2/m

P\1	\1
Pa3	2/m\3
P6*3/mmc	6/m2/m2/m
Pm3m	4/m\32/m
P\1	\1
P2*1/a	2/m
Pnca	2/m2/m2/m
Fmmm	2/m2/m2/m
A2/a	2/m
C2/m, C2, or Cm	2/m, 2, or m
P2*12*12	222
R\3	\3
R3m, R32, or R\3m	3m, 32, or \32/m
R\3	\3
P2*1/a	2/m
P\1	\1
Pbam	2/m2/m2/m
P222*1	222
P2*1/m	2/m
Pbca	2/m2/m2/m
C2/m	2/m
R\3m	\32/m
I\42m	\42m
P6/mmm	6/m2/m2/m
P2*1/a	2/m
Bmmb, B2mb, or Bm2*1b	2/m2/m2/m or mm2
P4/mmm	4/m2/m2/m
P2*1/*	2/m
R3c	\3m
I4/acd	4/m2/m2/m
P4/nmm	4/m2/m2/m
Pcab	2/m2/m2/m
C2/m, C2, or Cm	2/m, 2, or m
Pbam or Pba2	2/m2/m2/m or mm2
P2*13	23
Pnma	2/m2/m2/m
C2/m	2/m
P\1	\1
Fd3m	4/m\32/m
P\1	\1
C2/m	2/m
Fd3m	4/m\32/m

C2/m	2/m
C2/m	2/m
C2, Cm, or C2/m	2, m, or 2/m
R\3c	\32/m
A2/m	2/m
C2/m	2/m
Fd3m	4/m\32/m
P6*3/mmc	6/m2/m2/m
P2*1/a	2/m
Pcan	2/m2/m2/m
Ia3d	4/m\32/m
Ia3d	4/m\32/m
P2*1/c	2/m
R3m	3m
P2*1/a	2/m
P2*1/a	2/m
Fd3m	4/m\32/m
P321	32
P2*1/c	2/m
C2, Cm, or C2/m	2, m, or 2/m
P6*3/mmc	6/m2/m2/m
P2*1/c	2/m
C2/m	2/m
P\31m, P31m, or P312	\32/m, 3m, or 32
P\1	\1
P/1	\1
Ia3d	4/m\32/m
P2*1/c	2/m
Fm3m	4/m\32/m
Pbnm	2/m2/m2/m
B2*1/d	2/m
Fd3m	4/m\32/m
Pcan	2/m2/m2/m
P2*13	23
Fm3m	4/m\32/m
Ibmm	2/m2/m2/m
Pcan	2/m2/m2/m
P4*2/mnm	4/m2/m2/m
P\3m1	\32/m
I4/m	4/m
I4*1/a	4/m
Pcab	2/m2/m2/m
Pbca	2/m2/m2/m
Cm	m
Pnnm	2/m2/m2/m

P2*1/a	2/m
C2/c	2/m
P\1	\1
I4/m	4/m
Pmnb	2/m2/m2/m
Pmab	2/m2/m2/m
P2*1/a	2/m
F\43m	\43m
P1 or P\1	1 or \1
Pnma or Pn2*1a	2/m2/m2/m or mm2
Pnma	2/m2/m2/m
P2*13	23
Pbma	2/m2/m2/m
Cm or C2/m	m or 2/m
Pban	2/m2/m2/m
R3 or R\3	3 or \3
P4/nmm	4/m2/m2/m
R3m	3m
Pmnn	2/m2/m2/m
Aa	m
P2*1/c	2/m
P4*12*12 or P4*32*12	422
C2/m	
I-lattice	
I\43d	\43m
P6*3/mmc or P6*3mc	6/m2/m2/m or 6mm
R\3c	\32/m
R\3m	\32/m
R\3m or C2/m	\32/m or 2/m
R\3c or R3c	\32/m or 3m
P*/a	2/m
P31m	3m
Pnam or Pna2*1	2/m2/m2/m or mm2
P1 or P\1	1 or \1
P2*1/n	2/m
P4/m	4/m
P4*2/nbc	4/m2/m2/m
R\3	\3
C222*1	222
Fddd	2/m2/m2/m
A1	1
P2*1/c	2/m
P\42*1m or P\42*1c	\4 or \42m
P4*122 or P4*322	422
P\3m1	\32/m

Pbam	2/m2/m2/m
P2*12*12*1	222
C2/c	2/m
Pbnm	2/m2/m2/m
Pbca	2/m2/m2/m
R\3m	\3m
P\3m1	\32/m
Immm	2/m2/m2/m
P6/mcc	6/m2/m2/m
P2*1/a	2/m
C2	2
P\1	\1
P4/nmm	4/m2/m2/m
P4nmm	4/m2/m2/m
P2*1	2
P4/nmm	4/m2/m2/m
P\43m	\43m
F\43m	\43m
P\1 or P1	\1 or 1
Probably P2/c	2/m
P4*2/m, P4*222, or P4*2	4/m, 422, or 4
A2/m	2/m
P\1	\1
P4*2/m	4/m
P4/n	4/m
P\1	\1
P2/m	2/m
Pbna	2/m2/m2/m
	2/m2/m2/m
Immm	2/m2/m2/m
P2/a	2/m
P4/n	4/m
Pnam	2/m2/m2/m
Fdd2	mm2
P\1 or P1	\1 or 1
P2*1/n	2/m
P2*1/c	2/m
P3	3
Pbn2*1 or Pbnm	mm2 or 2/m2/m2/m
P4*2/n	4/m

P\1	\1
Fd3m	4/m\32/m
A2/a	2/m
P2*13	23
C\1	\1
Fd3m	4/m\32/m
P6*322	622
F\43m	\43m
Pbmm, Pb2m, or Pb2*1m	2/m2/m2/m or mm2
P6/mcc	6/m2/m2/m
R\3m	\32/m
P4*12*12 or P4*32*12	422
R\3	\3
P2*1/b	2/m
P2*1/a	2/m
P2*1/a	2/m
P6*3mmc, P6*3mc, P\62c	6/m2/m2/m, 6mm, or \62m
P\4b2	\4m2
C-centred	
R\3	\3
Pba2	mm2
P2*1/a	2/m
A2/a	2/m
P4*2/mnm	4/m2/m2/m
P6*3/m	6/m
P2*1/c	2/m
Pmcn	2/m2/m2/m
P1	1
P2*1/c	2/m
P6*3mc	6mm
P6*3/mmc	6/m2/m/2/m
Pbnm	2/m2/m2/m
P2*1/c	2/m
P2*1/m	2/m
R cell	
R\3	\3
P2*1/n	2/m
P2*1/n	2/m
P\3m	\32/m
P\1	\1
	4/m\32/m

P3*112	32
P\1	\1
C2/m; 1M or 3T polytype	2/m
P\1	\1
Fm3m	4/m\32/m
P2*1/m	2/m
C2/c	2/m
Pnma	2/m2/m2/m
C2/m	2/m
Pbnm	2/m2/m2/m
Pnma	2/m2/m2/m
P\42m	\42m
P2*1/a	2/m
C2/c	2/m
P4*2/n	4/m
Cc or C2/c	m or 2/m
Cmc2 or Cmcm	mm2 or 2/m2/m2/m
P2*1/c	2/m
P6*3/m or P6*3	6/m or 6
P2*12*12*1	222
P2*1/m	2/m
Im3m	4/m\32/m
F\43m	\43m
Pnam	2/m2/m2/m
P\1	\1
P2*1/a, P2*1/c, or P2*1/n	2/m
	2/m
Pbca	2/m2/m2/m
P2*1/n	
Pbca	2/m2/m2/m
P-lattice	4/m2/m2/m, 4mm, 422, or \42m
Pbam	2/m2/m2/m
P2*1cn or Pmcn	mm2 or 2/m2/m2/m
Pm, P2, or P2/m	m, 2, or 2/m
Fm3m, F432 or Fm3	4/m\32/m, 432 or 2/m\3
Fm3m	4/m\32/m
I4/mmm	4/m2/m2/m

C2/c	2/m
R\3m	\32/m
Pn3m	4/m\32/m
P2*13	23
Cmma or C2ma	2/m2/m2/m or mm2
Cc	m
Bmmb	2/m2/m2/m
Pmmn	2/m2/m2/m
P\4	\4
P2*1/n	2/m
P2*1/m or P2*1	2/m or 2
P\1	\1
C2/m, Cm, or C2	2/m, m, or 2
R3m or R\3m	3m or \32/m
F\43m	\43m
I4/m	4/m
P6*3/m or P6*3	6/m or 6
P2*13	23
C2/c	2/m
Pn3m	4/m\32/m
P4/nmm	4/m2/m2/m
R\3m	\32/m
Pnnm	2/m2/m2/m
Fd3m	4/m\32/m
I2/m	2/m
C2/c	2/m
R3m	3m
Fdd2	mm2
P\1	\1
I2/a	2/m
P1 or P\1	1 or \1
Pnam	2/m2/m2/m
Fd3c	
P2*1/a	2/m
C2/c	2/m
C2/m (?)	2/m
P2*12*12*1	222
P1 or P\1	1 or \1

P1	1
Pcmn	2/m2/m2/m
P1	1
\43n	\43m
C2/m (R\3m)	2/m (\32/m)
I4*1/acd	4/m2/m2/m
Pbam	2/m2/m2/m
P6*3	6
Cc	m
P2*1/n	2/m
P\3m, P3m, or P32	\32/m, 3m, or 32
Pbca	2/m2/m2/m
C2/m	2/m
Pmn2*1	mm2
P6*3/mmc	6/m2/m2/m
Fm3m	4/m\32/m
Im3	2/m\3
C2/m	2/m
P2*1/a	2/m
C2/c	2/m
C2/m	2/m
P\3m or P31m	\32/m or 3m
P6*3/mmc	6/m2/m2/m
C2/m	2/m
P222	222
Fm3m	4/m\32/m
Pbnm	2/m2/m2/m
P1 or P\1	1 or \1
Pa or P2/a	2/m or m
Pnnm	2/m2/m2/m
C2/c or Cc	2/m or m
Pmcn	2/m2/m2/m
R\3c	\32/m
P2*13	23
P2*1/n	2/m
P2*1/c	2/m
P2*1/a	2/m
P6*3mc	6mm
C2/m	2/m
Pnma	2/m2/m2/m
R\3	\3
Pcaa	2/m2/m2/m
P1	1

P2*1/m	2/m
R32	32
Fd3 or Fd3m	2/m\3 or 4/m\32/m
P\43m	\43m
P4*2/n	4/m
P-lattice	
R3	3
Pbnm or Pna2*1	2/m2/m2/m or mm2
P2*1/m or P2*1	2/m or 2
Cmc2*1	mm2
C2/c	2/m
Pcnm	2/m2/m2/m
P\6m2	\6m2
P2*1/m	2/m
P2*1/c	2/m
R-lattice	
Fm3m	4/m\32/m
P\3m, P3m, or P32	\32/m, 3m, or 32
C\1	\1
Pmnm or P2*12*12*1	2/m2/m2/m or 222
Pbnm	2/m2/m2/m
Pb2*1m	mm2
P22*12	222
Pnma or Pn2*1a	2/m2/m2/m or mm2
Pnnm or Pnn2	2/m2/m2/m or mm2
P2/n	2/m
C2/m	2/m
C6*222 or C6*422	622
P4*2/mnm	4/m2/m2/m
P3	3
P-lattice	
Cmcm	2/m2/m2/m
R\3m	\32/m
P2*1/n	2/m
P2*122	222
C2/m	2/m
Pmmn	2/m2/m2/m
Ccmm, Ccm2*1 or Cc2m	2/m2/m2/m or mm2
Pnnm	2/m2/m2/m
R3m	3m

P2*1/c	2/m
Fm3m	4/m\32/m
Fm3m	4/m\32/m
P6*3/mmc	6/m2/m2/m
P6/mcc	6/m2/m2/m
P6/mcc	6/m2/m2/m
R\3c	\32/m
P1 or P\1	1 or \1
Pnam	2/m2/m2/m
Aba2 or Abam	mm2 or 2/m2/m2/m
Pcca	2/m2/m2/m
Pnam	2/m2/m2/m
P2*12*12	222
P\6c2	\6m2
C2/c or Cc	2/m or m
2/m	P2*1/m
I23	23
P6*3	6
Immm	2/m2/m2/m
Fm3m	4/m\32/m
P2/m	2/m
Pmcn or P2*1cn	2/m2/m2/m or mm2
Pm3m	4/m\32/m
R\3m	\32/m
C2/m	2/m
C2/c	2/m
P2*1/n	2/m
Pbnm	2/m2/m2/m
C2/m	2/m
R\3m	\32/m
Pmnb	2/m2/m2/m
P2*1/c	2/m
R\3	\3
Pbca	2/m2/m2/m
P\1	\1
C2	2
C2/c or Cc	2/m or m
R\3m	\32/m
P1	1
P\1	\1
P\1	\1
P6*222	622
C2/m	2/m
P321	32

I4*1/amd	4/m2/m2/m
Pbnm	2/m2/m2/m
F-lattice	mm2, 222, or 2/m2/m2/m
P2*1/n	2/m
Pbma	2/m2/m2/m
Pc or P2/c	m or 2/m
Cmcm	2/m2/m2/m
Pbca	2/m2/m2/m
Cc or C2/c	m or 2/m
P2*1/a	2/m
C2/m	2/m
P2*1/a	2/m
P4*12*12 or P4*32*12	422
P\1	\1
P2*1	2
C2/m	2/m
R3	3
Pmam	2/m2/m2/m
P2*122	222
P\1	\1
C2/c	2/m
Fd3m	4/m\32/m
Aa	m
C2	2
I2/a	2/m
Im3m	4/m\32/m
Pbca	2/m2/m2/m
P2*1	2
C2/m	2/m
P-lattice	
C2/m	2/m
P\1	\1
R/3m	\32/m
P2*1am	mm2
Cmcm, Cmc2*1, or C2cm	2/m2/m2/m or mm2
P1 or P\1	1 or \1
C2/m	2/m
Pa3	2/m\3
Ccm2*1	mm2
P\1	\1
Fm3m	4/m\32/m
P6*322	622
C2/c	2/m

P6/mmm (probably)	6/m2/m2/m
Fm3m	4/m\32/m
Bmmb	2/m2/m2/m
P6/mmm	6/m2/m2/m
P2*1/m	2/m
I\42m	\42m
Pnma	2/m2/m2/m
C2/m	2/m
P2*22*12*1	
P2/a	2/m
P2*1/m	2/m
C2/c	2/m
P6*3/m or P6*3	6/m or 6
Pnam or Pna2*1	2/m2/m2/m or mm2
P2/m, P2, or Pm	2/m, 2, or m
P\31m	\32/m
I4*132	432
Ia	m
I\43m	\43m
P\1	\1
R\3	\3
R\3m or R3m	\32/m or 3m
P2*1/c	2/m
P2*1/m or P2*1	2/m or 2
C2/m	2/m and 32
C2/m	2/m
P4/mbm	4/m2/m2/m
P22*12 or P22*12*1	222
P2*1/c	2/m
Pmna	2/m2/m2/m
Pbmn or Pnmn	2/m2/m2/m
P2*1/c	2/m
A2/a	2/m
P2*1/n	2/m
Bmmb	2/m2/m2/m
P2*1/a	2/m
Pbca	2/m2/m2/m
P222, Pmm2, or Pmmm	222, mm2, or 2/m2/m2m
P2	2
C222, Cmm2, Amm2, or Cmmm	222, mm2, or 2/m2/m2/m
P2*1/a	2/m
	4
P2*1/m	2/m
P2*1/c	2/m
R\3m	\32/m
P2*1/m	2/m
Ibam	2/m2/m2/m

P4*2 or P4*2/m	4 or 4/m
I\42m or I\4	\42m or \4
Fdd2	mm2
4/mmm	4/m2/m2/m
C2/c	2/m
Pcnb	2/m2/m2/m
Pa3	2/m\3
Fm3m for nearly pure Ir	4/m\32/m
Fm3m	4/m\32/m
P4*2/mnm	4/m2/m2/m
R-lattice	
P2*1/m	2/m
C222*1	222
P312	32
R\3m	\32/m
R\3m	\32/m
Fd3m	4/m\32/m
P6*3mc	6mm
Fd3m8	4/m\32/m
C222*1	222
A2/a	2/m
P2*1/a	2/m
Ccm2*1	mm2
P4/n	4/m
Ia3d	4/m\32/m
C2/m	2/m
Pcan	2/m2/m2/m
Fd3m	4/m\32/m
P\1 or P1	\1 or 1
C2/m	2/m
	2/m2/m2/m
P\3m1	\32/m
C2/c	2/m
P4/mmm; P2*13	4/m2/m2/m or 23
Pa3	2/m\3
R\3m (probably)	\32/m
Pmnb	2/m2/m2/m
I4*1/a	4/m
C-lattice	
P2cm	mm2
P\1	\1
C2/c	2/m
Pbcn	2/m2/m2/m

I4/m	4/m
P2*1/a	2/m
A2/a	2/m
C2/c or Cc	2/m or m
Pn	m
R3c	\32/m
Bbmm	2/m2/m2/m
P2*1/a	2/m
P2*1/a	2/m
P\1	\1
Pnca	2/m2/m2/m
A2/m	2/m
A2/m	2/m
Pmnb	2/m2/m2/m
R3c	\32/m
Pa3	2/m\3
R\3m	\32/m
Pnam	2/m2/m2/m
Fd3m	4/m\32/m
P\3m1	\32/m
P4*2/mnm	4/m2/m2/m
P6*3/m	6/m
Ia3d	4/m\32/m
R\3	\3
C2/c	2/m
P\3m1	\32/m
P2*1/c	2/m
P1 or P\1	1 or \1
P\1	\1
A2/a	2/m
Fd3m	4/m\32/m
P2*1/n	2/m
Pbcn	2/m2/m2/m
P3*12 (Right-handed); P3*22 (Left-handed)	32
P2*1	2
P2	2
P\1	\1
C6*322	622
P-lattice	
C222	222
P2*1/c	2/m
Fd3m	4/m\32/m

P2/n	2/m
C2/c or Cc	2/m or m
Pnnm	2/m2/m2/m
P2*1/a	2/m
Pbnm	2/m2/m2/m
Pmmn	2/m2/m2/m
C-lattice	
P2*1/a	2/m
P2*1/c	2/m
Pcnb	2/m2/m2/m
P2/n	2/m
Cmcm	2/m2/m2/m
P2*1/n	2/m
P\1	\1
C2/c	2/m
P2*1/n	2/m
P2*1/c	2/m
Pbna	2/m2/m2/m
I4*1/a	4/m
C\1	\1
P2*12*12*1	222
P2*1/a	2/m
Pbam	2/m2/m2/m
P2*1/a	2/m
Bmmb	2/m2/m2/m
P\42m	\42m
P4*12*12 or P4*32*12	422
Pban	2/m2/m2/m
Pban	2/m2/m2/m
Pban	2/m2/m2/m
P1 or P\1	1 or \1
P\3 or P3	\3 or 3
P6*222	622
P6*222	622
P6*3/mmc	6/m2/m2/m
Pmn2*1 or Pmmn	mm2 or 2/m2/m2/m
Fm3m (?)	4/m\32/m (?)
P\43m	\43m
R\3c	\32/m
P\1	\1
Pnma	2/m2/m2/m
Pbnm or Pbn2*1	2/m2/m2/m or mm2
P4 (?)	4 (?)

C2/m	2/m
P1 or P\1	1 or \1
C2/m	2/m
P4/nmm	4/m2/m2/m
C2/m	2/m
F-lattice	
R\3c	\32/m
P2*1/m	2/m
B22*12	222
Pm3m	4/m\32/m
A2/a	2/m
P\1	\1
Bbmm	2/m2/m2/m
C2/m	2/m
P6*3/mmc (?)	6/m2/m2/m
I4/mcm	4/m2/m2/m
C2/m	2/m
C2/m	2/m
P4/nmm	4/m2/m2/m
Fd3m	4/m\32/m
P\1	\1
R3	3
P2/m	2/m
I\42d	\42m
P2*1/m or P2*1	2/m or 2
C2/c; C\1	2/m; \1
C2/m	2/m
P2*1/c	2/m
P\1	\1
P\1	\1
P\1	\1
P2/n	2/m
P\1	\1
A2/a	2/m
Pcab	2/m2/m2/m
P1 or P\1	1 or \1
P1 or P\1	1 or \1
I-lattice	
Pbam	2/m2/m2/m
P2*1/n	2/m
R3m	3m
R\3m	\32/m
P2*1/c	2/m
I\42d or I4/amd	\42m or 4/m2/m2/m
Fm3m	4/m\32/m

C2/c	2/m
Pnma	2/m2/m2/m
P6*3/mmc	6/m2/m2/m
P6*3/mmc (syn)	6/m2/m2/m
Fm3m	4/m\32/m
Pmmm	2/m2/m2/m
P4/mnm	4/m2/m2/m
Pmnb	2/m2/m2/m
P321 possible	32
C2/c or Cc	2/m or m
P6*3mc, P\6c, or P6*3/mmc	6mm, \6m2, or 6/m2/m2/m
Pnnm	2/m2/m2/m
P2*1/a	2/m
Cc or C2/c	m or 2/m
C2/c	2/m
F-lattice	
P-lattice	
Pm3m	4/m\32/m
I4/mmm	4/m2/m2/m
Pnma	2/m2/m2/m
Pbcn (?)	2/m2/m2/m
P-lattice	2/m2/m2/m
P2/n	2/m
C2/m	2/m
P\1	\1
C2/m	2/m
P2/c	2/m
P\1	\1
B22*12	222
P6*322	622
Aba2	mm2
P2*1/a	2/m
C2/c	2/m
I4/m	4/m
P2*1/a	2/m
P2*1/a	2/m
P2*1/c	2/m
P2*12*12*1	222
P42*12 or P4*22*12	422
P\1	\1

P\31m, P31m, or P312	\32/m, 3m or 32
P2*1/c	2/m
Pnnn, Pmm2, or P222	2/m2/m2/m, mm2, or 222
C2/c	2/m
R\3m	\3/m
I2/m	2/m
P6*3/mmc	6/m2/m2/m
P4*2/mbc	4/m2/m2/m
C312 or P\31m	32 or \32/m
P6*3/mmc, P6*3mc, or P*62c	6/m2/m2/m, 6mm, or \6m2
I4*1/a	4/m
Pbca	2/m2/m2/m
Cmcm	2/m2/m2/m
Bbmm, Bb2m, or Bbm2	2/m2/m2/m or mm2
Pmab	2/m2/m2/m
P\1	\1
P2*1/m	2/m
Pn3	2/m\3
Pbca	2/m2/m2/m
R3m, R\3m, or R32	3m, \32/m, or 32
Pbmm	2/m2/m2/m
Pmab	2/m2/m2/m
R3m	3m
Ia3d	4/m\32/m
I\4	\4
Cmmm	2/m2/m2/m
P\1	\1
P3*121	32
P2*1cn	mm2
P3 or P\3	3 or \3
Pa or P2/a	m or 2/m
P\1	\1
Fmmm	4/m2/m2/m
Aa	m
Pcab	2/m2/m2/m
P2/c	2/m
P2*1 or P2*1/m	2 or 2m
Pbnm	2/m2/m2/m
P2*1	2
P6*3/mmc	6/m2/m2/m
C222*1	222

Pcca	2/m2/m2/m
R3m	
P2/c	2/m
P-lattice	
Cccm	2/m2/m2/m
P3*121 or P3*221	32
P2*12*12*1	222
Pn2*1m, or Pnmm	2/m2/m2/m or mm2
P4*2/mnm	4/m2/m2/m
Pmnn	2/m2/m2/m
C2/c	2/m
R3 or R\3	3 or \3
Fd3m	4/m\32/m
Pna2*1	mm2
P2*1/a	2/m
P\1	\1
P1	1
Cm	m
C2/c	2/m
Fm3m	4/m\32/m
P3m	3m
Im	m
R\3m	\32/m
Pcab	2/m2/m2/m
I-lattice	
Pmmn	2/m2/m2/m
I4*1/amd	4/m2/m2/m
R3 or R\3	3 or \3
Amm2	mm2
A2/m	2/m
Pmnb	2/m2/m2/m
P6*322	622
R\3c	\32/m
Pbnm	2/m2/m2/m
C2/m	2/m
P\1	\1
P2*1/m or P2*1	2/m or 2
P2*1/n	2/m
Fd3m	4/m\32/m
P\1	\1
I23	23
Pbnm	2/m2/m2/m
Fm3m	4/m\32/m

Pnaa	2/m2/m2/m
P2*1/n	2/m
R\3m	\32/m
A2/m, Am, or A2	2/m, m, or 2
P3	3
Pbmm	2/m2/m2/m
P1 or P\1	1 or \1
P1	1
Cmc2*1	mm2
P6*3/mmc	6/m2/m2/m
P2*1/c	2/m
C2/m	2/m
Im3	2/m\3
R (?)	
P2*1/a	2/m
Cm2a	mm2
A2/a	2/m
R\3c	\32/m
R\3m	\32/m
P6*3/mmc	6/m2/m2/m
P\43n	\43m
Fddd	2/m2/m2/m
Pa3	2/m\3
P4/nmm	4/m2/m2/m
P2*12*12*1	222
C2/m	2/m
P\43m	\43m
P4/nmm	4/m2/m2/m
P6/mmm	6/m2/m2/m
Im3	2/m\3
P2*1/c	2/m
P2*1/a	2/m
P2*1/c	2/m
C2/m	2/m
C2/c or Cc	2/m or m
Pn2*1m	mm2
P-lattice	
P3c1	3m
P2/c	2/m

Pa3	2/m\3
Cmcm	2/m2/m2/m
Ia3d	4/m\32/m
R\3c	\32/m
F\43m	\43m
P2*1/n	2/m
Fd3m	4/m\32/m
P\3m1, P3m1, or P321	\32/m, 3m, or 32
Cc or C2/c	m or 2/m
C2/c	2/m
P2*1/a	2/m
Pnma	2/m2/m2/m
Pbcn	2/m2/m2/m
P2/c	2/m
I\42m	\42m
I-lattice	
Fd3m	4/m\32/m
P4*2/mnm	4/m2/m2/m
P2*1/n	2/m
C2/m	2/m
P4/mcc	4/m2/m2/m
R\3m	\32/m
Fmmm	2/m2/m2/m
I4*1	4
P2*1/n	2/m
Cmc2*1	mm2
P\1	\1
Cmma	2/m2/m2/m
Pbam	2/m2/m2/m
Fd3m	4/m\32/m
P\1	\1
R\3m	\32/m
Fd3m	4/m\32/m
Fd3m	4/m\32/m
Pc2*1n	mm2
P6*3/mmc, P63mc, or P\62c	6/m2/m2/m, 6mm, or \6m2
Pc2*1n	mm2
C2/c	2/m
Pbnm	2/m2/m2/m
R\3m	\32/m
C2/m	2/m
F\43m	\43m
P3 or P\3	3 or \3
P\3m	\32/m

P4mnm	4/m2/m2/m
P2*1/n	2/m
Pnna	2/m2/m2/m
I4*1/a	4/m
P4*2/n	4/m
C2/m, C2 or Cm	2/m, 2 or m
P\1	\1
P2/m, P2, or Pm	2/m, 2, or m
R3 or R\3	3 or \3
Pnmm or Pnm2	2/m2/m2/m or mm2
Pcab	2/m2/m2/m
P2*1/c	2/m
Cmcm	2/m2/m2/m
Ibam or Iba2	2/m2/m2/m or mm2
Pmcn	2/m2/m2/m
Pcam or Pca2*1	2/m2/m2/m or mm2
P2*1	2
P2*1/a	2/m
P2*1/a	2/m
P2, Pm or P2/m	2, m or 2/m
P6*3/m	6/m
C2/c	2/m
P4*2/mmm	4/m2/m2/m
Pmn2*1	mm2
C2, Cm, or C2/m	2, m, or 2/m
R31c	3m
P6/mmm	6/m2/m2/m
P2*1/a	2/m
P6*3/mmc	6/m2/m2/m
C2/m	2/m
Im3m	4/m\32/m
P6/mmc	6/m2/m2/m
Pnma	2/m2/m2/m
Fm3m	4/m\32/m
P\3m1	\32/m
Fddd	2/m2/m2/m
P\43m	\43m
C2, Cm, or C2/m	2, m, or 2/m
Fdd2	mm2
P2*1/n	2/m
P2*1	2
P2*1/m	2/m
R\3	\3

Amam or Ama2	2/m2/m2/m or mm2
P6*3/m	6/m
R\3m	\32/m
Ibmm or Ibm2	2/m2/m2/m or mm2
P1 or P\1	1 or \1
P2*1/a	2/m
P2*1/m or P2*1	2/m or 2
P6*3mc	6mm
P4*12*12 or P4*32*12	422
P2*1/a	2/m
P2/n, P2/c	2/m
Fm3m	4/m\32/m
P\1	\1
Pnma	2/m2/m2/m
C-lattice	
C-lattice	
C-lattice	
P2*1/m	2/m
P2*1/a	2/m
A2/a	2/m
A2/a	2/m
P6*3mc	6mm
C2/m	2/m
Fm3m	4/m\32/m
C2/m	2/m
Pnnm or Pnn2	2/m2/m2/m or mm2
C2/c	2/m
P\1	\1
I\43m	\43m
P2*1/a	2/m
Cmmb, Cm2a, or C2mb	mm2
P\1 or P1	\1 or 1
Pbnm (?)	2/m2/m2/m
P4*2/mnm	4/m2/m2/m
Pnm2*1 or Pnmm	mm2 or 2/m2/m2/m
C2/m	2/m

R3c or R\3c	3m or \32/m
Pnam	2/m2/m2/m
P\1	\1
P2*12*12*1	222
Pm3m	4/m\32/m
Pm3m, F432, or F\3c	4/m\32/m, 432, or \43m
Pbnm	2/m2/m2/m
P4/nmm	4/m2/m2/m
P2*12*12*1	222
R\3m	\32/m
Pbca	2/m2/m2/m
P3*121 or P3*221	32
R\3m	\32/m
P4/mmm	4/m2/m2/m
P2*1/c	2/m
I\43m	\43m
C2/c	2/m
Pnma	2/m2/m2/m
C2/c	2/m
P2*1/a	2/m
Pccn	2/m2/m2/m
P2*13	23
C4/mmm	4/m2/m2/m
R\3m	\32/m
I\43m	\43m
P6*3	6
I\42d or I4*1md	\42m or 4mm
P4/mmm	4/m2/m2/m
P4*2/n	4/m
C222*1	222
I-lattice	
P2*1/n	2/m
P6*3/m	6/m
Fddd	2/m2/m2/m
P\3m1	\32/m
Pca2*1	mm2
P2*1/c	2/m
Pcnn	2/m2/m2/m
P\62c	\62m

C2/c	2/m
Fm3m	4/m\32/m
I4/mmm	4/m2/m2/m
I4*1/amd	4/m2/m2/m
I-lattice	
C2/m	2/m
Cc or C2/c	m or 2/m
F\43m	\43m
P6/m, P6, or P\6	6/m, or 6, or \6
Aa	m
P2*1/a	2/m
Fd3m	4/m\32/m
P1 or P\1	1 or \1
R32	32
Pn or P2/n	m or 2/m
Pnnm	2/m2/m2/m
P\1	\1
P6*3/m or P6*3	6/m or 6
P2*1/n	2/m
C2/m	2/m
\3m	\32/m
P2*1/a	2/m
P-lattice (?)	
P2*1/c	2/m
C222*1	222
C2/m	2/m
P2*13	23
P2*1/n	2/m
P2*1/m or P2*1	2/m or 2
Pnma	2/m2/m2/m
Pbnm	2/m2/m2/m
I4/mmm	4/m2/m2/m
P2*1/c	2/m
P2*1/a	2/m
R3m	3m
R\3 or R3	\3 or 3
C2/m	2/m

Fd3m	4/m\32/m
P1 or P\1	1 or \1
Pn	m
P6*3	6
P2*1/c	2/m
Pmnb	2/m2/m2/m
I2/m	2/m
P2*1/a	2/m
P4*2/mbc	4/m2/m2/m
P4*2/mmm	4/m2/m2/m
P6*222	622
P6*3/m (?)	6/m
P6*3/m (?)	6/m
P4/mmm	4/m2/m2/m
Pa3	2/m\3
P6*3/mmc	6/m2/m2/m
I2/c	2/m
I2/a	2/m
P3 or P\3	3 or \3
Fd3m	4/m\32/m
Pa3	2/m\3
Pa3	2/m\3
C2/m	2/m
P2*1/m	2/m
P\3m1	\3m
P4/mmm	4/m2/m2/m
P2*1/n	2/m
I\4	\4
Cmca or C2ca	2/m2/m2/m or mm2
P1	1
P2*1/a	2/m
P6*3/mmc	6/m2/m2/m
Pmnb	2/m2/m2/m
P4/nmm	4/m2/m2/m
C2/m	2/m
P6*3/m	6/m
P\1	\1
P2*1/a	2/m
R\3	\3
Fd3	2/m\3
P1	1
Pmma	2/m2/m2/m

Fm3m	4/m\32/m
Pnan	2/m2/m2/m
Pmmm, P222, or Pmm2	2/m2/m2/m, 222, or mm2
P2*1/m	2/m
P\1	\1
P2*13	23
C2/m	
Fd3m	4/m\32/m
P\42*1m	\42m
P2*12*12*1	222
P2*1/m	2/m
R\3	\3
P2*1/a	2/a
P2*1/n	2/m
4/nmm	4/m2/m2/m
Pbnm or Pbn2*1	2/m2/m2/m or mm2
Fm3m	4/m\32/m
Fd3m (?)	4/m\32/m
P4/nnc	4/m2/m2/m
P2*1	2
P2*1/c	2/m
P22*12*1, Pmm2, or Pmcb	222, mm2, or 2/m2/m2/m
P4*2/n	4/m
I4/mmm	4/m2/m2/m
P-lattice	
P\42*1m	\42m
P2*1/a	2/m
P\1	\1
P\1	\1
Ia3d	4/m\32/m
R3m	3m
P4*122 or P4*1	422 or 4
P2*1/m	2/m
Pa3	2/m\3
Pccn	2/m2/m/2m
R\3m	\32/m
P6*3/m	6/m
P2/m	2/m
P\1	\1
Pmma or Pm2a	2/m2/m2/m or mm2

Pmn2*1	mm2
P2*1/c	2/m
A2/a	2/m
Pcab	2/m2/m2/m
P4*2/mnm	4/m2/m2/m
I2*1/a	2/m
Pnam or Pna2*1	2/m2/m2/m or mm2
P6*3/mmc	6/m2/m2/m
P2*1/n	2/m
P\1	\1
P2*1/a	2/m
Aa	m
A1 or A\1	1 or \1
Pmcn or Pnc2*1	2/m2/m2/m or mm2
I4/mmm	4/m2/m2/m
P-lattice	
Pbam or Pba2	2/m2/m2/m or mm2
P2*1/*	2/m
C2/c	2/m
P4/nnc	4/m2/m2/m
P2*1/a	2/m
Pmnb	2/m2/m2/m
P2*1 or P2*1/m	2 or 2/m
B2/m or Bm	2/m or m
Pa3	2/m\3
Fm3m	4/m\32/m
C2/c	2/m
C2/c	2/m
P-lattice	
A2/a	2/m
Fd3m	m3m
P6*222 or P6*422	622
622	a = 12.58-12.76, c = 5.11-5.20
Pn3m	4/m\32/m
Pcmb or Pc2*1b	2/m2/m2/m or mm2
C2/m	2/m
P2*1/c	2/m
C2/c	2/m
	2/m
C-lattice	
P2*1	2
Fd3c	4/m\32/m
Pbam	2/m2/m2/m
Cmca	2/m2/m2/m

P2*12*12*1	222
Pmnm	2/m2/m2/m
P1 or P\1	1 or \1
Fd3m	4/m\32/m
C-lattice	2/m2/m2/m or mm2
P4*2/m	4/m
P2*1/c	2/m
P6*3/m	6/m
Imma (syn.)	2/m2/m2/m
P2*1/a	2/m
Ia or I2/a	m or 2/m
P6*3/mmc	6/m2/m2/m
I4*1/amd	4/m2/m2/m
I4*1/amd	4/m2/m2/m
P\1	\1
P6/mmc	6/m2/m2/m
P\1	\1
P\1 or P1	\1 or 1
P4*12*12	422
P\1	\1
Pnam	2/m2/m2/m
Pcmn	2/m2/m2/m
R\3m	\32/m
Immm, I222, I2*12*12*1, or Imm2	2/m2/m2/m, 222, or mm2
I4/m	4/m
Pnnb	2/m2/m2/m
P\1	\1
P-lattice	2/m2/m2/m or mm2
P\1	\1
P1	1
P6/mmm	6/m2/m2/m
P3	3
P2*1/m or P2*1	2/m or 2
P\1	1
P\1	\1
P2*1/c	2/m
P\62m	\6m2
P3cl	3m
Pnam	2/m2/m2/m
P\1	\1
C2, Cm or C2/m	2, m or 2/m
P2*1/n	2/m
P2*1/a	2/m

R3c	3m
P2*1/c	2/m
P6*3/mmc	6/m2/m2/m
Pn3m	4/m\32/m
Pbca	2/m2/m2/m
P-lattice	2/m2/m2/m or 222
P2*1/c	
I2/m	2/m
P\1 or P1	\1 or 1
Pbca	2/m2/m2/m
I2/m	2/m
R\3	\3
C2/c	2/m
P\1	\1
C2/m	2/m
Ia3	2/m\3
Pmcn	2/m2/m2/m
P2*12*12*1	222
C2/m and P2/m	2/m
C2/c or Cc	2/m or m
P2*1/m	2/m
P2*1/a	2/m
P2/c	2/m
P2/c	2/m
P\1	\1
C2/m	2/m
R\3m	\32/m
Pc	m
I4*1/a	4/m
P6*3mc	6mm
	4/m\32/m
P2*12*12*1(I), Pmcn(II) or P2*1cn(II)	222(I), 2/m2/m2/m(II) or mm2(II)
P2*1/a	2/m
A2/a, C2/c	2/m
P\1	\1
I4/amd	4/m2/m2/m
P6*3/mcm	6/m2/m2/m
C2/m, C2, or Cm	2/m, 2, or m
Fd3m	4/m\32/m
P2*1/a	2/m
P2/a	2/m

Pm3n or P\43n	4/m\32/m or \43m
P6/mcc	6/m2/m2/m
P3m1, P\3m1, or P321	3m, \32/m, or 32
C2, C2/m, or Cm	2, 2/m, or m
P\1 or P1	\1 or 1
R\3	\3
Cmcm	2/m2/m2/m
P6*3/mmc	6/m2/m2/m
Fm3m	4/m\32/m
P2*1	2
Pn	m
P/1	\1
Pnma	2/m2/m2/m
I2/a	2/m
P2*1/m	2/m
Pc	m
R/3m	\32/m
P31m or P3m1	3m
P4/nmm	4/m2/m2/m
Cmca	2/m2/m2/m
Pmnm or Pmn2*1	2/m2/m2/m or mm2
P6*3/m	6/m
P\1	\1
P4/nnc	4/m2/m2/m
A2/a	2/m
P6*3/mmc	6/m2/m2/m
	2/m
P6*3mc	6mm
P2*1/n	2/m
P\1	\1

P6*3 or P6*3/m	6 or 6m
C2/m or C2/c	2/m
I4*1/amd	4/m2/m2/m
Fddd	2/m2/m2/m
C2/c	2/m
R3m, R\3m, or R32	3/m, \32/m, or 32
Pnmc	2/m2/m2/m
Cmcm or Cmc2	2/m2/m2/m or mm2
F\43m	\43m
R3 or R/3	3 or \3
Pm3m	4/m\32/m
I2/a	2/m

LATTICE,C,165
a = 8.44, b = 11.12, c = 7.28, \a = 90_53', \b = 113_45', \g = 79_34'
a = 7.17, c = 9.08
a = 10.0175, c = 44.014
a = 7.87, b = 6.91, c = 4.23, \b = 99_35'
a = 11.44, c = 13.50
a = 3.636, c = 5.946
a = 9.884, b = 18.145, c = 5.294, \b = 104.70_
a = 8.306, b = 8.524, c = 6.043
a = 7.47, b = 8.94, c = 5.88
a = 12.68, b = 10.07, c = 11.32, \b = 109_68'
a = 8.5784, b = 12.960, c = 7.2112, \a = 89.70_, \b = 115.97_, \g = 90.87_
a = 9.65, b = 8.79, c = 5.29, \b = 107.5_
a = 10.406, b = 10.813, c = 8.926, \a = 104_56', \b = 96_52', \g = 125_19'
a = 10.29, b = 5.95, c = 9.79, \b = 110_19'

a=5.18, b=10.98, c=7.41
a=12.77, c=21.35

P2*1: a = 11.39, b = 5.47, c = 13.09, \b = 98_26'   Ia: a = 13.23, b = 5.632, c = 11.68, \b = 98_42'

a = 13.55, c = 5.87
a = 4.999, c = 5.457 (at 575_C)
a = 7.759, b = 18.946, c = 6.986 \a = 89.88_, \b = 116.65_, \g = 94.32_
a = 14.04, b = 24.07, c = 14.13
a = 4.33, b = 7.09, c = 7.76
a = 7.53, b = 8.76, c = 6.43, \b = 99_05'
a = 11.297, b = 11.654, c = 4.061
a = 13.637, b = 14.507, c = 13.620, \a = 107.16_, \b = 105.45_, \g = 110.57_
a = 10.48, c = 3.023
a = 8.344, b = 10.358, c = 7.627, \a = 104_29', \b = 93_38', \g = 103_57'
a = 12.87, c = 14.97
a = 7.84, c = 5.01
a = 5.70, b = 17.60, c = 6.752, \b = 99_48'
a = 12.54, b = 24.35, c = 7.484
a = 13.72, c = 9.32
a = 5.214
a = 12.254, b = 7.055, c = 11.243, \b = 113_9'
High temp: a = 8.15, b = 12.88, c = 7.11, \a = 93_22', \b = 116_18', \g = 90_17'   Low temp: a = 8.14, b = 12.79, c = 7.16, \a =
a = 15.000, b = 8.330, c = 26.60
a = 12.76, b = 14.59, c = 8.19
a = 4.238, c = 79.76
a = 10.25, c = 7.64
a = 2.586, c = 4.228
a = 11.03, b = 12.12, c = 5.51, \b = 114_04'
a = 8.932, b = 5.770, c = 10.158, \b = 114.69_
a=2.95, c=4.77
a = 10.46, b = 4.86, c = 8.3, \b = 109_8'

a = 4.641, 4.631, 4.662, b = 5.606, 5.605, 5.606, c = 3.415, 3.430, 3.415

a=12.004, b=12.533, c=6.404, \b=114.4
a = 11.526
a = 30.14, b = 17.40, c = 6.12, \a = \b = \g = 90_
a = 6.452
a = 8.258, b = 14.383, c = 6.054
a = 7.251, b = 18.161, c = 7.267, \a = 93_59', \b = 102_17', \g = 97_58'
a = 4.04 - 4.07
a = 6.498, b = 14.457, c = 5.678, \a = 95.83_, \b = 93.23_, \g = 82.24_
a = 7.745
a = 4.90, b = 11.58, c = 5.66
a = 6.96, c = 17.35
a = 7.420, b = 26.97, c = 6.062, \a = 89_57', \b = 97_34', \g = 91_53'
\b = 115_
a = 6.917, c = 14.52
a = 8.90, b = 11.56, c = 6.64, \a = 95_38+', \b = 90_23+', \g = 97_13'
a : b : c : = 0.7757 : 1 : 1.1482, \b = 95_37'
a = 8.5784, b = 12.960, c = 7.2112, \a = 89.70_, \b = 115.97_, \g = 90.87_

a = 5.18, b = 7.03, c = 5.03, \a = 109_29', \b = 97_46+', \g = 106_37'
a = 18.428, b = 9.882, c = 6.326, \b = 104_23'
a = 5.307, b = 9.195, c = 14.068, \a = 90.09_, \b = 90.25_, \g = 89.96_
a = 4.999, c = 5.457 (at 575_C)
a = 10.226, b = 10.422, c = 9.884, \b = 88_19'
a = 13.8, c = 9.8
a = 25.27, b = 9.65, c = 11.56, \b = 94_17'
a = 7.20, c = 17.00
a = 13.214, c = 13.713
a = 13.7
a=5.412, b=9.434, c=19.953 \b=94.52
a = 6.41, b = 6.88, c = 5.86, \a = 101_34+', \b = 104_05+', \g = 71_03+'
a = 3.73, c = 9.37

a = 5.03, b = 8.53, c = 7.29
a = 7.79, b = 7.90, c = 5.56
a = 18.009, c = 23.838
a = 8.14, b = 12.86, c = 7.17, \a = 93_26', \b = 116_28', \g = 89_59'
a = 13.01, b = 19.19, c = 4.27
a = 12.048
a = 7.464, b = 13.794, c = 7.093, \b = 118_15'
a = 14.16, b = 16.83, c = 5.18
a = 5.41, b = 6.206, c = 3.01
a = 5.03, b = 6.49, c = 7.11, \a = 114_, \b = 116_, \g = 81_
a = 6.959, b = 8.482, c = 5.398
a = 6.94, b = 6.97, c = 6.20
a = 7.89, b = 7.84, c = 11.01
Fe:Mg = 1:1.1: a = 4.822, c = 16.11 (vary with ratio of Fe to Mg)
a = 10.122, b = 13.284, c = 4.698, \b = 104_45'

synthetic: a = 5.39, b = 9.334, c = 10.290, \b = 100_00'
a = 8.18, b = 12.88, c = 14.16, \a = 93_10', \b = 115_51', \g = 91_13'
a = 8.2, b = 12.8, c = 7.1, b = 116_
a = 7.89, c = 3.95
a = 9.51, b = 9.23, c = 13.05, \a = 93_20', \b = 120_00', \g = 88_20'
a : b : c = 0.6898 : 1 : 0.4271, \b = 112_38'
a = 18.5-18.6, b = 17.7-18.1, c = 5.27-5.32
a = 43.53, b = 9.259, c = 7.263, \b = 91_8'
a = 12.8, b = 7.4, c = 11.9, \b = 90_
a = 4.299, c = 11.25
a = 8.22 kX, b = 11.97, c = 6.02
a = 12.89, b = 6.055, c = 19.11, \b = 90.42_
a = 9.368, c = 6.884
a = 5.65 kX, c = 7.29
a = 6.198, b = 24.347, c = 21.266, \b = 100.28_
a = 5.94, b = 13.56, c = 7.90, \b = 90_30'
a = 8.367, c = 17.959
a = 9.21, c = 9.17 (Values depend on chemical composition.)
a = 4.94, b = 7.94, c = 5.72
a = 8.32, b = 8.83, c = 7.73, \a = 103_54', \b = 90_, \g = 100_23'
a = 5.76, b = 10.05, c = 7.46
a = 7.448, c = 6.977
a = 7.078, c = 41.203
a = 22.09, b = 21.11, c = 8.05, \b = 103_01'
a = 5.721, b = 30.994, c = 6.250, \b = 117.26_
a=8.72, b= 18.56 c=5.83
a = 9.9, b = 18.0, c = 5.3, \b = 104_
a = 4.91
a = 7.35, c = 16.58
a = 10.521
a = 6.64, b = 11.47, c = 6.45
a = 4.3963, c = 2.8626
(synthetic): a = 15.149, b = 7.476, c = 10.589

a = 18.886, b = 7.521, c = 7.815, \b = 97.72_
a = 9.743, b = 10.024, c = 3.738
a = 13.491, c = 8.855
a = 10.732, c = 13.886
a = 14.04, b = 14.16, c = 7.81, \b = 109_33'
a = 16.537, b = 10.056, c = 24.750, \b = 105_65'
a=7.764, b=6.045, c=9.022, \b=112.5
a = 6.075, b = 9.358, c = 7.634
a = 3.77, c = 10.57
a = 17.76, b = 19.53, c = 11.30, \b = 96.0_

a = 9.31, b = 5.75, c = 18.84
a=7.08, c=1.727
a = 7.10, c = 17.16
a = 14.517, c = 10.803

a = 3.63, b = 4.45, c = 10.96
a = 11.0457
a = 7.399, b = 14.063, c = 7.352, \a = 92_03', \b = 118_57', \g = 95_54'
a = 5.74, b = 5.68, c = 5.79, \b = 112.17_
a = 5.257
a = 26.08, b = 15.04, c = 23.84 - 23.95, \b = 90_
a = 8.85, b = 5.92, c = 7.84, \b = 112.60_
a = 7.16, c = 30.37
a = 15.40, b = 17.40, c = 13.768
a=10.09, b=9.62, c=5.55, \b=92.2
a = 16.56, b = 3.15, c = 6.22, \b = 99_9'
a = 8.36, c = 15.30
a = 5.313, b = 9.120, c = 14.637, \b = 93_10'
a=2.823, c=9.6
a = 13.71, b = 4.09, c = 31.43, \b = 91.0_
a = 5.869, b = 4.873, c = 5.216
a = 24.044, c = 17.553
a=15.66
a = 11.72, b = 5.41, c = 21.14, \a = 90_, \b = 94_, \g = 103_
a = 6.84, b = 9.13, c = 6.01
a = 10.88, b = 7.42, c = 6.98, \b = 107_13' ; a : b : c = 0.933 : 1 : 1.505
a = 8.227, b = 11.982, c = 6.441
a = 6.798, c = 3.483
a = 3.991
a=11.38, b=13.22, c=14.08
a = 6.288, b = 13.239, c = 6.284, \a = 91_52', \b = 94_40', \g = 82_27'
a = 13.124, b = 7.988, c = 5.066, \b = 112_15'
a = 9.8, b = 9.0, c = 5.25, \b = 105_
a = 27.78, b = 6.40, c = 5.25
a = 3.88, b = 42.68, c = 3.84

a = 6.66
a = 7.43 kX, b = 9.00 c = 5.90
a = 6.989, c = 20.63
a = 10.5468
a = 8.664, b = 5.480, c = 7.028

a = 8.957, b = 9.218, c = 7.163, \a = 102.70_, \b = 98.03_, \g = 88.03_
a = 9.26, b = 12.25, c = 3.01
a = 10.35, b = 5.85, c = 5.00, \b = 92_20'
a = 4.89, c = 16.74
a = 7.36, b = 11.52, c = 6.58, \a = 91_31', \b = 93_51', \g = 104_4'
a = 5.1477, b = 5.2030, c = 5.3156, \b = 99.38_
a = 10.98, b = 6.80, c = 5.36, \b = 94_
a = 10.42, b = 10.16, c = 7.36, \b = 91.1_
a = 9.406, b = 11.541, c = 4.410, \b = 90.94_
a = 4.82, b = 7.60, c = 9.60, \b = 90_12'
a=13.85, b=13.58, c=9.65
a = 13.60, b = 20.24, c = 5.16

a = 10.62, b = 9.42, c = 3.92
a = 7.60, b = 5.83, c = 12.69
a = 3.865, c = 5.632
a = 8.50, b = 9.97, c = 16.73
a = 6.14, c = 5.58
a=15.413, b=3.615, c=10.066, \b=109.29

a = 22.20, b = 16.32, c = 24.70, \b = 94_20'
a = 20.02, c = 6.006
a = 5.76, c = 4.77
a = 16.94, b = 9.746, c = 20.907, \b = 112.50_
a = 6.17, c = 15.52
a = 7.25, b = 7.46, c = 7.49, \b = 120_15'
a = 6.472, b = 6.735, c = 8.806, \a = 92.50_, \b = 97.33_, \g = 119.32_
a = 11.70, b = 3.63, c = 29.06, \b = 101_30'
a = 10.075, b = 13.416, c = 4.760, \b = 104_52'
a = 10.477, b = 9.599, c = 22.59
a = 10.570
a=10.562

a = 15.850, c = 16.052
a = 12.17, b = 3.602, c = 7.78, \b = 95.03_
a = 13.643, b = 18.200, c = 17.842
a = 5.87, c = 3.44
a = 9.155, b = 6.202, c = 6.092, \a = 94.00_, \b = 95.5_, \g = 108.7_
a = 5.431, b = 13.689, c = 5.892, \b = 111.79_
a = 10.424, c = 20.626
a = 9.82, b = 11.67, c = 4.69
a = 9.82, c = 38.3
a = 8.134, b = 5.47, \b = 106.0_
A=19.96, b=7.07, c=5.43, \b=96.5
a = 22.56, c = 18.72
a = 12.031, b = 12.695, c = 6.934
a = 6.98, b = 17.07, c = 7.01, \b = 90.53_
a = 7.16, c = 9.79
a = 6.57, c = 9.48, c/a = 1.441
a = 10.41, b = 13.85, c = 8.06
a = 22.905, b = 8.329, c = 7.957, \a = 90.35_, \b = 97.00_, \g = 90.42_
a=5.360, b=9.222, c=7.189

a = 19.34, b = 22.90, c = 4.96

a = 5.062, b = 8.671, c = 4.713, \b = 90.27_
a = 14.083, b = 5.893, c = 10.152, \b = 106.10_
a = 26.65, b = 15.31, c = 6.53, \b = 93_4'
a = 12.37, b = 6.24, c = 6.86, \b = 114.5_
a = 6.7690, 6.7622; c = 10.020, 10.0158
a = 9.521, c = 9.165
a = 8.55, b = 36.90, c = 7.13, \b = 97_49'

a=7.203, c=16.94
a = 13.86, b = 12.30, c = 14.92
a = 6.206, c = 5.472
a = 4.64, b = 7.05, c = 4.55

a = 11.52, c = 11.74
a = 7.228, b = 7.829, c = 7.940, \a = 105.0_, \b = 96.98_, \g = 92.94_
a=9.62, c=7.12
a = 7.5, b = 9.8, c = 5.65
a = 15.74, b = 19.14, c = 4.06, \b = 91.50_
a = 6.60, c = 9.71
a=13.246, b=4.044, c=20.179, \b=103.21
a = 18.28, c = 8.67
a=22.35, c=21.41
a = 20.80-20.646, b = 5.156-5.129, c = 19.22-19.213, \b = 93.34_
a = 4.43, c = 5.33
a = 10.11, b = 5.084, c = 7.03, \b = 111.46_
a=22.32, b=17.19, c=20.63, \b=93.0
a = 4.8818, b = 7.809, c = 10.127, \b = 90.16_
a = 4.92, c = 10.91
a = 5.446, b = 19.25, c = 5.428, \b = 110.29_
a = 7.544, b = 7.560, c = 7.558

a = 4.24, b = 4.02, c = 29.04, \b = 102.5_
Monoclinic a=5.41, b=9.33, c=7.28, \b=104.5
Hexagonal a=5.415, c=7.114
a = 11.44, b = 14.12, c = 3.76
a = 11.48, b = 15.73, c = 7.23
a = 15.22, b = 8.69, c = 4.54
a = 9.21, c = 9.17 (Values depend on chemical composition.)

a = 8.13 kX, b = 7.76, c = 14.17, \b = 90_00'
a = 5.739
a=12.35-12.46
a = 4.036, b = 4.025, c = 4.061
a = 10.31
a = 14.693, b = 22.72, c = 3.861
a=19.44, b=11.096, c=15.25, \b=131.28
a = 7.32, c = 17.02
a=8.78, b=11.52, c=6.15, \b=99.42
a = 3.767, c = 21.690
a = 10.096, b = 7,201, c = 24.492, \b = 98.27_
a = 8.829
a = 14.132
a = 14.13, b = 6.55, c = 11.00, \b = 105_05'

a=21.22, b=45.30, c=13.38
a = 8.613, b = 4.962, c = 7.600, \b = 114.45_
a = 7.14, b = 12.08, c = 15.10

a = 14.96, b = 14.99, c = 10.56
a =10.41
1M: a = 5.3, b = 9.2, c = 10.2, \b = 100_   2M: a = 5.3, b = 9.2, c = 20.2, \b = 95_   3T: a = 5.3, c = 30.0
a = 7.4935, c = 7.340
a = 11.1955, b = 6.5607, c = 20.7566, \b = 93.891_
a = 8.54, b = 15.39, c = 14.26
a = 9.90, b = 7.15, c = 6.10, \b = 93_42'
a = 5.83, b = 8.14, c = 7.48, \b = 67_04'
a = 3.883, c = 7.347
a = 4.537, c = 11.838
a = 11.13, b = 11.27, c = 3.97
a = 3.859 kX, c = 13.658

a=10.430
a = 10.38
a = 4.97, b = 11.80, c = 5.66
a = 4.948, b = 8.693, c = 18.81, \b = 90.08_
a = 9.365
a=8.930, b=12.073, c=4.917, \b100.15

a = 5.832, b = 5.694, c = 25.47
a = 11.126, b = 8.242, c = 5.539, \b = 100.84_
a = 12.773, b = 12.486, c = 11.038, \b = 97.15_
a = 9.946 kX, b = 27.654, c = 4.639, \b = 104_01'
a = 3.78, b = 11.8, c = 2.85
a=4.087 (pseudocubic)
a = 5.251, b = 10.464, c = 18.577, \b = 107.53_
a = 8.41, c = 19.63

a = 15.283

a = 13.71, b = 7.14, c = 12.35, \b = 102.2_
a = 9.213, b = 12.229, c = 3.001
a = 5.59, b = 13.03, c = 7.34, \b = 97.1_
a:b:c = 0.9004:1:0.3249
a = 8.921, b = 6.631, c = 5.151, \b = 90_25'
a:b:c = 1.622:1:1.5000, \b = 105_36'
a = 8.54, b = 8.54, c = 12.10
a = 12.197, b = 10.674, c = 11.858, \b = 106_41'
a = 17.81, b = 8.36, c = 4.46, \b = 102.0_

a = 5.48, b = 7.10, c = 48.2
a = 10.2
a = 10.94
a = 5.794

a = 5.715, b = 6.126, c = 5.632, \b = 93.07_
a = 10.50, b = 17.84, c = 7.12, \b = 100_15'

a = 21.56, b = 23.51, c = 8.09, \b = 100_ 48'
a = 8.168, b = 8.712, c = 7.811
a = 9.28 kX, b = 12.57, c = 6.20, \b = 107_06'
a = 5.95, b = 13.60, c = 7.96, \b = 90_18'
a = 6.726, b = 6.933, c = 6.447, \b = 103_55' (unheated): a = 6.718, b = 6.916, c = 6.442, \b = 103_46' (heated)
a = 4.492, b = 9.860, c = 2.974
a = 8.880, b = 6.155, c = 7.681, \b = 111.00_
a = 8.85, b = 6.63, c = 5.16, \b = 90_25'
a = 6.380, c = 6.570
a = 12.156, c = 7.377
a=5.12, b=8.91, c=19.26, \b95.83
a = 5.899, b = 12.968, c = 5.684, \b = 108.05_
a = 8.90, b = 3.80, c = 6.99, \b = 104_45'
a = 10.017, c = 14.245
a = 7.472, b = 10.891, c = 16.585
a = 9.432, c = 18.703
a = 5.57 (variable depending on amount of substitution), a = 5.74 (synthetic)
a = 11.19, b = 10.08, c 7.06, \b = 97_22'
a = 10.909, b = 18.34, c = 6.739
a = 3.942, c = 5.155
a = 7.650, b = 7.550, c = 6.548
a = 6.77, b = 17.41, c = 7.66, \b = 93_04'
a = 5.96, b = 3.425, c = 11.27, \b = 91_32'
a = 13.36, b = 5.23, c = 9.13 \b = 91.2_
a = 5.32, c = 10.51
Monoclinic a=5.286, b=9.133, c=7.31, \b=104.15
Hexagonal a=5.277, c=7.09
a=9.63, c=7.03

a = 12.756, b = 9.863, c = 6.030, \b = 90.00_
a=6.98, c=6.40
a = 5.7745
a = 2.68, c = 4.36
a = 5.436, b = 9.166, c = 5.135
a = 5.52, b = 14.44, c = 5.34
a = 3.125, c = 4.75
a = 8.509, b = 10.027, c = 7.512, \b = 95.27_
a = 5.47, c = 15.97
a = 8.409
a = 5.88, b = 15.15, c = 6.37, \b = 117_28'
a = 5.167, b = 9.259, c = 6.737
a = 8.571, b = 13.032, c = 7.187, \b = 112.7_
a = 15.873, c = 7.187
a = 5.38, c = 18.12
synthetic: a = 3.966; c = 13.713

a = 15.53, b = 17.78, c = 7.03
a = 8.34, b = 11.18, c = 5.68, \a = 91_59', \b = 94_17', \g = 90_44'
a = 4.1768

a=25.09, b=5.048, c13.45, \b=110.91
a=10.53, c=6.47
a=5.21, b=9.04, c=12.85, \b=90
a = 21.15, b = 27.63, c = 5.16
a = 4.118, b = 13.376, c = 20.508
a = 8.128, \a = 90_ (trig.)
a = 15.46, b = 7.18, c = 13.84, \a = 89_34', \b = 94_53', \g = 102_47'
a = 6.44, b = 7.31, c = 5.87, \b = 108_35'
a=15.82, 9.13
a = 4.68, c = 9.21

a = b = 7.88, c = 3.94
a = 27.669, c = 10.655
a = 2.979, b = 5.617
a = 4.271, c = 6.969

a=16.01
a = 31.34, b = 12.12, c = 4.96, \b = 90_
a = 7.095, c = 6.190
a = 7.19, b = 4.40, c = 5.08, \b = 90_30'
a = 8.38, b = 13.81, c = 5.00
a = 7.35, b = 18.21, c = 7.10, \a = 85.52_, \b = 103.55_, \g = 100.62_

a = 6.23, c = 12.22
a=7.45, b=9.26, c=5.91
a = 4.98, c = 17.02

a = 7.32, c = 10.15
a = 16.19, b = 9.868, c = 7.157, \b = 99.2_
a = 10.41, b = 13.72, c = 6.82, \b = 99_6'

a=11.819
a = 20.088, b = 7.143, c = 6.564

a = 9.57, b = 12.65, c = 8.94
a = 10.06, b = 11.80, c = 8.24, \b = 107_18'
a = 4.45 kX, c = 10.89

a = 15.30, c = 10.20
a = 21.707, b = 6.098, c = 11.245, \b = 100.3_
a = 10.529, b = 8.48, c = 5.637, \b = 106.13_
a = 18.90, b = 7.25, c = 12.62, \b = 112.00_
a = 23.49, b = 6.164, c = 21.91, \b = 114.91_
a = 12.58-12.76, c = 5.11-5.20
a = 21.11
P2/m: a = 4.13, b = 4.10, c = 15.5, \b = 99_ C2/m: a = 7.07, b = 4.10, c = 15.5, \b = 99_
a = 10.67, c = 4.680
a = 19.62, b = 7.14, c = 9.81, \b = 120.00_
a = 13.60, c = 4.98

a = 18.59, b = 6.68, c = 11.32, \b = 91_41'
a=6.410, b=7.279, c=5.198
a = 9.513, b = 5.569, c = 9.296, \a = 96.08_, \b = 101.52_, \g = 89.45_

a = 9.346, c = 6.887
a = 9.419, c = 6.886
a = 13.178, c = 16.695
a = 12.576, b = 5.662, c = 9.994, \b = 115.56_
a = 9.48, b = 6.98, c = 9.30, \a = 91.14_, \b = 104.85_, \g = 90.0_
a = 12.12, c = 18.175
a=36.70, b=9.41, c=7.291, \b=101.1
a = 4.16
a = 12.25, b = 16.52, c = 7.64
a = 16.145, b = 22.517, c = 9.567
a = 10.47, b = 8.41, c = 6.91, \b = 103_40'
a = 5.34
a = 13.86, b = 20.13, c = 5.12
a=9.14, c=10.34
a = 9.477
a=11.48, b=13.17, c=6.87, \b=99.0
a = 5.668, b = 9.811, c = 7.527, \b = 104.52_
a = 9.791, b = 10.420, c = 7.076, \a = 98.91_, \b = 102.63_, \g = 84.17_
a = 5.71, b = 6.73, c = 5.41, \a = 96.83_, \b = 107.4_, \g = 104.6_
a = 4.738, c = 3.188
a = 3.55, c = 19.5
a = 7.40, c = 10.07
a = 5.535
a = 9.778, b = 13.678, c = 9.601
a=13.30, b=13.95, c=9.74
a = 21.4256, b = 5.0348, c = 13.2395, \b = 91.613_

a = 7.607, b = 9.441, c = 6.096
a=5.23, b=9.06, c=10.13, \b=100.9
a = 6.870, b = 8.371, c = 5.355
a = 8.627, b = 13.045, c = 14.408, \b = 115.2_
a = 5.42

a=10.779, c=38.061
a = 5.5330, c = 10.8266 (Tanco); a = 5.4871, c = 10.845 (Hugo)
a = 5.874, b = 8.700, c = 7.070, \b = 105.45_
a = 14.359, b = 14.687, c = 7.440, \a = 96.06_, \b = 93.19_, \g = 91.63_
a = 5.1726, b = 8.4800, c = 6.1302
a = 4.79, b = 5.43, c = 11.73
a = 9.442, c = 6.903
a = 8.624, b = 11.878, c = 5.872
a=5.41, b=11.74, c=21.16
a = 13.8, c = 15.0
a=16.346, b=42.602, c=8.534, \a=95.86, \b=86.91, \g=96.88

a = 6.12, b = 10.7, c = 5.97, \a = 97_35', \b = 107_10', \g = 77_33'
a = 4.999, c = 5.457 (at 575_C)
a = 17.090, b = 8.915, c = 10.221, \b = 95_53'
a = 15.235, b = 11.885, c = 13.496, \b = 116.35_
a = 6.69, b = 8.39, c = 4.82
a = 6.671, b = 9.193, c = 7.384
a = 13.72, b = 6.12, c = 9.70, \b = 91_18'
a=7.53, b=7.53, c=8.20, \a=90.0, \b=117.3, \g=120.0
a = 10.77, c = 57.5
a = 5.24, c = 10.30
a = 7.66 kX, b = 10.18, c = 7.88, \a = 112_29', \b = 115_18', \g = 69_00'
a = 6.008, b = 14.456, c = 3.784
a = 3.900, c = 13.05

a = 8.68, b = 8.68, c = 12.26
a=11.039
a = 5.373, b = 9.306, c = 14.222, \b = 97.88_
a = 10.499, c = 11.553
a = 4.945, c = 23.268
a = 8.948, c = 14.078

a=11.16, c=21.21
a = 31.82, b = 7.13, c = 22.10, \b = 94.25_
a = 7.61, c = 5.373
a = 13.69, b = 20.84, c = 8.26
a = 15.006, b = 5.189, c = 5.724
a = 5.791, b = 7.940, c = 7.967, \a = 112.02, \b = 97.73, \g = 100.45_
a = 6.717, b = 6.920, c = 6.434, \b = 103_50'
a = 5.70, b = 3.59, c = 6.00

a = 7.039, c = 6.272
a=5.29, b=9.182, c=20.023, \b=95.68
a = 13.47, b = 7.32, c = 6.95, \b = 107_25'
a=13.91, b=27.96, c =9.99
a=13.56, b=5.82, c=11.21. \b=100.45
a = 8.729, b = 31.326, c = 4.903
a=10.38, b=13.36, c=6.911 \b=90
a = 7.005 kX, c = 10.39
a = 21.1, b = 21.1, c = 6.87
a = 11.831, c = 11.910
Hexagonal: a = 9.634, c = 6.778   Monoclinic: a = 19.210, b = 6.785, c = 9.605, \b = 120_
a = 5.556
monoclinic a=9.483, b=5.487, c=18.187, \b=101.9; triclinic a=9.50, b=5.48, c=9.16, \a=96.88. \b=101.8, \g=90.03
a=5.29, c=15.46
a = 11.93, c = 14.79
a=22.98, b=3.32, c=7.32, \b=106
a = 7.730, b = 6.078, c = 16.292
a = 10.458, b = 5.750, c = 6.693, \b = 97.79_
a = 12.519

a = 7.87, b = 4.73, c = 10.27, \b = 109_02'
a = 6.113, b = 16.188, c = 6.111, \b = 96.71_
a = 7.242, c = 6.290
a = 16.11, c = 7.27
a = 8.344
a = 2.8839
a = 5.488, b = 9.423, c = 4.433

a = 7.69, b = 11.37, c = 6.59, \a = 115.2_, \b = 95.9_, \g = 94.1_
a=16.80
a = 16.80
a = 5.61, b = 15.14, c = 6.19, \b = 115.3_
a = 8.71, b = 5.08, c = 15.66, \b = 128.27_
a = 4.160, c = 9.540
a = 4.999, c = 5.457 (at 575_C)

a = 9.368, b = 9.150, c = 52.610, \a = 88. 15, \b = 90, \g = 118.36
a = 26.22, c = 21.56 (based on hexagonal pseudocell)
a = 6.671, c = 9.183
a = 6.147
a = 11.371
a = 2.463, c = 6.714
a = 5.195, b = 11.701, c = 5.092, \b = 89.62_
a = 8.177, b = 8.611, c = 6.290, \b = 97_16'
a ~ 5.3, b ~ 9.3, c ~ 14.3, \b ~ 97_
a = 5.313, b = 9.120, c = 14.637, \b = 93_10'
a = 12.48, b = 6.48, c = 7.27, \b = 99.03_
a = 9.6065, b = 8.8146, c = 5.1688, \b = 108.335_
a = 9.53, b = 9.21, c = 5.15, \b = 107_38'
a = 5.43, b = 15.94, c = 5.24, \b = 103_56'
a = 9.80, b = 17.83, c = 5.30, \b = 109.1
a = 13.71, b = 4.755, c = 10.29, \b = 100_50'
a = 9.874, b = 27.24, c = 5.316, \b = 109.47
a = 12.19, b = 10.95, c = 5.59, \b = ?
a = 7.303, b = 12.201, c = 14.715, \b = 91_56'
a = 17.627, b = 17.995, c = 7.399, \b = 116.00
a = 5.040, b = 5.862, c = 3.193, \b = 90.13
a = 10.513, b = 5.56, c = 27.61, \b = 94.00
a = 8.87-8.88, b = 5.59-5.61, c = 10.15-10.17, \b = 115_27'
a = 5.204, b = 9.026, c = 9.812, \b = 100_21'
a = 3.12, c = 37.4

a = 9.973

a = b = c = 5.582
a = 7.95, b = 15.83, c = 6.67, \a = 90.9, \b = 96.6, \g = 90.0
a = 7.640, b = 8.825, c = 6.516, \b = 98.60_
a = 8.292

a = 7.652, b = 10.153, c = 7.648, \a = 111.9, \b = 115.9, \g = 67.6
a = 7.17, b = 12.38, c = 7.17, \b = 120_
a = 6.92-6.94, c = 6.22-6.31
a = 5.06, b = 6.73, c = 4.51,
a = 8.743, b = 11.264, c = 6.102, \b = 110_7'
a = 5.734, b = 6.780, c = 5.441, \a = 97.29_, \b = 108.56_, \g = 107.28_
a = 6.448
a = 5.02, c = 9.67
a = 5.746, b = 14.308, c = 5.075
a = 10.629
a = 18.41, b = 21.64, c = 6.677
a = 10.480, c = 13.188
a = 3.038, c = 22.79
a = 7.16, b = 12.14, c = 14.88
a = 8.6225, c = 21.054
a = 7.382, b = 9.234, c = 5.815
a = 15.78, c = 9.10
a = 5.13, b = 8.93, c = 28.7, \b = 98_45'
a = 3.47, c = 6.10
a = 7227, b = 18.76, c = 7.379, \a = 91.46, \b = 102.18, \g = 98.95
a = 3.615
a = 10.922, c = 17.084
a = 8.94
a = 9.739, b = 17.08, c = 9.345
a = 5.098, c = 23.050
a = 7.22, c = 16.66
a = 10.88, b = 14.10, c = 7.11
a = 6.12, b = 6.251, c = 6.790, \a = 92.93_, \b = 111.30_, \g = 107.47_
a = 17.405, b = 5.784, c = 4.608, \b = 92.00_
a = 9.84, c = 2.85
a = 4.751, c = 12.97
a = 19.09, b = 23.89, c = 4.058
a = 3.603, b = 4.868, c = 4.838
a = 7.6222, b = 9.0448, c = 4.5348
a = 8.297
a = 3.802, c = 16.43
a = 11.27, b = 15.25, c = 12.61
a = 7.409, b = 9.881, c = 6.441, \a = 100_25', \b = 104_37', \g = 81_29'
Trigonal: a = 7.0062, c = 16.192   Triclinic: a = 7.010, b = 9.819, c = 9.697, \a = 103_10', \b = 91_14',   \g = 90_34'
a = 12.483, b = 21.375, c = 7.283 (Tiger)
a = 5.898, b = 2.884, c = 5.530, \b = 104_36'
a = 12.91, b = 8.58, c = 10.00, \b = 94.40_
a = 10.374, c = 20.756
a = 4.971, c = 6.918
a = 9.769, b = 18.048, c = 5.335, \b = 103.6_
a = 7.12, b = 7.44, c = 6.80, \a = 102.4_
a = 5.49, b = 9.52, c = 7.32, \b = 104_31'
a = 10.40, c = 3.93

a = 9.647, b = 17.905, c = 5.316, \b = 103_60
a = 5.40, b = 5.60, c = 7.78, \b = 90_11'   synthetic: a = 7.769, b = 5.593, c = 5.404, \b = 90.18_
a = 12.125
a = 8.395
a = 9.79, b = 2.88, c = 9.94, \b = 90.62_
a = 9.20, c = 9.73
a = 6.460, b = 11.110, c = 6.233
a = 15.10, c = 24.52
a = 9.534, b = 18.231, c = 5.3235, \b = 101.97
a = 6.95, b = 4.16, c = 10.04
a = 4.252
a = 17.65, b = 3.93, c = 15.24, \b = 100_30'
a = 7.34, b = 18.19, c = 7.28; \a = 93.85, \b = 101.5, \g = 99.33
a = 9.92
a = 13.45, b = 4.02, c = 33.06
a = 9.88
a = 7.30, c = 15.12
a = 7.052, b = 9.267, c = 6.655, \a = 109.23_, \b = 89.84_, \g = 110.01_
a = 8.369
a = 3.99, c = 6.09

a = 6.957, b = 12.55, c = 5.22, \b = 102_
a = 10.40, b = 8.45, c = 16.34
a = 12.67, b = 12.93, c = 8.38
a = 10.93, b = 10.57, c = 7.57, \b = 110.1_
a = 5.045, c = 14.63
a = 9.09, b = 12.14, c = 6.18, \b = 105.5_

a = 11.82, b = 10.80, c = 9.64
a = 10.16, b = 12.61, c = 2.90
a = 11.73, b = 5.79, c = 5.80, \a = 90.0_, \b = 92.38_, \g = 93.87_
a = 5.334, c = 7.705
a = 7.334, c = 19.368
a = 18.03, b = 7.52, c = 10.20, \b = 104_46
a = 19.05, b = 4.11, c = 17.33, \b = 96_20
a = 7.51, b = 7.73, c = 7.00, \a = 106_, \b = 113.5_, \g = 99.5_
a = 8.20 - 8.15
a = 7.7615
a = 8.048, b = 8.763, c = 7.731
a = 9.561, b = 18.28, c = 5.348, \b = 102.09_
a = 5.93, b = 16.23, c = 3.67
a = 10.058, c = 9.225
a = 10.32, c = 14.39
a = 10.564, b = 6.913, c = 5.1890

a = 4.84, b = 7.60, c = 9.62, \b = 90_09'
a = 3.85 kX, c = 7.40
a = 9.966
a = 7.14, b = 7.53, c = 6.93, \a = 103.35_, \b = 114.48_, \g = 93.80_

a = 10.37, c = 20.87
a = 9.550, b = 5.767, c = 12.077, \b = 108.1_
a = 12.70, c = 5.33
a = 6.73, b = 10.36, c = 5.575
a = 10.786, b = 18.88, c = 9.564, \b = 107_45
a = 17.860, b = 22.775, c = 3.658
a = 3.04, c = 17.12
a = 13.06 (or 6.53), b = 24.65, c = 7.04
a = 17.170, b = 7.081, c = 14.644, \b = 102_29'

a = 12.048
a = 11.90, b = 10.02, c = 5.63, \a = 90_11', \b = 100_01', \g = 91_49'
a = 30.92, b = 7.20, c = 18.27, \b = 95_
a = 8.82, c = 13.04
a = 7.160, b = 14.347, c = 4.970, \b = 104.61_
a = 5.570, b = 19.088, c = 5.965
a = 6.833, b = 12.932, c = 9.638, \b = 99.53_
a = 3.114, c = 23.39
a = 7.607, b = 9.446, c = 6.074
a = 8.56, c = 10.76
a = 20.867, b = 6.135, c = 22.187, \b = 102.73_
a = 16.05, b = 17.50, c = 13.64
a = 5.870, c = 5.494
a = 9.475, b = 9.600, c = 7.320, \a = 98.7, \b = 107.8, \g = 64.8
a = 3.567
a = 15.86, b = 32.29, c = 5.90
a = 4.40, b = 9.39, c = 2.84
a = 16.70, b = 9.95, c = 24.69, \b = 104_41
a = 5.15, b = 8.95, c = 14.42, \b = 96.8_
a = 10.16, b = 7.30, c = 14.03, \b = 106_32'
Cubic: a = 5.54   Hexagonal: a = 3.919, c = 48.00
a = 11.24, b = 9.90, c = 6.56
a = 9.761, b = 8.926, c = 5.258, \b = 105.8_
a = 14.570, b = 7.780
a = 5.606, b = 8.758, c = 4.788
a = 8.233, c = 37.49
a = 10.41
a = 26.90, b = 15.72, c = 13.57
a = 9.335, b = 6.312, c = 7.628, \b = 122_17.5'
a = 4.8112, c = 16.02
a = 19.64, b = 2.99, c = 4.83, \b = 103.9_
a = 9.611
a = 8.342, c = 8.305
a = 9.000, b = 8.999, c = 6.793, \a = 102.77_, \b = 116.28_, \g = 59.99_
a = 18.384, b = 8.878, c = 5.226
a = 10.34, b = 16.82, c = 6.01
a:b:c = 0.737:1:0.504 \b = 104_50
a = 8.36, c = 5.07

a = 5.002, b = 5.175, c = 4.980, \a = 97.50_, \b = 118.60_, \g = 104.74_
a = 15.947, c = 7.194
a = 9.27, b = 16.83, c = 5.63
a = 7.303, c = 6.458
a = 11.100, b = 7.976, c = 4.644, \b = 90.60_
a = 3.286 - 3.287, c = 12.899 - 12.929
a = 25.84, b = 5.126, c = 13.78, \b = 111.2
a = 8.41, b = 25.85, c = 7.88, \b = 90.5_
a = 7.81, b = 9.19, c = 6.08
a = 8.472, c = 5.208
a = 7.49, b = 9.66, c = 5.87
a = 8.16, b = 16.73, c = 7.02, \b = 110.00_
a = 11.79, b = 20.209, c = 4.7015
a = 9.05, b = 16.35, c = 5.61
a = 6.579, b = 8.523, c = 7.048, \b = 115.47_
a = 3.576, b = 6.759, c = 10.074
a = 7.4244, c = 17.494
a = 8.80, b = 3.95, c = 5.96, \b = 90.67_
a = 6.839, b = 7.582, c = 7.474, \b = 117.85_

a = 3.008, b = 4.828, c = 5.214
a = 7.958
a = 15.892, b = 7.721, c = 7.438, \b = 101.32_
a = 30.94, b = 5.93, c = 10.56, \b = 93.74_
a = 9.910, b = 9.669, c = 5.455, \b = 93.95_
a = 10.80, c = 25.62
a = 9.672, b = 17.892, c = 5.284, \b = 103.2
a = 54.76, b = 4.030, c = 22.75
a = 9.837, b = 17.9554, c = 5.307, \b = 105.18
Orthorhombic: a = 9.523, b = 9.644, c = 6.506   Tetragonal: a = 9.581, c = 6.526
a = 554, b = 13.72, c = 25.00, \b = 93.95
a = 16.036
a = 7.32, b = 7.54, c = 12.42, \a = 91.19_, \b = 99.94_, \g = 98.64_
a = 10.137, c = 14.223
a = 4.9423, b = 16.396
a = 7.483, c = 14.893
a = 11.86, c = 23.88
a = 15.843, c = 7.102
a = 12.324, c = 9.647
a = 8.1220
a = 7.297, b = 14.302, c = 7.032
a = 14.248, b = 5.768, c = 7.309, \b = 100_26'
a - 9.755, b = 5.636, c = 7.135, \b = 103.08_

a = 7.874, b = 8.018, c = 7.567, \a = 95.6_, \b = 94.3_, \g = 84.7_
a = 6.125, b = 14.512, c = 3.890
a = 8.90, b = 20.07, c = 4.62
a = 6.46, b = 7.43, c = 6.18
a = 5.2, b = 8.9, c = 10.1, \b = 92_18'

a = 10.45, b = 13.49, c = 6.93, \b = 90_
a = 5.120, b = 8.853, c = 19.303, \b = 95.08_
a = 12.66, b = 7.34, c = 13.48
a = 8.90, b = 5.63, c = 10.20, \b = 115.4_
a = 9.089 - 9.102, b = 17.741 - 17.802, c = 10.205 - 10.242, \b = 124.55_ - 124.68_
\b = 74_42'
a = 11.94 kX, b = 12.03, c = 6.865
a = 10.693, b = 9.115, c = 5.507, \b = 92_10'
a = 8.58, b = 8.65, c = 12.17
a = 20.42, b = 7.03, c = 5.34, \b = 95.5_
a = 7.38, b = 8.04, c = 3.72
a = 13.20, c = 15.07
a = 23.20, b = 9.20, c = 13.18
a = 5.6196
a = 13.92, b = 10.497, c = 6.969, \b = 90_37
a = 5.975
a = 10.118, b = 13.433, c = 4.762, \b = 101.90_
a = 13.75, b = 9.924, c = 6.93
a = 5.53
a = 13.459, b = 30.194, c = 4.100, \b = 93.35
a = 4.958, c = 13.60
a = 17.63, b = 8.27, c = 30.52, \b = 90_

a = 9.79, b = 8.822, c = 5.37, \b = 105.81
a = 22.46, c = 21.44
a = 4.105, b = 4.070, c = 6.310

a = 10.07, b = 10.52, c = 6.11
a = 4.763, b = 14.29, c = 4.618, \b = 100.3_
a = 13.48, c = 9.001
a = 14.34, c = 30.21
a = 12.64, b = 7.38, c = 14.02, \b = 103.7_

a = 10.27
a = 5.520, b = 14.57, c = 5.166

a = 8.57, b = 8.77, c = 6.27
a = 7.59, b = 4.98, c = 33.8, \b = 92.25
a = 5.284, c =12.78
a = 6.99, c = 16.70
a = 8.598, b = 9.570, c = 6.576, \a = 102.75_, \b = 107.50_, \g = 71.50_
a = 6.58, b = 9.68, c = 20.52, \b = 90.25
a = 6.593, b = 10.488, c = 6.365, \b = 113.38_
a = 9.43, b = 16.00
a = 7.81, b = 7.11, c = 6.96, \a = 117.20_, \b = 93.78_, \g = 93.40_
a = 5.272, c = 13.280
a = 5.78, b = 6.57, c = 5.48, \a = 102.1_, \b = 108.7_, \g = 90.09_
a = 13.5, b = 26.9, c = 5.24

a = 5.3853, c = 10.7483
a = 7.60, b = 8.23, c = 5.08, \b = 94.06_
a = 24.65
a = 7.44, b = 9.89, c = 7.67, \a = 107.2_, \b = 115.6_, \g = 69.65_
a = 4.817, b = 10.477, c = 6.105
a = 9.676, b = 16.706, c = 13.233, \a = 93.35, \b = 114.96, \g = 90.03
a = 8.96, b = 13.15, c = 8.15
a = 8.20, b = 9.97, c = 6.97, \a = 98_58, \b = 114_47, \g = 105_02
a = 4.730, b = 5.703, c = 4.952, \b = 90-90.17_
a = 2.69, c = 5.08
a = 7.74, c = 11.34
a = 5.19, b = 11.34, c = 5.48, \b = 95.57
a = 5.07, b = 5.62, c = 5.41, \b = 93.0
a = 5.292, b = 10.94, c = 5.069, \b = 94.60
a = 9.55, c = 6.98
a = 2.93, c= 4.60
a = 8.294, b = 6.722, c = 11.198, \a = 106.16_, \b = 92.94_, \g = 99.20_
a = 5.402, b = 9.237, c = 10.306, \b = 99_16
a = 7.394, b = 18.36, c = 7.324, \a = 93.8, \b = 18.36, \g = 98.9
a = 16.20, c = 7.47
a = 14.14, b = 19.12, c = 7.48
a = 5.08, c = 9.4

a = 8.997, b = 6.236, c = 7.390, \b = 115.74_

a = 15.57, c = 8.67
a = 5.9160, b = 10.026, c = 4.7956
a = 10.28, c = 7.28
a = 9.912, b = 18.171, c = 5.278. \b = 104.98

a = 10.89, b = 12.54, c = 6.46, \b = 97.55

a = 8.957, b = 9.218, c = 7.163, \a = 102.70_, \b = 98.03_, \g = 88.03_
a = 7.854, b = 7.862, c = 7.253, \a = 103.48_, \b = 117.23_, \g = 88.69_
a = 13.763, b = 20.162, c = 5.115
a = 5.746, b = 14.308, c = 5.075
a = 18.526, b = 17.948, c = 5.317,
a = 9.543, b = 17.726, c = 5.302, \b = 103.72
a = 10.08, b = 7.28, c = 24.59
a = 9.96, b = 18.19, c = 5.32, \b = 104.87_
a = 3.871, c = 3.635
a = 9.95, b = 18.14, c = 5.33. \b = 105.3
a = 9.982, b = 18.223, c = 5.298, \b = 103.73
a = 4.8001, b = 5.776, c = 3.5850
a = 10.23, b = 9.77, c = 7.37, \a = 8.965, \b = 1.682, \g = 1.723
a = 5.73, b = 14.24, c = 5.08

a = 13.962

a = 11.868, b = 12.382, c = 6.354, \b = 114.52
a = 6.82, b = 6.25, c = 6.77
a = 4.48
a = 7.210, b = 7.213, c = 20.451, \a = 95.15, \b = 95.60, \g = 89.04
a = 5.718, b = 14.91, c = 5.221
a = 24.12, c = 7.63
a = 16.59, b = 8.00, c = 7.19, \b = 102.2_
a = 15.282, c = 43.507
a = 8.1576, b = 8.2691, c = 8.0437, \a = 107.144_, \b = 91.389_, \g = 106.441_
a = 10.23, c = 7.00
a = 9.967
a = 13.167, b = 19.246, c = 8.700, \a = 90.4_
a = 18.60, b = 23.00, c = 10.86
a = 8.89, c = 10.86
a = 9.520
a = 9.55, b = 13.11, c = 5.35
a = 6.974, c = 16.36
a = 6.987, c = 16.248
a = 8.459, b = 7.613, c = 6.98, \a = 82.21_, \b = 98.25_, \g = 95.86_
a = 8.546, b = 11.222, c = 21.158
a = 8.924, c = 3.115
a = 7.12, c = 7.28
a = 4.135, c = 7.295
a = 9.368, c = 6.884
a = 8.963, c = 15.804
a = 9.53, c = 6.91
a = 5.462
a = 9.270, b = 21.324, c = 5.190

a = 7.76, c = 11.32
a = 7.91, b = 5.91, c = 17.46
a = 4.756, b = 10.195, c = 5.981
a = 10.406, b = 3.661, c = 7.034, \b = 107.07_
a = 14.00, b = 16.47, c = 14.39
a = 5.372, b = 9.246, c = 7.273, \b = 103_33
a = 10.41, b = 8.51, c = 16.76
a = 8.148, c = 4.804
a = 46.9, b = 5.82, c = 17.3, \a = 90.00_, \b = 94.68_, \g = 90.00_
a = 8.71, c = 82.50
a = 22. 22, b = 12.857, c = 6.359, \b = 92.24
a = 6.1964
a = 8.403 (variable)
a = 7.354, b = 15.07, c = 7.055, \b = 96.41_
a = 12.884, c = 26.50
a = 3.61, c = 5.28
a = 9.18, b = 12.555, c = 2.954
a = 13.569, b = 20.085, c = 7.463, \b = 105.75
a = 10.47
a = 7.53, b = 12.79, c = 5.95, \b = 92.23_

a = 8.5291, c = 5.2110
a = 12.305, b = 3.822, c = 6.500, \b = 107.3_
a = 23.33, b = 13.396, c = 7.447, \b = 105.08
a = 33.84, b = 11.65, c = 4.01
a = 10.59, b = 8.25, c= 15.54
a = 5.28, b = 6.26, c = 3.85
a = 13.810, b = 16.968, c = 5.182
a = 12.75, b = 4.29, c = 5.67, \b = 102_52'
a = 5.48, b = 3.78, c = 23.42
a = 5.58
a = 16.90, b = 11.69, c = 13.39, \b = 94.72_
a = 17.87, b = 14.18, c = 12.18, \a = 67.8, \b = 77.5, \g = 79.9
a = 20.025, b = 3.963, c = 9.705, \b = 101.57
a = 7.86, b = 5.98, c = 8.62
a = 4.82, b = 7.58, c = 10.01, \b = 90.47_
a = 9.89, b = 7.55, c = 4.66, \b = 90.61_

a = 5.99, c = 3.53
a = 13.79, b = 13.68, c = 9.837
a = 8.062
a = 11.740, b = 12.820, c = 6.691
a = 6.567, c = 17.119
a = 5.90, b = 7.61, c = 5.57, \a = 111_40', \b = 70_50', \g = 119_25'
a = 8.271
a = 12.197, c = 13.955
a = 5.936
a = 11.65, b = 14.49, c = 4.08
a = 10365
a = 5.35, c = 10.48
a = 9.15, b = 6.17, c = 7.88, \b = 122.7
a = 9.82, c = 10.13
a = 16.60, b = 27.04, c = 50.34, \b = 94.10
a = 11.439, b = 14.093, c = 3.754
a = 14.639, b = 8.466, c = 13.438, \b = 114.21_
a = 5.454, b = 7.664, c = 5.685, \a = 98.0_, \b = 110.0_, \g = 111.1_
a = 9.452, b = 9.890, c = 8.198
a = 4.621, c = 14.93
a = 9.097, b = 5.693, c = 18.002
a = 6.907, b = 5.095, c = 10.764, \b = 91_03'
a = 10.6, c = 5.90
a = 11.589, b = 7.779, c = 11.207, \b = 102.00_

a = 6.724, b = 11.20, c = 34.19, \b = 85.2_
a = 18.594, b = 17.890, c = 5.304
a = 5.410
a = 10.889
a = 7.690, c = 5.067
a = 5.086, c = 14.093
a = 7.736, c = 24.161

a = 8.1206
a = 8.963, b = 31.93, c = 8.50, \b = 118.02_
a = 11.836, b = 12.940, c = 6.735

a = 13.803, b = 7.910, c = 10.812, \b = 102.68_
a = 5.592, b = 6.075, c = 13.812
a = 10.5862
a = 5.719

a = 8.185, b = 18.65, c = 6.25
a = 11.87, b = 9.03, c = 10.14, \b = 116.2_
a = 6.44
a = 9.5215
a = 8.624, b = 5.060, c = 9.700, \b = 94_34'
a = 34.51, b = 38.18, c = 4.080, \b ~ 90_
a = 13.38, b = 19.16, c = 9.026, \b 'sensibly' 90_
a = 7.5164, c = 16.0768
a = 10.365, b = 26.582, c = 5.162
a = 13.375, b = 14.368, c = 12.261, \b = 101.2_
a = 10.578
a = 6.241, b = 5.686, c = 8.719, \b = 91_41'
a = 10.02, b = 10.63, c = 9.83, \b = 92.7_
a = 6.878, b = 8.674, c = 4.697, \b = 101.74_
a = 12.850, c = 42.22
a = 11.486, b = 4.003, c = 33.531
a = 10.129, b = 8.306, c = 8.533, \b = 112_11'
a = 4.92, b = 11.14, c = 6.50
a = 6.63, b = 28.33, c = 5.63
a = 3.057, c =32.52 (hexagonal pseudocell)
a = 5.234, b = 9.066, c = 10.16, \b = 100.5
a = 9.541, b = 17.740, c = 5.295, \b = 103_40'
a = 9.34, b = 11.93, c = 3.07, \b = 90.00_
a = 12.675, b = 5.406, c = 9.984, \b = 129.45_
a = 13.72, c = 9.95
a = 9.80, b = 10.15, c = 10.10
a = 9.180, b = 11.263, c = 9.457
a = 8.45, b = 5.74, c = 7.26, \b = 113.7_
a = 4.596, b = 9.957, c = 3.021
a = 4.0781
a = 10.01
a = 10.45, b = 10.53, c = 9.15, \b = 101_49'
a = 12.011
a = 13.38, b = 13.38, c = 6.66
a = 9.46, b = 28.8, c = 5.47
a = 7.52, b = 17.56, c = 7.35, \b = 105.71_
Trigonal: a = 7.02, c = 16.87   Monoclinic: a = 12.1892, b = 7.0306, c = 7.0364, \b = 125.3_
a = 5.24, b = 10.49, c = 6.96, \a = 107.4_, \b = 111.1_, \g = 72.37_
a = 17.48, b = 6.83, c = 18.23, \b = 113.3_
a = 11.77, b = 5.11, c = 13.57, \a = 90_45', \b = 99_15', \g = 90_05'

a = 14.958, b = 7.900, c = 24.10
a = 11.799, b = 12.050, c = 6.822
a = 9.65, b = 7.32, c = 5.74, \a = 90.00, \b = 101.3, \g =101.1
a = 13.472, c = 5.902
a = 11.03, b = 16.40, c = 6.577, \b = 90_56'
a = 7.0218, c = 16.597
a = 6.805, b = 25.613, c = 5.780
a = 8.87, b = 11.57, c = 6.17, \b = 99.12
a = 10.34, b = 10.98, c = 5.76
a = 17.545, b = 3.60, c = 12.41, \b = 95.15
a = 2.45, c = 6.69
a = 17.701, c = 7.792

a = 5.56, b = 9.60, c = 7.21
a = 4.142, c = 6.724
a = 9.876
a = 2.973, c = 13.392
a = 9.30, c = 8.26
a = 12.205
a = 12.913, b = 13.48, c = 12.076
a = 11.851
a = 4.56, b = 10.70, c = 2.85
a = 9.57, b = 18.22, c = 5.33, \b = 102.1_
a = 13.90, c = 9.432
a = 11.32, b = 11.48, c = 4.17
a = 16.510, b = 11.277, c = 3.645, \b = 96.8_
a = 10.02, b = 5.94, c = 6.74, \b = 90.00_
a = 17.63, b = 6.734, c = 23.47, \b = 90.6_
a = 20.095, b = 7.946, c = 8.763, \b = 101_12'
a = 7.43, c = 5.024
a = 9.786, b = 7.134, c = 7.263, \b = 105.28_
a = 7.25, b = 16.85, c = 7.08
a = 7.56, b = 7.586, c = 6.954, \b = 115_56'
a = 5.670
a = 13.548, b = 19.449, c = 4.105
a = 4.857, b = 4.295, c = 2.958
a = 6.286, b = 15.213, c = 5.678, \b = 114.1_
a = 9.72, c = 132.8

a = 5.04, b = 8.50, c = 7.25
a = 3.64, c = 34.02
a = 6.5725, c = 5.9632
a = 10.93, b = 12.59, c = 6.52, \b = 97.98
a = 12.17, b = 2.99, c = 4.83, \b = 98.25_
a = 6.94, b = 16.15, c = 7.94
a = 15.4, b = 7.05, c = 7.10, \b = 107_52'
a = 10.88
a = 5.6387
a = 7.123, b = 10.469, c = 6.844, \a = 100.6_, \b = 94.8_, \g = 91.26_

a = 5.14, b = 8.90, c = 7.25, \b = 90.0_
a = 20.519, b = 24.297, c = 6.181, \b = 100.9_
a = 13.25, b = 7.60, c = 13.20, \b = 92.2_
a = 9.76, b = 12.23, c = 4.43
a = 11.219, b = 11.447, c =3.991
a = 9.03, b = 5.62, c = 10.29, \b = 115.9
a = 10.47, c = 21.20
a = 7.70, b = 11.51, c = 6.70, \a = 76.0_, \b = 99.8_, \g = 115.8_
a = 7.001, b = 14.67, c = 5.324
a = 7.823, c = 5.013
a = 18.131, \a = 33.46
a = 9.87, b = 14.14, c = 8.71, \b = 124.8_
a = 13.90, b = 13.62, c = 9.68
a = 9.112, b = 5.541, c = 7.343
a = 9.912; b = 18.030, c = 5.296, \b = 103.946
a = 3.60, b = 4.84, c = 5.72
a = 8.038, b = 9.167, c = 7.807, \a = 105.23_, \b = 113.62_, \g = 64.82_
a = 7.150, c = 25.560
a = 7.29, c = 5.40
a = 9.17, c = 30.21
a = 6.10
a = 5.7621, c = 9.4696
a = 9.13
a = 5.818
a = 10.55
a = b = 10.71, c = 31.56
a = 5.741, c = 7.139
a = 5.25, b = 9.18, c = 16.0, \b = 99_
a = 9.827, b = 8.994, c = 5.261, \b = 105.52_
a = 4.47, c = 119.0
a = 10.140, c = 7.185
a = 5.97 b = 3.42, c = 11.4, \b = 90.2
a = 10.21, b = 7.84, c = 18.79, \b = 93.33_
a = 7.13, c = 20.56
a = 9.21, c = 9.17 (values depend on chemical composition)
a = 10.823, b = 10.783, c = 25.580
a = 18.99, b = 4.715, c = 10.30, \b = 111.4
a = 10.770, b = 7.299, c = 18.681, \b = 94.00_
a = 5.63, b = 7.760, c = 5.60, \a = 94.7_, \b = 110.7_, \g = 112.7_
a = 8.294
a = 5.0317, c = 13.737
a = 8.275, c = 36.60
a = 3.92, c = 15.31
a = 9.497, b = 11.443, c = 10.841, \a = 120.50_, \b = 92.10_, \g = 55.84_
a = 8.370, b = 10.719, c = 5.120
a = 10.82
a = 12.40, b = 18.92, c = 10.77
a = 5.34, b = 9.524, c = 10.235, \b = 100.07
a = 5.761, b = 7.9774, c = 5.6488, \a = 109.611_, \b = 91.473_, \g = 83.686_

a = 12.39, c = 11.91
a = 12.20
a = 6.984, b = 7.786, c = 7.266, b = 117.68_
a = 8.136
a = 9.789, b = 7.661, c = 4.804, \b = 90.02_
a = 13.799, c = 15.102
a = 4.33, b = 11.18, c = 3.98
a = 8.13, b = 4.48, c = 8.09, \b = 112.9_
a = 5.74, c = 9.15
a = 2.849, c = 13.130
a = 13.628, b = 11.943, c = 21.285, \b = 90.92_
a = 5.824, b = 9.823, c = 4.786
a = 17.73, b = 17.82, c = 7.43, \b = 116_20'
a = 12.250, b = 3.497, c = 11.174, \b = 97.25_
a = 24.442, b = 7.216, c = 10.119, \b = 98.28_
a = 8.006, b = 6.649, c = 8.012, \b = 104.21_
a = 3.98, c = 5.35
a = 8.910, b = 6.017, c = 7.734, \b = 111.88_
a = 13.705, b = 31.194, c = 4.121
a = 5.564, c = 21.892
a = 7.04, c = 16.99
a = 8.184
a = 10.556, c = 15.851
a = 11.438, b = 11.318, c = 6.318, \b = 90.06_
a = 16.60, b = 7.26, c = 11.85, \b = 90_
a = 9.861, b = 7.605, c = 4.720, \b = 89.65_
a = 9.888, b = 7.607, c = 4.740, \b = 90.45_
a = 6.99, c = 16.8
a = 10.93, b = 10.31, c = 7.33, \a = 90.32, \b = 109.03, \g = 90.08
a = 5.40, b = 9.03, c = 14.99, \b = 98.32_
a = 5.74, c = 10.96
a = 11.764, b = 5.318, c = 8.182, \b = 95.42_
a = 27.21, b = 3.93, c = 17.58, \b = 92_09'
a = 15.81, b = 3.967, c = 7.876, \b = 102.67
18R: a = 5.738, c = 83.36, 5H: a = 5.718, c = 23.02
a = 9.05, b = 10.88, c = 7.17, \a = 90.15_, \b = 90.58_, \g = 107.00_
a = 11.99, b = 31.46, c = 8.697
a = 10.026, b = 2.878, c = 9.729, \b = 91.03
a = 5.769
a = 18.30, b = 17.69, c = 5.30
a = 11.188, c = 4.9751
a = 11.905, b = 20.355, c = 4.690
a = 9.67, b = 7.57, c = 4.74, \b = 90_22'
a = 4.293
a = 10.51, c = 4.59
a = 10.597, b = 18.318, c = 5.031
a = 10.26, b = 13.44, c = 4.74, \b = 104.9_
a = 11.23, b = 11.66, c = 10.55, \a = 112.32, \b = 107_32, \g = 64 _27
a = 10.17, b = 9.72, c = 9.56, \a = 91.3, \b = 70.7, \g = 109.0

a = 12.78, b = 9.33, c = 8.60, \b = 104.83_
a = 12.897
a = 5.1, c = 19.6
a = 4.829, b = 5.759, c = 4.998, \b = 91.16_
a = 8.13, b = 17.27, c = 7.01, \b = 109.0_
a = 10.695, b = 3.102, c = 5.431, \b = 94.21_
a = 10.900, c = 24.410
a = 9.921, b = 5.556, c = 9.707, \b = 104.5_
a = 10.243, b = 20.72, c = 4.735
a = 10.81, b = 11.01, c = 8.85, \a = 106.1_, \b = 107.8_\g = 65.67_
a = 8.811, b = 10.644, c = 7.888, \a = 103.38_, \b = 108.58_, \g = 97.15_
a = 9.5027, c = 7.8212
a = 17.618, b = 9.1172, c = 9.482, \b = 96.58_
a = 8.299, b = 8.782, c = 7.798, \b = 90.5_
a = 10.78, b = 35.28, c = 8.14
a = 6.80, b = 6.96, c = 6.54, \b = 104.99_
a = 8.52, b = 12.95, c = 7.14, \b = 116_
a = 11.310, b = 10.955, c = 10.317, \a = 90.43, \b = 90.02, \g = 90.16
a = 11.86, b = 11.98, c = 5.42, \a = 103.42, \b = 95.15, \g = 112.2
a = 11.769, b = 6.684, c = 8.235, \b = 102.59_
a = 9.6, b = 11.4, c = 16.84, \b = 111.0
a = 5.24, c = 23.74
a = 22.783, b = 8.745, c = 17.066, \b = 96.705_
a = 9.755, b = 10.407, c = 5.632, \a = 95.695_, \b = 92.273_, \g = 115.643_
a =11.85-12.16
a = 5.735, c = 9.005
a = 3.087, c = 23.05
a = 10.11, b = 8.94, c = 8.38, \b = 114.58_
a = 11.834, b = 7.029, c = 5.9524, \b = 100.47_

a = 7.3559, c = 17.009
a = 6.24 kX, b = 6.43, c = 4.20
a = 7.89, c = 9.01

a = 6.13, c = 46.15
a = 7.45, b = 6.92, c = 3.72, \b = 90.5_
a =12.063
a = 8.978, c = 15.83
a = 9.418, c = 6.884
a = 7.23, c =9.98
a = 9.491, c = 6.921
a = 9.802, b = 7.761, c = 4.829, \b = 90.01_
a = 13.479, b = 6.320, c = 5.368, \b = 95.6_
a = 7.01, c = 14.13
a = 11.52, b = 7.15, c = 30.3
a = 4.51, c = 7.35
a = 3.777, c = 11.18
a = 8.07, b = 6.42, c = 27.75
a = 6.573, b = 6.651, c = 6.454, \a = 116.44_, \b = 92.34_, \g = 95.63_

a = 8.87, b = 8.23, c = 11.02, \b = 110.2_
a = 4.15, c = 39.19
a = 6.02, b = 13.76, c = 8.01, \b = 90.8_
a = 10.80, c = 20.31
a = 5.19, b = 9.00, c = 20.16, \b = 95.18
a = 23, b = 24.4, c = 37 (approximately)
a = 5.083, c = 14.04
a = 4.606, c = 2.982
a = 8.78, b = 12.99, c = 5.85
a = 7.426, b = 10.546, c = 10.331
Synthetic: a = 3.937, c = 5.354
a = 8.755, b = 24.425, c = 5.739, \b = 108.28_
a = 4.039, b = 8.0052, c = 6.580
a = 7.03, c = 16.44
Triclinic with alternating pseudotetragonal and pseudohexagonal layers
a = 19.11, b = 7.46, c = 12.22, \b = 90_48'
a = 12.12, b = 13.18, c = 6.83, \b = 104_49'
a = 9.812, c = 9.351
a = 10.62
a = 3.25, c = 4.95
a = 8.889, b = 9.247, c = 11.975, \a = 88.15_, \b = 132.07_, \g = 96.64_
a = 4.248, c = 23.22
a = 5.38, b = 7.14, c = 14.76, \a = 99, \b = 95, \g = 90
a = 6.625
a = 10.63, b = 12.06, c = 8.405, \b = 114.0_
a = 4.5922, c = 7.510
a = 3.119, c = 24.25
a = 11.6369, c = 30.158
a = 10.02, b = 9.54, c = 9.89, \a = 104.5, \b = 66.00, \g = 108.5

a = 7.61, c = 14.77
a = 5.777
a = 16.73, b = 9.48, c = 10.84, \b = 97.15
a = 6.05, b = 6.06, c = 6.18, \b = 113.17
a = 3.8394
a = 2.719, c = 4.276
a = 8.58, b = 12.87, c = 7.48, \b = 107.7_
a = 2.866
a = 6.231, c = 36.77
a = 3.858
a = 6.52, b = 8.75, c = 7.51, \b = 121_28'
a = 12.283
a = 8.47, b = 5.38, c = 6.94
a =8.519, c = 8.540

a = 5.731, b = 4.742, c = 5.152
a = 33.88, b = 38.02, c = 4.070
a = 8.499
a = 9.418, b = 8.562, c = 5.219, \b = 107.56_

a = 8.528, c = 33.33
a = 6.049, b = 6.964, c = 4.971, \a = 116.51_, \b = 86.06_, \g = 112.59_

a = 14.94, b = 7.14, c = 9.93, \b = 110.68
a = 8.633, c = 11.743
a = 3.07, c = 23.3
a = 5.622, b = 9.593, c = 10.279, \a = 109.80_, \b = 90.54_, \g = 97.69_
a = 15.65, b = 19.03, c = 4.03, \b = 91_48'
a = 9.324, b = 14.05, c = 7.956
a = 10.668, b = 9.787, c = 13.931, \b = 107.82_
a = 15.942, b = 10.821, c = 7.241, \b = 101.86_
a = 6.56, b = 25.20, c = 10.00
a = 7.20, c = 17.00
a = 11.331, b = 19.871, c = 4.100
a = 10.461, c = 8.813
a = c = 7.648
a = 14.90, b = 14.90, c = 40.41
a = 10.593, b = 7.284, c = 10.839, \a = 99.67_, \b = 97.65_, \g = 110.11_
a = 15.543, b = 3.8368, c = 9.123, \b = 99.25_
a = 8.5591, c = 8.1814
a = 4.85, b = 10.70, c = 28.17
a = 9.853, b = 9.042, c = 5.312, \b = 106.62
a = 5.640, b = 8.715, c = 4.637
a = 18.626, b = 27.230, c = 5.297
a = 10.732, b = 13.847, c = 20.817, \b =95.3
a = 10.3594
a = 10.516, b - 9.686, c = 11.833 \b = 109.67
a = 9.88, b = 17.87, c = 5.227, \b = 105.40
a = 7.968, b = 11.724, c = 4.374
a = 8.92, b = 9.59, c = 6.84
\a = 110, \b = 111.59, \g = 100.18
a = 9.978, b = 9.156, c = 5.293, \b = 105.48_
a = 11.870, b = 12.755, c = 6.770, \b = 113.42_
a = 9.70, c = 6.93
a = 15.00, c = 42.75
a = 7.516, b = 10.023, c = 6.502
a = 6.37, b = 10.77, c = 6.13, \a = 98_46', \b = 109_58', \g = 77_50'
a = 8.16, b = 10.35, c = 6.32
a = 13.730, b = 25.904, c = 10.608
a = 8.87, b = 31.65, c = 8.30, \b = 118_6'

a = 4.25, c = 39.77
a = 4.34, c = 40.83
a = 11.06, c = 10.50

a = 19.433, b = 6.081, c = 8.922, \b = 97.60
a = 19.0, c = 5.47
a = 11.98, b = 20.37, c = 9.95
a = 6.309, b = 12.503, c = 8.549
a = 26.66, b = 4.06, c = 17.03, \b = 127.20_

a = 8.3913, b = 12.4846, c = 8.1545, \b = 101.90_
a = 15.363, b = 19.844, c = 4.736, \b = 91.77_
a = 9.83, b = 17.99, c = 5.30, \b = 105.1_

a = 14.30, c = 21.97
a = 19.72, b = 16.23, c = 9.53, \b = 94.92_
a = 13.02 , b = 14.32, c = 6.75
a = 9.851, c = 13.060
a = 18.93, b = 8.62, c = 14.97, \b = 99.9_
a = 15.11, b = 5.67, c = 3.71, \b = 103.8_
a = 9.997
a = 26.930, c = 8.522
a = 10.56-10.59
a = 5.45, c = 20.7
a = 5.159, c = 8.703
a = 8.603
a = 8.850, c = 8.770
a = 10.340, c = 6.097
a = 10.98, b = 15.96, c = 9.068
\a = 95.1, \b = 96.1, \g = 80.0
a = 7.282, b = 20.507, c = 4.959
a = 18.803, b = 17.490, c = 7.633, \b = 92.71
a = 9.739, b = 8.939, c = 5.260, \b = 108.56
a = 7.953, b = 8.038, c = 5.619
a = 43.53, b = 9.259, c = 7.263, \b = 91_8'
a = 4.99, c = 13.98
a = 27.91, b = 6.53, c = 7.20

a = 5.617, b = 23.02, c = 9.079, \b = 101_23'

a = 8.450, b = 6.001, c = 6.145
a = 13.31, b = 7.02, c = 6.72, \b = 104.7_
a = 9.02, b = 9.56, c = 5.26
a = 12.358
a = 5.617, b = 23.02, c = 7.079, \b = 101.23
a = 4.24, c = 29.66
a = 10.18, c = 13.06
a = 15.02, b = 7.19, c = 19.74, \b = 110.30

a = 11.45, c = 11.40

a = 6.840, b = 8.916, c = 4.745, \b = 102.11_
a = 6.66, b = 8.33, c = 5.42
\a = 92.45, \b = 94.13, \g = 72.20
a = 5.438, c = 14.04
a = 23.50, b = 13.62, c = 10.31, \b = 97.01
a = 7.072, c = 16.51
a = 6.49, b = 9.52, c = 7.12
a = 9.77, b = 9.95, c = 3.73

a = 7.006, b = 11.071, c = 9.980
a = 7.79, b = 19.72, c = 6.91, \b = 95.54
a = 10.84, b = 4.07, c = 10.25, \a = 90.00_, \b = 101.53_, \g = 90.00_
a = 7.016, b = 9.152, c = 15.678, \b = 108.88_
a = 5.50, b = 7.04, c = 8.48
a = 5.44, c = 10.88
a = 3.79, c = 13.59
a = 11.65, b = 12.68, c = 6.87, \b = 98.95
a = 4.319
a - 10.65, c = 6.58
a = 6.07, c = 4.89
a = 19.22, b = 11.10, c = 14.10, \b = 116.50_
a = 5.740, b = 9.983, c = 23.960
a = 10.856
a = 20.61, b = 5.15, c = 13.75, \b = 112.64_
a = 6.90, b = 7.71, c = 7.54, \b = 116.17_
a = 11.42, b = 5.09, c = 21.95
a = 6.807, b = 15.459, c = 6.811, \b = 97.76_
a = 3.812
a = 9.2545, b = 23.9760, c = 6.0433
a = 12.46
a = 9.15, b = 10.00, c = 7.24, \a = 98.6_, \b = 93.6_, \g = 93.2_
a = 10.029, b = 24.46, c = 6.258, \b = 91.16
a = 9.419, c = 7.665
a = 6.990, b = 12.890, c = 5.654, \b = 96.08_
a = 5.345, b = 9.250, c = 10.25, \b = 99.99
a = 12.197, b = 9.156, c = 10.667, \b = 99.77
a = 8.69, b = 26.06
a = 6.4413, b = 11.1586, c = 4.8753
a = 3.716, c = 5.126
a = 6.498, c = 22.78
a = 15.88, b = 17.24, c = 13.76
a = 22.70, b = 7.611, c = 3.765, \b = 91.32_
a = 11.279, b = 14.909, c = 5.7648
a = 2.8542, c = 4.5857
a = 6.290, b = 7.194, c = 9.762, \b = 110.20_

a = 13.56, c = 11.13
a = 3.938, c = 17.25
a = 11.65
a = 7.356, b = 20.950, c = 10.194
a = 5.753, b = 14.758, c = 4.985
a =22.62, b = 34.08, c = 4.02
a = 5.502, b = 16.213, c = 5.483

a = 18.073, b = 6.949, c = 11.440, \b = 107_43'
a = 10.17, b = 7.15, c = 6.34, \b = 102_45'
a = 5.93, b = 3.25, c = 3.89
a = 8.92, b = 10.22, c = 5.44

a = 17.86, b = 19.66, c = 11.11, \b = 96
a = 18.59, b = 8.789, c = 12.04
a = 9.50, b = 12.15, c = 3.189
\a = 93.32, \b = 90.74, \g = 91.47
a = 9.418
a = 21.20, b = 14.00, c = 17.19
a = 7.024, c = 16.48

a = 5.784, b = 24.026, c = 8.066, \b = 95.37_
a = 7.948, b = 15.829, c = 6.668
\a = 90.86, \b = 96.56, \g = 90.05
a = 14.29, b = 20.10, c = 5.45, \b = 97.02_
a = 15.999, b = 13.707, c = 6.7037
a = 8.64, b = 6.25, c = 7.42, \a = 101.4, \b = 103.9, \g = 72.7
a = 9.574, b = 8.712, c = 5.265, \b = 107.49_
a = 16.50, b = 8.84, c = 4.42
a = 13.171, b = 11.717, c = 6.565, \b = 105.26_
a = 5.398, b = 8.416, c = 4.497
a = 10.241, b = 13.405, c = 4.757, \b = 105.21_
a = 4.19, c = 5.67
a = 11.51, c = 14.54
a = 4.74, b= 12.90, c = 10.35, \b = 102.00
a = 9.91, b = 18.11, c = 5.30, \b = 104.6
a = 8.22, c = 43.88
a = 8.514, b = 5.744, c = 18.52
a = 7.920, b = 5.146, c = 9.014, \b = 102.76_
a = 8.460, b = 10.622, c = 7.837, \b = 94.53_
a = 8.012, b = 15.956, c = 6.80, \b = 96.60_
a = 9.803, b = 13.657, c = 7.028
a = 16.54, b = 8.82, c = 4.46
a = 19.48, b = 29.18, c = 10.25, \b = 103_
a = 5.800, b = 12.651, c = 5.512, \b = 108.45_
a = 4.003, b = 11.20, c = 11.560
a = 6.056
a = 5.794
a = 9.404, b = 9.973, c = 8.536
a = 5.598, b = 6.121, c = 23. 762, \b = 95.55_
a = 9.031, b = 12.119, c = 4.936
\a = 90, \b = 100.23, \g = 90
a = 5.32, b = 9.20, c = 23.88, \b = 97
a = 4.89, b = 5.96, c = 3.67
a = 9.466, b = 8.394, c = 5.221, \b = 110.17_

a = 5.445, c = 10.75
a = 5.1, b = 8.9, c = 5.3
a = 11.15, b = 36.4, c = 5.55,
a = 8.344, b = 10.590, c = 6.43, \a = 99.0_, \b = 108.9_, \g = 105.5_
a = 11.76
a = 4.85, c = 16.34
a = 8.40

a = 10.213, b = 15.878, c = 9.058
a = 7.112, b = 7.844, c = 5.574, \a = 90.12_, \b = 101.1_, \g = 105.9_
a = 33.80, b = 4.578, c = 19.99, \b = 93.40_
a = 8.176, b = 12.865, c = 7.102, \a = 93_27.1', \b = 116_2.9', \g = 90_30.6'
a = 15.57, b = 13.75, c = 14.27, \b = 116_55'
a = 6.414, b = 8.207, c = 6.885, \b = 115.47_
a = 7.732, b = 11.285, c = 6.643, \b = 115.16_
a = 4.805, b = 10.189, c = 5.801, \b ~ 90_
a = 4.225, c = 39.93
a = 5.080, b = 11.616, c = 5.391, \b = 111.71_
Named after Prof. Arthur Leonard Parsons, Toronto, Canada.
a = 13.746, b = 5.6964, c = 7.066, \b = 115.79_
a = 10.366, c = 20.77
a = 9.43, b = 10.17, c = 8.47
a = 9.9211
a = 3.538, b = 5.127
a = 6.02, b = 11.2, c = 7.12
a = 6.84, c = 28.01
a = 12.48, b = 7.55, c = 7.34, \b = 101_46'
a = 9.482, b = 16.938, c = 8.965
a = 9.504, b = 16.943, c = 8.937
a = 9.476, b = 16.940, c = 8.942
a = 11.86, b = 9.756, c = 4.265, \b = 90.17_
a = 7.422, b = 12.508, c = 4.900
a = 7.27, b = 14.38, c = 22.25
a = 11.63, b = 7.15, c = 9.447, \b = 96.75_
a = 5.48, b = 6.76, c = 9.28, 94_33'
a = 22.15, b = 24.03, c = 11.67
a = 8.244, b = 18.963, c = 5.06
a 12.06, b = 5.08, c = 10.81, \b = 106.0
a = 5.448, b = 7.777, c = 5.553
a = 13.95, b = 30.77, c = 5.16
a = 5.28, b = 10.66, c = 7.14, \a = 107.9_, \b = 110.9_, \g = 71.12_
a = 14.90, b = 13.17, c = 7.55, \b = 11_30'
a = 42.58, b = 4.015, c = 32.16, \b = 102_01'
a = 7.1, b = 9.7, c = 4.05
a = 5.60
a = 7.280, b = 11.304, c = 7.148, \b = 106.36_
a = 3.79, b = 5.43, c = 11.42
a = 9.815, b = 40.394, c = 9.990
a = 3.5775, c = 17.52
a = 10.50, b = 9.64, c = 16.41, \b = 95.21_
a = 8.795, b 5.847, c = 13.142
a = 21.80, b = 12.64, c = 8.40
a = 7.1526, b = 7.2780, c = 7.2334, \b = 120.54_
a = 9.09
a = 4.9496
a = 3.545, c = 4.525
a = 9.08, b = 20.76, c = 11.56, \b = 90.27

a = 8.24, b = 12.85, c = 6.24
a = 12.80, b = 7.94, c = 10.22, \b = 104.2_
a = 14.352, c = 4.852
a = 11.67, b = 16.52, c = 7.49
a = 17.645, b = 5.019, c = 4.547, \b = 90.98_
a = 10.48, b = 16.20, c = 9.07, \b = 105.33_
a = 34.82, b = 11.49, c = 36.72, \b = 94_19'

a = 11.78, b = 9.52, c = 9.88, \b = 95.29_
a = 16.23, b = 38.78, c = 11.73
a = 3.86, b = 12.50, c = 3.06
(1M): a = 5.3, b = 9.2, c = 10.2, \b = 100_
a = 5.87, b = 10.17, c = 8.27, \a = 101.1_, \b = 111.1_, \g = 89.9_
a = 13.09, c = 13.75
a = 7.38, b = 9.96, c = 7.38
a = 10.842, b = 4.826, c = 11.324, \b = 103.93_
a = 9.782, b = 9.658, c = 9.751, \b = 102.24_
a = 9.781, b = 16.854, c = 7.208, \b = 93.27_
a = 13.386, c = 23.0
a = 10.29
a = 6.36, c = 4.01
a = 6.111, b = 4.946, c = 4.706
a = 8.10, b = 8.445, c = 5.91
a =15.847, c = 7.1080
a = 4.725, b = 10.118, c = 5.908
a = 16.703, b = 17.513, c = 13.741
a = 5.828, b = 6.769, c = 21.690
a = 13.522, b = 20.608, c = 4.112
a = 4.797
a = 9.6913, b = 5.6503, c = 4.6873, \b = 102.66_
a = 5.613, b = 14.03, c = 5.405, \b = 98_23'
a = 1.037, c = 1.052
a = 11.57, b = 56.07, c = 4.01
a = 9.401
a = 12.842, c = 16.091
a = 7.40, c = 12.81
a = 12.665, b = 7.575, c = 9.896, \b = 91.25_
a = 3.986, c = 5.011
a = 6.108, b = 10.459, c = 4.732
a = 5.06, b = 2.91, c = 9.55, \b = 100_30'
a = 6.1155, b = 5.2340, c = 4.8452
a = 7.444, b = 5.044, c = 15.255, \b = 107.18_
a = 15.197, b = 10.233, c = 8.435, \b = 90.21_
a = 9.80, b = 8.01, c = 6.97, \a = 114.12_, \b = 99.52_, \g = 105.59_
a = 8.43, b = 70.70, c = 7.91, \b = 90_
a = 30.25, b = 3.98, c = 21.60, \b = 104_10'
(1T): a = 5.31, b = 9.20, c = 7.31, \b = 90_
a = 39.35, b = 6.104, c = 9.26
a = 5.25, b = 5.92, c = 2.85

a = 5.40, b = 7.03, c = 14.3, \a = 100_, \b = 96_, \g = 90_
a = 12.302
a = 2.52, c = 4.12
a = 3.8861
a = 7.50, b = 13.40, c = 7.38, \a = 98_00', \b = 90_51', \g = 96_13'

a = 12.29, b = 11.34, c = 6.14, \b = 104.6_
(synthetic): a = 14.492, b = 8.699, c = 5.233
a = 5.50, b = 22.9, c = 5.49
a = 16.23, b = 5.51, c = 14.95, \b = 95.4
a = 9.066, b = 6.276, c = 7.408, \b = 116.16

a = 38.789, b = 6.776, c = 7.012
a = 10.337, c = 20.677
a = 10.18, c = 13.10
a = 18.866, c = 13.434
a = 7.85, b = 20.06, c = 14.72, \b = 90.78_
a = 10.562, b = 4.6520, c = 9.325, \b = 100.52_
a = 10.41, b = 11.95, c = 9.86, \a = 113.9_, \b = 99.7_, \g = 82.7_
a = 9.26, b = 12.26, c = 3.05
a = 5.51, b = 5.53, c = 15.50
a = 14.743, b = 5.093, c = 5.598, \b = 101_49'
a = 14.95, b = 18.71, c = 6.96
a = 10.10, b = 7.62, c = 9.81, \b = 97_24'

a = 5.290, c = 10.465
a = 11.56, c = 11.11
a = 10.54, b = 9.90, c = 7.14, \b = 108.12
a = 5.038, b = 9.726, c = 36.342, \b = 92_
a = 14.06, b = 23.52, c = 13.08
a = 3.889, c = 4.209
a = 8.929, b = 6.045, c = 10.905, \b = 119.10.
a = 15.127, c = 22.471
a = 11.704, c = 14.885
a = 3.676, c = 5.032
a = 10.37, b = 23.10, c = 9.25
a = 20.81, b = 5.84, c = 9.26, \b = 91_48'
a = 27.2, b = 34.1, c = 4.06
a = 12.620, c = 15.573
a = 8.339
a = 18.010, b = 18.610, c = 5.240
a = 9.796, b = 17.932, c = 5.289, \b = 104.99_
a = 8.933, b = 9.155, c = 7.121, \a = 102.59_, \b = 98.28_, \g = 88.09_
a = 9.43, b = 5.44, c = 9.13, \a = 96.4, \b = 101.1, \g = 90.0
a = 8.277
a = 7.33 kX, b = 18.15, c = 7.27, \a = 93_51', \b = 101_30', \g = 99_23'
a = 9.583, b = 18.091, c = 5.315, \b = 102.6_
a = 8.366

a = 9.887, b = 18.174, c = 5.308, \b = 105.00_
a = 9.801, b = 17.988, c = 5.235, \b = 104.984_
a = 9.964, b = 18.008, c = 5.354, \b = 105.55
a = 4.579, c = 14.845
a = 10.43, b = 23.00, c = 5.35, \b = 102
a =23.02, b= 3.303, c = 7.346, \b = 106.22

a = 8.374
a = 5.88, c = 23.02
a = 11.92, b = 12.77, c = 9.66, \b = 107.18
a = 5.02, b = 14.17, c = 5.64
a = 16.05
a = 6.066, c = 7.20
a = 11.524
a = 7.3881, b = 18.094, c = 9.5234, \b = 90.64_
a = 10.01, c = 3.28
a = 9.48, b = 12.03, c = 3.21, \b = 98_
a = 6.030
a = 7.149, b = 8.906, c = 6.667, \b = 113.3_
a = 7.958
a = 8.86, c = 5.04
a = 14.15, b = 6.50, c = 11.06, \b = 105.60_
a = 18.89, b = 7.22, c = 11.31, \b = 112.43_
a = 5.23, b = 8.92, c = 14.11, \b = 97_45'
a = 6.12, c = 15.324
a = 16.78, b = 7.86, c = 9.96, \b = 98.3_
a = 16.38, b = 12.48, c = 10.01, \b = 115.4_
a = 11.451, c = 7.252
a = 8.978, b = 9.190, c = 7.161, \a = 102.74_, \b = 98.20_, \g = 88.26_
a = 6.91, b = 11.72, c = 6.78, \a = 90.37, \b = 93.75, \g = 104.80
a = 12.52
a = 10.38, b = 28.09, c = 4.774, \b = 105.7_
a = 10.73
a = 4.815, b = 10.580, c = 21.448
a = 8.94, b = 5.28, c = 5.74, \b = 90_
a = 8.47
a = 5.767, b = 14.434, c = 5.085
a = 10.014
a = 4.436
a = 8.72, b = 18.85, c = 6.06
a = 5.772, b = 14.465, c = 5.097
a = 4.762, c = 9.272
a = 13.36, c = 7.16
a = 9.916, c = 2.864
a = 14.356, c = 5.911
a = 10.08, b = 9.76, c = 8.72
a = 10.409, b = 20.330, c = 12.312
a = 11.425, b = 11.296, c = 8.667, \b = 107_44'
a = 4.436, b = 5.414, c = 3.381

a = 10.514, b = 8.425, c = 7.25, \b = 106.01
a = 5.118, b = 8.799, c = 19.159, \b = 95.15_
a = 6.768, b = 9.575, c = 6.718, \a = 110.36_, \b = 102.98_, \g = 83.02_
a = 12.075, c = 7.516
a = 6.867, b = 8.989, c = 5.045
a = 9.71, b = 10.03, c = 3.16
a = 7.291, b = 12.68, c = 5.998, \b = 91.22_
a = 6.047 kX
a = 7.70, b = 12.03, c = 6.78, \a = 85.26_, \b = 94.10_, \g = 111.04_
a = 16.40, b = 17.20, c = 6.98
a = 7.782, b = 5.993, c = 10.636
a = 6.689
a = 5.459, b = 4.723, c = 5.859
a = 5.253, b = 9.085, c = 10.107, \b = 100.15
a = 13.98, b = 14.20, c = 12.11
a = 1.035, c = 2.052
a = 8.12, c = 19.02
a = 4.1104, c = 7.2325
a = 3.8, c = 9.4
a = 5.31, b = 6.31, c = 3.89
a = 8.213, b = 7.812, c = 7.805, \b = 120.04_
a = 20.4, b = 16.7, c = 10.6, \b = 98.2_
a = 6.868, c = 21.80
a = 9.052, b = 6.277, c = 7.580, \b = 114.57_

a = 11.982
a = 18.392, c = 7.646
a = 10.71, b = 8.865, c = 17.145, \b = 95.37
a = 11.543, c = 35.556
a = 2.997, c = 17.188
a = 13.498, c = 85.657
a = 8.22, c = 205.5
a = 9.398, b = 12.011, c = 3.379, \b = 93.28_

a = 9.174, c = 19.154
a = 14.043, b = 15.677, c = 7.803
a = 13.50, b = 14.10, c = 6.95, \a = 90_, \b = 92_, \g = 119_
a = 6.712, b = 28.948, c = 7.578, \b = 95.4
a = 12.26, c = 7.61
a = 9.35, c = 6.88
Supercell: a = 26.79, c = 13.395   Subcell: a = 13.395
a = 5.226, c = 14.325
a = 6.97, b = 11.0, c = 9.83
a = 9.595, b = 9.693, c = 7.461
a = 6.357, b = 16.868, c = 6.274, \a = 90.04_, \b = 101.60_, \g = 93.20_
a = 14.07, b = 6.50, c = 11.04, \b = 105_34'
a = 10.60, c = 9.90
a = 21.91, c = 23.20
a = 3.842, c = 5.266

a = 9.548, b = 10.847, c = 6.380
a = 9.52, b = 11.95, c = 5.87

a = 21.75, b = 9.108, c = 8.298, \b = 92.47_
a = 11.343, b = 24.028, c = 4.126
a = 9.794, b = 18.96, c = 8.401
a = 3.457, c = 6.664
a = 4.036, c = 5.132
a = 14.116, b = 14.229, c = 9.946
a = 10.16, c = 14.32
a = 15.04, c = 22.41
a = 7.601, c = 42.904
a = 13.254, b = 5.293, c = 9.328, \b = 91.90_
a = 56.7, b = 6.55, c = 18.48, \b = 90_
a = 5.8, b = 6.6, c = 5.5, \a = 102_, \b = 109_, \g = 90_
a = 7.930, b = 16.879, c = 7.353, \b = 106.74_
a = 6.993, c = 8.891
a = 6.972, c = 8.47
a = 9.855, b = 9.756, c = 16.84, \b = 90.60_
a = 7.14, c = 17.00
a = 8.89
a = 5.853
a = 7.343, b = 8.382, c = 5.117, \a = 119.65_, \b = 90.27_, \g = 102.82_
related to those of haiweeite
a = 7.07, c = 17.74
a = 12.15, b = 3.607, c = 18.44, \b = 118.03_
a = 7.18, c = 8.58

a = 7.96, b = 9.44, c = 4.72, \a = 95.6, \b = 97.0, \g = 107.8
a = 7.16, c = 17.20
a = 7.16, c = 8.58
a = 6.215, b = 7.065, c = 7.769, \a = 92.920_, \b = 96.650_, \g = 105.78_
a = 11.4, b = 14.9, c = 9.2, \b = 101.0_
a = 13.99, b = 16.72, c = 14.73
a = 7.357, b = 16.002, c = 7.102

a = 6.51, b = 8.78, c = 4.21
a = 17.099, b = 12.694, c = 8.282, \b = 95_55'
a = 6.96, c = 8.62
a = 10.54, b = 8.49, c = 17.34
a = 14.07, b = 41.31, c = 43.33
a = 34.18, b = 33.88, c = 14.074
a = 10.46, b = 8.44, c = 10.43, \a = 75.88, \b = 102.83, \g = 90.00
a = 5.1820, b = 9.5115, c = 8.4516, \b = 90.40_
a = 10.248, b = 9.586, c = 6.962, \b = 97.87_
a = 7.81, b = 9.08, c = 4.65, \a = 94.77, \b = 97.15, \g = 107.37
a = 9.575, c = 18.17
a = 9.718, b = 18.266, c = 4.965
a = 7.10, c = 17.42

a = 6.617, b = 8.323, c = 6.494, \a = 90.55_, \b = 102.28_, \g = 87.2_

a = 5.530
a = 13.20, b = 4.40, c = 12.86, \b = 98_37.5'
a = 6.646
a = 8.5784, b = 12.960, c = 7.2112, \a = 89.70_, \b = 115.97_, \g = 90.87_
a = 10.41
a = 22.08, c = 5.33
a = 6.504
a = 10.854, b = 11.985, c = 3.871
a = 10.45, c = 13.88
a = 9.591, c = 3.145
a = 7.00, c = 19.07
a = 8.055, c = 21.191
a = 10.24, b = 20.48, c = 7.45, \b = 120_

a = 9.833, b = 7.562, c = 4.702, \b = 90.46_
a = 12.947, b = 9.748, c = 7.005, \b = 110.93_
a = 9.77, c = 33.01

a = 8.824, c = 6.654
a = 5.623, b = 9.419, c = 9.624, \a = 85.21_, \b = 95.64_, \g = 90.00_
a = 4.8183, c = 16.0295
a = 9.337, b = 9.740, c = 5.522
a = 12.82, b = 10.35, c = 11.48, \b = 107.66_
a : b : c = 3.2196 : 1 : 2.1842, \b = 102_05'
a = 10.099, b = 15.996, c = 7.367, \a = 96.40_, \b = 111.07_, \g = 76.65_
a = 17.52, b = 19.35, c = 11.25, \b = 95.92_
a = 7.45, c = 7.88
a = 13.63, c = 5.90
a = 7.810, b = 7.070, c = 13.836, \b = 93.62_
a = 3.458, b = 5.869, c = 5.292
a = 6.64, b = 11.51, c = 19.93, \a = 90_, \b = 109_45', \g = 90_
a = 6.237, b = 12.613, c = 9.292, \b = 106_53'
2H: a = 3.081, c = 5.031   6H (syn.): a = 3.073, c = 15.08   5H: a = 3.03, \g = 12.37

a = 3.15, c = 12.30
a = 3.954, b = 13.808, c = 3.690
a = 8.100, b = 5.946, c = 17.65, \b = 109.17
a = 6.86, b = 5.48, c = 4.50, \b = 112.7_
c/a = 0.549
a = 5.92 kX, c = 17.26

a = 6.761, b = 6.966, c = 6.473, \b = 103.58_
a = 6.84, b = 7.07, c = 6.45, \b = 103.85

a = 4.049, c = 5.288
a = 6.90, b = 7.00, c = 6.65, \a = 96_21', \b = 91_16', \g = 76_6'
a = 7.00, c = 29.00
a = 10.47

a = 10.566, c = 7.573

a = 12.10, b = 13.46, c = 10.80, \a = 104_30.5', \b = 97_34.5', \g = 107_53.5'
a = 5.310, b = 9.20, c = 10.175. \b = 99.9
a - 5.178, b = 7.123, c = 5.053, \a = 112.03, \b = 97.9, \g = 67.81
a = 4.689

a = 9.512, b = 23.956, c = 9.617, \b = 93.85_

a = 10.023, b = 24.121, c = 6.243, \b = 91.55_
a = 4.815, b = 11.08, c = 6.37
a = 5.17, b = 8.94, c = 9.95, \b = 99_54'
a = 4.82, b = 9.48, c = 2.93

a = 6.613, b = 3.513, c = 5.504
a = 10.581, c = 5.371
a = 5.35, b = 5.63, c = 2.56
a = 11.147, b = 20.350, c = 8.202, \b = 92.69
a = 10.04, b = 7.234, c = 24.30, \b = 98.34
a = 7.994, c = 7.859
a = 8.55, b = 36.90, c = 7.13, \b = 97.68_
a = 18.114, b = 20.514, c = 7.527
a = 23.41, b = 21.44, c = 18.34, \b = 92.0_
a = 10.169, c = 7.315
a = 11.86, b = 12.08, c = 6.81
a = 9.454, b = 10.692, c = 5.444, \b = 105.46_
a = 10.61
a = 18.41, b = 5.64, c = 7.43, \b = 93
a = 10.1
a = 9.524
a = 7.685, b = 9.301, c = 6.02
a = 9.336, c = 44.72
a = 5.55, b = 7.66, c = 5.56, \a = 111.02_, \b = 112.12_, \g = 94.15_
a = 13.51, b = 13.10, c = 13.51, \b = 104_
a = 10.698, c = 22.545
a = 24.426, b = 7.185, c = 9.895, \b = 102.17_
a = 9.080, b = 12.222, c = 8.911
a = 9.065, b = 6.340, c = 21.239, \b = 101.57_
a = 6.93, b = 11.16, c = 10.54
a = 13.942, c = 5.590
a = 8.90, b = 5.61, c = 10.15, \b = 115.50_
a = 7.5456, b = 7.6898, c = 2.8842
a = 17.08, b = 30.98, c = 13.76
a = 8.643, b = 8.184, c = 6.411, \b = 98.0_
a = 10.4330, b = 15.7220, c = 7.4809
a = 14.863
a = 9.224

a = 3.88, c = 13.10

a = 5.19, b = 9.04, c = 20.08, \b = 95_30'

a = 5.675, c = 41.096
a = 7.735 (Zn>Fe); a = 7.705 (Fe>Zn)
a = 3.07, c = 4.6

a = 10.711
a = 10.644, b = 24.423, c = 7.098
a = 8.909, b = 5.146, c = 15.697, \b = 113.70_
a = 5.60, b = 5.44, c = 12.22
a = 13.937, b = 12.122, c = 7.116
a = 5.38, c = 7.10
a = 4.14, c = 30.15
a = 7.475, b = 9.686, c = 3.481, \b = 93.38_
a = 5.463, b = 6.82, c = 5.75, \b = 122.05_
a = 14.585, b = 11.47, c = 16.22
a = 7.621, b = 11.761, c = 6.731, \a = 92.77_, \b = 95.08_, \g = 106.87_
a = 11.864, b = 3.696, c = 7.419, \b = 109_42'
a = 8.29, c = 10.50
a = 10.24, c = 25.76
a = 5.418
a = 10.74, c = 7.90
a = 11.998, b = 6.529, c = 11.163
a = 9.94, c = 13.08
a = 10.559
a = 9.58, b = 8.72, c = 5.27, \b = 107.16_
a = 7.69
a = 6.50, c = 5.07

a = 6.977, c = 16.74
a = 8.875, b = 8.881, c = 15.79
a = 10.502
a = 8.33, b = 6.16, c = 7.44, \b = 112.9_
a = 25.83, b = 5.150, c = 13.722, \b = 111.32

a = 7.18 kX, c = 16.30
a = 18.295, b = 18.615, c = 6.603
a = 5.18, b = 7.11, c = 5.03, \a = 11.02, \b = 97.49, \g = 68.07
a = 12.57, b = 9.01, c = 13.47, \b = 121_26'
a = 7.620, b = 11.762, c = 6.737, \a = 92.81_, \b = 94.55_, \g = 106.87_
a = 10.53, b = 5.00, c = 6.29
a = 27.79
a = 12.30, b = 4.88, c = 8.27, \b = 104.23'
a = 10.819, b = 6.239, c = 12.781
a = 15.039, b = 7.991, c = 10.487, \b =113.7
a = 4.336, b = 7.067, c = 7.753
a = 17.43, b = 3.65, c = 12.25, \b = 97_30'
a = 6.537, b = 10.239, c = 5.582, \a = 96.20_, \b = 89.39_, \g = 97.74_

a = 5.401, b = 11.647, c = 16.484, \a = 134.99_, \b = 90.04_, \g = 89.96_
a = 5.363, b = 7.676, c = 5.503
a = 7.588, b = 9.793, c = 7.339, \a = 111.77_, \b = 103.50_, \g = 86.53_
a = 10.73
a = 23.24, b = 13.418, c = 7.282, \b = 105.21
a = 9.464, c = 18.854
a = 7.048, b = 14.198, c = 7.148
a = 10.237, c = 8.508
a = 5.31, b = 9.19, c = 14.50
a = 16.46, b = 12.50, c = 10.01, \b = 115.4_
a = 12.00, b = 5.39, c = 7.68, \b = 90.45_
a = 4.197, c = 22.80
a = 10.215, b = 10.681, c = 10.014
a = 37.5, b = 4.07, c = 41.6, \b = 96.8_
a = 5.68, b = 8.78, c = 4.88
a = 3.602, c = 5.009
a = 3.524
a = 9.21, b = 12.46, c = 12.50, \b = 106.52
a = 8.2

a = 10.175, b = 8.860, c = 17.174, \b = 95.95
a = 10.318, b = 7.077, c = 6.623, \b = 122.37_
a = 10.87, b = 8.07, c = 5.46, \b = 100.72_

a = 9.84, b = 7.17, c = 24.0, \b = 97.5_
a = 13.089, b = 9.498, c = 13.566, \b = 119.58_
a = 5.72, c = 13.86
a = 4.111, c = 5.446
a = 5.20, b = 9.214, c = 14.302, \b = 97.10
a = 6.78, b = 12.10, c = 6.38

a = 5.396, b = 11.085, c = 7.585
a = 5.391, b = 11.88, c = 11.66
\a = 113.1, \b = 94.5, \g = 103.1
a = 10.83, b = 10.42, c = 7.38, \b = 109_40'
a = 5.16, b = 6.30, c = 3.84
a = 22.58, b = 5.027, c = 10.514, \b = 99_20'
(synthetic): a = 5.414, b = 9.164, c = 6.431
a = 5.07, c = 16.81, \a = 47_15'
a = 8.1184
a = 14.477, b = 9.160, c = 6.285, \b = 98.42_
a = 6.194, b = 12.71, c = 6.600, \b = 93_
a = 14.56, b = 8.016, c = 9.838, \b = 111.8_
a = 5.846, c = 9.254
a = 5.23, b = 9.11, c = 15-15.5
a = 8.72, b = 4.70, c = 10.20, \b = 90_
a = 4.853, c = 15.920

a = 14.27, b = 5.16, c = 19.45
a = 6.148, b = 6.936, c = 5.074, \a = 95.76_, \b = 99.06_, \g = 83.30_

a = 17.97, b = 4.11, c = 17.62, \b = 94.30_
a = 5.02, c = 16.75
a = 13.98
a = 9.05
a = 7.11, c = 20.06
a = 9.99, c = 14.03
a = 13.44, c = 9.17
a = 9.65, c = 4.43
a = 14.61, b = 21.38, c = 4.03
a = 3.782, c = 11.187
a = 9.236, b = 12.001, c = 3.091, \b = 90.48_
a = 5.044, b = 8.809, c = 12.743
a = 12.11, b = 12.44, c = 6.79, \b = 112.87
a = 12.249, b = 15.113, c = 6.868 \a = 116.45, \b = 98.58, \g = 85.82
a = 15.406, b = 14.846, c = 11.056
a = 13.291, c = 7.582

a = 10.979, b = 7.799, c = 7.818, \b = 100.90
a = 10.247, b = 9.665, c = 5.569, \b = 94_22'
a = 10.72, c = 27.05
a = 9.84, b = 7.20, c = 21.33, \a = 90_, \b = 103.9_, \g = 111.5_
a = 5.686
a = 5.558, c = 7.037
a = 8.163, b = 12.875, c = 7.107, \a = 93.39_, \b = 116.27_, \g = 90.29_
a = 8.22, b = 8.64, c = 5.95
a = 4.756, b = 10.195, c = 5.981
a = 7.512, b = 10.000, c = 6.492
a = 8.42, b = 10.96, c = 7.00
a = 10.154, b = 14.819, c = 10.143
a = 5.409, b = 6.617, c = 3.021
a = 9.585, b = 8.776, c = 5.260, \b = 106.85_
a = 19.047, b = 4.0530, c = 10.318, \b = 110.25_
a = 4.999, c = 5.457 (at 575_C)
a = 10.42, b = 10.60, c = 14.43

a = 4.652, c = 9.230
a = 8.183, c = 4.756
a = 6.083, c = 7.130
a = 3.695, c = 6.16
a = 6.08, b = 9.04, c = 19.14
a = 7.00, c = 16.72
a = 11.46, b = 9.59, c = 4.24, \b = 90.45_
a = 7.37, b = 11.67, c = 6.33

a = 8.56, b = 13.00, c = 7.19, \b = 116_
a = 20.30, b = 6.986, c = 5.387
a = 10.48, b = 9.66, c = 22.26
a = 18.357, b = 12.591, c = 6.068
a = 7.05, c = 17.25

a = 5.933, b = 5.916, c = 6.009, \b = 112.35_
a = 4.235
a = 3.88
a = 2.7341, c = 4.3197
a = 10.155, c = 14.284
a = 10.117; c = 14.255
a = 4.912, c = 16.199
a = 6.945, b = 6.58, c = 9.279, \a = 102.94, \b = 103.05, \g = 9.279
a = 8.864, b = 14.020, c = 3.747
a = 9.505, b = 5.484, c = 18.214, \b = 101_46
a = 10.18, b = 27.4, c = 3.22
a = 12.74, b = 17.55, c = 7.050
a = 14.78, b = 18.78, c = 7.14
a = 22.82, b = 27.20, c = 8.19
a = 8.035, b = 10.31, c = 3.801
a = 11.25, b = 7.25, c = 20.46
a = 5.372, b = 3.975, c = 11.41, \b = 89.71
a = 6.706, c = 9.829
a = 12.12 kX, b = 10.39, c = 15.68
a = 28.44, b = 3.95, c = 17.55, \b = 106.1_
a = 13.781
a = 8.755, c = 8.491
a = 6.784, c = 14.80
a = 7.315, b = 15.849, c = 11.556
a = 3.8824
a = 9.25, b = 8.47, c = 10.44, \b = 94.0_
a = 7.504, b = 18.884, c = 6.841
a = 10.606
a = 5.4950, c = 20.849
a = 12.7, b = 17.9, c = 5.2, \b = 95_
a = 6.535, b = 8.753, c = 6.919, \g = 112.33_
a = 10.224, b = 14.715, c = 26.258, \b = 91.5
a = 8.11, b = 5.65, c = 4.324
a = 12.91, b = 11.48, c = 4.69, \b = 100.6_
a = 7.4290, c = 18.505
a = 7.38, b = 20.13, c = 7.22
a = 8.58, b = 9.583, c = 9.08, \b = 90_
a = 10.930, c = 51.300
a = 5.764, b = 5.952, c = 11.635
a = 5.830, b = 6.711, c = 5.648, \a = 104.73_, \b = 92.26_, \g = 76.81_
a = 7.252, b = 4.172, c = 4.431, \b = 123.13_
a = 5.13, b = 8.89, c = 19.32, \b = 95_
a = 4.125, c = 28.56
a = 6.31, b = 6.484, c = 17.50, \a = 84.0_, \b = 79.6_, \g = 60.9_
a = 5.755, b = 7.547, c = 5.278, \a = 93.35_, \b = 91.18_, \g = 91.42_
a = 5.419, b = 6.607, c = 8.806, \a = 71.50_, \b = 87.15_, \g = 85.63_
a = 5.753, c = 17.958
a = 10.79, b = 3.98, c = 7.19, \b = 117.2_
a = 8.692, c = 6.148

a = 5.837, c = 9.932

a = 4.905, b = 9.422, c = 2.916
a = 19.07, b = 19.13, c = 6.580
a = 8.02, b = 19.35, c = 9.03, \b = 91_58'
a = 5.770, b = 5.838, c = 11.419
a = 9.929, b = 9.691, c = 8.503, \b = 97.06_
a = 2.961, b = 5.13, c = 4.83
a = 14.12, b = 16.83, c = 15.22
a = 17.864, b = 7.422 c = 6.674, \b = 106_27'
a = 10.473, b = 6.706, c = 27.78, \b = 90.58_
a = 10.349, b = 13.515, c = 4.789, \b = 104.92_
a = 11.901, b = 6.830, c = 10.162, \b = 112.87_
a = 4.810, c = 7.613
a = 10.34, b = 13.29, c = 14.55
a = 5.239, b = 10.56, c = 6.972, \a = 106.80_, \b = 110.78_, \g = 72.13_
a = 15.42, b = 7.32, c = 7.07, \b = 95_24'
a = 9.870, b 18.006, c = 5.300, \b = 105.26
a = 7.1248, c = 14.0175
a = 5.545, b = 5.731, c = 4.052
a = 14.98, b = 14.233, c = 6.018
a = 5.6, b = 9.8, c = 12.6
a = 6.862, b = 10.425, c = 6.684, \a = 101.4_, \b = 98.25_, \g = 86.28_
a = 21.59, b = 8.78, c = 9.31, \b = 91.47_
a = 10.25
a = 10.048, b = 19.418, c = 9.735, \b = 95.83_
a = 16.834, b = 10.156, c = 10.921, \b = 93.13_
a = 6.78, b = 10.42, c = 12.11, \b = 100.8
a = 35.10
a = 10.49, b = 20.75, c = 12.44
a = 8.558, b = 5.654, c = 13.606, \b = 108.88_
a = 13.333, b = 4.039, c = 16.346, \b = 94.21
a = 12.84, b = 11.50, c = 7.654
a = 12.61, b = 7.28, c = 11.88, \b = 90.0_
a = 5.26, b = 9.16, c = 14.7, \b = 92.0
a = 7.999, b = 7.033, c = 7.032, \a = 90.51_, \b = 95.21_, \g = 102.53_
a = 5.70, c = 41.16
a = 13.31, b = 12.62, c = 23.14, \b = 110.0
a = 11.472, b = 33.744, c = 4.016,
a = 15.677, b = 7.151, c = 14.209
a = 8.999, b = 12.069, c = 4.921, \a = 90, \b = 100.32, \g = 90
a = 7.48, b = 8.77, c = ? \g = 90
a = 5.454, b = 9.45, c = 14.40, \b = 97.2_
a = 5.991
a = 10.298, b = 13.999, c = 8.89
a = 6.335, b = 10.55, c = 6.075, a = 99.17_, b = 109.88_, g = 75.00_
a = 10.038
a = 13.779, c = 16.980
a = 24.641, b = 5.598, c = 10.180, \b = 95.95_

a = 7.02, c = 20.21
a = 4.203
a = 5.627, b = 5.575, c = 12.425
a = 18.49, c = 7.51
a = 9.223, b = 12.422, c = 4.995, \b = 100.39_
a = 5.63, c = 11.23
a = 5.44, b = 7.64, c = 5.38
a = 13.61, b = 5.68, c= 11.73, \b = 113.5
a = 17.47, b = 12.23, c = 4.29
a = 6.667, c = 12.277
a = 11.7540, b = 5.1395, c = 7.6296, \b = 113.04_
a = 10.7956, b = 14.4928, c = 6.6229, \b = 113.214_
a = 9.82, b = 9.00, c = 5.27, \b = 105.6_
a = 13.288, c = 5.877
a = 16.176, b = 14.684, c = 4.331
a = 4.943, b = 6.670, c = 7.221, \b = 95.68_
a = 6.42, c = 4.02
a = 10.38
a = 5.959, b = 15.313, c = 6.357, \b = 114.67_
a = 15.961
a = 12.563, b = 12.181, c = 6.205, \a = 88.94, \b = 91.67, \g = 113.44
a = 12.472, c = 8.252
a = 7.01, \a = 60.94_
a = 12.33, b = 9.20, c = 10.69, \b = 96.92
a = 9.874, b = 14.306, c = 14.362, \b = 90.0_
a = 5.3078, b = 9.1901, c = 10.1547, \b = 100.08_
a = 14.001, b = 5.675, c = 7.137, \b = 115_13'
a = 8.112, c = 8.814
a = 12.23, b = 14.62, c = 7.21
a = 10.735, b = 6.689, c = 8.000, \b = 109.72_
a = 9.41, b = 10.02, c = 8.66
a = 14.40, b = 18.76, c = 10.40
a = 10.377, b = 5.086, c = 10.559, \b = 121.10_
a = 11.61, b = 25.4, c = 6.63, \b = 94.77_
a = 5.32, b = 9.87, c = 8.69, \b = 90_36'
a = 15.85, b = 17.42, c = 13.76
a = 13.87, b = 20.79, c = 9.38, \b = 112.
a = 17.426, b = 16.062, c = 13.592
a = 7.29, b = 12.59, c = 19.55
a = 20.8, b = 24.2, c = 6.18, \b = 95_
a = 4.50, b = 10.72, c = 9.04
a = 9.064, b = 12.256, c = 6.113, \b = 104.8_
a = 21 (or a = 13.7), b = 13.5, c = 6.74, \b = 140_
a = 8.843, b = 5.665, c = 10.150, \b = 115.4_
a = 8.77, b = 38.8, c = 8.03
a = 9.706, b = 8.950, c = 5.246, \b = 108.59
a = 4.446, c = 41.94
a = 11.02, b = 5.98, c = 5.36, \b = 95_48'; or   a = 5.36, b = 5.98, c = 12.73, \b = 120_34'
a = 11.54, b = 6.08, c = 11.64

a = 7.617, c = 8.190
a = 5.786, c = 10.829
a = 11.32, b = 20.06, c = 6.00
a = 13.67, c = 4.94
a = 13.45, b = 11.81, c = 19.94, \b = 107_11'
a = 19.043, b = 20.129, c = 5.269
a = 5.790
a = 3.8312
a = 3.9237
a = 4.931, c = 3.367
a = 8.49, c = 20.80
a = 45.12, b = 4.139, c = 21.45, \b = 92_32'
a = 11.24, b = 28.0, c = 7.30
a = 4.90, b = 4.90, c = 4.08
a = 10.33
a = 11.86, c = 47.14
a = 7.018, b = 16.784
a = 7.315, c = 33.788
a = 10.56
a = 9.076, c = 24.96
a = 4.470, c = 5.719
a = 10.534
a = 8.423, b = 13.739, c = 9.199
a = 15.875, b = 9.261, c = 29.364
a = 7.480, b = 7.424, c = 7.053, \b = 114_40'
a = 9.43, b = 12.27, c = 3.395, \b = 96.6_
a = 7.191, b = 8.693, c = 10.681,
a = 8.71, c = 14.74
a = 10.61
a = 13.682
a = 26.12, b = 15.08, c = 23.89, \b = 90_0'
a = 5.55 kX, b = 14.62, c = 5.19
a = 9.405
a = 6.952, b = 8.886, c = 6.954, \a = 104.06_, \b = 113.94_, \g = 101.15_
a = 5.186, b = 8.968, c = 10.029, \b = 100.4_

a = 3.585, c = 4.895
a = 14.236, b = 6.340, c = 10.571, \b = 102_55'
a = 3.020, c = 3.706
a = 12.133 kX
a = 4.252, c = 40.095
a = 9.66, b = 14.20, c = 7.86
a = 5.23 kX, c = 11.44
a = 18.82, b = 9.02, c = 16.79, \b = 112_24'
a = 4.61, b = 5.47, c = 18.48
a = 9.993, b = 7.404, c = 6.937, \a = 87.82_, \b = 115.01_, \g = 111.07_
a = 5.22, b = 9.05, c = 19.42, \b = 95_10'
a = 16.30, b = 9.14, c = 10.15
a : b : c = 0.551 : 1 : ?,   \b = 110_

a = 10.11, c = 2.964
a = 13.43, b = 12.57, c = 6.589, \b = 100.3_
a = 7.32 kX, b = 11.11, c = 6.69, \b = 95.00_
a = 19.252, b = 7.737, c = 9.765, \b = 104_32'
a = 12.295, b = 7.221, c = 6.9558, \b = 90.40_
a = 10.77, c = 8.67

a = b = 6.94 kX, c = 12.85
a = 15.294, c = 30.588
a = 9.79, b = 9.93, c = 3.725
a = 9.647, b = 7.428, c = 10.194, \b = 104.63
a = 17.06, b = 5.76, c = 4.49, \b = 91_02'
a = 2.872, c = 4.594
a = 6.90, b = 11.78, c = 19.65, \a = 90_, \b = 90_48', \g = 119_18'
a = 5.332, b = 5.060, c = 12.02
a = 8.81, b = 5.94, c = 19.14, \b = 97.7
a = 8.923, b = 5.995, c = 19.156, \b = 97.8
a = 5.83, b = 9.70, c = 4.77
a = 5.30
a = 11.03, c = 8.72
a = 5.405
a = 6.19, c = 46.54
a = 7.644, b = 9.508, c = 6.182
a = 10.35 - 10.43
a = 3.34, c = 4.68
a = 4.42, c = 2.87
a = 10.00, c = 7.33
a = 11.459
a = 5.137, c = 14.29
a = 5.138, b = 8.910, c = 18.60, \b = 100.02_
a = 13.36, c = 7.16
a = 6.84, b = 15.84, c = 6.24, \b = 117.15_
a = 6.62, b = 7.54, c = 17.35, \a = 114.4_, \b = 82.7_, \g = 94.5_
a = 7.56, b = 17.45, c = 6.67, \a = 84.0_, \b = 94.3_, \g = 113.7_
a = 12.811, b = 6.870, c = 11.885, \b = 117.17_
a = 8.4033
a = 11.85, b = 12.411, c = 6.421, \b = 114.45
a = 23.706, b = 5.723, c = 5.045
a = 4.9133, c = 5.4053
a = 11.362, b = 5.266, c = 12.652, \b = 108.16
a = 5.61, b = 5.68, c = 9.16, \b = 93_18'
a = 6.184, b = 23.600, c = 6.539, \a = 94.18_, \b = 101.73_, \g = 96.27_
a = 10.097, c = 4.944
a = 32.6, b = 23.8, c = 9.45, \b = 90
a = 5.71, c = 3.77
a = 12.40, b = 10.44, c = 5.26
a = 30.6, b = 5.31, c = 18.20
a = 6.866, b = 9.314, c = 7.598, \b = 109.1_
a = 9.89

a = 19.24, b = 13.08, c = 8.73, \b = 90.28_
a = 13.97, b = 14.26, c = 14.22, \b = 121.02_
a = 4.78, b = 5.78, c = 3.53
a = 16.066, b = 15.577, c = 7.102, \b = 90.20_
a = 4.533, b = 9.27, c = 2.866
a = 2.83, c = 7.55
a = 8.17, b = 42.02, c = 5.45
a = 17.19, b = 17.70, c = 3.933
a = 10.55, b = 8.88, c = 7.85, \b = 120.1_
a = 4.811, b = 16.217, c = 10.403, \b = 93_01'
a = 11.10, b = 17.7, c = 18.0, \b = 90
a =15.49, b = 19.18, c = 6.157
a = 13.525, b = 4.968, c = 5.546, \b = 107.7_
a = 9.049, b = 11.019, c = 5.431
a = 25.1, b = 7.91, c = 8.46, \b = 99_
a = 12.564, b = 12.169, c = 6.195, \a = 89.09_, \b = 79.69_, \g = 118.58_

a = 13.60, b = 11.96, c = 24.49, \b = 103.94
a = 9.27, b = 13.50, c = 6.56, \b = 106_33'
a = 17.441, b = 7.363, c = 32.052, \b = 105.03
a = 9.49, b = 10.08, c = 8.70
a = 20.33, c = 5.88
a = 7.833, b = 12.360, c = 6.803, \a = 93.31_, \b = 116.35_, \g = 92.06_
a = 6.614, c = 45.54
a = 10.43, b = 22.35, c = 7.98
a = 9.198, b = 10.691, c = 4.476, \b = 92.42_
a = 6.092, b = 14.407, c = 7.811
a = 11.458, b = 5.052, c = 8.840, \b = 108.91_
a = 16.01, b = 17.5, c = 13.7
a = 10.622, c = 10.551 (zincian); a = 10.60, c = 10.45 (arsenian)
a = 6.782, c = 18.28
a = 5.670, b = 12.03, c = 4.863
a = 5.670, b = 12.01, c = 4.869
a = 2.726, b = 12.12, c = 4.874
a = 27.470, b = 10.006, c = 6.995, \a = 90.00_, \b = 97.29_, \g = 100.49_
a = 9.764, c = 19.070
a = 6.960, c = 6.372
a = 6.98, c = 6.39
a = 2.760, c = 4.458
a = 23.636, b = 6.549, c = 7.037
a = 3.856
a = 7.317
a = 4.73 kX, c = 15.51
a = 7.669, b = 12.22, c = 6.702, \a = 93.97_, \b = 93.07_, \g = 68.20_
a = 7.27, c = 18.07
a = 9.723, b = 18.295, c = 5.424
a = 10.478, b = 10.923, c = 9.170, \a = 101.43, \b = 96.95, \g = 129.68
a = 4.799, b = 10.742, c = 15.70
a = 5.18, c = 12.61

a = 14.17, b = 14.42, c = 13.57, \b = 102.0
a = 20.81, b = 12.06, c = 16.03, \a = 103.8_, \b = 115.1_, \g = 90.4_
a = 10.030, b = 18.415, c = 5.234, \b = 104.97_
a = 3.97, c = 6.11
a = 9.769, b = 18.048, c = 5.335, \b = 103.6_
a = 8.113
a = 11.90, c = 13.91
a = 14.779, b = 8.010, c = 11.128, \b = 105.9_
a = 5.571, b = 3.641, c = 18.79
a = 3.79
a = 17.36, b = 19.53, c = 11.30, \b = 96.0_
a = 16.51, b = 17.62, c = 3.976, \a = 95.7_, \b = 96.18_, \g = 91.23_
a = 13.783, b = 16.805, c = 5.172
a = 8.89, b = 5.08, c = 6.63, \a = 103.2_, \b = 107.1_, \g = 77.87_
a = 13.208, b = 8.287, c = 13.099, \b = 106.65
a = 10.139, c = 14.275
a = 18.332, c = 9.164
a = 3.801, c = 20.986
a = 7.396, b = 8.458, c = 3.638, \b = 97.68_
a = 13.929, b = 2.8459, c = 9.678, \b = 92.39_
a = 3.79, c = 4.83
a = 10.284
a = 6.463, b = 15.309, c = 6.341, \a = 90.533_, \b = 101.083_, \g = 85.733_
a = 7.13, c = 69.4
a = 6.882, b = 7.164, c = 6.734, \b = 104.83_
a = 5.51, c = 11.05
a = 9.366, b = 12.116, c = 3.127, \b = 90.11_
a = 15.95, b = 11.95, c = 6.62, \b = 94.50 monoclinic; a = 15.921, b = 11.95, c = 6.62, \a = 91_04, \b = 94_21, \g = 89_59.5
a = 5.26, b = 9.09, c = 10.25, \b = 101.0_
a = 5.801, b = 12.898, c = 5.617, \b = 107.42_
a = 5.88, b = 7.67, c = 5.58, \a = 112_19', \b = 71_12', \g = 119_41'
a = 10.126, b = 11.377, c = 7.358, \a = 91.3_, \b = 101.15_, \g = 112.02_
a = 6.955, b = 9.484, c = 6.812, \a = 108.64_, \b = 94.84_, \g = 95.89_
a = 8.52, b = 13.05, c = 8.23, \b = 112_53'
a = 8.53, b = 7.015, c = 8.56, \a = 78.38_, \b = 103.38_, \g = 65.30_
a = 11.531, b = 25.73, c = 6.687, \b = 95.12_
a = 11.169, b = 13.039, c = 10.871
a = 7.73, b = 6.87, c = 10.87, \a = 86.48, \b = 134.20, \g = 93.17
a = 6.36, b = 7.29, c = 5.54, \a = 97.3_, \b = 114.2_, \g = 106.0_
a = 9.997, c = 11.290
a = 9.057, b = 13.357, c = 8.289

a = 5.945, b = 13.59, c = 7.94, \b = 90_30'
a = 5.931, b = 5.915, c = 6.003, \b = 112_27'
a = 15.843, c = 7.102
a = 4.422, c = 41.49
a = 11.95, b = 6.17, c = 9.03, \b = 99_22.5'
a = 5.42, c = 11.3
a = 3.991

a = 7.62, b = 18.55, c = 15.51, \b = 104.33_
a = 5.628, b = 3.239, c = 6.184

a = 2.7058, c = 4.2819

a = 4.845, b = 9.205, c = 4.296
a = 4.58, c = 2.95
a = 7.505, b = 11.063, c = 5.370
a = 3.986, b = 5.624, c = 9.778
a = 4.822, c = 8.1696
a = 10.171, b = 6.623, c = 17.976, \b = 94.32_
a = 6.96, c = 19.3 (pseudotetragonal cell)
a = 12.865, c = 72.240
a = 5.173, b = 5.954, c = 2.999
a = 1.679, b = 16.21, c = 4.63, \b = 106.7
a = 12.710, b = 22.498, c = 11.360, \b = 118.99_
a = 18.64, b = 9.81, c = 10.12, \b = 97_
a = 14.64

a = 5.4563
a = 3.8758
a = 7.01, c = 19.84
a = 10.773, b = 6.696, c = 4.780

a = 5.498, b = 14.34, c = 5.120
a = 9.70 kX, b = 38.40, c = 9.65
a = 10.29, b = 8.05, c = 6.61, \b = 92.79_
a = 18.495, b = 6.805, c = 14.000, \b = 112.75
a = 9.741, b = 9.974, c = 9.108, \a = 92.70, \b = 117.11. \g = 105.30
a = 8.427, b = 13.00, c = 7.168, \b = 116.1_

a = 4.680, b = 5.712, c = 4.933, \b = 90.3
a = 15.633, b = 7.603, c = 12.003, \a = 109.71_, \b = 88.61_, \g = 99.95_
a = 9.25, b = 30.00, c = 6.33
a = 9.03, c = 39.84
a = 11.10, b = 11.18, c = 9.08
Glycollated: a = 5.3, b = 9.14, c = 16.9 Dried: a = 5.3, b = 9.16, c = 12.4

a = 11.266, b = 14.401, c = 9.929, \b = 125.46_
a = 25.37, b = 5.654, c = 16.87, \b = 117.58_
a = 12.343, c = 15.463
a = 10.437, b = 4.768, c = 6.026, \b = 90.00
a = 12.68, b = 13.54, c = 10.17, \b = 108_44'
a = 6.55, b = 18.55, c = 9.70, \b = 97.65
a = 19.576, b = 4.193, c = 7.879
a = 8.213, c = 6.55
a = 21.50, b = 30.04, c = 92.06
a = 7.039, b = 7.053, c = 6.578, \a = 92_35', \b = 101_10', \g = 119_50'
a = 12.62, b = 18.64, c = 6.97

a = 11.361, c = 5.041
a = 5.34, b = 9.32, c = 15.8, \b = 90.0
a = 10.704, b = 6.960, c = 14.533, \b = 116.81_

a = 7.35, b = 7.50, c = 15.62
a = 11.10, b = 16.35, c = 13.59, \b = 113_10'
a = 3.68 kX, c = 17.48
a = 9.94, b = 14.88, c = 26.47, \a = 98.7_, \b = 96.5_, \g = 89.0_
a = 10.121, b = 15.180, c = 6.623, \b = 100.55_
a = 2.978, c = 4.842
a = 8.59 kX, c = 5.92
a = 12.17, c = 19.29
a = 13.43, c = 19.29
a = 8.525, c = 10.803
a = 5.246 kX, c = 11.349
a = 11.47, b = 23.63, c = 8.62

a = 9.67, b = 19.56, c = 10.47
a = 13.448, b = 44.386, c = 4.022
a = 7.860, b = 10.089, c = 5.368
a = 8.924, b = 10.016, c = 9.103, \a = 59.91_, \b = 112.41_, \g = 81.69_
a = 16.26, b = 30.60, c = 12.55, \b = 91.77_
a = 7.759
a = 14.33, b = 16.79, c = 14.73
a = 3.32, c = 26.6
a = 17.14, b = 22.19, c = 6.61
a = 11.119, b = 25.546, c = 6.437
a = 16.095, c = 7.136
a = 12.128
a = 9.013, c = 4.424
a = 7.06, b = 5.01, c = 18.74, \b = 119.4
a = 9.69, b = 16.83, c = 14.26
a = 6.59, b = 5.43, c = 6.62, \a = 125_, \b = 104_, \g = 84_43'
a = 7.07, c = 10.9

a = 7.418, b = 18.87, c = 6.385
a = 8.249, c = 7.183
a = 5.83, b = 6.76, c = 4.85, \b = 95.5_
a = 10.05, b = 7.46, c = 6.90, \a = 87.7, \b = 115.3, \g = 115.5
a = 5.614, c = 12.549
a = 9.848, b = 18.978, c = 6.522, \b = 110.10_
a = 10.36, b = 10.05, c = 8.98
a = 7.1568, b = 7.3018, c = 7.2481, \b = 120.588
a = 4.542, b = 5.333, c = 6.413, \b = 106.22_
a = 7.811, b = 15.114, c = 6.691
a = 7.972, b = 7.052, c = 4.900, \b = 93_57'
a = 3.65, c = 5.34
a = 3.36, b = 11.08, c = 6.42
a = b = 7.964, c = 27.288

a = 14.826, b = 18.751, c = 7.307
a = 7.359, c = 17.113
a = 5.53, b = 7.10, c = 18.30, \b = 102.7
a = 3.19, b = 5.81, c = 6.49
a = 17.186, b = 9.827, c = 9.298
a = 4.366, c = 4.954
a = 7.86, b = 11.84, c = 8.92
a = 8.08, b = 8.75, c = 7.65
a = 4.660, c = 3.078
a = 13.879, b = 13.835, c = 9.942
a = 13.48, b = 11.87, c = 24.48, \b = 105_45'
a = 10.42, c = 20.86
a = 11.14
a = 9.678, b = 7.597, c = 7.668
a = 10.599, b = 8.903, c = 10.085, \b = 103.42
a = 13.50, b = 26.97, c = 5.25
a = 7.706, b = 6.893, c = 6.730, \a = 90.33_, \b = 94.17_, \g = 77.25_
a = 9.513, b = 10.001, c = 8.622
a = 19.01, c = 7.82
a = 43.53, b = 9.259, c = 7.263, \b = 91_8'
a = 22.186, b = 6.250, c = 21.853, \b = 113.37_

a = 10.91
a = 14.58, c = 21.01
a = 4.871, b = 15.098, c = 5.433, \b = 98.86_
a = 5.565, c = 13.631
a = 21.99, b = 15.63, c = 4.487
a = 9.876, b = 19.812, c = 5.381
a = 10.55, b = 13.92, c = 8.10
a = 11.51, b = 3.559, c = 4.371
a = 28.06, c = 13.56
a = 9.51, c = 32.83
a = 4.961, b = 11.03, c = 7.12
a = 8.897, b = 5.843, c = 19.41, \b = 98
a = 5.9468, b = 10.0631, c = 4.7935
a = 4.678, c = 4.369
a = 4.688, c = 15.375
a = 7.27, b = 20.50, c = 7.15
a = 5.369, b = 9.297, c = 10.268, \b = 100.06_
a = 6.26, b = 10.63, c = 6.06, \a = 97.25_, \b = 109.67_, \g = 75.00_
a = 8.979, b = 6.729, c = 5.150, \b = 90_06'
a = 10.618, b = 13.825, c = 10.482, \b = 91.61_
a = 9.41
a = 9.41, b = 7.56, c = 5.95, \a = 90.25_, \b = 91.27_, \g = 104.02_
a = 5.26, b = 10.52, c = 7.06, \a = 106_58, \b = 113_30, \g = 69_30
a = 14.519, b = 18.80, c = 15.938
a = 10.184
a = 7.44, b = 7.59, c = 5.75
a = 4.085

a = 9.231, b = 9.134, c = 36.01
a = 5.948, b = 11.404, c = 15.979, \b = 90.15
a = 6.334, c = 23.58
a = 8.39, b = 17.02, c = 8.37, \b = 90.42_
a = 7.377, c = 4.514
a = 8.895, c = 12.727
a = 4.328, b = 9.878, c = 5.675
a = 9.58, b = 9.79, c = 6.88, \a = 108.1_, \b = 99.6_, \g = 98.7_
a = 9.06, b = 9.83, c = 9.08, \a = 90.00_, \b = 109.50_, \g = 107.80_
a = 5.473, b = 8.843, c = 4.835
a = 3.113, c = 15.61
a = 7.81, b = 10.25, c = 13.27, \b = 90_21'
a = 17.28, b = 7.03, c = 6.56, \b = 105.88
a = 8.19
c/a = 1.389

a = 8.888, b = 9.344, c = 8.326, \b = 90.33_
a = 16.447, b = 5.513, c = 11.579
a = 17.20, b = 7.76, c = 15.16, \b = 101_12'
a = 4.651, c = 14.977
a = 6.40, b = 11.72, c = 21.9
a = 3.47, c = 34.50
a = 7.074, b = 5.4087, c = 40.606, \b = 93.18_
a = 4.23, c = 5.69

a = 8.878
a = 8.32, b = 11.21, c = 18.71
a = 12.214
a = 6.97, c = 8.69
a = 11.28, b = 19.30, c = 17.67, \b = 94_30
a = 27.40, b = 7.02, c = 6.65
a = 18.641, b = 7.512, c = 10.299, \b = 108.48
a = 8.012
a = 7.12, c = 8.61

a = 8.80, b = 68.48, c = 14.55
a = 10.059, c = 14.052
a = 7.47
a = 7.93, b = 7.26, c = 12.54, \b = 94_
a = 10.66, b = 4.88, c = 14.33, \b = 100_34'
a = 10.984, b = 10.268, c = 7.917, \b = 108_29'
a = 9.645, b = 7.906, c = 11.040
a = 45.15, b = 4.146 (true cell x 2), c = 26.53, \b = 113_25'
a = 18.58, b = 7.45, c = 12.05, \b = 98_09'
a = 17.25, b = 17.73, c = 3.95
a = 8.153, \b = 8.498, c = 8.080
a = 11.74, b = 5.11, c = 13.58, \a = 90.92, \b = 99.08, \g = 90.33
a = 8.245, c = 14.34
a = 10.441, b = 5.280, c = 11.196, \b = 116_50'

a = 5.941
a = 2.951, b = 10.592, c = 5.257
a = 11.621
a = 4.659, c = 14.957
a = 5.43
a = 9.75, b = 9.63, c = 9.70, \b = 102.34
a = 8.086
a = 22.962, c = 41.429
a = 13.00, b = 5.38, c = 12.12, \b = 98_
a = 9.466, b = 8.394, c = 5.221, \b = 110.17_
a = 10.49, b = 6.705, c = 14.15, \b = 101_19'
a = 5.420, b = 14.752, c = 5.594
a = 4.708, b = 5.553, c = 5.019
a = 17.267, b = 10.002, c = 22.917, \b = 100_31'
a = 7.47, b = 10.137, c = 6.20, \a = 101.9_, \b = 95.54_, \g = 92.12_
a = 5.4531, c = 10.7470
a = 10.76, b = 5.40, c = 16.09
a = 10.57
a = 4.742, c = 9.535
a = 5.922, b = 13.604, c = 7.905, \b = 90_51'
a = 7.86-7.90, b = 16.60-1664, c = 5.65-5.67, \b = 90_
a = 7.58, c = 14.77

a = 10.460, c = 45. 479
a = 13.599, b = 18.222, c = 17.836
a = 16.075, c = 10.658
a = 5.450, b = 8.704, c = 13.150, \b = 98.72_
a = 9.84, c = 36.67
a = 7.793, b = 12.295, c = 8.506
a = 6.921, b = 10.616, c = 6.438, \a = 98.29_, \b = 90.42_, \g = 71.16_

a = 6.625, b = 11.558, c = 12.750
a = 28.48, b = 42.62, c = 4.090
a = 10.46
a = 5.4, b = 9.1, c = 15.3
a = 10.398, b = 10.672, c = 7.223, \a = 90.10_, \b = 109.10_, \g = 71.83_
a = 4.02, c = 10.80
a = 10.27
a = 10.356
a = 4.929, b = 11.797, c = 5.559
a = 7.598, c = 28.112
a = 4.90, b = 11.79, c = 5.57
a = 17.989, b = 4.7924, c = 5.500, \b = 95.15_
a = 11.20, b = 11.28, c = 3.83
a = 6.18, c = 46.38
a = 13.63, b = 18.17, c = 11.31, \b = 129_10'
a = 5.67
a = 7.399, c = 10.311
a = 6.907, c = 6.768

a = 21.72, b = 21.72, c = 17.74, \b = 95.86_
a = 4.1790, c = 2.6649
a = 4.15
a = 15.654, b = 6.054, c = 8.385, \b = 102.29_
a = 14.41, b = 11.61, c = 5.23
a = 5.46, c = 12.05
a = 7.557, c = 7.471
a = 11.679, b = 3.6608, c = 10.636, \b = 100.53
a = 5.073, b = 6.669, c = 5.267, \a = 109.85_, \b = 112.14_, \g = 86.88_
a = 9.71, b = 18.85, c = 8.94, \b = 97.2_
a = 6.737, c = 37.59
a = 10.64, b = 8.36, c = 32.72
a = 10.122, b = 9.886, c = 8.7233
a = 5.028, b = 16.07, c = 5.303, \b = 102.58_
a = 4.06, b = 6.66, c = 7.99
a = 8.407, b = 9.886, c = 16.691
a = 5.118 kX, b = 8.404, c = 6.082
a = 10.517, b = 9.777, c = 22.392
a = 9.83, b = 8.22, c = 7.55, \b = 107_46'
a = 13.56, b = 5.70, c = 11.10, \b = 100.32
a = 9.14, b = 15.91, c = 5.594
a = 12.850, b = 14.48, c = 12.845, \b = 101.6_
a = 10.516, b = 9.764, c = 11.87, \b = 109.17

a = 9.66 kX, c = 7.19
a = 9.835, b = 18.071, c = 7.331, \b = 100.32_
a = 4.645, c = 2.999
a = 6.945, b = 11.208, c = 6.1355
a = 11.85, b = 6.80, c = 4.25, \b = 93_51'
a = 4.175, c = 5.504
a = 11.16, c = 21.79
a = 13.38, c = 8.45
a = 12.31, b = 3.120, c = 9.20, \b = 104_20'
a = 4.06, c = 5.59
a = 5.237, b = 9.070, c = 14.285, \b = 97_02'
a = 2.841
a = 10.007, c = 14.000
a = 10.132, b = 12.537, c = 7.775
a = 10.065
a = 4.316, c = 23.43
a = 10.45, b = 12.84, c = 24.46
a = 5.3912
a = 24.67, b = 3.781, c = 11.881, \b = 100.07_
a = 11.15, b = 19.67, c = 6.08
a = 9.91, b = 11.384, c = 9.631, \b = 109.30_
a = 5.22, b = 8.97, c = 16.3, \b = \96.1
a = 8.70, b = 5.79, c = 8.78, \b = 108.9
a = 9.05, c = 11.54
a = 10.70, b = 12.77, c = 3.25

a = 7.089, b = 15.261, c = 5.364
a = 9.95, c = 6.75, or a = 9.75, c = 6.92
a = 6.99, c = 16.75
a = 10.89, b = 13.04, c = 30.71, \b = 92_10'
a = 6.818, b = 13.273, c = 10.815
a = 19.482, b = 20.963, c = 7.554
a = 6.217, b = 13.306, c = 6.255, \a = 90.09, \b = 93.50, \g = 82.05
a = 17.64, b = 21.00, c = 20.12, \b = 103.4_
a = 11.12, b = 14.72, c = 6.47, \b = 99_26'
a = 5.442, c = 8.848
a = 8.222, c = 14.34
a = 5.2, b = 9.0, c = 13.0
a = 8.528, b = 13.166, c = 11.812
P2/n: a = 8.94, b = 4.48, c = 8.83 \b = 110_22'   P2/c: a = 8.94, b = 4.48, c = 14.59, \b = 145_26'
a = 6.2910
a = 7.97, b = 9.41, c = 4.72, \a = 99_55', \b = 97_23', \g = 105_58_
a = 10.754, b = 18.865, c = 9.884
a = 4.10, b = 7.10, c = 9.12
a = 4.039, b = 6.984, c = 9.045
a = 4.00, b = 6.92, c = 9.00
a = 9.55, b = 7.13, c = 6.00, \b = 105_
a = 12.577, b = 10.393, c = 3.139, \b = 95.88_
a = 7.758, b - 7.712, c = 7.126, \b = 115.85_
a = 7.624, b = 7.468, c = 7.123, \b = 115_52'
a = 5.69, c = 18.3
a = 17.07, b = 3.65, c = 27.9, \b = 114.1_
a : c = 1 : 1.76

a = 17.93, b = 4.71, c = 10.39, \b = 100.75
a = 5.227, b = 9.057, c = 10.133, \b = 99.86_
a = 7.168
a = 7.82, b = 14.60, c = 5.15, \b = 92.50_
a = 16.11, b = 11.27, c = 17.09
a = 8.68, c = 9.00
a = 27.50, b = 12.614, c = 6.046
a = 3.028, c = 22.45
a = 5.28, b = 9.15, c = 18.9, \b = 100_15'
a = 5.89, b = 7.69, c = 5.56, \a = 112_38', \b = 70_49', \g = 119_25'
a = 10.64
a = 7.353, b = 25.225, c = 6.097, \b = 95.2_
a = 7.041, b = 14.130, c = 6.975
a = 10.198, b = 9.820, c = 9.485, \a = 90.50, \b = 70.53, \g = 108.57
a = 5.34, b = 10.97, c = 7.38

a = 3.80, b = 3.79, c = 35.74, \a = 90.92_, \b = 90.18_, \g = 90_
a = 4.750 - 4.753, c = 9.208 - 9.278
a = 12.125, b = 13.929, c = 7.136
a 9.952, b = 18.101, c = 5.322, \b = 105.4

a = 8.71, c = 96.1
a = 7.663, b = 10.391, c = 5.919
a = 5.13, b = 8.88, c = 19.7, \b = 95.0
a = 5.657, b = 6.432, c = 5.521, \a = 102_27', \b = 87_42', \g = 102_34'

a = 3.9048

a = 5.108
a = 4.266, b = 11.419, c = 4.090
a = 7.26, c = 4.85
a = 6.630, b = 9.615, c = 7.432
a = 12.60
a = 4.258, c = 30.516
a = 5.607, b = 12.034, c = 5.463
a = 4.447, c = 5.915
a = 4.375, c = 30.39
a = 14.64, c = 10.87
a = 7.45, b = 13.95, c = 8.82, \b = 91.9_
a = 11.57, b = 12.16, c = 6.76
a = 9.152, b = 11.287, c = 7.569
a = 10.186
a = 4.653, b = 3.425, c = 5.129, \b = 99_28'
a = 4.86 - 4.90, b = 10.60 - 10.62, c = 6.22 - 6.25
a = 12.01, b = 5.91, c = 9.49, \b = 106_
a = 14.12, b = 14.69, c = 7.51
a = 15.68, b = 19.90, c = 6.25, \b = 100_05'
a = 7.255, b = 10.709, c = 8.746
a = 6.572

a = 3.98, c = 3.72
a = 4.2381, c = 29.589
a = 10.33
a = 20.513, c = 8.553
a = 13.098, c = 6.6355
a = 2.533, c = 3.582
a = 7.7870, c = 7.797
a = 6.412, b = 13.563, c = 8.545
a = 3.882, c = 13.25
a = 10.543, b = 7.294, c = 11.093, \b = 96_55'
a =10.92
a = 11.03, c = 10.40
a = 8.225, b = 7.123, c = 14.97
a = 9.75 kX, b = 12.29, c = 5.85
a = 3.131, c = 4.608
a = 10.72, b = 5.249, c = 6.469
a = 22.40, b = 22.44, c = 7.62, \a = 70.2, \b = 70.0, \g = 69.2
a = 5.57, b = 5.50, c = 16.10, \b = 96_23'
a = 13.051, b = 13.092, c = 13.263
a = 6.99, c = 9.71

a = 17.140, b = 4.865, c = 5.548, \b = 91.0_
a = 5.595 (variable)
a = 3.919, c = 12.854
a = 7.132, c = 6.322
a = 7.068, c = 6.260

a = 6.508, b = 8.506, c = 4.677, \b = 102_43.4'

a = 20.25, b = 9.85, c = 19.75, \b = 111.4_
a = 6.084
a = 16.755, c = 10.435
a = 8.73, b = 10.62, c = 5.02, \b = 102_43'
a = 7.553, b = 8.951, c = 6.701, \b = 120_58'
a = 15.025, b = 10.269, c = 7.628, \b = 105_50'
a = 6.47
a = 10.35, b = 12.17, c = 7.05, \a = 91_00', \b = 99_20', \g = 92_30'
a = 11.09, c = 21.07
a = 9.602, b = 5.91, c = 9.543, \b = 103.16_
a = 22.30, b = 34.00, c = 4.04
a = 8.988, b = 9.175, c = 7.149, \a = 102.9_, \b = 98.1_, \g = 88.0_
a = 11.655, c = 4.692
a = 6.66, b = 19.92, c = 7.61, \b = 95.7_
a = 9.799, b = 17.99, c = 5.289, \b = 103.89_
a = 10.14, c = 13.08
a = 6.56, b = 8.72, c = 7.44, \b = 119_43'
a = 12.053-12.220, b = 13.904-14.005, c = 7.127-7141
a = 7.494, b = 4.552, c = 10.005, \b = 129.79_

a = 11.97, b = 9.11, c = 15.66, \b = 90.36
a = 5.219, b = 8.986, c = 10.477, \b = 101.31
a = 11.3, b = 7.33, c = 22.6

a = 9.75, b = 2.84, c = 9.59, \b = 90_
a = 10.37, b = 25.39, c = 7.27, \a = 91.67_, \b = 100.66_, \g = 92.09_
a = 6.89, b = 3.31, c = 6.82, \b = 122.3_
a = 6.027
a = 7.12, b = 7.29, c = 6.71, \b = 102.41
a = 7.119, b = 14.176, c = 4.992, \b = 105.05_
a = 5.57, b = 11.47, c = 2.816
a = 4.649, b = 8.796, c = 8.390
a = 7.06, c = 20.54
a = 7.383, b = 5.673, c = 16.937, \b = 112.04
a = 16.486, b = 9.292, c = 10.619, \b = 95.42
a = 5.0 b = 8.9, c = 29.8
a = 15.843, c = 7.102
a = 11.69, c = 22.25
a = 17.88, c = 12.30
a = 13.98, c = 9.12
a = 9.84, b = 18.02, c = 5.27, \b = 104_57'

a = 8.41
a = 10.39, b = 10.56, c = 10.60, \a = 116.4, \b = 107.8, \g = 113.4
a = 10.04, b = 17.28, c = 8.20, \b = 91.83_
a = 7.25 kX, b = 6.80, c = 11.07, \b = 91.49
a = 15.35, c = 8.538
a = 16.4, b = 7.62, c = 27.92, \b = 90_09'
a = 6.0285, b = 10.3586, c = 4.7031
a = 12.085, b = 6.536, c = 9.910, \b = 105_38
a = 12.366, b = 13.276, c = 9.943, \b = 108.23_
a = 8.592, c = 5.573
a = 4.63, c = 9.14
a = 6.913, c = 6.422
a = 9.35, c = 6.88
a = 9.32, c = 6.84
a = 7.16, c = 8.80
a = 5.87
a = 5.958, c = 11.74
a = 18.894, b = 7.161, c = 7.162, \b = 99.99_
a = 20.106, b = 3.492, c = 10.303, \b = 103.05_
a = 9.731, c = 18.836
a = 9.94
a = 1.680, b = 18.0, c = 5.3, \b = 105
12.215
a = 9.131, b = 6.326, c = 7.583, \b = 115.3_
a = 8.70, b = 5.80, c = 7.85, \b = 111.87
a = 4.422, c = 24.05
a = 7.174, c = 5.402
a = 5.59, b = 4.82, c = 5.51, \b = 119_32'
a = 8.583, c = 8.817
a = 14.31, b = 17.28, c = 10.11
a = 3.891, c = 3.577

a = 7.51, b = 13.84, c = 5.04, \a = 98_00, \b = 70_40, \g = 99_.00
a = 14.390, b = 8.213, c = 9.934, \b = 114_02'

a = 3.154, c = 12.362
a = 5.328, b = 10.704, c = 5.120
a = 11.22, c = 6.582
a = 13.729, b = 18.000, c = 4.828, \b = 104.28_
a = 9.810, c = 6.868
a = 7.424, b = 7.629, c = 9.910, \a = 68.61_, \b = 69.71_, \g = 65.08_
a = 24.036, b = 5.110, c = 10.888, \b = 106.95
a = 4.787, c = 15.30
a = 11.51, b = 4.39, c = 14.62, \b = 92.14_
a = 3.924, b = 3.893, c = 5.525, \b = 90.26
a = 19.583, b = 7.981, c = 8.564, \a = 89_46', \b = 89_37', \g = 90_16'
a = 13.898

a = 6.30, b = 6.46, c = 6.56, \a = 74.27, \b = 61.6, \g = 61.25
a = 10.212, b = 55.51, c = 5.602

a = 10.005
a = 10.36, b = 8.36, c = 20.40
a = 12.67, b = 19.32, c = 4.38
a = 7.195, b = 7.211, c = 5.722, \b = 113.22_
a = 8.809, b = 12.86, c = 6.678, \a = 90.25_, \b = 109.1_, \g = 105.1_
a = 5.886 (cubic or pseudocubic cell)
a = 12.79, b = 6.85, c = 13.02, \b = 91.03_
a = 8.4596
a = 6.406, c = 4.282
a = 10.208, b = 13.241, c = 7.174

a = 14.30, b = 7.50, c = 6.38, \b = 99_5'
a = 10.867, c = 24.910
a = 13.704, b = 16.82, c = 9.322, \b = 111.5
a = 6.881, b = 12.305, c = 9.791
a = 8.43, b = 39.50, c = 7.12, \b = 94.97_
a = 7.01, c = 9.05
a = 15.42, b = 16.08, c = 6.970
a = 5.368-5.555

a = 7.01, c = 20.46
a = 15.87, b = 7.05, c = 6.66, \b = 97_15'
a = 6.64, b = 15.55, c = 14.01, \b = 91_

a = 11.60, b = 14.68, c = 12.83
a = 7.00, c = 30.02

a = 9.22, b = 13.81, c = 7.17
a = 10.44

a = 13.82, c = 6.53
a = 5.646, c = 4.701
a = 14.465, b = 7.403, c = 6.208, \b = 65.20
a = 5.20, b = 10.70, c = 7.14, \a = 108_36', \b = 106_56', \g = 72_43'

a = 7.256, b = 7.686, c = 8.683, \a = 90.75_, \b = 99.75_, \g = 122.48_

a = 12.00
a = 15.981, c = 7.207
a = 9.68, c = 9.81
a = 7.98, b = 8.10, c = 7.09, \b = 100.14_
a = 5.6793
a = 4.92, b = 12.46, c = 5.42
a = 3.792, c = 34.10
a = 10.323, c = 7.346
a = 12.618, b = 10.673, c = 10.932, \b = 95.22_
a = 7.86, b = 5.44, c = 6.10, \a = 91.87_, \b = 102.00_, \g = 89.92_
a = 14.07, b = 40.85, c = 43.33

a = 17.06, b = 16.76, c = 7.023
a = 9.80, b = 9.22, c = 8.20, \b = 113_30'
a = 10.55, b = 8.44, c = 24.52, \b = 103_
a = 10.49, b = 8.37, c = 20.20
a = 9.90, b = 9.66, c = 17.18
a = 4.71, c = 3.13

a = 10.754, b = 14.971, c = 22.675
a = 7.135, c = 16.98
a = 13.754, b = 5.806, c = 9.563, \b = 94.57_
a = 9.142, b = 11.599, c = 6.158, \a = 98.29_, \b = 91.93_, \g = 108.27_
a = 5.411, b = 14.49, c = 4.73, \b = 102_45'
a = 20.81, b = 11.74, c = 6.637, \b = 92_2'
a = 20.80, b = 11.72, c = 6.63, \a = 90_, \b = 90.80_, \g = 91.95_
a = 4.22 x 2, b = 26.2, c = 7.90
a = 5.542, c = 10.908
a = 9.866, c = 2.844
a = 16.35, c = 7.17
a = 8.499, b = 8.325, c = 11.935
a = 5.744, b = 5.766, c = 25.12, \b = 119.72_

a = 15.5-15.6, c = 11.80
a = 9.828, b = 10.224, c = 7.532, \b = 103.18
a = 7.559, b = 11.028, c = 5.360
a = 6.832, b = 7.143, c = 5.447, \b = 109_22
a = 13.603, b = 25.248, c = 4.112, \b = 95.55_
a = 5.693
a = 4.630 - 4.633
a = 18.55, b = 9.52, c = 10.01, \b = 97_
a = 10.02, b =9.71, c = 4.44, \b = 92_
a = c = 10.697
a = 5.35, b = 8.56, c = 24.22, \b = 101.00_
a = 9.445 (variable)
a = 5.132, c = 5.454
a = 13.65

a = 7.69
a = 5.36, b = 18.68, c = 13.96
a = 10.039, b = 13.388, c = 4.687, \b = 104_18'
a = 5.81, b = 10.19, c = 22.7, \b = 97.32_
a = 10.98, b = 10.00, c = 8.52, \b = 100_24'
a = 25.97, b = 24.50, c = 10.70, \b = 104.0_
a = 10.604, b = 5.879, c = 7.202, \b = 94.81_
a = 6.57, b = 48.30, c = 6.51, \b = 119.1_
a = 27.178

a = 9.452, b = 12.287, c = 3.072
a = 17.46, c = 7.20
a = 13.189, b = 23.235, c = 11.223

a = 7.055, b = 8.542, c = 5.683
a = 4.09, b = 6.95, c = 3.15
a = 5.501, b = 7.162, c = 14.440, \a = 92.63_, \b = 95.33_, \g = 90.51_
a = 8.48
a = 6.96, b = 9.10, c = 12.38
a = 6.371, c = 6.540
a = 5.830, b = 14.763, c = 6.216, \b = 123.05_
a = 6.893, c = 10.172
a = 5.70, b = 11.51, c = 8.24
a = 11.90 kX, b = 12.51, c = 9.63, \b = 108_07'
a = 13.69, b = 13.68, c = 13.56, \b = 90.5_
a = 2.856
a = 14.564, c = 6.480
a = 7.35, c = 6.56

a = 7.105, c = 6.29
a = 26.24, b = 10.31, c = 7.38
a = 7.980, b = 8.979, c = 7.761, \a = 106.11_, \b = 114.48_, \g = 65.48_
a = 6.506, c = 23.49
a = 7.13, b = 10.44, c = 5.49, \a = 101_40', \b = 110_49', \g = 88_17'
a = 6.743, b = 9.607, c = 6.687, \a = 69.85_, \b = 102.2_, \g = 97.61_
a = 7.0587, c = 19.062

a = 6.710, b = 8.989, c = 14.553, \a = 105.59_, \b = 93.44_, \g = 108.68_
a = 9.197, b = 9.358, c = 3.085
a = 1.525, b = 17.338, c = 6.986
a = 6.9649, c = 16.256
a = 7.30, b = 9.99, c = 7.06
a = 12.33, c = 7.353
a = 14.26, b = 35.88, c = 14.20
a = 10.04, b = 15.56, c = 3.466, \a = 91_55', \b = 95_49', \g = 108_40'
a = 15.39, b = 4.068, c = 53.8
a = 7.11, c = 17.38
a = 7.11, b = 6.94, c = 7.15, \a = 94.32_, \b = 101.6_, \g = 87.37_
a = 11.9, b = 6.4, c = 6.1, \a = 109.9_, \b = 81.8_, \g = 105.4_
a = 12.54, c = 21.71
a = 8.155, c = 4.785
a = 9.95, b - 14.21, c = 8.68, \b = 126_33'
a = 8.988, b = 8.988, c = 6.730, \a = 102.84_, \b = 116.42_, \g = 59.99_
a = 10.28, b = 10.69, c = 8.838, \a = 106.1_, \b = 96.3_, \g = 124.00_
a = 5.806, b = 12.912, c = 5.623, \b = 107_24'
a = 13.511, c = 7.462
a = 9.260, c = 22.52
a = 3.457, b = 5.971, c = 5.332
a = 7.559, b = 9.665, c = 3.589, \a = 76.65_, \b = 103.67_, \g = 109.10_
a = 20.32, b = 5.79, c = 9.17, \b = 91.28

a = 6.276, b = 14.561, c = 10.012, \b = 107_05'

a = 14.90, b = 6.98, c = 10.13, \b = 113.07

a = 10.330, c = 37.103
a = 10.00, b = 9.73, c = 5.471, \b = 93.8_
a = 8.53, c = 20.16
a = 7.873
a = 12.896, b = 12.511, c = 11.634
a = 8.99, b = 9.36, c = 4.95
a = 10.06, b = 8.75, c = 8.32, \b = 114.3_
a = 13.46, b = 3.102, c = 18.17, \b = 91.60_
a = 14.90, b = 6.65, c = 6.77, \a = 117_26', \b = 100_35', \g = 89_10'
a = 14.80, b = 18.50, c = 7.31
a = 6.22, b = 3.63, c = 10.52, \b = 90.53_
a = 13.94, c = 9.34
a = 5.316 (or 5.136), b = 9.149, c = 18.994, \b = 99.96_
a = 9.23, b = 9.21, c = 9.52, \a = 92.7_, \b = 92.4_, \g = 90.1_
a = 5.860
a = 9.83, b = 18.062, c = 5.300, \b = 104.4_
a = 10.963
a = 14.30, c = 3.32
a = 5.252 kX, b = 8.828, c = 6.544
a = 7.66, b = 10.31, c = 6.69
P2/m: a = 4.19, b = 4.08, c = 15.56, \b = 101.35_   C2/m: a = 7.21, b = 4.08, c = 15.50, \b = 98.75_
a = 9.52, b = 11.47, c = 5.10, \b = 91.18
a = 12.20, b = 13.17, c = 9.79, \b = 108.00
a = 12.20, b = 13.17, c = 9.79, \b = 108.00
a = 4.829, b = 5.759, c = 4.998, \b = 91.16_
a = 4.750, b = 5.72, c = 5.06, \b = 90.00?

a = 7.934, b = 7.334, c = 7.075, \a = 89.95_, \b = 95.26_, \g = 103.45_
a = 11.95, b = 13.99, c = 7.02
a = 5.312, b = 9.163, c = 9.825, \b = 103.18
a = 6.975, c = 16.30
a = 8.42, c = 9.28
a = 6.058, b = 6.656, c = 14.360, \b = 93_28'
a = 5.435, c = 12.11
a = 3.820, c = 6.260
a = 4.296
a = 11.25, b = 7.09, c = 20.80 or a = 11.25, b = 7.09, c = 16.83
a = 10.174, b = 9.548, c = 5.766, \b = 92.98_
A2/a: a = 16.98, b = 6.21, c = 11.99, \b = 110_10'   C2/c: a = 12.06, b = 6.26, c = 17.08, \b = 110_0'
a = 6.70, b = 8.85, c = 6.54, \a = 92.1_, \b = 110.2_, \g = 93.2_

a = 6.904, c = 6.035
a = 7.17, b = 22.22
a = 6.759, c = 4.720
a = 13.65, b = 4.078, c = 20.68, \b = 93.0_
a = 9.970
a = 14.102, b = 6.908, c = 10.673, \b = 111.266_
a = 12.140, b = 14.318, c = 11.662
a = 17.029, b = 3.678, c = 7.007, \b = 90.34_

a = 6.315
a = 10.09, c = 14.29
a = 8.74, b = 5.53, c = 4.51
a = 3.800, c = 67.26
a = 8.12, b = 5.14, c = 7.82, \b = 94.4_
a = 18.392
a = 5.604, b = 11.602, c = 9.058, \a = 92_10', \b = 100_54', \g = 77_18'

a = 12.868, c = 9.821

a = 15.04, b = 10.63, c = 7.052
a = 5.875, c = 22.940
a = 3.948
a = 8.10, b = 5.78, c = 7.28, \b = 106_
a = 12.759, b = 18.369, c = 5.024, \b = 91.98_
a = 7.00, b = 14.71, c = 5.39, \a = 93.5, \b = 90.2, \g = 95.3

Orthorhombic: a = 5.299, b = 10.986, c = 7.496, cubic: a = 10.3
a = 5.34, b = 10.94, c = 5.07, \b = 95_18'

a = 6.95, b = 8.64, c = 5.77, \b = 104.93_
a = 6.72, b = 13.98, c = 10.05, \b = 111.3_

a = 2.4869, b = 1.6756, c = 0.7057
a = 3.21, b = 11.3
a = 18.475, b = 19.454, c = 3.771, \a = 95_14.40', \b = 91_28.80', \g = 80_14.40'
a = 7.015, c = 16.365
a = 14.58, c = 37.71
a = 15.22, c = 11.52
a = 6.16
a = 3.747, c = 6.226
a = 14.330, b = 17.354, c = 10.164
a = 11.220, b = 19.252, c = 4.933
a = 9.41, c = 7.64
a = 9.34, b = 9.34, c = 13.2, \a = 90_, \b = 110_, \g = 120_
a = 7.18, c = 21.06

a = 16.67 kX, c = 12.51
a = 5.07, c = 9.82
a = 10.094, b = 8.020, c = 7.711, \b = 110.43_

a = 2.6591, c = 4.9353

a = 3.242, c = 5.176
a = 10.488, b = 17.819, c = 7.185, \b = 100_50
a = 7.35, b = 18.16, c = 7.28, \a = 93_50', \b = 101_30', \g = 99_22'

a = 44.14, c = 8.62
a = 5.27, b = 9.09, c = 20.14, \b = 100.0_
a = 7.14, b = 17.34, c = 4.43
a = 6.612, c = 5.994

a = 25.92, b = 11.62, c = 5.532
a = 12.431, b = 7.224, c = 11.483, \b = 100.33_
a = 10.29, c = 13.11
a = 16.2-16.3, b = 5.45-5.63, c = 10.04-10.21
a = 23.9, b = 7.23, c = 14.25
a = 18.698, b = 6.492, c = 4.577
a = 13.925
a = 11.65, c = 28.688
a = 4.02
a = 12.046, b = 6.446, c = 9.888, \b = 107.42
a = 20.853, b = 7.033, c = 36.991

SOURCES,C,254
Uintah County, Utah, USA
Temple Mountain, Emery County, Utah, USA; Cave Hills and Slim Buttes areas, Harding County, South Dakota, USA
Sharm Abhur, Red Sea, Saudi Arabia
Silver Plume district, Clear Creek County, Delores County, Summit County, Cripple Creek district, Colorado, USA; Broken Hill
L'vov-Volynskii basin, FSU
Cerro de Cacheuta, Mendoza, Argentina
Common mineral widespread including California, USA; Alaska; Canada; England; Japan; Madagascar; New Zealand; Scotla
Utah, California, Nevada, USA; Mapimi, Durango, Mexico; Algeria; Chile; France; Germany, Greece; Italy; Namibia; Turkey
L†ngban, Sweden; Nordmark at Jacobsbeg; Franklin, Sussex County, New Jersey, USA
Near Admont, Styria, Austria
California, USA
Green River Formation in Utah, Wyoming, Colorado; California, New Mexico, Washington, Montana, South Dakota, Arkansas
California, USA; Greenland; Pantelleria Islanad, Mediterranean Sea; East Africa; Nigeria
Cornwall, England, UK; Johanngeorgenstadt, Sachsen, Germany
Hitter", Norway; Urals, FSU and Bayan-Obo, China
Inner Mongolia, China
Virginia, USA; Madagascar and Swaziland, Africa; Hitter", Norway; Switzerland; Urals, FSU;
Badakshan, Afghanistan

California, USA; Kimberley, South Africa; Antrim County, Ireland; Laacher See District, Germany
Laurion, Greece
Cornwall, England; Tintic district, Utah, USA; Bou-Skour, Morocco; Gallinas Mountains, New Mexico; Germany
western USA
Kipawa River, T,miscamingue County, Quebec, Canada
Margnac, Massif Central, France
Guanaguato, Mexico; Naratoto Valley, New Zealand; Washington County, Utah; Chelan and Republic Ferry counties, Washin
Central Cordillera, Bolivia
Ural Mountains, FSU; Colorado, Utah, Idaho, North Carolina, Virginia, Arizona, USA; Bulgaria; Canada; Czech Republic; Fran
Arizona, USA; Messina, Transvaal, South Africa
Arizona, USA; Iwate Prefecture, Japan; White Island volcano, New Zealand
Eastern Otago, New Zealand
Karagandin region, Kazakhstan, FSU
California, Colorado, New Mexico, USA; Canada; Ireland; Israel; Italy; Japan; Java; Mexico; Romania; FSU
Sussex County, New Jersey, USA; L†ngban, Sweden
Kazakhstan, FSU
Yakutia, Gornyi Altai, FSU
California, Arizona, Nevada, Montana, San Juan, Colorado, USA; Asia Minor; France; Germany; Japan; Mexico; Peru; Roman
Pinal County, Arizona; Sonora, Mexico; Tsumeb, Namibia
Arizona, California, Colorado, New Mexico, South Dakota, Wyoming, USA; Austria; Brazil; Canada; England; France; German
Adelaide, South Australia, Australia
Kazakhstan, FSU
Sutamskii region, Stanovio Range, FSU
Mariposa County, Fresno County, California, USA, Mexico
Houghton County, Keweenaw County, Baraga County, Michigan, USA; Chile; Tsumeb, Namibia
Sussex County, New Jersey, USA; L†ngban, Sweden
Widespread in USA; Canada; China; Germany; Greenland; Japan; Madagascar; Norway; Sweden
Ontario, Canada
New Jersey, North Carolina, California, Washington, Colorado, USA; Wales

Oravicza, Romania; Germany; Japan; FSU
western USA, Pennsylvania, Massachusetts, USA; Brazil; Germany; Japan; Sardinia; Devonshire, England
South Dakota and New Hampshire, USA; France; Finland; Rwanda; Germany
Widepread, USA; Wrangell, Alaska; Australia; Austria; Brazil; Canada; Greenland; India; Japan; Madagascar; Norway; Sri Lar
Cumberland, Durham, Northumberland, England; Cave-in-Rock, Illinois, USA
North Carolina, Colorado, Madera, Nevada, California, USA; Kalgoorlie, Western Australia; Canada; Chile; India; Sweden; FS
Modum, Norway; Portugal
Forty Mile River, Alaska, USA
Tadzhik SSR, FSU
Siberia, FSU; California, USA; Belgium; Germany; Japan
Guanaco, north-eastern Chile
Kola Peninsula, FSU
Widespread in western USA; Australia; China; Czech Republic; Hungary; Italy; Newfoundland; Spain
Utah, California, New Mexico, Arizona, Colorado, North Carolina, New York, USA; NSW, Australia; Canada, Chile, Czech Rep
north-western Kara-Tau, Kirgiz SSR, FSU
Yakut, FSU
Santa Maria Mountains, Riverside County, California, Pennington County, South Dakota, USA; Chile
Tierra Amarilla, Chile
California, USA
Klaipeda, Lithuania
South Dakota, Arizona, New Mexico, California, New Hampshire, Maine, USA; Brazil; Czech Republic; France; Germany; Swe
Salta, Argentina
Massachusetts, Arizona, USA; Canada; FSU
western USA
Hegan, Germany
L†ngban, Sweden; Tuva, FSU
Tuscany, Italy
Lake County, California, Utah, USA; Czech Republic
Gumma Prefecture, Japan
Widespread many localities, USA; Australia; Canada; Czech Republic; Germany; Iceland; Ireland; Italy; Norway; Scotland
North Western Province, Sri Lanka
Kings County, California, New Hampshire, USA; Germany; Spain; FSU
Widespread; many localities, in California, Colorado, Washington, Arizona, Massachusetts, Montana, North Carolina, Utah, V

Montana, USA; Mont St Hilaire, Canada; Greenland; Italy; Norway; FSU
Widespread, USA; Australia; Austria; Brazil; Canada; France; Germany; Korea; Scotland; Spain; Sweden; FSU
Yavapai county, Arizona, Utah, New Mexico, McKinley County, Pennsylvania, USA
California, Colorado, Minnesota, New York, North Carolina, Utah, Washington, USA; Argentina; France; Germany; India; Italy
Inyo county, California, USA; Australia; Bolivia; Canada; Czech Republic; France; Romania
Widespread. Garnet Hill, Calaveras county, California, USA; Australia; Czech Republic; Korea; Norway; Romania; Sweden; S
Mt. Nyiragongo, eastern Democratic Republic of Congo
Cornwall, England, UK
Tibet, China
Cerro Pululus tin mine, north-western Argentina
Widespread. Utah, USA; Tsumeb, Namibia; Mexico; Morocco; Broken Hill, Australia; Dundas, Tasmania; Argentina; Brazil; Ne
Widespread. South Dakota, USA; Austria; Chile; France; Germany; India; Poland
Akita, Japan; Lower Silesia, Poland
Widespread. South Dakota, USA; Algeria; Styria, Austria; Colombia; Czech Republic; England; France; Hungary; Namibia; Fo
Nevada, Los Angeles, Santa Cruz, California, Colorado, Washington, Michigan, USA; Austria; Canada; Germany; Greece; Bo

Uncertain
Widespread. Grass Valley, Nevada county, California, Utah, Colorado, USA; Australia; England; Finland; Greenland; India; Ita
Colorado, New Jersey, USA; Antarctica; Australia; Germany; Italy; Kenya; Mongolia; Norway; Sicily; Scotland
San Bernardino County, California, USA; Victoria Land, Antarctica
Mt Misobo, Kalima, Democratic Republic of Congo; Rwanda; Uganda;
Calumet, Michigan, USA
Widespread. Arizona, California, Colorado, Montana, New York, North Carolina, Pennsylvania, USA; Austria; Canada; Czech
Widespread, USA; Australia; Austria; Brazil; Canada; England; Finland; Germany; New Zealand; Italy; Poland; Switzerland
Sonora, Mexico; Sardinia
Widespread. Kern county, California, USA; Australia; Borneo; Bulgaria; Canada; Chile; Czech Republic; England; France; Ge
Widespread; Arizona, Alaska, USA; Czech Republic; Chile; Mexico; Germany; FSU
Gila County, Arizona, USA
Widespread. Tennessee, USA
Searles Lake, San Bernardino County, California, Inyo County, California, USA; Cocklebiddy, Western Australia; China; Germ
Tennessee, Utah, USA; Czech Republic; Italy; Mozambique
Walton, Nova Scotia, Canada
Apuan Alps, Italy
Widespread. Riverside county, California, USA
Many localities. Arizona, Colorado, South Dakota, New Mexico, Washington, Wyoming, USA; Austria; Czech Republic; Engla
Chocoya, Potosi, Bolivia; Argentina
Trabuco Canyon, Orange County, California, USA; Latium, Italy
Petrogale Cave, Madura and Nullabor, Western Australia, Australia
Kola Peninsula, FSU
Madjarovo deposit, Bulgaria; Sweden
Transylvania, Romania; Moorba Cave, Jurien Bay, Western Australia
Ardennes, Belgium
Widespread, Colorado, New Hampshire, Washington, USA; Mont St Hilaire, Canada; Czech Republic; Greenland, Finland, FS
Widespread, many localities western USA; Bolivia; Chile; Czech Republic; England; Germany; Mexico; Norway; Sardinia
Utah, Colorado, South Dakota, USA; Cornwall, Yorkshire, England; Rio Tinto, Spain
Noril'sk region, FSU; East Finland; Manitoba
Czech Republic; Sachsen, Germany; Broken Hill, Australia
Pyrenees, France
Colquechaca, Bolivia; Germany; Utah, USA
Arhbar mine, Bou-Azzer, Morocco
Salta, Argentina; Death Valley, California, USA
Tranquility Base in moon rocks; Garfield county, Montana, USA; Greenland; South Africa; Ukraine; FSU
L†ngban, Sweden
Kongsberg, Norway; Quebec, Canada
Khan-Bogdinskii massif, Mongolia
South Dakota, Newport, New Hampshire, USA; Yukon, Canada; Brazil; Rwanda
Tsumeb mine, Namibia; Schwarzwald, Germany
Tsumeb, Namibia
Widespread. Inyo, Monterey, Nevada counties, California, South Dakota, USA; Western Australia; Borneo; Canada; Chile; Fra
Many localities, Utah, South Dakota, USA; Dome Rock, South Australia; Austria; Canada; France; Germany; Mexico; Tsumeb
Utah, USA
L†ngban, Sweden
Baden-W□rttemberg, Germany
Clara Mine, central Schwarzwald, Germany
Sudbury District, Ontario, Canada

Cerny Dul, Czech Republic; Chile; Germany; France
California, Kansas, Nevada, South Dakota, USA; Canada; Cerny Dul, Czech Republic; France; Germany; Hungary; Italy; Peru
Minas Gerais, Brazil; Montana, USA; northern Finland
Widespread. USA; Austria; Bolivia; Canada; Czech Republic; England; Germany; Hungary; Italy; Japan; Mexico; Norway; Sw
Bor, eastern Serbia; Armenia; Japan
Sachsen, Germany; Quespisiza, Chile
Tsumeb, Namibia; Morenci, Arizona, USA
Central Schwarzwald, Germany
FSU
Cornwall, England
San Benito County, Fresno County, California, Nevada, New York, New Jersey, Pennsylvania, Vermont, USA; Aosta, Italy
Southern Binnatal, Switzerland
Alto Adige, Italy
Lipov deposit, Middle Urals, UFSU
Salzberg, Austria
Altai Mountains, north-western China
Mont St. Hilaire, Quebec, Canada; Narsarsuk, Greenland
Sachsen, Germany
Widespread. Colorado, Washington, Arkansas, USA; Quebec, Canada; Greenland; Norway; Iles de Los, Guinea
Widespread. Goffs, San Bernardino, California, Utah, South Dakota, Arizona, USA; Moonta, South Australia; Argentina; Austr
Sachsen, Germany
Northern Saskatchewan, Canada; Czech Republic; France
Minas Gerais, Brazil
Bushveld Igneous Complex, South Africa
V„stan†, southern Sweden
Antofagasta Province, Chile
Widespread. White Mountain, Mono county, California, South Dakota, Maine, USA; Bolivia; Brazil; Canada; Rwanda; Uganda
Widespread, many localities, USA; Canada; Czech Republic, Finland, Germany, Greenland; India; Italy; Japan; Namibia; Nor
Many localities. Arizona, Utah, California, USA; Congo; England; France; Greece; Italy; Japan; Namibia; Romania; Scotland;
Noril'sk region, FSU
Hamilton, Nevada, USA
Northwest Territories, Canada; FSU; Former Yugoslavia; Zimbabwe
Utah, Arizona, Washington, New Jersey, USA; Bolivia; Greece; Mexico; Morocco; Tsumeb, Namibia
California, Colorado, South Dakota, Utah, Washington, USA; Brazil; Cornwall, England; France; Germany; Iran; Japan; Demo
Mt. Zirabulaksk region, Bukhara, FSU
Mt. Vesuvius, Italy
Awarua Bay, New Zealand; Oregon; Canada; Norway; Japan; Tasmania
Canton Graubnnden, Switzerland
Siberia, FSU
Widespread; Bisbee, Arizona, New Mexico, Nevada, Utah, Washington, California, USA; Broken Hill, Australia; China; France
Siberia, FSU
Arizona, Massachusetts, New Jersey, USA; Devon, England; Germany; India; Italy; Norway
Montana, USA; Austria; Brazil; Canadian Arctic Archipelago; Italy; South Africa; FSU
North Carolina, USA; Mongolia
Qala-Dizeh region, north-eastern Iraq
Bahia, Brazil
California, USA; Mexico; Turkey
Piemonte, Italy
Hunan, China

Stara Planina, Bulgaria
eastern Sayan, central Kamchatka, FSU
Sonora, Mexico
Caernarvonshire, Wales; L†ngban, Sweden
Mina Quetena, Chile

Izalco Volcano, El Salvador
New Jersey, USA; Caernarvonshire, Wales; Broken Hill, NSW, Australia; Japan
Montana, USA; China
Mt. Vesuvius, Italy; Schwarzwald, Germany
Tadzhikistan, FSU
Barberton district, Transvaal, South Africa; Cunnigsburgh, Scotland; Dundas, Tasmania
South Dakota, USA; Brazil
Kola Peninsula, FSU
Mounana, Gabon
north-eastern Yukon Territory, Canada
San Benito county, California, USA
Minas Gerais, Brazil
near Mbeya, Tanzania
Widespread. South Dakota, California, Colorado, USA; Czech Republic; France; Germany; Norway; Romania
Schramberg, Germany; Czech Republic; France; New Jersey, USA
Grand County, Utah, USA
Sardinia, Italy
Deep Space
Rainbow Falls, Barrington Tops, NSW, Australia
Tsumeb, Namibia
Humboldt County, California, USA
New Jersey, Colorado, USA; Canada; Norway; Sweden
New Jersey, USA; L†ngban, Vermland, Sweden
Cumberland, England, UK; L†ngban, Sweden; Sachsen, Germany
Kola Peninsula, Russia
Utah, Kansas, Iowa, Indianan, Tennessee, Maryland, Arizona, Virginia, USA; England; France
Mt. Vesuvius, Italy; Nova Scotia; Arizona, USA; Switzerland; Tunisia
Arizona, Utah, USA; Cornwall, England
San Bernardino County, California, Colorado, USA; Sweden and many other localities
Kazakhstan, FSU
central Aldan, FSU
Valais, Switzerland
New Jersey, USA
Weipa, Queensland, Australia
San Diego County, Virginia, North Carolina, California, USA; Austria; Czech Republic; Germany; Italy; Poland; Switzerland; T
Mongolia
Hatrurim, Israel; Sussex, England
Tsumeb, Namibia; Cornwall, England; France; Pima County, Arizona, USA
Arizona, New Mexico, Wyoming, Colorado Plateau region, USA; Morocco
Canton Berne, Switzerland
Inverness-shire, Scotland
Kazakhstan, FSU; Austria; Italy; Switzerland
Kazakhstan, FSU

Utah, USA
Katanga, Democratic Republic of Congo; Colorado, USA
Manjaka, Madagascar
Texas, Colorado, Utah, USA; Quebec, Canada
Colorado, USA
western Moravia, Czech Republic
Chuquicamata, Chile
Kola Peninsula, FSU
California, Washington, Arizona, New Jersey, USA; L†ngban, Sweden; Broken Hill, New South Wales, Australia
Uchucchacua, Peru; Sweden
California, Texas, USA; Owithe Valley, Belguim
Nye County, Nevada, USA; eastern Karamazasr, Soviet Central Asia
Arkansas, Illinois, USA; L†ngban, Sweden
Hatrurim Formation, Southern Israel
South Dakota, New Hampshire, Alabama, Arkansas, New Jersey, North Carolina, Maine, Pennslyvania, USA; Australia; Belgi
north-western FSU
Lasamba Hill, Kwale, Kenya
Streuberg near Bergen, Vogtland, Sachsen, Germany
L†ngban, Bergslagen region, Sweden
N„sum, Sweden
Arizona, South Dakota, California, Maine, Alabama, USA; Argentina; Brazil; France; Germany; Madagascar; Portugal; Rwand
Broken Hill, New South Wales, Australia
Cerro de Potosi, Bolivia
Ivigtut, Greenland; Owen Lake, Canada; Colorado, USA; Sweden

Corby, Northamptonshire, England; Ayrshire, Scotland
Widepsread. California, Colorado, New Jesey, USA; Australia; Bolivia; Canada; China; Chile; Czech Republic; England; Franc
Rwanda; Ankole, Uganda
California, Colorado, South Dakota, Maine, New Hampshire, Connecticut, Virginia, USA; Australia; Czech Republic; England;
Widespread. San Diego county, California, Utah, South Dakota, Colorado, North Carolina, USA; Afghanistan; Africa; Austria;
Kola Peninsula, FSU
Maine, USA; Brazil; England
Nevada, USA; Argentina; Canada; Czech Republic; Germany; Sweden
L†ngban, Sweden
far-eastern FSU
Colorado, California, New Mexico, USA; Canada; Brazil; India; Manchuria; Norway; Pakistan; Peru; Spain; FSU
Germany; Tsumeb, Namibia; FSU; Bulgaria; Japan; Turkey
Kazakhstan, FSU
Widespread. Arizona, Utah, South Dakota, USA; Western Australia; France; Germany; Greece; Japan; Mexico; Tsumeb, Nam
Los Aleros, San Luis, Argentina
Arizona, California, Colorado, Arizona, New Mexico, USA; Sachsen, Germany
Bulgaria; Italy; Olkusz, Poland
Okayama Prefecture, Japan; Northern Ireland
Pinal County, Arizona, USA
Trinity County, California, Arizona, USA; Austria; Chile; France; Germany; Salzburg; Switzerland; Zimbabwe

Shaba, Democratic Republic of Congo
Cleveland County, North Carolina, USA; Bikita, Zimbabwe
Shinkolobwe, Katanga, Democratic Republic of Congo

East Tintic district, Utah, USA
Arizona, California, Idaho, Nevada, South Dakota, Utah, Washington, USA; Algeria, Australia, Austria, Bolivia, England, Italy,
Common mineral, widespread. Alaska, USA
Murra El Elevyn Cave, Western Australia, Australia; Guanape Island
Lardarello, Tuscany, Italy
Arizona, California, Massachusetts, New Hampshire, New Jersey, Utah, Washington, USA; Quebec, Canada; Mexico; Scotlan
Utah, USA; Strassfurt, Vienenburg, Leopoldshall, northern Germany
Arizona, California, Colorado, Connecticut, New Mexico, New York, North Carolina, South Dakota, Utah, USA; Bolivia, Czech
Nevada, Utah, USA; New South Wales, Australia; Namaqualand, South Africa
Widespread, many localities. San Diego county, California, USA
Arizona, California, Colorado, Connecticut, South Carolina, Utah, Washington, USA; Australia; Bolivia; Brazil; Canada; Czech
Arizona, California, Colorado, Connecticut, Montana, New York, Pennsylvania, South Dakota, Utah, USA; Bolivia, Canada; Po
Ullersreuth, Gersdorf, Sachsen, Germany; Cornwall, England; Yinietharra, Western Australia
Buganda, Uganda
Schwarzwald, Germany
Uganda, Africa; Brazil; New Mexico, USA
Madagascar; Western Australia; North Carolina, USA
Arizona, Utah, USA; Argentina; Mexico; India; South Africa; Spain; Sweden
New Hampshire, Arizona, USA; Rwanda
Nevada, USA; Sonora, Mexico.
L†ngban, Sweden; Somerset, England; Laurium, Greece
California, Colorado, Kentucky, New Mexico, Utah, USA; Austria; Chile; china; Germany; India; Poland; Sicily; Turkey; FSU
central Manitoba, Canada
Minnesota, USA; Western Australia; New Zealand; Norway; Chile
California, Georgia, Washington, USA; Canada; France; Germany; Hungary; Italy; Norway; Scotland and elsewhere
Kazakhstan and Far Eastern FSU
Ivigtut, Greenland
Julienehaab, Greenland; Kletna, Poland
Kara-Tau, FSU
Baha California, Mexico
near Pontevedra, Spain; Kivu, Democratic Republic of Congo
Widspread in uranium deposits. Utah, USA
Bon Accord, Barberton area, Transvaal, South Africa
Lillooet area, British Columbia, Canada
central Rhodopian Mountains, Bulgaria
Kola Peninsula, FSU
Alameda County, California, USA; Rh“ne, France
Louisiana, USA
Kramer, Kern county, California, USA
Siberia
Czech Republic
Noril'sk region, FSU
Kola Peninsula, FSU
Harz, Germany
Alaska, Arizona, California, Colordao, Connecticut, Montana, North Carolina, Virginia, USA; Canada; Chile; England; German
Karelian, FSU
New Jersey, USA
Cornwall, England, UK; Laurium, Greece
Arizona, California, Ohio, Pennsylvania, USA; Argentina; Bulgaria; Chile; France; Germany; Iran; Mexico; Sweden

California, Colorado, Idaho, Nevada, South Dakota, Utah, Washington, USA; Algeria; Australia; Bolivia; Canada; China; Czec
central western USA; Australia; Bolivia; Canada; Chile; Czech Republic; England; France; Germany; Hungary; Italy; Mexico; F
California, Pennsylvania, USA; Tuscany, Italy
southern Schwarzwald, Germany
Karibib district, Namibia
MerumeRiver, Guyana
Cordoba Province, Argentina
Wyoming, USA
Transvaal, South Africa; Montana, USA; Ontario, Canada
Grand County, Utah, USA
Dyfed, Wales
Sussex County, New Jersey, USA; V„rmland, Sweden
central western USA; Canada; France; Morocco; Spain; South Australia
central western USA; Brazil; Italy; Germany; India; Norway; South Africa; Sweden
Bohemia, Czech Republic; Germany
Arizona, Arkansas, California, Colorado, Georgia, Texas, Utah, Washington, USA; Brazil; Germany; India; Italy; Norway; Pana
Alaska, Arizona, Colorado, USA; Austria; England; Germany; Spain; Sweden
Maine, New Hampshire, USA; Brazil
Texas, USA; County Antrim, Ireland; Israel
Ontario, Canada; Australia; Germany; India; Norway; Spain; FSU
Eifel, Germany
Mendocino county, California, USA; France; Germany; Ireland; FSU; Argyllshire, Scotland;
Deep Space
Deep Space
Katanga, Democratic Republic of Congo; Tsumeb, Namibia

Marmara bauxite deposit, Greece
Il¡maussaq intrusive, Greenland
Fukushima, Japan
central western USA; Australia; Chile; England; France; Germany; Greece; Italy; Mexico; Namibia; Spain; FSU
Colorado, Wyoming, USA; Quebec, Canada; Bohemia, Czech Republic; Switzerland
Arizona, California, Colorado USA; Broken Hill, Australia; Chile; France; Germany; Mexico; FSU
L†ngban, Sweden; Transbaikalia, FSU
Widespread USA; Austria; Brazil; Canada; Czech Republic; England; France; Italy; Norway; Switzerland; Wales
Eifel district, Germany; Israel
Widespread USA; Austria; Canada; England; Italy; Scotland, Sweden; Turkey; FSU
Oficina Lautero, Chile
Colorado, USA; Canada; Western Australia; Italy; Japan
Tsumeb, Namibia
Virginia, USA; Algeria; Quercy, France; Aves Island, Caribbean Sea and widespread throughout the world
Deep Space
Lake county, California, Idado USA; Queensland, Australia
San Luis Potosi, Mexico
many localities in western USA
Czech Republic; France
Bohemia, Czech Republic
northern Schwarzwald, Germany
Kimberley district, South Africa; Crestmore quarry, Riverside, California, USA
Sachsen, Germany, Kambalda, Western Australia.

Giseny Province, Rwanda
Montana, USA
Moctezuma, Sonora, Mexico
Searles Lake, San Bernardino County, California, Washington USA; Kenya; Turkey; Uganda
Uludag, Turkey
central Morocco
New Jersey, USA; Cornwall, England, UK; Broken Hill, Australia; L†ngban, Sweden; Japan
Arizona, Utah, USA; Argentina; Chile
Likasi, Katanga, Democratic Republic of Congo; Pima County, Arizona, USA
Sonora, Mexico
Bytown, Ontario, Canada; Montana, South Dakota, Oklahoma, Minnesota, Wisconsin, USA; England; Iceland; Japan; Scotlar
Noril'sk district, FSU
Widespread USA; Australia; Belgium; Czech Republic; France; Germany; Sweden
Vilui River Basin, eastern Siberian Platform, FSU
Turinsk, FSU
Tarapac Province, Chile
southern Binnatal, Valais, Switzerland; Novara Province, Piemonte, Italy
Kola Peninsula, FSU
New Jersey, USA; Italy; Norway
Widespread in USA; Kalgoorlie, Australia; Canada; El Salvador; Fiji; Japan; Philippine Islands; Mexico; Romania; FSU
Turlinsk deposit, Ural Mountains, FSU
Dashkesan, Caucusus Mountains, Azerbaijan, FSU
Battenberg, Bayern, Germany
Kola Peninsula, FSU
Arizona, California, Colorado, Utah, USA; Germany; Namibia; Democratic Republic of Congo
Common mineral very widespread. Michigan, Tennessee, USA; England; France; Mexico; Norway;

Northern Baikal, FSU
Yenisei region, FSU
Museums
FSU
Otjosondu, Namibia
central western USA; Australia; Canada; Chile; England; France; Germany; Tsumeb, Namibia; Sardinia; Scotland; FSU

Montana, USA; Khanneshin, Afghanistan
Nye County, Nevada, USA
Arkansas, Arizona, California, Oregon, USA; England; France; Germany; Mexico; Spain
Calumet, Michigan, USA; Laurium, Greece
northern border of Siberian platform, Eastern Siberia, Kola Peninsula, FSU; Brazil
Tuscany, Italy
New Jersey, USA
Khibina Tundra, FSU
Piedmont, Italy
Colorado, Maine, USA; Brazil; Canada; China; Finland; Germany; India; Kenya; Korea; Uganda; FSU; Democratic Republic o
Colquechaca, Bolivia; Czech Republic; Germany; Japan; Portugal
Lipari Island, Italy; Japan; Switzerland; FSU
Langesundfjord, Norway
Atacama Province, Chile
Naples, Italy

China
Kola Peninsula, FSU; Ontario, Canada; near Khanneshin, Afghanistan
central Pyrenees, France
Arizona, California, Massachusetts, USA; Kara-Tau, FSU
South Dakota, USA
Arkansas, Maine, New Hampshire, South Dakota, Wyoming, USA; France; Greenland; Germany; Norway; FSU
Mont St. Hilaire, Quebec, Canada
Sonora, Mexico
Bayern, Germany
Nevada, USA
Italy
Deep Space
Durango, Mexico; Tsumeb, Namibia; Broken Hill, Australia; England; Germany; Colorado, New Jersey, Nevada, Utah, USA
south-western New Mexico, USA; Canada; Spain; Germany; FSU
Olary, South Australia; Arizona, South Dakota, Pennsylvania, Utah, Wyoming, USA; Gabon; Morocco; FSU; Democratic Repu
Mt. Vesuvius, Italy
Ardennes, Belgium; Czech Republic; Germany; FSU; Former Yugoslavia
Kalgoorlie, Western Australia, Australia
Maryland, USA; Kalgoorlie, Western Australia; Bulgaria; Chile; Japan; Sweden; Zambia
V„rmland, Sweden
L†ngban, Sweden; Japan; North Carolina, USA
Baveno, Italy
Wolf Creek Meteorite Crater Western Australia, Australia
Widespread, USA; Australia; Bolivia; Brazil; China; Czech Republic; England; Finland; France; Germany; Italy; Japan; Malay
Deep Space
Mont St. Hilaire, Quebec, Canada; Arkansas, USA; Islands of Los, Guinea; Madagascar; Norway; FSU
Katanga, Democratic Republic of Congo; North Carolina, USA
Malheur County, Oregon; Columbia County, USA; Bombay, India
Qu,bec, Canada
Bayan Obo, inner Mongolia, China
Colorado, USA; County Antrim, Ireland; South Africa
Bohemia, Czech Republic
Planitz, Zwickau, Poland
South Bass Is., Lake Erie, Ohio, and widespread USA; Austria; Belgium; Egypt; England; France; Germany; Italy; Madagasca
Alaska, California, USA; Australia; Czech Republic; Greece; Italy; Namibia; Sweden; FSU; North Wales, UK
Brazil; Sudbury, Ontario, Canada; Republic of Burundi

Wisconsin, USA
California, Colorado, New York, USA; Quebec, Canada; Korea; Sweden; FSU
South Dakota, USA; Manitoba
Kigezi district, Uganda
Cornwall, England, UK; Chile
Widespread USA; Broken Hill, Australia; Morocco; New Zealand; Tsumeb, Namibia; Tasmania; Sardinia; Scotland; Zambia
Algeria; Bolivia; Hungary; Former Yugoslavia
Latium, Italy
Sonora, Mexico
Alai province, Tadzhikistan, FSU
Widespread, USA; Australia; Czech Republic; Germany; Greenland; Hawaii; Hungary; Ireland; Italy; Scotland; Sicily; FSU and
Hautes-Alpes, France; Hokkaido, Japan

Arizona, California, Colorado, Montana, New Mexico, Nevada, Tennessee, USA; Chile; England; France; Germany; New Zea
Widespread USA; Australia; Austria; Brazil; Canada; Czech Republic; England; France; Germany; India; Italy; Japan; Madaga
Bisbee, Arizona, USA; Belgium
Widespread, USA; Africa; Australia; Chile; Czech Republic; England; Germany; Mexico; Namibia; Peru; Spain
Mt. Vesuvius, Italy; El Salvador, Central America
Sierra Famatina, Mendoza province, Argentina; Bolivia
Harz Mountains, Germany; Western Australia
Arizona, California, Colorado, New Jersey, South Dakota, Utah, USA; Japan; Mexico; Poland; South Africa; Tasmania, Austr
Arizona, Nevada, Utah, USA; Austria; Chile; England; France; Germany; Hungary; FSU
Arizona, Montana, New Mexico, Tennessee, Utah, USA; Australia; Austria; Czech Republic; England; France; Germany; Italy
Arizona, USA; Cornwall, England; Germany
Harz Mountains, Germany; Bolivia; Czech Republic; France; Greenland; Morocco; Spain; FSU
Ilimaussaq massif, Greenland
Widespread USA; Australia; Bolivia; Chile; England; France; Germany; Hungary; Mexico; Japan; Tsumeb, Namibia; FSU; Der
Texas, USA; Carpathian region, FSU
Puy-de-D“me, France
Valais, Switzerland; Czech Republic; England; France; Germany and elsewhere
southern Kirin, China
Taurus Mountains, south-western Turkey
Ries Crater, Germany
Cobalt, Ontario, Canada; Czech Republic; Germany; Italy; Mexico
New Jersey, USA
near Charo River, Aldan Shield, FSU
eastern Uzbekistan, FSU
Kazakhstan, FSU
Arizona, Utah, USA; Broken Hill, Australia; Chile; Tsumeb, Namibia; Germany; Democratic Republic of Congo
Leadhills, Scotland, UK
Travancore, southern India
Koriakskho-Kamchatskaya fold zone,FSU

eastern Telpos-iz, Polar Urals, FSU; Pizzo Cerrandone, Switzerland-Italy border
Kara Tau, Kazakhstan, FSU
Mounana, Gabon
Autun, Sa“ne-et-Loire, France
Ural Mts., Russia, FSU
Chiavenna, Lombardy, Italy; Oslo Region, Norway
Devon, England
Ivigtut, Greenland; Urals, FSU
Julianehaab district, Greenland; Kola Peninsula, FSU
Mt. Vesuvius, Italy
Loudon county, Virginia, USA; Ontario, Canada; Kanagawa Prefecture, Japan; Norway
Western USA; Chile; Broken Hill, Australia; Bolivia; Chile; England; France; Italy; Peru; Spain; FSU
Ural Mts., Russia, FSU
Siberian platform (S), Russia, FSU
Mt. Vesuvius, Italy
New Jersey, USA
Mt. Vesuvius, Italy
Somerset, England, UK
Tombstone, Arizona, USA; Sonora, Mexico; Arabia

Arizona, California, New York, USA; Ontario, Canada; Finland; South Africa; Sweden
north-central Nevada, USA
Jordan; Hatrurim Formation, Israel
Karelia, FSU
northward from Santa Barbara county, California, Maryland, North Carolina, New York, Oregon, Pennsylvania, Washington, W
Sichuan, China
Arizona, Colorado, Connecticut, Maine, New Hampshire, New York, USA; Australia; Austria; Brazil; Burma; Czech Republic; F
Pennsylvania, Michigan and western USA; Australia; Chile; England; Mexico; FSU; Democratic Republic of Congo; Zambia
California, USA
Tsumeb, Namibia
Baden-W□rttemberg, Germany
Central Kazakhstan, FSU
Virginia, USA; Cornwall, England, UK; Bavaria, Germany
Kirgiz S.S.R., FSU
Arkansas, Arizona, California, Nevada, Washington USA; China, Chile; Germany; Italy; Peru; Spain; FSU
California, USA
Boulby K mine, England
Transvaal, South Africa
Schwarzwald, Baden-W□rttemberg, Germany
Shaba, Democratic Republic of Congo
Argentina; Bolivia; Canada; China; Germany; Spain; Sweden; Colorado Plateau, USA
Sonora, Mexico
Deep Space
Yinnietharra, Western Australia; Mozambique; South Dakota, USA
China
Widespread, California, Colorado, Montana, Pennsylvania, New York, South Dakota, Vermont USA; Austria; Italy; Japan; New
Cochise County, Arizona, San Benito county, California, USA
Arizona, Nevada,Utah, USA; Chile; Australia; England; Germany; Morocco; Namibia; Japan
Cape Vogel area, Papua New Guinea; Bonin Island, Japan
California, Wyoming, USA; Hrafntinn-uhryggur, Iceland
Franklin, New Jersey, USA
Siberia, FSU
California, Monterey, New York, Utah, USA; Canada; Greenland; Italy; India; Japan; Switzerland; FSU
Vermont, USA
Kazakhstan, FSU
Kola Peninsula, FSU
Wyoming, USA
Ontario, Canada
Yunnan, China
California, Colorado, Nevada, USA; Austria; Czech Republic; India; Italy; Ireland; Mexico; Switzerland
Arizona, California, Montana, New York, USA; Finland; Italy; southern Urals, FSU
California, New York, USA; Canada; Australia

Noranda, Quebec, Canada
Utah, USA
central western USA; Australia; Canada; England; Germany; India; Mexico; Norway; Tunaberg; Sweden
Sachsen, Germany
Utah, USA; Argentina
Barberton, South Africa

Arizona, New Hampshire, Utah and Wyoming, USA
Nassau, Germany
Arizona, Indiana, Ohio, USA; Arabia; Germany; Norway; South Africa; FSU
Colorado and various locations in the USA
Greenland; South Africa
widespread in California, USA; Argentina; Canada; Turkey; FSU
North Carolina, South Dakota, USA; Canada; South and Western Australia
California, Boulder County, Colorado, USA; Western Australia
Colquiri, Bolivia
(Ferrocolumbite) Lawrence, South Dakota, USA; Widespread
Arizona, Colorado, Montana, USA; Chile; southern Urals, FSU
Texas, USA
Mt. Shaheru, Democratic Republic of Congo
Shaba, Democratic Republic of Congo
Compreignac, France
southern Harz, Germany
Chile; France; Germany; Mexico; Morocco; Poland, Tsumeb, Namibia; FSU; Arizona, South Dakota, Utah, USA
Arizona, California, Utah, USA; Algeria; Austria; France; Germany; Greenland; England; Tsumeb, Namibia; Sardinia; South A
Londonderry, Western Australia; Widespread USA; Sweden; FSU and elsewhere
Transvaal, South Africa; Stillwater Complex, Montana, USA
Arizona, California, Colorado, Nevada, Utah, USA; Bulgaria, Czech Republic; France; Germany; Italy; Poland; Sweden; Chile
Widespread USA; Australia; Bolivia; Canada; Chile; England; Germany; India; Italy; FSU
Widespread USA; Bulgaria; Chile; Cyprus; Germany; Hungary; Spain
Nevada, USA
Widespread USA; Antarctica; Australia; Brazil; Canada; England; Finland; Germany; Greenland; India; Japan; Madagascar; N
Mont St. Hilaire, Quebec, Canada; Narsarsuk, Greenland
Arizona, South Dakota, Utah, USA; County Cork, Ireland; Belgium; Germany; Sardinia; FSU; Former Yugoslavia
Arizona, Nevada, USA; Zambia; Democratic Republic of Congo
England, UK; Arizona, Utah, USA; France; Japan
Nevada, Utah, USA; Cornwall, England, UK; Ireland; Germany; Scotland
Broken Hill, New South Wales, Australia; Arizona, California, USA; Morocco; Tsumeb, Namibia
Widespread USA; Australia; Afghanistan; Brazil; Burma; Cambodia; Canada; France; Greece; India; Japan; Madagascar; Mal
Colorado, South Dakota, Utah, Washington USA; Australia; Canada; Czech Republic; England; France; Germany; Greenland
Broken Hill, New South Wales, Australia; Bergslagen, Sweden
Arizona, Massachusetts, Utah, USA; Chile; Greece; India; Italy
Kalgoorlie, Western Australia; Lovelock, Nevada, USA
Widespread USA; Argentina; Austria; Chile; Germany; Greece; Italy; Tsumeb, Namibia; New Zealand; Philippines; Former Yu
Arizona, Colorado, Oregon, Washington, USA; Iceland; Ireland
Orick, Humboldt county, California, USA
central USA; Australia; Bolivia; Brazil; Canada; France; Germany; Senegal; Guatamala
Arizona, USA; Mexico
Thuringia, Germany; California, USA; England; Sweden
California, Colorado, Nevada, USA; Bolivia; Mexico
Dauphin, region, France
western USA; Czech Republic; France; Germany; Hungary; India; Japan; Mexico; New Zealand and elsewhere
California, USA
California, Arizona, USA; Tasmania, Australia; Brazil; Philippine Islands; Romania; FSU; Zimbabwe
Minas Gerais, Brazil; Czech Republic; England; Romania
Kalmar, Sweden; Saskatchewan, Canada

California, USA
Colorado, USA; Canada; Ivigtut, Greenland; Spain; FSU
Ilmen Mountains, FSU
Libusin, Czech Republic; India; Italy; Germany
central western USA; Cape Province, South Africa and elsewhere
Oberwolfach, Central Schwarzwald, Germany;
California, New Mexico, USA; Alaska; Brazil; Sudbury, Ontario, Canada; Cuba; Italy; Mexico; Norway; Sweden
Baja California, Mexico; Cornwall, England; Germany
Massachusetts, USA
Khativskij ultrabasic zone, eastern FSU
Widespread USA; Australia; Bolivia; Chile; England; France; Germany; Hungary; Mexico; Japan; Tsumeb, Namibia; FSU; Den
Colorado, Utah USA; Vosges, France
Chuquicamata, Chile
Kamchatka, eastern FSU
Colorado, USA
Kamchatka, eastern FSU
Mt. Vesuvius, Italy
Utah, New Mexico, USA; Czech Republic; Germany; Morocco; Katanga, Democratic Republic of Congo
Baie, Verte, Newfoundland
Greenland
Arizona, California, Idaho, New Mexico, USA; Australia, Japan; South Africa
Nevada, USA
Mounana, Gabon, Africa
Northern Territory, Australia; Madagascar; France; Katanga district, Democratic Republic of Congo
Riverside County, California, Idaho, New Jersey, USA; Italy; Israel; Japan
Sonora, Mexico
Mt. Vesuvius, Italy

Baden-W□rttemberg, Germany
Arizona, Nevada, Utah, USA; France; Germany; Greece; Italy; Romania; Scotland; South Africa; FSU
Colquechaca, Bolivia
Rhiw, Carnarvonshire, Wales, UK; Alaska, California, USA; Greece; South Africa; Spain; Sweden
Hagendorf, Germany; Minas Gerais, Brazil; South Australia; Czech Republic; South Dakota, USA
Elba, Italy; Japan; Washington, USA
Yellowknife, Ontario, Canada
Ascension Island, Atlantic Ocean; Norway; FSU
Arizona, Colorado, Massachusetts, New Hampshire, Rhode Island USA; Canada; England; Japan; Sweden; FSU
Sichuan, China
Connecticut, New York, USA; Burma, Japan; Madagascar; Mexico; Switzerland
Broken Hill, NSW, Australia; Sweden
China
Bayan Obo, China
Tadzhikistan, FSU
Chuquicamata, Chile; California, USA; Antarctica
California, Connecticut, Massachusetts, Michigan, New Jersey, USA; Australia; Canada; Czech Republic; England; Germany

Tazna, Bolivia; Utah, USA
California, USA; Deep Space
extreme western Yakut, FSU; Montana, USA

South Australia, Australia
Ottr,, Belgium
Napoli, Campania, Italy
Muswellbrook, New South Wales, Australia; Colorado, Montreal, USA; Canada; northern Albania; Algeria; Tanzania and elsew
California, USA
Pontides, Turkey
Arizona, Idaho, Nevada, USA; Belgium; Bulgaria; Germany; Mexico; Spain; FSU
Kivu, Democratic Republic of Congo
Colorado, USA
Liege, Belgium; Austria; Czech Republic; Germany; FSU; Washington, USA
Piedmont, Italy
Katanga, Democratic Republic of Congo
Kola Peninsula, FSU
Sonora, Mexico
Minas Gerais, Brazil; Italy
Katanga, Democratic Republic of Congo
Haut Rhin, France
San Benito County, California; Lancaster County, Pennsylvania, USA; Japan
Widespread USA; Algeria; Argentina; Austria; Brazil; Germany; Iran; Italy; Tsumeb, Namibia; Mexico; Tunisia; Zambia; Demo
Tachgagalt, Morocco
Arizona; New Jersey, Pennsylvania, USA; Corsica; Czech Republic; England; Germany; Namibia; FSU
Katanga, Democratic Republic of Congo; Bavaria, Germany
Arizona, USA; Somerset, England; Iran
New Idria mine, San Benito, California; Roberts Mountain, Eureka, Nevada.
South Africa; Western Australia, Sierra Leone; FSU; Arkansas, USA; Brazil; Botswana; India; Venezuela
Washington, USA; Czech Republic; Germany; Mexico
Widespread, USA; China; England; Greece; Greenland; France; Germany; Hungary; Japan; Norway; South Africa; Sweden; S
Branchville and Portland, Connecticut; Maine; Poland; Newry, Northern Ireland.
Arkansas, Colorado, Pennsylvania, USA; Japan; FSU; Wales
Oficina Maria Elena, Chile
Arizona, California, Colorado, Utah, Montana, Pennsylvania, USA; Argentina; Australia; England; Iran; Namibia; Poland; Swe
Phlegraean fields, Italy; Pampa Laga, Chile
Widespread, USA; Austria; Canada; England; Finland; India; Japan; Korea; Sri Lanka; Sweden; Switzerland; FSU and elsewh
Arizona, California, USA; Chile; Iran; Tsumeb, Namibia; FSU; Democratic Republic of Congo
Skipton Caves, Ballarat, Victoria, Australia
L†ngban, V„rmland, Sweden
Coyote Peak, Humboldt County, California, USA; western Siberia; Kola Peninsula, FSU; Deep Space
Butte Montana, Pennsylvania, USA; Cornwall, England; Germany; Mexico; Peru; Philippine Islands; Tsumeb, Namibia; Japan
Mt. Vesuvius, Italy
Widespread; Missouri-Oklahoma-Kansas lead-zinc deposits, USA; Austria; Brazil; Canada; Germany; Tsumeb, Namibia; Spa
Arizona, Colorado, New Mexico, Utah, Wyoming, USA
Colorado, Michigan, USA; England; Canada; Chile; England; Germany; Iran; Mexico; Sweden
Hestmand” Island, Norway
Mont St. Hilaire, Quebec, Canada
New York, USA
Kola Penninsula, FSU
Douglashall, Stassfurt, Sachsen, Germany
Pennsylvania, USA

Mont St. Hilaire, Quebec, Canada
California and Widespread USA; Yinnietharra, Western Australia, Australia; Austria; Bolivia; Brazil; Canada; China; Czech Re
Montreal Island, Quebec, Canada
Hirschhorn Pfalz, Germany
Richelle, Belgium
N.W. province, Zambia
Alabama; New hampshire; Brazil; England; Germany
Valais, Switzerland; Dundas, Tasmania; California, Idaho, Utah, USA; Austria
Arizona, Colorado, USA; Northern Territory, South and Western Australia, Australia; France; Iran; Japan; Tsumeb, Namibia
Arizona, USA
Arizona, USA
Arizona, Nevada, USA; Katanga, Democratic Republic of Congo
Widespread, USA; Australia; Brazil; Canada; France; India; Madagascar; Mexico; New Zealand; Norway; FSU and elsewhere
Dundas, Tasmania, Australia; England; France; Germany; New Zealand; Tsumeb, Namibia;Ireland; Wales
Black Range, New Mexico, Utah, USA; Mexico
Alpes-Maritimes, France
Mapimi, Durango, Mexico; Constantine, Algeria
Colorado, USA
Minasragra, Peru
Snarum, Norway
Colorado, Nevada, USA; Broken Hill, Australia; Canada; France
Little Khingan Range, far-eastern Siberia, FSU
North Carolina, USA
Weddell Sea, Antarctica
North Carolina, USA; Hagendorf pegmatites, Waidhaus, Bayern, Germany
Arizona, USA; Laurium, Greece; L_ngban, Jacobsberg, Harstigen, Sweden
Gr„nna, Sweden
Salzburg, Austria
New York, USA
Dunbartonshire, Scotland, UK; Westergotland, Sweden; Canada; British Columbia
Arkansas, USA
San Benito County, Arizona, California, Arkansas, Texas, USA; Mexico; Germany; South Africa
South Dakota, USA
eastern Eifel, Germany
Utah, USA
Yukon Territory, Canada; Raknapura district, Sri Lanka
Irkutsk, Siberia, FSU
Widespread USA; Minas Gerais, Brazil; Ontario, Canada; Afghanistan; Germany; Madagascar; Mozambique; Namibia; Nepal
Nevada, USA
Colorado, USA; Ivigtut, Greenland; northwestern part Ukrainian Shield
Mont St. Hilaire, Quebec, Canada; Greenland; Norway; Kola Peninsula, FSU
Nevada, USA; Rauris Valley, Austria
Urals, FSU
Widespread; California, USA
Arizona, California, Colorado, Nevada, New Mexico, South Dakota, USA; Mexico; Tegucigalpa, Honduras
Colorado, USA; Bulgaria; Chile; Czech Republic; France; Germany; Japan; FSU
Arizona, Colorado, USA; Kochbulak deposit, FSU
Widespread USA; Argentina; Austria; Bolivia; Chile; Hungary; Philippine Islands; Sardinia; Taiwan; Tsumeb, Namibia; Former
Iowa, Utah, USA; Laurium, Greece

Utah, USA
Arizona, Connecticut, Maine, New Hampshire, North Carolina, South Dakota, USA; Minas Gerais, Afghanistan; Brazil; Germa
Gumuch-Dagh, near Ephesus, Turkey; Postmasburg district, South Africa
Mont St. Hilaire, Quebec, Canada; Greenland; Norway; Kola Peninsula, FSU
Widespread USA; Prince of Wales Island, Alaska; Austria; Burma; Czech Republic; Finland; France; Italy; Japan; Korea; Mad
Hawaii, New Jersey, New York, Washington, USA; Iceland; India; Nova Scotia; Switzerland
Julianehaab district, Greenland; Lovozero alkali massif, FSU
Widespread USA; Czech Republic; England; France; Germany; Italy and elsewhere
Coyote Peak, Humboldt County, California, USA
Hannover, Germany
L†ngban, Sweden
Mt. Vesuvius, Italy; Antofagasta province, Chile
Oregon, USA
Inner Mongolia, China
Humboldt county, California, USA; western Ethiopian laterites
Karibib, Namibia
Xinjiang Autonomous Region, China
central western USA; Austria; Canada; Chile; Czech Republic; England; France; Germany; Mexico; Morocco; Sweden; Switze
Sachsen, Germany
Harz Mountains, Germany; western Moravia, Czech Republic
Ivigtut, Greenland
Outokumpu, Finland; Merume River, Guyana
Franklin, Sussex County, New Jersey, USA

Wyoming, USA
Arizona, California, New Jersey, USA; Rhine Province, Germany; Antrim, Ireland; Israel; South Africa
Argentina; northern Saskatchewan, Canada; Chile; Germany; Sweden
Napoli, Campania, Italy
western Stara-Planina, Bulgaria; Attica, Greece; Libethen, Hungary
Bavaria; Brazil; Guyana; Ireland; Norway; Tanzania; Colorado, USA; FSU
Connecticut, New Mexico, North Carolina, USA; Canada, Zimbabwe
Arkansas, Montana, USA; Canada; Greenland; Ireland; Madagascar; Norway; FSU
Julianehaab district, Greenland; FSU; Langesundfjord district, Norway; Kola peninsul, FSU
Anatolia, Turkey
Sachsen, Germany; Quebec, Canada
Arizona, California, Colorado, Pennsylvania, Wyoming, USA; Australia; Bulgaria; Brazil; Canada; China; Finland; Greenland; I
Alabama, Idaho, USA; Australia; Slovakia; England; France; Hungary; Madagascar, Spain
L†ngban, Sweden; Sussex County, New Jersey, USA
Siberia, FSU
Wyoming, USA
Kivu, Democratic Republic of Congo
Salta Province, Argentina
Sonora, Mexico
Rehden, near Diepholz, Germany
Minas Gerais, Brazil
Tombstone, Arizona, USA
western USA
Connecticut; Maine, North Carolina, South Dakota, USA; Bavaria, Germany
Bonao, Dominican Republic

Argentina; Arizona, Colorado, Montana, Nevada, Utah, USA; Mankayan, Luzon, Philippines; Japan; Mexico; Peru; Taiwan
Deep Space
Baden, Germany; California, USA; Switzerland
Eureka County, Nevada, USA; Linkenhorne, Cornwall, England
California, Colorado, Hawaii, Massachusetts, Washington, Wyoming, USA; Canada; Finland; France; Germany; New Caledor
Kola Peninsula, FSU
Solongo, Buryat, FSU
Kola Peninsula, FSU
Arizona, Colorado, Idaho, New Mexico, South Dakota, USA; Australia; Bolivia; Canada; France; Germany; Greenland; Japan;
Zachativsk station, Donetsk region and Surskii region FSU
Widespread, USA; Canada; Finland; Greenland; Japan; Madagascar; Norway; Poland; Sweden; FSU and elsewhere
Novopoltavsk massif, FSU
Inner Mongolia, China
Greenland
Madhya Pradesh, India
Pacific Ocean
Alsace, France; Baden, Germany
Wittenoom area, Western Australia
Atacama, Chile
San Francisco crocidolite mine
Francois Lake, British Columbia, Canada; Phillip Island, Australia; Germany; Italy; California, USA; FSU
Altai, FSU

Tsumeb, Namibia
Siberia, FSU
Atacama Desert, northern Chile; Mount Vesuvius, Italy
Maine, New Hampshire, North Carolina, South Dakota, USA; Brazil; Finland; France; Germany; Morocco; Rwanda; Sweden
Nevada, Washington, USA; Argentina; Rwanda; Uganda
Prieska, South Africa

South Dakota, USA

Idaho, USA
Alaska, California, New Jersey, USA; Durango, Switzerland; Canton Graub□nden, Switzerland
Bann an Dubhaich, Isle of Skye, Scotland, UK
eastern-central Celebes, Indonesia; Calabria, southern Italy
Widespread, USA; Afghanistan; Argentina; Australia; Brazil; Canada; France; Germany; Greenland; India; Italy; Japan; Mada
Kitakami Mountainland, northeast Japan
Champ de Praz, Val D'Aosta, Piemonte, Italy
north-eastern Tatar, FSU; Vesuvius, Italy
California, South Dakota, USA; Barkevik, Norway; "hornblende" localities worldwide
Koryak-Kamchatka region, FSU

western Moravia, Czech Republic; China; Utah, USA
New Jersey, USA
South Dakota, USA
Kayal, Kohistan, Pakistan
Kola Peninsula, FSU

South Dakota, USA
Mt. Vesuvius, Italy
Zachativsk station, Donetsk,FSU
Kola Peninsula, FSU
Ural Mts., FSU
Arizona, California, Colorado, Utah, USA; Antarctica; Argentina; Austria; Chile; Cyprus; Czech Republic; France; Greece; Italy
Laurium, Greece
Branchville, Connecticut, USA
Izalco volcano, El Salvador, central America
L†ngban, Sweden
Bohemia, Czech Republic; Puttapa, South Australia; Ontario, Canada
Kisbanya, Romania; FSU
north of Flagstaff, Arizona, USA
Tsumeb mine, Namibia
Reynolds County, Missouri, USA
New Jersey, USA; Varmland, Sweden
Minas Gerais, Brazil; Malawi; Namibia; FSU
Shaba, Democratic Republic of Congo
Vosges, France
Cornwall, England, UK; Czech Republic; Germany; North Carolina, South Dakota, Utah, USA
Ludlow, San Bernardino County, California; Sussex County, New Jersey, USA; Finland; France; Italy; Korea; Malaya; Manchu
Colorado, USA; Sweden; FSU; Australia; Burundi; Japan; Nigeria
central Kazakhstan, FSU
Widespread USA; Austria; Bolivia; Brazil; Burma; Canada; Czech Republic; England; France; Germany; Japan; Mexico; Portu
Widespread USA; Brazil; Canada; Czech Republic; Finland; Germany; Iceland; India; Ireland; Scotland; Sweden
Ural Mts. (S), Russia, FSU
Widespread; Colorado, Illinois, Kentucky, New Hampshire, New Mexico, New York, USA; Canada; England; France; German
North Groton, New Hampshire, USA

Cooglegong, Western Australia
Democratic Republic of Congo
Riverside County, California, Massachusetts, South Dakota, USA; Burma, Finland; Germany; Greenland; Italy; Norway; Swed
Crestmore, Riverside County, California, Utah, USA; Israel; Japan; Scotland
Katanga, Democratic Republic of Congo; Colorado Plateau, USA
Belgium
Mounana, Gabon; St. Stephen-in-Brannel, Cornwall, England; Otish Mountains, Quebec, Canada
Santa Clara County, California, USA
Inyo County and Santa Cruz County, California, USA; Bolivia
Italy
Qu,bec, Canada
Eureka County, Nevada, USA
New Jersey, USA; Banat, Romania; L†ngban, Sweden
Custer County, South Dakota, USA
Toscana, Italy
Harz Mountains, Germany
Varmland, Sweden
V„rmland, Sweden
Queensland, Australia and South Australia; Cobalt-Gowganda region, Ontario, Canada; Chile; France; Poland; Colorado, Uta
Hiendelaencina, Spain; Germany; Czech Republic; France; Romania

Fresno County, California, USA
Michelsberg, Katzenbuckel, Odenwald, Germany
Hautes Pyr,n,es, France
Salzberg, Austria
Autun, France
Kambalda, Western Australia; Quebec, Canada; Romania
Minas Gerais, Brazil
Sudbury District, Ontario, Canada; Koillismaa deposit, Finland; Noril'sk region, FSU
Okayama Prefecture, Japan
Akita Prefecture, Japan
Nagyag, Romania; FinistŠre, France; Cumberland, England; Tadshikistan, FSU
Hunan, China
Akita, Japan
L†ngban, Sweden
near Skien, Oslo region, Norway
Arizona, Colorado, Texas, USA; Australia; Greenland; Japan; Norway; Sweden, Switzerland; FSU and elsewhere

Kazakhstan, FSU
New Jersey, USA
Widespread USA; Australia; Brazil; Canada; Finland; Germany; Ghana; Italy; Madagascar; Spain; Sweden
Mont St. Hilaire, Quebec, Canada
Newry, Oxford, Maine, USA
Tsumeb, Namibia
North Carolina, USA
Searles Lake, California, USA
Common lead mineral; Widespread USA; Australia; Austria; Bolivia; Canada; Chile; Czech Republic; England; France; Germ
Colorado, Idaho, Montana, Washington, USA; Austria; Canada; Italy
Kirghizia, FSU
Tsumeb, Namibia; Kipushi, Democratic Republic of Congo
Cape Province, South Africa
L†ngban and Jacobsberg, Sweden; New Jersey, USA
V„rmland, Sweden
Toscana, Italy
California, Utah, USA
Ashburton Downs, Western Australia and Broken Hill, New South Wales
north-eastern Yukon Territory, Canada
Gasp, Peninsula, Quebec, Canada; Western Australia
Iron Knob, South Australia
Gisenyi Province, Rwanda
Tachgagalt, Morocco
California, Nevada, Wyoming, USA; Kenya; Mongolia; Venezuela
Ivigtut, Greenland
Tsumeb, Namibia
Widespread; Arizona, Idaho, Maine, Montana, North Carolina, USA; Australia; Canada; Finland; Greenland; India; Japan; Sco
New York, USA
Puy-de-D“me, France
California, Colorado, New Mexico, USA; Canada; Ireland; Israel; Italy; Japan; Java; Mexico; Romania; FSU and elsewhere
Crestmore, Riverside County, California, USA; Quebec, Canada; Sri Lanka; FSU
Transvaal, South Africa

Colorado, USA; Quebec, Canada; northern Nigeria; FSU
California, Idaho, Utah, Washington, USA; Brazil; Czech Republic; France; Italy; Ireland; Spain; Sweden
Otero County, New Mexico, USA
Western Australia, Australia
Laurium, Greece
Arizona, USA; Katanga, Democratic Republic of Congo
Tsumeb, Namibia
Widespread; Austria; Western Australia; Burma; Canada; Czech Republic; England; Greece; Spain; Arizona, California, Color
California, USA
Sussex County, New Jersey, USA
Humboldt County, Nevada, USA
eastern Transvaal, South Africa
Brewster County, Texas, USA
Arizona, Arkansas, California, Massachusetts, New York, Pennsylvania, Washington, USA; , Tasmania, Australia; Brazil; Can
Valais, Switzerland; Otoften, northern Norway
Gila County, Arizona, USA
Fresno County, Mariposa County, California, USA; Dry Delta, Alaska Range, Alaska
Usakos, Namibia
Death Valley, California, USA; Nova Scotia, Canada; Italy; Turkey
Puy-de-D“me, France
Tombstone, Arizona, USA
Arizona, Hawaii, Pennsylvania, USA; Australia; Faeroe Islands; Germany; Iceland; Ireland; Israel
Kipawa, Quebec, Canada
Roma, Italy
Gladhammar Kalmar, Sweden; Upper Carinthia, Austria; northern Kazakhstan, FSU
Widespread; Arizona, California, New Mexico, Texas, Utah, USA; Australia; Austria; Canada; Chile; China; France; Germany;
Sussex County, New Jersey, USA
Oregon, USA; Australia; Chile; England; Morocco; Norway; Romania; Spain; Sweden
Attik¡, Greece
Widespread USA; Australia; Belgium; England; France; New Zealand; India and FSU
California, Colorado, Washington, USA; France; Corsica; Italy; Japan; Scotland; Switzerland; Syra
Carr Boyd Rocks, Kambalda, Scotia, Widgiemooltha, Windarra, Western Australia
Insch, north-eastern Scotland, UK; Arctic Russia
Flinders Island, Australia; Oregon, New Jersey, Washington, USA; Canada; Cyprus; Germany; Hungary; Ireland; Italy; Scotlar
County Antrim, Northern Ireland
Noril'sk deposit and Talnakh deposit, FSU
North Groton, New Hampshire, USA
common mineral; Widespread USA; Australia; Brazil; Chile; Cuba; Czech Republic; England; France; Germany; Mexico; Sout
Widespread; western USA; Alaska; Australia; Brazil; Canada; Chile; China; Columbia; India; Mexico; Romania; South Africa; I
Nevada county, California, Colorado, USA; Borneo; China; Colombia
Swell, Utah, USA
Albuquerque, New Mexico, USA
Crestmore, Riverside County, California, USA; Austria; France; Germany; Greenland; Italy; Japan; Norway
V„rmland, Sweden
Goose Creek quarry, Leesburg, Virginia, USA
Arkansas, Missouri, South Carolina, USA; Africa; Brazil; Guyana; Romania; Switzerland
Utah, USA; Milgun Station, Western Australia
Ischl salt deposit, Austria
Yukon, Canada

Tipperary, Ireland
Widespread USA; Australia; Argentina; France; Germany; Mexico; Peru; Spain, Sweden and elsewhere
Democratic Republic of Congo
Nevada, USA
Death Valley, California, USA
Boulder County, Colorado, USA
Bisbee and Yuma County, Arizona, USA
New Hampshire, USA
Madagascar
USA
Widespread USA; Canada; England; central Europe; Germany; Greenland; Mexico; Sri Lanka; FSU
Cerro de Pasco, Peru; Tsumeb, Namibia; Taiwan
Colorado, Wyoming, USA; Zimbabwe
Minnesota, USA; Bergslagen, Sweden; Grisons, Switzerland
central western USA; Australia; Spain; Tsumeb, Namibia
San Bernardino County, California, USA; Corsica; Israel; Mexico; FSU; Former Yugoslavia
Merume River, Guyana
Canton Bern, Switzerland
South Dakota, USA
Canton Grisons, eastern Switzerland
Widespread western USA; Australia; Canada; Italy; Korea; Mexico; Sri Lanka; Switzerland; FSU
Talcville, New Jersey, New York, USA; Quebec, Canada; Chihuahua, Mexico
Widespread USA; Australia; Canada; Finland; France; India; Japan; Scotland; South Africa
southern Kirgizia, FSU
Idaho, USA; Germany; Mexico; Sweden
Murra El Elevyn Cave, Western Australia, Australia; North Chincha Island, Peru
Virginia, USA; Canada; Czech Republic; Germany; Greenland; India; Norway; Sweden; Turkey; FSU
Schneeberg, Sachsen, Germany and Richelsdorf, Hessia, Germany
San Juan County, Colorado, USA; Ontario, Canada
Gugia, China
Jerome, Arizona, USA
Democratic Republic of Congo
Central Yukon; Dundas, Ontario, Canada
Yanshan area, China
Ivigtut, Greenland; Akita Prefecture, Japan; Bom-Gorkhon deposit, FSU
Mazaruni dist., Guyana
Widepsread very common mineral; USA; Austria; Canada; Chile; France; Germany; Mexico; Poland; Sicily; FSU and elsewhe
Skye, Scotland

Democratic Republic of Congo
Outokumpu, Finland
Zambezia dist., Mozambique
Bayern, Germany
South Dakota, Wyoming, USA; Dera Ghazi Khan district, Pakistan
Czech Republic; Germany; Nevada, USA
Coso Mountains, California, USA; Austria; Brazil; Japan
Bohemia, Czech Republic
Widespread common mineral; Kansas; Michigan; Ohio; New York, USA; Algeria; Austria; Canada; Colombia; England; France
Schwarzwald, Germany

Widespread; California, USA
California, New Mexico, Utah, and other western states in USA; Chile; Finland; France; Germany; Italy; Pakistan; Poland; Swe
unspecified locality, probably in the Inder Basin, FSU
Czech Republic; India; Langesundsfjord, Norway; Pakistan; California, USA
Kalmar, Sweden; Salzburg Province, Austria; FSU
New Jersey, USA
California, USA
Skipton Caves, Victoria, Australia; Murra-el-elevyn Cave, Cocklebiddy, Western Australia
Iwate, Japan
Sussex County, New Jersey, USA
Isle of Skye, Scotland
Connecticut, New York, Pennsylvania, USA; Canada; Finland; Germany; Italy; New Zealand; Norway; Scotland; North Wales;
V„rmland, Sweden
Amman, Jordan
Ontario, Canada
Harz, Germany
Binnental, Valais, Switzerland
Dead Sea, Israel
Westphalia, Germany; Ontario Canada; Kazakhstan, FSU
New Jersey, USA
Slovakia; Texas, USA; New Zealand; Sicily
Arizona, Arkansas, California, Colorado, New Jersey, Washington, USA; Brazil; Bulgaria; England; Germany; Italy; Morocco;
Colorado, Montana, South Dakota, USA; France; Germany; Italy; Morocco; Tahiti; FSU
Yukon Territory, Canada; Derbyshire, England; India; Spain
Deep Space
Lydenburg district, Transvaal, South Africa; Krzemianka, Poland
Yukon Territory, Canada; Heazlewood, Tasmania, Australia; Japan; Turkey; Switzerland; Pennsylvania; USA; FSU
Hector, San Bernardino County, California, USA
Widespread USA; Australia; England; Finland; Greenland; Italy; Nigeria; Sweden; FSU
near Hedley, British Columbia, Canada; India; Norway; FSU
New Jersey, USA; Puttapa, South Australia; Tsumeb, Namibia; L†ngban, Sweden
Deep Space
North-West of Nordhorn, German-Dutch border
Oregon, USA; Schwarzwald, Germany
California, USA
V„rmland, Sweden
Kragero, Norway
Heazlewood, Tasmania, Australia
Tsumeb, Namibia
Widespread USA; Mont St. Hilaire, Quebec, Canada; Brazil; England; Germany; Greenland; Iceland; India; Morocco; Norway
Widespread common mineral; Australia; Austria; Brazil; Canada; Cuba; Czech Republic; England; France; Germany; Italy; Me
Nordmark, Sweden
Nordmark, Sweden
Arizona, USA; Seh Changi mine, Iran
WidespreadUSA; Algeria; Broken Hill, New South Wales, Australia; Austria; Belgium; Brazil; England; France; Germany; Gree
Balkin Mts., Bulgaria
Colorado, New Mexico, USA
New Jersey, USA
Fuka, Okayama Prefecture, Japan

Morocco
Arizona, USA
Reichenbach, Hessen, Germany; Spring Creek, South Australia
Arizona, New York, Virginia, Washington, USA; Brazil; Bulgaria; Czech Republic; Germany; India; Ireland; Madagascar; Norw
Brazil
Ilimaussaq alkaline intrusion, southern Greenland; Victoria, Australia; Arizona, USA; Mt Etna, Sicily
Huari, Bolivia; eastern Pennsylvania, USA
Arizona, California, Colorado, Nevada, Utah, USA; Western Australia; Chile; Fiji; Mexico; Romania; FSU and elsewhere
Arizona, New Jersey, Utah, USA; Belgium; Romania
Nevada, USA; Australia; Morocco; Katanga, Democratic Republic of Congo
Arnsberg, Westphalia, Germany; Madjarovo deposit, Bulgaria; Tadzhik, FSU
Maine, Massachusetts, New Hampshire, South Dakota, USA; Afghanistan; Australia; Brazil; France; Germany; Ghana; Namib
New Jersey, Maryland, Oregon, USA; Alaska; Hawaii; Phillip Island, Victoria, Australia; Austria; Brazil; Germany; Iceland; Indi
Arizona, Colorado, South Dakota, Utah, USA; Peru; Ferghana, FSU
Canada; Czech Republic; Olkusz, Poland; Turkey; Arizona, New Jersey, Washington, USA; FSU
Solongo deposit, Buryat ASSR, FSU
south-western China
Ely, White Pine county, Nevada, USA
Canada; H□rky, Czech Republic, Germany; Turkey; California, USA
Madagascar
Arizona, Tooele County, Utah, USA; Cap Garrone, France; Mexico
Mt. Vesuvius, Italy
Mont St. Hilaire, Quebec, Canada
Iberville Parish, Louisiana, USA; New Brunswick, Canada
Durango, Mexico; Japan; Saudi Arabia; Turkey; Arizona, USA
Tuva region, FSU
Kola Peninsula, FSU
Arizona, Lake City, Hinsdale County, Colorado, USA; Germany; Tasmania
Langesundfjord, Norway
Widespread throughout world; Idaho, Minnesota, New York, Washington, USA; Canada; England; Japan; Romania; Sweden
Argentina; Bolivia; France; FSU
Sussex County, New Jersey, USA
Banska-Hodruse, Slovakia
Svalbard, Norway
New York, USA; Widespread
Knoxville, Napa county, California, USA; Chile
New Jersey, USA
Jhabua State, India
Transvaal, South Africa
North Carolina, South Dakota, USA; Canada; Sweden; FSU and elsewhere
Modum, Norway
Western Australia, Australia
Langesundfjord, Norway
Tao district, China
Hong district, China
Broken Hill mine, Zambia; Canada; New Hampshire, South Dakota, USA; Belgium
Fiano, near Naples, Italy
Cape Province, South Africa
California, USA

California, USA; Canada; Mexico
Hunan Province, China
near Huang Ho River, China; Siberia, FSU
Western USA; Australia; Czech Republica; France; Peru and elsewhere
Baden (near Lahn), Germany
Seward Peninsula, Alaska
Atacama Desert, Chile
Ontario, Canada; coal deposits in Germany and Czech Republic
New York, USA; Finland; Italy; Spain; Sweden
Montrose County, Colorado; Fall River County, South Dakota, USA
Black Mountains, California, USA; China
California, Nevada, New Mexico, USA; Australia; Brazil; Bulgaria; China; Greece; FSU
central western USA; Brazil; France; Germany; Poland; Portugal; Namibia; Rwanda; Sweden
New Hampshire, South Dakota, USA; Viitaniemi, Finland
Binnental, Valais, Switzerland; Ancash Province, Peru
South Westland, New Zealand
Montana, New Jersey, USA; Broken Hill, Australia; Canada; Japan; Namibia; Sweden; Switzerland; FSU
V„rmland, Sweden
Sichuan, China
Ryan, Death Valley, Inyo County, California, USA; Canada; Germany; Turkey; FSU
Co. Antrim, Northern Ireland
Arizona, Idaho, USA; England; Laurium, Greece; Iran; Norway; Sweden; FSU
Antofagasta Province, Chile
Francon quarry, Montreal Island, Quebec, Canada
Dun Mountain, New Zealand
Arizona, Colorada, New Jersey, USA
Western Australia, Australia
Widespread; California, New Jersey, Nevada, New York, Pennsylvania, USA; Canada; Iran; Italy and many European deposit
Rio Marina, Elba, Italy

Poland
England; Hanover, Germany; Peru; Sicily
Ontario, Canada
North Yorkshire, England
New Jersey, New York, Washington, USA; Quebec, Canada; Norway; FSU
Oruro, Bolivia; near Velingrad, Bulgaria
Hsiaosungshan, China
South Africa; Norway; North Carolina, USA; India; Mexico
Milgun Station, Western Australia; Georgia, USA; Italy, Switzerland
Kola Peninsula, Russia
Saitama Pref., Japan
Connecticut, Maine, New Hampshire, North Carolina, USA; Brazil; Finland; Germany; Ural Mountains, FSU
Widespread USA; Algeria; Mexico; Spain and elsewhere
California, USA
Colorado, USA; France; Germany; Democratic Republic of Congo
Widespread common mineral; Elk Creek, Meade County, South Dakota
Austria; Chile; Cyprus; Germany; Morocco; Tsumeb, Namibia; Pennsylvania, USA; Democratic Republic of Congo
Idria, FYRO Slovenia; Sonoma County, California
Fusamata, Kawamatamachi, Fukushima Prefecture, Japan; Bokan Mountain, Prince of Wales Island, Alaska

Ika Fjord, south of Ivigtut, Greenland
Ikuno mine, Hyogo Prefecture, Japan; Schwarzwald, Germany; Primor'ye, FSU
Park County, Colorado, USA
Nakalaq, Ilimaussaq alkalic massif, southern Greenland
Illinois, USA
Kola Peninsula, Russia, FSU
Widespread, common mineral; USA; Australia; Canada; England; France; India; Italy; Mexico; Norway; Sweden; Switzerland;
Ural Mts., Russia, FSU
Widespread USA; Australia; Elba; England; Germany; Greece; Julianehaab district, Greenland; Italy; Japan; Switzerland and
Kola Peninsula, FSU
Monchegorsk region, FSU
Canton Wallis, Switzerland
Anti-Atlas, Morocco
Yakutia, FSU
Poop¢, Bolivia
western Kazakhstan, FSU; Turkey
California, USA; Turkey; FSU
South Dakota, USA; central Japan
Little Khingan Ridge, far-eastern Siberia, FSU
eastern Transbaikal, FSU
Broken Hill, New South Wales, Australia; Germany; Japan; Mexico; South Africa; Sweden; USA
central Transbaikal, FSU; Cumberland, England
Yakutia, Russia, FSU
Pondoland and East Griqualand areas, South Africa
western Kazakhstan, FSU; California, USA; New Brunswick, Canada; Turkey
Widespread; Broken Hill, New South Wales, Australia; Chile; France; Germany; Mexico; Spain; USA; FSU; Democratic Repub
Iowa, USA; FSU
Tarapaca Province, Chile
Anarak, Iran

Qala-Dizeh, Iraq
Transvaal, South Africa
Anti-Atlas, Morocco
Papua New Guinea
Tulameen, British Columbia, Canada
British Columbia, Canada; Papua New Guinea; Australia; Brazil; South Africa; USA; FSU
Scenic, South Dakota, USA; Hervey Range, North Queensland, Australia; Democratic Republic of Congo
Missouri, New Brunswick, New Jersey, USA; Canada; Czech Republic; France; Germany; Greenland; Ireland; Japan; Poland
Irtysh river, eastern Kazakhstan, FSU
British Columbia, Canada
Nkumbwa Hill, east of Isoka, Zambia
Minas Gerais, Brazil
Tsumeb, Namibia
Fukushima Pref., Japan

Kemi”, Finland
Izok Lake, Northwest Territories, Canada; Vena, Sweden
Nordmark, Sweden
California, USA; Upper Burma; Chine; Guatemala; Japan; Mexico; New Zealand; Tibet

L†ngban, Sweden
west-central Yukon Territory, Canada

South Dakota, USA
Mexico; Czech Republic; Broken Hill, New South Wales, Australia; Niigata Prefecture, Japan; Poland
Italy
Tsumeb, Namibia
Arkansas, California, Colorado, Idaho, Nevada, Utah, USA; Canada; Argentina; Bolivia; China; Czech Republic; England; Ge
Bonghwa, Korea
Nordmarka, northern Oslo region, Norway
Ivigtut, Greenland; Enisei Range, FSU
New Jersey, USA
Widespread common mineral; USA; Australia; Bolivia; Chile; Czech Republic; France; Germany; Greece; Italy; Namibia; Spai
Canada; Sweden
Eifel, Germany
Llallagua, Bolivia
Qu,bec, Canada
Crestmore, Riverside county, California, USA; Hatrurim Formation, Israel
Walgidee Hills, Western Australia
Nerchinsk district, eastern Siberia, FSU; Germany; Namibia
Sussex County, New Jersey, USA
Baveno, Italy
Kanuma City, Tochigi Prefecture, Japan
Chester, Vermont, USA
Sichuan, China
Hebei, China
California, USA
V„rmland, Sweden
Kenkyohokudo Prefecture, Korea

Bohemia, Czech Republic
Arizona, New Mexico, Washington, USA; Broken Hill, Australia; Bulgaria; Italy; Mexico
Tsumeb, Namibia
Sussex County, New Jersey, USA
Inverness, Scotland
South Dakota, USA
south-western Hokkaido, Japan
Schwarzwald, Germany
California, USA
Austria; China; Italy; Japan; Poland; Binnental, Valais, Switzerland; USA
Sachsen, Germany
Smithers, British Columbia, Canada; Maldon; Victoria, Australia; English Lake district, England; northern Norway; Brazil
British Columbia, Canada
Anti-Atlas, Morocco

V„rmland, Sweden
Katanga, Democratic Republic of Congo
Bayern, Germany
Arizona, USA
Tennant Creek, Northern Territory, Australia

Pinal County, Arizona, USA
Kvortane, western Finland
Arizona, USA; British Columbia, Canada; France; Greenland; Japan; New Zealand; FSU
Sayan (E), Russia, FSU
Huttenberg, Austria
New Mexico, Texas, USA; central Germany; Kalusz, Poland; FSU
Hitter", Norway
Kola Peninsula, FSU
Sachsen, Germany; Calascibetta, Sicily; Sallent, Spain; Kazakhstan, FSU
Canton Wallis, Switzerland
southern Baikal Region, FSU
Albano, Latium, Italy
Democratic Republic of Congo
Alshtan, Bachkir Autonomous SSR, FSU
Umbria, Italy; southwestern Uganda; Nyiragongo area, Democratic Republic of Congo

Kamaishi mine, Japan
Kambalda nickel deposit, south of Kalgoorlie, Western Australia

Democratic Republic of Congo
Lake Chad, Kanem region, Chad, Africa
Czech Republic
Hokkaido, Japan
Serenje, Zambia
Widespread common mineral; Brazil; Chile; Czech Republic; England; France; Germany; USA
south-eastern Outokumpu, Finland
Karibib pegmatite, Namibia
Schlegeistal, Zillertalei Alpen, Austria

Nordmark, Grythyttan, L†ngban, Sweden
Ural Mts., Russia, FSU
Ural Mountains, FSU
Widespread in uranium deposits; New Hampshire, Nevada, South Dakota, USA; Canada; France; Gabon; Italy; Norway; Dem
Kola Peninsula, FSU
Lazio, Italy
V„rmland, Sweden
Shizuoka Prefecture, Japan
Lovozero alkalic massif, FSU
Bayern, Germany
Tsumeb, Namibia
Montana, USA

Kola Peninsula, FSU

Kola Peniens Township, Nipissing district, Ontario, Canada; India; Japan; Democratic Republic of Congo
North Carolina, USA
Ural Mts., Russia, FSU
Sachsen, Germany
Alum Rock Park, San Jose, Santa Clara County, California, USA
Mateke Hills, Zimbabwe

New Jersey, USA; Chile; Sardinia; Sweden
Rift Valley, Kenya
Widespread; Broken Hill, New South Wales, Australia; California, Idaho, Utah, Washington, USA; Algeria; Bolivia; Canada; Cz
Boron, Kern County, California, USA; Salta Province, Argentina
Mendoza, Argentina; Pacajake, Bolivia; near Hildburghausen, Germany
northeast Argentina; Bolivia; Canada; Czech Republic; Cornwall, England; New Brunswick, South Dakota, USA; Yano-Ady-Cl
north-western Bohemia, Czech Republic
Tsumeb, Namibia
Alashan Mountains, central Asia, FSU
Khanneshin, Afghanistan
Koriaskho-Kamchatskaya fold area, eastern FSU
Khibina massif, Kola Peninsula, FSU
Cochise County, Arizona, USA
Kidd Creek mine, Timmins, Ontario, Canada; Bisbee, Arizona, USA
Alabama, Arkansas, Virginia, USA; Waldgirmes, Germany
New Mexico, Texas, Utah, USA; Austria; Germany; India; Poland; Sicily; FSU
Carlingford, Ireland; Hatrurim Formation, Israel; Okayama Prefecture, Japan; Ardnamurchan, Scotland, UK
Killala Bay, Ireland
Western Australia, Australia
Saga Prefecture, Japan
Arkansas, USA
Robertstown, South Australia
North Carolina, USA
Izu Peninsula, Japan
Arizona, USA
Iwate, Japan
Democratic Republic of Congo
Thrace, Greece
Mt. Shaheru, Democratic Republic ofongo
Kuusamo, north-eastern Finland
Sussex County, New Jersey, USA
Democratic Republic of Congo
Bohemia, Czech Republic
Tuscany, Italy; Romania
Weissel basin, Germany
Iron Knob, South Australia

Texas, USA
Argentina; Canada; western Moravia, Czech Republic; Harz Mountains, Germany; Sweden
Kao, Lesotho
Kola Peninsula, Russia, FSU
Shiraishi, Kobe-mura, Kyoto Prefecture, Japan; Paringa River, Sourth Westland, New Zealand
Askersund, Sweden
Bygoo, New South Wales, Australia; Coolgardie, Western Australia; Sachsen, Germany; Arizona, USA
Hannover, Germany
Kola Peninsula, FSU; Chaffee County, Colorado, USA
Moravia, Czech Republic
Kolar gold deposit, India
Utah, USA; Germany; Romania; Democratic Republic of Congo

Kola Peninsula, Russia, FSU
New Jersey, USA

Democratic Republic of Congo
Magadin region, FSU
Kola Peninsula, FSU
Siberia, Russia (E), FSU
LiŠge, Belgium
Great Konya Basin, Turkey

Tsumeb, Namibia
Arizona, Utah, USA; Bulgaria; Hungary
Nuuk area, Greenland
Irkutsk, Russia, FSU
Coahuila, Toluca, and Hex River Mountains meteorites, Mexico; Deep Space
Chelopech, Bulgaria; Kochbulak deposit, eastern Uzbekistan, FSU
Kola Peninsula, FSU
China; Suan, North Korea; Romania; Washington, USA
Sachsen, Germany; Durango, Mexico; Tsumeb, Namibia; New Jersey, USA
Ontario, Canada; South Africa; Wyoming, USA; Monche Tundra, FSU
Bohemia, Czech Republic; southern Vosges, France; Anarak district, Iran
Kola Peninsula, Russia, FSU
Iwate Pref., Japan
New Jersey, USA
Czech Republic
Calico Mountains, San Bernardino County, California, USA; Durango, Mexico
Fresno County, California, USA
Sacarimb, Transylvania, Romania
Mt. Etna, Mt. Vesuvius, Italy
Arizona, Colorado, Washington, USA; Kalgoorlie and Mulgabbie, Western Australia; Canada; Fiji; Transylvania
Texas, USA; Avon, Western Australia, Australia meteorites; Deep Space
Chuquicamata, Chile
north-western Bohemia, Czech Republic; Tennant Creek, Northern Territory, Australia
eastern Moravia, Czech Republic
Bohemia, Czech Republic; Khomahs deposit, Tuva, ASSR
Canada; Bavaria, Germany; New Hampshire; South Dakota, USA; Kalbinsk pegmatites, FSU
Laurium, Greece

Yukon Territory, Canada
Perrag, Algeria
Kuusamo, north-eastern Finland
South Dakota, USA
Kola Peninsula, Russia, FSU
Kuramin Mountains, eastern Uzbekistan, FSU
southern Yakutia, FSU
Buryat, Russia, FSU
Death Valley National Monument, Kern county, California, USA; Turkey, FSU
northern Bohemia, Czech Republic; Southern Vosges, France; Anarak district, Iran
Czech Republic
Tuva ASSR, FSU

Greenland
Widespread common mineral; USA; Australia; Austria; Brazil; Canada; Czech Republic; France; India; Ireland; Italy; Kenya; K
Kyzyl-Kum, Uzbekistan, FSU
Widespread; USA; Canada; Finland; Greenland; Ireland; Mexico; Norway; Romania; Sicily; South Africa; Sweden
Mont St. Hilaire, Quebec, Canada; Wyoming, USA; Lovozero and Khibina alkalic massifs, FSU
Czech Republic; Sachsen, Germany; Portland, Connecticut, USA
Alpes, France; Nevada, USA
Lai-He Village, north-eastern China
Ontario, Canada; English Lakes district, England; Orjarvi, Finland
Laurani, Bolivia
Fr/m
Austria; Chile; France; Germany; Laurium, Greece; Lanarkshire, Scotland, UK; Sweden; Arizona, Utah, USA
Transbaikal, Russia, FSU
Maine, USA
New Mexico, USA; Austria; Canada; China; Germany
Ontario, Canada
Czech Republic; Cornwall, England, UK, France; Germany; Namibia; Arizona, Massachusettes, Nevada, USA and elsewhere
New Mexico, USA
Pennsylvania, USA; Canada; Italy
Snowdonia, northern Wales, UK
Colorado, New York, Pennsylvania, Texas, USA; Brazil; Sweden; Switzerland
Parana, Brazil
Pennsylvania, USA
Yukon Territory, Canada
Kola Peninsula, FSU
Larderello, Tuscany, Italy
Texas, USA; County Antrim, Ireland; Hatrurim Formation, Israel; Tokatoka, New Zealand
Ontario, Canada
Beltana lead-zinc deposit, Puttapa, South Australia; New Jersey, USA
Lazio, Italy
Qu,bec, Canada
Arkansas, USA; Bavaria, Germany; Norbotten Province, Sweden
Brazil; eastern Bayern, Germany; Namibia; Connecticut, New Hampshire, South Dakota, USA
Arizona, California, Michigan, New Jersey, Oregon, Pennsylvania, Washington, USA; Austria; Brazil; Canada; England; Germ
Madjarovo deposit, Bulgaria; Madoc, Ontario, Canada
Laurium, Greece; Cornwall, England, UK
Ethiopia; Unst, Shetland Isles; Transvaal, South Africa; Oregon, Columbia, USA; Urals, FSU
Antofagasta Province, Chile
Ontario, Canada; Alsace-Lor-raine, France; Sachsen, Germany
Sachsen, Germany
Ovifak, Greenland; Deep Space
New Jersey, USA
Widespread Coast Ranges in California, USA; Antarctica; Corsica; Crete; Cuba; France; Italy; Japan; New Caledonia
Siberia, Russia, FSU
California, Georgia, USA; Bolivia; Brazil; Yukon Territory, Canada; Madagascar; Rwanda; Horrsjoberg, Sweden
California, Colorado, USA; northeast Afghanistan; Canada; Chile; Italy; FSU
Idaho, New Jersey and other western states, USA; Canada; Greenland; Mexico; Sweden; FSU
Shiaonanshan, Inner Mongolia Autonomous Region, China
Lanarkshire, Scotland

Comayagua, Honduras
Durango and Nuevo Leon, Mexico; Kyushu, Japan
Mont St. Hilaire, Quebec, Canada; Narsarsuk, Greenland
Chuquicamata, Chile; Tsumeb, Namibia
Tsumeb, Namibia
St. Hilaire alkaline massif, Quebec, Canada
Lengenbach, Binnental, Valais, Switzerland
New Jersey, USA
New Mexico, USA; Germany
Shinkolobwe, Shaba, Democratic Republic of Congo
Broken Hill, New South Wales and South Australia; California, Pennsylvania, South Dakota, USA; France; Germany; Mexico;
Widespread USA; Brazil; Canada; Moravia, Czech Republic; Finland; Germany; Japan; Madagascar, Mozambique; Sweden;
Letovice, Czech Republic; Sonoma County, California, USA
Arkansas, Montana, New Jersey, Wyoming, USA; Australia; Canada; France; Germany; Italy; Uganda; Democratic Republic o
Langesundfjord, Norway
New Jersey, USA; Japan; Hotazel, South Africa
Alabama,Arizona, Indiana, New Hampshire, South Dakota, USA; Brazil; Germany; western Liberia; Western Australia
Utah, Wyoming, USA; Quebec, Canada; Greenland; Turkestan; FSU
Colorado, Oregon, Washington, USA; Argentina; Australia; Greenland; Iceland; Ireland; Italy; Japan
Minas Gerais, Brazil
Antsakoa, Madagascar
Nan ling Range, southern China
Arizona, California, New Mexico, Nevada, Pennsylvania, USA; Chile, England; France; FSU; Broken Hill mine, Kabwe, Zambi
Antsirabe, Madagascar
Transvaal, South Africa
Colorado, New Mexico, Pennsylvania, Utah, Washington, USA; Canada; Czech Republic; England; Germany; Turkey; Swede
Likasi copper mine, Democratic Republic of Congo
Austria; Czech Republic; Finland; Sweden; Colorado, USA
Mt. Vesuvius, Italy
Central Western USA; Argentina; Australia; Canada; Chile; England; Germany; Japan; Namibia; New Zealand; Peru; Sardinia
Arizona, Idaho, USA; Chuquicamata, Chile
Kimberley, South Africa
Kalmar, Sweden; Ontario, Canada; Rondonia, Brazil
California, Maryland, USA; Kalgoorlie, Western Australia; Bolivia; Germany; Morocco; Namibia; Sweden; Democratic Republic
Toscana, Italy
Minas Gerais, Brazil
Cornwall, Devonshire, England, UK; Czech Republic; California, USA; Urals, FSU
California, Idaho, USA; Laurium, Greece and other oxidized lead deposits throughout the world
Widespread USA; Argentina; Western Australia; Canada; Namibia; Portugal; Rwanda, South Africa
Arizona, North Carolina, Tennessee, Utah, virginia, USA; Western Australia; Belgium; Brazil; Bulgaria; Canada; Germany; Po
North Carolina, South Dakota, USA; Manitoba, Canada; Kola Peninsula, FSU
eastern Kazakhstan, FSU
Kola Peninsula, FSU
Mt. Vesuvius, Italy
Lengenbach quarry, Binnental, Valais, Switzerland
San Luis Potosi, Mexico; Iwate Prefecture, Japan
Michigan, New York, USA; Cornwall, England
Kangasala, south-western Finland; Quebec, Canada
California, Colorado, Maine, New Hampshire, New Jersey, New York, South Dakota, USA; L”lling, Carinthia, Austria; Ontario,

Kola Peninsula, FSU
Eastern Transvaal, South Africa
Canyon Diablo, USA and Goalpara, Mexico meteorites; Deep Space
Kola peninsula, Russia, FSU
Antofagasta province, Chile

Switzerland; Utah, Nevada, USA; Tadzhikistan, FSU; FYRO Macedonia;
Mont St. Hilaire, Quebec, Canada; Greenland; New Mexico, USA; FSU
Tennessee, USA; Argentina
New Jersey, USA
Durango, Mexico
Virginia, USA
Kola peninsula, Russia, FSU
Western Australia, Australia
Julianehaab district, Greenland; Kola peninsula, FSU
New Mexico, USA; Upper Austria; Germany
Arizona, USA
Connecticut, Idaho, New Hampshire, South Dakota, USA; Brazil; England; France; Germany; Mexico
Tsumeb, Namibia
California, Idaho, Montana, Nevada, Utah, Washington, USA; China; Japan; Korea; Norway; Romania; Sweden
Lueshe, Democratic Republic of Congo; Colorado, USA
Arizona, USA
Kola peninsula, Russia, FSU
New Mexico, Texas, USA; Germany; Peru
Democratic Republic of Congo
Argentina; Japan; Mexico; Peru; Luzon, Philippines; Montana, Nevada, Utah, USA
V†rmland, Sweden
Langesundfjord, Norway
Aberdeenshire, Scotland, UK
Big Creek, Fresno County, California, USA
FYRO Macedonia; L†ngban, Sweden
Michigan, USA
Schwarzwald, Germany
Arizona, Nevada, USA; Sonora, Mexico
Washington, USA; Australia; Canada; Finland; India; Japan; New Zealand; Norway; Portugal; Saudi Arabia; South Africa; FSU
Lanarkshire, Scotland, UK; France
Tiger, Arizona, USA
Madoc, Ontario, Canada; Bolivia
Rift Valley, Kenya
Arizona, California, New York, Oklahoma, USA; Algeria, Canada; Germany; Namibia; South Africa and elsewhere
New York, USA
Japan
a gemstone from Tanzania
Monte Rosa massif, Italy
Garnet Ridge, Apache County, Arizona, USA; Bulgaria; Canada; Czech Republic; Germany; New Caledonia; New Zealand
Knoxville, Napa County, California, USA; Iran; Nova Scotia; Sweden
Wabush iron formation, Labrador, Canada
Arkansas, California, New Jersey, Utah, USA; France; Italy, Lipari Islands; Sicily

throughout the world
South Australia; Bolivia; Finland, Greenland; India; Japan; Namibia; Aberdeenshire, Scotland, UK; Colorado, Utah, Wyoming,
Japan
Widespread; Algeria; Austria; Brazil; India; Korea; Manchuria; Norway; South Africa; western USA; Democratic Republic of Co
Kola peninsula, Russia, FSU
New Jersey, USA
Utah, USA
Widespread common mineral; Austria; Brazil; Canada; Germany; Hungary; Italy; Mexico; Norway; South Africa; Sweden; Swit
L†ngban, Sweden
FSU
Pamir, Russia, FSU
V„rmland, Sweden
Noril'sk region, FSU
Western Australia, Australia
Evaporite series of Lake Magadi, Kenya; Kola Peninsula; FSU
Kuusamo, north-eastern Finland
Widespread, common copper mineral; Burra, South Australia; Broken Hill, New South Wales, Australia; France; Germany; Gr
certain region in China
Devon, England; Japan; Chenderiang, Malaysia; Morocco; Thailand; FSU
Maldon, Victoria, Australia; FSU
Mt. Vesuvius, Italy
New Mexico, Utah, USA; Hokkaido, Japan
Arizona, USA; Laurium, Attika, Greece
Antandrokomby, Madagascar; Arizona, USA
New York, USA; Brazil; Canada; Norway; Southern Siberian Platform
Pacajake, Bolivia; Cyprus; Honduras
Quebec, Canada; New Mexico; USA; Kola Peninsula, FSU
L†ngban, Sweden
New Jersey, USA; central Morocco; southern New Zealand
Sayan, Russia, FSU
V„rmland, Sweden
L†ngban, Sweden
Oktyabr deposit, Noril'sk region, FSU
V„rmland, Sweden
Widespread USA; Canada; China; England; France; Ilfeld, Harz Mountains, Germany; Romania; Scotland; South Africa; Swe
Nairne pyrite deposit, South Australia
San Diego County, California, Virginia, USA
Mt. Vesuvius, Italy
New Jersey, USA; Sweden
V„rmland, Sweden
Widespread USA; Afghanistan, Australia; Brazil; England; Japan; Mozambique; Sweden; FSU
Orivesi, southern Finland
Sussex County, New Jersey, USA
Iwate, Japan
Sifton Pass, British Columbia and New Brunswick, Canada
Oregon, Washington, USA; Altai Mountains, FSU
Anloua, Cameroon
Mapimi, Durango, Mexico
Widespread USA; Bolivia; Czech Republic; England; France; Germany; Mexico

Chihuahua, Mexico
California, Massachusetts, North Carolina, Pennsylvania, USA; Australia; Austria; Greece; Italy; Japan; Scotland; South Africa
New Jersey, USA; L†ngban, Sweden
Ontario, Quebec, Canada; north Karelia, FSU
Yukon Territory, Canada
Tachgagalt, Morocco; N.W. Cape Province, South Africa
Binnatal, Valais, Switzerland
Broken Hill, New South Wales, Australia; Chuquicamata, Chile
Sussex County, New Jersey, USA
Katanga, Democratic Republic of Congo
California, USA; Mt. Vesuvius, Italy; Mt. Etna, Sicily; Democratic Republic of Congo
Noril'sk region, FSU
Virginia and western USA; New South Wales, Australia; Bolivia; Czech Republic; France; Germany; Greece; Italy; Mexico; Na
Shiga Pref., Japan
Katanga, Democratic Republic of Congo
Orange Free State, South Africa
California, Colorado, Idaho, USA; Austria; Bolivia; Brazil; Canada; Germany, Greenland; Japan; Peru; Spain; Switzerland; FS
Arizona, USA; Chile; Derbyshire, England; Laurium Greece;
Matra Mountains, Hungary
Matagami, Quebec, Canada
Mt. Vesuvius, Italy
Wald-girmes, Germany; North Carolina, Pennsylvania, USA
Ontario, Quebec, Canada; Austria; Germany; Morocco; Spain; Pennsylvania, USA
Broken Hill, New South Wales
Australia
Eifel district, Germany; Hatrurim Formation, Israel
Loire, France
Transvaal, South Africa
California, USA; Argentina; China
Merume River, Guyana
British Columbia, Canada; Tochigi Prefecture, Japan
New Jersey, USA
Mendocino County, California, USA; Austria

Wyoming, USA
Foster mine, Cobalt, Ontario, Canada; Japan; Poland; Norway; FSU
Vosges, France
Liguria, Italy
Finland; Italy; FSU
Wilberforce, Ontario, Canada; Langesundfjord district, Norway; Siberia
Agrigento and Palermo, Sicily; Bohemia, Czech Republic
™rebro, Sweden
New Mexico, USA; Namibia; Sweden
Mt. Vesuvius, Italy
Minasragra (near Cerro de Pasco), Peru; Arizona, Utah, USA
Widespread USA; Czech Republic; Spain; Sweden; FSU
Norway
Czech Republic; Seine, France; Germany; Italy; FSU
California, Colorado, USA; South Australia; Kambalda, Western Australlia; Canada; Japan; Norway; Sweden; FSU

Plaine des Zenaga, Morocco
Somerset, England, UK; Westphalia, Germany; Altai Mountains, FSU
Sonora, Mexico
California, Colorado, Missouri, Utah, USA; Argentina; Chile; Japan
California, USA; Broken Hill, Australia; Ontario, Canada; England; Germany; Italy; Sweden
Mt. Vesuvius, Italy
Arizona, California, Texas, Utah, Washington, USA; Germany; Italy; Spain; Former Yugoslavia
Transvaal, South Africa
Lazio, Italy
Deep Space
Goodnews Bay, Alaska
Goodnews Bay, Alaska; Farm Tweefontein, near Potgietersrust, Transvaal, South Africa
California, Montana, USA; Ireland; Mexico; FSU
California, Colorado, Oregon, New Jersey, Pennsylvania, Washington, USA; Australia; Faeroe Islands, Greenland; Iceland, Ir
New Hampshire, North Carolina, South Dakota, USA; Minas Gerais, Brazil
Utah, USA; Greater Goloustan area, FSU
Ankole district, south-eastern Uganda; Sebungive district, Zimbabwe
California, Colorado, South Dakota, Utah, Washington, USA; Brazil; Cornwall, England; France; Germany; Iran; Japan; Demo
Arizona, South Dakota, Utah, USA; Bavaria; France; Germany; Madagascar; Romania; Spain
Baden, Germany
Kazakhstan, FSU
Alaska, California, Utah, USA; Canada; China; Czech Republic; Italy; Mexico; Romania; Spain; FSU
Colorado, USA
California, USA
Oregon, USA; Schwarzwald, Germany
Colorado, South Dakota, Utah, USA
Baden, Germany
Schwarzwald, Germany
Durango, Mexico
Riviera deposit, near LodŠve, France
Schwarzwald, Germany
Arizona, Colorado, Utah, USA
Eureka, Nevada, USA
Katanga, Democratic Republic of Congo
Antofagasta province, Chile; Teruel, Spain; Arizona, USA
Nevada, USA
Shaba, Democratic Republic of Congo
North Carolina, USA
Arizona, Colorado, South Dakota, USA; Czech Republic; Gabon; Germany; Democratic Republic of Congo
Colorado, New Mexico, South Dakota, Wyoming, USA; Turkestan, FSU
Democratic Republic of Congo
Democratic Republic of Congo
Haut-Ogoou,, Gabon
Nevada, Utah, USA; Malpelo Island, Pacific Ocean
Llallagua and Tasna, Bolivia
South Dakota, USA
Arizona, California, USA; Chile; Italy; Iran;
Wyoming, USA
Nevada, South Dakota, Utay, USA; Brazil; Canada; Czech Republic; Cornwall, England; Germany; Italy

California, USA; Turkey
Democratic Republic of Congo
Sachsen, Germany
central western USA; Australia; Bolivia; Chile; Czech Republic; Germany; Japan; Romania; Spain
Sudbury, Ontario, Canada; Western Australia; Finland; South Africa; Wyoming, USA; FSU
very common mineral; widespread USA; Afghanistan, Brazil; Canada; Germany; India; Italy; Japan; Madagascar; Mexico; Nor
Widespread, USA; Afghanistan, Western Australia; Brazil; Finland; France; Greenland; Madagascar; Norway; Sweden
Campania, Italy
Broken Hill, New South Wales, Australia; Arizona, USA
Okayama Prefecture, Japan
Czech Republic; Germany; Guanajuato, Mexico; Namibia; Switzerland; New Hampshire, North Carolina, USA; FSU
Widespread USA; Kambalda, Western Australia; Bulgaria; Quebec, Canada; Czech Republic; Finland; Germany; Namibia; FS
Utah, USA
Lipari Islands, Italy
central western USA; Algeria; Australia; Czech Republic; France; Germany; Mexico; Tsumeb, Namibia; Sweden; FSU

Minas Gerais, Brazil
Minasragra, Peru
New Jersey, USA
Toscana, Italy
central western USA; Broken Hill, New South Wales, Australia; England; Germany; Iran; Italy; Mexico; Scotland; Sweden; FSU
Minnesota; USA; Cape Province, South Africa; Sweden
Tsumeb, Namibia
Noarlunga, South Australia, Queensland, Western Australia; Belgium; France; Italy
California, Nevada, Wyoming, Utah and other western states, USA; Australia; Austria; Canada; Chile; Czech Republic; Italy; S
Cape Miseno, Italy
Arkansas, USA; Quebec, Canada; Tadzhikistan, FSU
Connecticut, Maine, New Hampshire, North Carolina, South Dakota, USA; Central Africa; FSU
Mt. Vesuvius, Italy
Arizona, California, Utah, USA; Australia; Czech Republic; England; Germany; Greece; Mexico; Namibia;
Sonora, Mexico
Transvaal, South Africa
eastern Ubekistan, FSU
Tuscany, Italy
Arizona, USA; Fergana and Kola Peninsula, FSU; Deep Space
FSU
Widespread common mineral, USA; Africa; Australia; Canada; China; Czech Republic; England; Germany; Japan; Mexico; M
north-eastern Bohemia, Czech Republic
Tsumeb, Namibia
Harz, Germany; Mendoza, Argentina
L†ngban, Sweden
Mt. Vesuvius, Italy; Mt. Etna, Sicily

Widespread throughout world and USA; Australia; Bolivia; Brazil; Finland; Malaya; Madagascar; Norway; Sri Lanka; Switzerla
Dickens Township, Nipissing district, Ontario, Canada; India; Japan; Democratic Republic of Congo

Monche Tundra, FSU; Kambalda, Western Australia; Canada; South Africa; Wyoming, USA; FSU
Moneta in the Caribbean Sea (West Indies?)
Gobi, Mongolia
Pajsberg and Langban, Sweden

Robe, South Australia; New Jersey, USA; Kirgizia, FSU
Maramures, Romania
Montbray, Abitibi County, Quebec, Canada
Puy-de-D“me, France
Creuse, France
Genarutta, Sardinia

Mont St. Hilaire, Quebec, Canada
Lipez Huay-co-Ocuri, Bolivia
North Carolina, South Dakota, Utah, USA; South Australia; Western Australia; Brazil; Namibia; FSU
Arkansas, California, New York, USA; Canada; Israel; Italy; Scotland; Tasmania; FSU; Democratic Republic of Congo
Widespread common mineral, USA; Brazil; Czech Republic; France; Italy; Romania and elsewhere
western Colorado, South Dakota, Utah, USA; Gabon
Qu‚bec, Canada
California, Texas, USA
Minnesota, USA; Transvaal, South Africa; FSU
Western Australia, Australia
New Jersey, USA
Nova Scotia, Canada
Nevada, USA
Minas Gerais, Brazil; Londonderry, Western Australia; New Hampshire, USA
Widespread USA; Canada; Iceland; Italy; Japan; New Zealand; Scotland; FSU; Former Yugoslavia
Kivu, Democratic Republic of Congo
V„rmland, Sweden
California, Colorado, USA; Algeria; Western Australia; Canada; France; Germany; Italy; Peru; Spain;
South Dakota, USA; Finland; France; Germany
Lower Silesia, Poland
Langesundfjord, Norway
Chile; France; Bavaria, Germany; Sweden
Texas, USA
western USA; Bolivia; Chile; France; Gabon; Germany; Namibia; Sardinia; Zambia
Auckland, New Zealand
Gabon, Africa
Kimberley, South Africa
Western Australia, Australia
FSU
Wakefield, Quebec
Czeck Republic, Germany and Victoria, Australia
Sonora, Mexico
California, USA
Gornaya Shoriva, western Siberia, FSU
Mull Island, Scotland, UK
Democratic Republic of Congo
Petrogale Cave (near Mudrabilla), Western Australia
Azad Kashmir, Pakistan
Colorado, USA
Arizona, New Mexico, USA; Iran; Mexico
Kola Peninsula, Russia, FSU
Murunskii alkalic massif, FSU

Widespread common mineral; USA; Austria; Brazil; Canada; Greenland; India; Norway; Sweden; Switzerland; FSU

South Australia, Australia
Tadzhikistan, FSU
Northwest Territories, Canada
Ilimaussaq massif, Greenland
Kola Peninsula, FSU
Kola Peninsula, FSU
Arizona, Colorado, Michigan, USA; Germany
Constantine, Algeria; Bulgaria; Cornwall, England; Sweden
Gumma Prefecture, Japan
Israel
Kalgoorlie, Western Australia; Canada; Fiji Islands; Hungary; Japan; New Zealand; Nagyag, Romania; California, Colorado, N
California, Colorado, USA; East Africa; Egypt; Kenya; Italy
Big Fish River area, Yukon Territory, Canada
Honshu, Japan
Kitakami Mountains, north-eastern Japan
north-eastern Namibia (near Khorixas), Africa
Caernarvonshire, Wales
Nan Ling area, China
Copiapo (near Nantoko), Chile; Broken Hill, New South Wales, Australia
north-central Montana, USA; Canada; Greenland; Norway; Sudan; FSU
Lardarello, Tuscany, Italy
New Jersey, USA; Langban, Sweden
Kola Peninsula, FSU
Slyudianska Precambrian Metamorphic Complex, FSU
Trudov deposits, central Asia
Kola Peninsula, FSU
Kola Peninsula, Russia, FSU
Arizona, California, Colorado, Hawaii, Texas, Utah, USA; Western Australia; Chile; Japan; New Zealand
Okayama, Japan
Xinjiang, China
Antofagasta Province, Chile
Morbihan, France
Kola Peninsula, Russia, FSU
Widespread USA; Western Australia; Chile; Czech Republic; Denmark; Greece; Iran; Mexico; Norway; FSU
Widespread USA; Canada; Czech Republic; Faeroe Islands; France; Germany; Greenland; Iceland; Ireland; Norway; Scotlan
Colorado, USA
California, Nevada, Utah, USA; Egypt; Italy; Mongolia; Sicily and elsewhere
Iwate Prefecture, Japan
Connecticut, USA
Khibina massif, FSU
Kola Peninsula, FSU
Kola Peninsula, FSU
Greenland
Idaho, Washington, USA; Argentina; Germany; Norway
Apache County, Arizona; San Juan County, Utah, USA
Laurium, Greece

Kola Peninsula, FSU
Utah, USA; Norway; Ural Mountains, eastern Siberia; Kola Peninsula, FSU
Arizona, California, USA; Brazil
Eastern Uzbekhistan, FSU
New Jersey, USA
Tachgagalt, Morocco
Kola Peninsula, Russia, FSU
Widespread USA; Burma; Canada; Finland; Italy; Kenya; Korea; New Zealand; Norway; Romania; Scotland; South Africa; FS
N,poui, New Caledonia
California, New Mexico, USA; Wood's Reef serpentinite, New South Wales, Australia; Mont St. Hilaire, Canada; Greeland; FS
Idaho, Pennsylvania, USA; Austria; France; Italy; Japan; FSU
Nevskii deposit, north-eastern FSU
Skipton Caves, Victoria, Australia; Chile; La Reunion Island, Indian Ocean; Malaysia; Ascension Island in South Atlantic; Calif
British Columbia, Canada
Sarawak, Malaysia
California, Colorado, New Jersey, USA; South Australia; Ontario, Canada; Czech Republic; England; France; Germany; Iran;
Bogota, New Caledonia; New Zealand; Brukunga, South Australia
Noril'sk deposits, FSU
Arizona; New Mexico, Washington, USA; Canada; France; Germany
Bohemia, Czech Republic
Transvaal, South Africa
Gumma Prefecture, Japan; Quebec, Canada
Kambalda and Carr Boyd Rocks, Western Australia

Finland; Tasmania; Noril'sk deposit, FSU
Tur'insk region, northern Urals, FSU
Kabba province, Nigeria
Insizwa, South Africa; Monchegorsk, FSU
Transvaal, South Africa
Honshu, Japan
Deep Space
Tanana Quadrangle, Alaska; Vishnevye Gor, FSU

Labrador, Canada
Oka, Quebec, Canada
Red Lake district, Ontario, Canada; Sweden; FSU
Panoche Valley, California, USA
central western USA; Bolivia; Chile; Italy; Spain; FSU and elsewhere
California, Nevada, New Mexico, Texas, Utah, USA; Bolivia; Chile; India; North Africa; Peru; FSU
northern Chile
Arizona, California, Indiana, Kentucky, New Mexico, USA; France; Hungary; Spain
Kentucky, USA; Jura, France
Death Valley region, California, USA
Saskatchewan, Canada
Dordogne, France
New Jersey, New York, USA; Ontario, Canada; Sweden
China; Langesundfjord, Norway; Arandis, Namibia

Kola Peninsula, Russia, FSU
Mont. St. Hilaire, Quebec, Canada

Falun, Sweden
Wyoming, USA
California, Wyoming, USA; Chad; Uganda
Colorado, South Dakota, Utah, USA; China; Cornwall, England; Germany
New Mexico, Oklahoma, USA; Brazil; Germany; Mexico
northern Bohemia, Czech Republic
Canton Wallis, Switzerland
Nsuta, Ghana
British Columbia, Canada; Kazakhstan, FSU
Nukundamu, Fiji
Nullagine district, Western Australia
Oldoinyo Lengai volcano, Tanzania
Tsumeb, Namibia
Arizona, USA
Antofagasta, Chile
New South Wales and Victoria, Australia; Caroline Islands; Montbrison, Loire, France; Germany; Arizona, Oregon, Washingto
New Jersey, USA
Niigata, Japan
Mapini, Durango, Mexico
Okanogan County, Washington
Chile; Faeroe Islands; Disco Island, Greenland; Iceland; India and elsewhere
Deep Space
Kola Peninsula, FSU
Widespread common mineral; Australia; Canada; Kenya; Norway; Sweden; USA; FSU
Chile; England; Germany; Greece; Tsumeb, Namibia; Arizona, Nevada, Utah, USA and elsewhere
(Fayalite) California, USA
South Dakota, USA
Pacajake mine (near Hiaco), Bolivia
Kola Peninsula, FSU
Sichuan, China
Sonoma County, California, USA; Austria; France; Germany; Ghana; Greenland; Japan; Norway
Tuscany, Italy
California, USA
Katanga, Democratic Republic of Congo
Widespread; USA; New South Wales and Queensland, Australia; Brazil; Honduras; Hungary; Mexico
Guanajuato, Mexico
™rebro, Sweden
Oregon, USA
Humboldt County, California, USA
Oriente Province, Cuba; South Africa; Michigan, USA
Rhodope Mts., Bulgaria
California, Nevada, Utah, Wyoming, USA; China; France; Germany; Greece; Hungary; Italy; Japan; Peru; Switzerland; Turkey
Yunan and Szechuan, China
Madras, India
Widspread, very common mineral; USA; Austria; Canada; Czech Republic; England; France; Germany; Italy; Japan; Madagas
L†ngban, Sweden; Iwate Prefecture, Japan

L†ngban, Sweden
Whim Creek, Marble Bar area, Western Australia; Argentina; Chile; Japan; New Zealand; Arizona, Utah, USA

Humboldt County, California, USA
Deep Space
Ural Mountains, FSU; New South Wales, Australia; Borneo; Brazil; Canada; Colombia; California, Oregon, USA
Ural Mountains, FSU
Kagosima, Japan
Co. Antrim, Northern Ireland
Tsumeb, Namibia; Broken Hill, Australia
Tsumeb, Namibia
Cerro de Potosi, Bolivia
Ardennes, Belgium
Nullagine region, Western Australia
Shaba, Democratic Republic of Congo
Utah, USA; Milgun Station, Australia
Idaho, USA
Gua¤ape Islands, Peru
Honshu, Japan
Sein„joki, Finland
Santa Cruz, California, USA
Colorado, USA; Bavaria, Germany; Greenland; Norway
Baita Bihorului, Rezbanya, Romania
South Dakota, USA
Mogok, Burma
Siberia (N), Russia, FSU
New Hampshire, USA
Minas Gerais, Brazil; Colombia; South Africa; Ural Mountains, FSU
Kambalda, Western Australia; Canada; FSU
Montana, USA
Minas Gerais, Brazil
Mt. Vesuvius, Italy
Georgia, Metaline Falls, Washinton, USA; England; France; Morocco; Shetland Islands; FSU and elsewhere
Panasqueira, Portugal
Deep Space
Oktyabr deposit, Talnakh ore field, FSU
Arizona, USA; Transvaal, South Africa
Alto Giz pegmatite, Brazil
Utah, USA; Argentina; Chile
Lleyn Peninsula, Caernavonshire, Wales, UK
Alcaparrosa, Tierra Amarilla and Quetena, Chile
Kenora district, Ontario, Canada; Broken Hill, New South Australia; China; Sweden
Durango, Mexico
Broken Hill, New South Wales, Australia
Colorado, southern Vermont, Virginia, USA; Italy; Switzerland
Sierra de Santa Rosa (near Guanajuato), Mexico; Japan; Sweden
Iberville Parish, Louisiana, USA
Broken Hill mine, Zambia; Reaphook Hill, South Australia; Canada; Germany
Lagendalen (near Larvik), Norway; Kola Peninsula, FSU
Arizona, USA; Lagendalen, Norway
Arizona, USA; Chile; England; Laurium, Greece
Illinois, USA

Bisbee, Arizona; Ontonagon County, Michigan, USA
Sonora, Mexico
Colorado, USA
Mont St. Hilaire, Quebec, Canada
Hautes Alpes, France; FYRO Macedonia
Austria; South Lorrain, Ontario, Canada; France; Morocco; FSU
Canada; Valais, Switzerland; Nevada, USA
Pfalz (near Obermoschel), Germany; Sofia district, Bulgaria
Katanga, Democratic Republic of Congo
Bayern, Germany
Inyo County, California, USA
Germany; Japan; Mexico; Morocco; New Jersey, South Dakota, USA
Arizona, Nevada, USA; Broken Hill, New South Wales, Australia; Chile; England; Greece; Italy
Sonora, Mexico; Tombstone district, Arizona, USA
Kola Peninsula, FSU
Llallagua, Bolivia; New Hampshire, North Carolina, USA
Riverside County, California, USA; Mt. Somma, Italy; Csiklova, Romania
Pargas, Finland
Quincy, Massachusetts, Montana, USA; Brazil; Canada; Greenland; Italy; Madagascar; Manchuria; Norway; Switzerland
Austria; Sudbury, Ontario, Canada; South Africa; FSU
Nevada, USA
Grischun, Switzerland
Arizona, New Hampshire, USA; France; Germany; mocratic Republic of Congo
Taurus Mountains, south-western Turkey
Mono County, California, USA
L†ngban, Sweden
Colorado, New Mexico, South Dakota, Utah, USA; Peru
Pasco dept., Peru
Washington, USA
Arizona, USA
Laurium, Greece; V„rmland, Sweden
Sur-Lipez, Bolivia
Bohemia, Czech Republic
Colorado, Idaho, Montana, Utah, USA; Canada; Chile; Czech Republic; Mexico; Spain
Western Australia, Australia
Kansas, New Jersey, USA; Australia; Canada; Czech Republic; Greenland; Island of Los, Guinea; Italy; Japan; Morocco; Sco
Kemi” island, Finland
South Australia, Australia
Northern Territory, Australia
Pelly River, Yukon Territory, Canada; California, USA
Yukon Territory, Canada
Kola Peninsula, Russia, FSU
Caernarvonshire, Wales, UK; North Carolina, USA
Colquechaea, Bolivia
Malheur County, Oregon, USA
Sonoma County, California, Colorado, Nevada, USA; Tarapaca Province, Chile
Alaska, California, Colorado, Montana, Nevada, Washington, USA; Canada; Norway; South Africa
Penguin River, eastern FSU
Tuscany, Italy

Maine, USA
Riverside County, California, New Mexico, USA; Czech Republic; Italy; Sardinia; Spain, Sweden
L†ngban, Sweden
Kola Peninsula, FSU
South Dakota, USA; Wilmington, Australia; Bavaria, Germany
Bohemia, Czech Republic
Widespread USA; Brazil; Canada; Germany; Italy; Sweden; Switzerland; FSU

Cap-Garonne, France; Broken Hill, NSW and Coppin Pool, Western Australia
Deep Space; Cape Province, South Africa
California, Maine, Massachusetts, USA; Canada; Italy; Namibia; Sweden; FSU; Zimbabwe and elsewhere
Mont St. Hilaire, Quebec, Canada
New Jersey, USA
New Jersey, USA
western Moravia, Czech Republic
central Kazakhstan, FSU
Madagascar
Kalgoorlie, Western Australia; Canada; Fiji; Transylvania, Romania; California, Colorado, Montana, USA
Los Angeles County, California, Nevada, USA; Czech Republic; France; Germany
Nevada, New Jersey, South Dakota, Utah, USA; Algeria; Brazil; Chile; Czech Republic; England; France; Germany; Greece;
Vosges, France
Widespread USA; Austria; Brazil; Czech Republic; France; Namibia; Norway; Poland; Switzerland; Tanzania; FSU
Dundas district, Tasmania, Australia; Nsumeb, Namibia
Montana, USA
California, Hawaii, Washington, USA; Australia; Czech Republic; Germany; Hungary; Northern Ireland; Israel; Italy; Sicily; Uga
Widespread USA; Australia; Brazil; Canada; Finland; India; Italy; Madagascar; New Zealand; Norway; Sri Lanka; Sweden; Sw
Urals, FSU; Dundas, Tasmania; Arizona, USA
Arizona, California, Colorado, Massachusetts, New Mexico, Utah, USA; Australia; England; Greece; Italy; Namibia; Poland; F
Kola Peninsula, FSU
Kalgoorlie, Western Australia, Australia
New Hampshire, South Dakota, USA; Brazil; France; Germany
Baden-W□rttemberg, Germany
Potosi, Bolivia; Germany; Reaphook Hill, South Australia; USA
Salzburg Province, Austria
Alabama, California, New Hampshire, Nevada, South Dakota, USA; France; Germany; Malpelo Island, Pacific Ocean; Sardini
North Carolina, USA
Democratic Republic of Congo
Sachsen, Germany
Schwarzwald, Germany
central western USA; Austria; Canada; Chile; Czech Republic; France; Germany; Italy and elsewhere
FYRO Macedonia
Chile; Germany; Italy; Poland
France; Sachsen, Germany; Missouri, New Jersey, USA
Arizona, California, Colorado, Missouri, Pennsylvania, USA; Egypt; Italy; Japan; New Zealand; Poland; Scotland; Sweden
Jas-Roux, Hautes-Alpes, France
Minnesota, USA
Deutsch-Pilsen, Hungary
L†ngban, Sweden
Brewster County, Texas, USA

Sachsen-Anhalt, Germany
Rinconada department, Argentina
California, Wyoming, USA; Kola Peninsula, FSU
Kamchatka, FSU
Oruro, Bolivia; Canada; France; Germany
Arizona, Utah, USA; Katanga, Democratic Republic of Congo
Transvaal, South Africa
Trinity County, California, USA; Brazil; Burma; Canada; FSU
Alaska, California, North Carolina, Washington, USA; Australia; Borneo; Brazil; Canada; Colombia; Ethiopia; Finland; German
Idaho, New Mexico, South Dakota, USA; Mexico; Namibia
Fahlun, Sweden
Madoc, Ontario, Canada
Riverside County, California, USA; Austria; Ireland
Ukrainian Shield, FSU
Transbaikal, Russia, FSU
Orebro, Sweden
Arizona, California, Colorado, Georgia, Missouri, USA; Brazil; England; France
central western USA; Australia; Bolivia; Chile; England; Greece; Namibia; Turkey
Democratic Republic of Congo
Dumfries-shire, Scotland
Polar Urals, FSU
Ural Mts., Russia, FSU
Kazakhstan (N), FSU
Tsumeb, Namibia
British Columbia, Canada
central Kazakhstan, FSU
Siberia (N), Russia, FSU
Idaho, USA
Lower Silesia, Poland
California, Maine, South Dakota, USA; Afghanistan; Brazil; Canada; England; Finland; Italy; Japan; Mozambique; Namibia; S
western USA; New South Wales, Australia; Canada; Czech Republic; Germany; Mexico; Peru; Sardinia
Widespread USA; Brazil; Canada; Norway; Sweden; FSU and elsewhere
Siegen, Westphalia, Germany
Arizona, New Mexico, Texas, Utah, USA; Austria; England; France; Germany; Iran; Italy; Poland; FSU
Mont St. Hilaire, Quebec, Canada; Greenway; Norway; New Mexico, USA; FSU

Germany; Hatrurim Formation, Israel; Antrim, Ireland; Italy
Austria; Czech Republic; England; Germany; Arizona, USA; central Kazakhstan, FSU
Guyana
western USA; Chile; England; France; Germany; Italy; Scotland; Spain
Czech Republic
Mexico; Honduras
Houghton County, Michigan and western USA; India; Morocco; Namibia; Turkey; FSU
Kazakstan, FSU
Widespread USA; Australia; Austria; Canada; Czech Republic; France; Germany; Italy; New Zealand; Pakistan; South Africa;
Calingasta, San Juan Province, Argentina
Canton Valais, Switzerland
western Kazakhstan, FSU
California, Oregon, USA; Canada; England; Turkey;

Western Australia, Australia
California, USA
Colorado, Utah, USA; Czech Republic; Germany; Tasmania; FSU
Tsumeb, Namibia
Shinkolobwe mine, Shaba Province, Democratic Republic of Congo
western USA; Chile; Czech Republic; France; Germany; Mexico; Romania; Sardinia
Former Soviet Union

Baja California, Mexico; Greece; Peru; Arizona, USA
Transylvania, Romania
Bayern, Germany
France; Germany; Czech Republic; Romania; Widespread
Greenbushes, Western Australia; Brazil; India; Florida, New Jersey, USA
near Hauzenberg, Bayerischer Wald, Germany; southwest Iran
San Diego County, California, USA; Coolgardie, Western Australia; Brazil; Germany; Madagascar
Michigan, USA
Yamanashi, Japan
Arizona, California, North Carolina, South Dakota, USA; Western Australia; Afghanistan; France; Portugal
Siberia, Russia, FSU
Widespread western USA; Bolivia; Canada; Chile; Czech Republic; Germany; Mexico; Spain
Common mineral; widespread throughout USA; Bolivia; Canada; Czech Republic; England; France; Germany; Italy; Japan; M
Maryland, New Jersey, Pennsylvania, USA; Australia; Austria; Canada; Greece; Italy; Japan; Morocco; Scotland; Sweden; FS
L†ngban, Sweden; Glamorgan, Wales, UK
California, Colorado, Maine, North Carolina, Wisconsin, USA; Canada; Greenland; France; Germany; Italy; Norway; Sweden;
California, New Jersey, USA; Canada; Sweden; Switzerland; Former Yugoslavia
Widespread USA; Brazil; Canada; Cuba; Czech Republic; France; Germany; Ghana; India; Mexico; Morocco; Romania; Spai
Common secondary lead mineral; widespread USA; Broken Hill, Australia; Algeria; Burma; Canada; Czech Republi; England;
Arizona; Arkansas, New Mexico, North Carolina, Utah, USA; New South Wales, Queensland, Australia; Czech Republic; India
Minas Gerais, Brazil; Canada; Japan; Broken Hill, Australia; North Caarolina, USA; Wales, UK
Widespread USA; Belgium; Brazil; Japan; Korea; Mexico; South Africa; Sweden; Switzerland; FSU
Broken Hill, New South Wales, Australia; Canada; England; Sweden; North Wales, UK
California, Colorado, Idaho, USA; Broken Hill and Tasmania, Australia; Chile; Czech Republic; Germany; Japan
Moon rocks; Kyoto Prefecture, Japan; India
California, Colorado, Idaho, South Carolina, USA; Broken Hill, Australia; Finland; France; Japan; Scotland; Sweden
Maine, Pennsylvania, South Dakota, Tennessee, USA; Brazil; Bolivia; Canada; Germany; Mexico; Norway; Former Yugoslavi
Qala-Dizeh region, north-eastern Iraq
Xinjiang, China
Hunan, China
Widespread, very common mineral; USA; Australia; Austria; Brazil; Canada; Czech Republic; England; France; Germany; Ind
Tsumeb, Namibia
L†ngban, Sweden
Alcaparrosa and Tierra Amarilla, Chile
Sonora, Mexico
Utah, USA
Kolar gold deposit, India
FYRO Macedonia
Kola Peninsula, FSU
Lone Pine, New Mexico, USA
Ivigtut, Greenland

Potosi, Bolivia
Margnac, Massif Central, France
Michigan, USA; Austria; Canada; Chile; England; France; Germany; Iran; Italy; Sardinia; Switzerland; FSU
Ramsbeck, Germany
California Idaho, Minnesota, Montana, New Mexico, USA; Canada; Czech Republic; India; Mexico; South Africa; Turkey and
AriŠge, France
Baden-W□rttemberg, Germany
Democratic Republic of Congo
Hatrurim Formation, Israel; Antrim, N. Ireland; Japan; New Zealand; FSU
Arizona, USA
Democratic Republic of Congo
Rapid Creek area, northern Yukon Territory, Canada
Broken Hill, New South Wales, Australia; Brazil; Mexico
Kola Peninsula, FSU
Valais, Switzerland
Sainte-Marie aux mines, Alsace, France
Utah, USA
Rajasthan, India
Wiedspread USA; Peru; Romania; Switzerland
FYRO Macedonia
Connecticut, Maine, USA
California, USA
Duchesne County, Utah, USA
Clear Creek, San Benito County, California, USA; Wolf Creek, Western Australia; Barberton Mountain Land, South Africa
Bavaria, Germany
Reichenbach and Borstein, Oldenwald, Germany
Tsumeb, Namibia
Laacher See volcanic area, Mayen, Germany
Democratic Republic of Congo
Dempublic of Congo
Illinois, Nevada, Pennsylvania, USA; Mount Keith, Western Australia; Canada; Germany; Peru; Poland
New Jersey, USA; Nordmark, Sweden
New Jersey, USA
New Jersey, USA
Kola Peninsula, FSU
Nuussuaq, Greenland
Canada; Cornwall, England; middle Schwarzwald, Germany; Republic of Burundi; Virginia, USA
Connecticut, USA
Zabaikal'ye, Russia, FSU
Canada; Germany; Kimberley, South Africa; California, USA
Montana, USA
Devon, England; Manjaka, Madagascar; FSU
Widespread USA; Argentina; Canada; Germany; Romania; Peru; South Africa
Widespread USA; Broken Hill, Australia; Brazil; England; Finland; Hungary; India; Italy; Japan; South Africa; Sweden; FSU
Bolivia
Bisbee, Arizona, USA; Argentina; Canada; Chile; Slovakia; Peru
Hessen, Germany
Tsumeb, Namibia
LiŠge, Belgium

Hessen, Germany
Katanga, Democratic Republic of Congo
Colorado, Montana, Wyoming, USA; Australia; Burma; Canada; Madagascar; Sweden
Arizona, Colorado, USA; Western Australia; Japan; South Africa; FSU
Widespread USA; Australia; Austria; Canada; Corsica; France; Greenland; Korea; Nigeria; Portugal; Scotland; South Africa; F
Deep Space
Sachsen, Germany; FSU
Province of Salta, Argentina
Riverside County, California, USA
Deep Space
Arizona, South Dakota, USA; Namibia; Germany
Pershing County, Nevada, USA; Spain
Virginia, USA
Almeria Province, Spain
New Jersey, USA
Deep Space
Novara Province, Italy
Kvanefeld, Greenland
Zechstein Basin, Germany
Widespread USA; Belgium; France; Germany; India; Scotland; Sweden and elsewhere
Ontario, Canada
Minas Gerais, Brazil; Germany; Algeria; Austria; Italy; Sweden
Arizona, California, Utah, USA; Chile; Czech Republic; Germany; Iran; FSU
Narsarsuaq, Greenland
Potosi, Bolivia; Germany
Mt Pleasant, Fredericton, New Brunswick, Canada; Sweden; Japan
Widespread USA; Germany; Japan; Mexico; Namibia; Sardinia
Sachsen, Germany
California, Colorado, USA; Kalgoorlie, Western Australia; Gabon
Bou Izakarn, Morocco; Namibia; Germany; Spain
Germany; Namibia; Bou Izakarn, Morocco
New Hampshire, USA; Brazil; Norway; FSU
Mendocino County, California, USA; Bohemia, Czech Republic; New Zealand
New Letovice, M„hren, Czech Republic; Italy; California, USA
Colorado, Utah, USA
Bieber (near Hanau) and Schwarzwald, Germany; Bohemia, Czech Republic
Kladno district, Bohemia, Czech Republic
Democratic Republic of Congo
L†ngban, V„rmland, Sweden
Hautes-Alpes, France
New Jersey, USA
Texas, USA
Ontario, Canada; Arizona, Iowa, USA; England; Japan; Poland
northern Tibet, China
San Diego County, California, USA
Zod and Kochkar gold deposits, FSU
Gila County, Arizona, USA
Cornwall, England, UK
Rustenburg and Atok platinum mines, Bushveld Igneous Complex, South Africa

Kilchoan, Ardnamurchan, Scotland; Turkey
Ioma area, Papua New Guinea
Hokkaido, Japan
Hokkaido, Japan
Japan
Edwards Creek, South Australia; Tanzania; Maine, New Hampshire, Wyoming, USA; Katanga, Democratic Republic of Congo
Widespread common mineral; USA; Austria; Brazil; Canada; Czech Reoublic; France; Germany; Italy; Madagascar; Norway;
San Diego County, California, USA
Czech Republic
Transvaal, South Africa
Montreal Island, Quebec, Canada
Arizona, Utah, Wyoming, USA; France; Brazil; France; Portugal; Spain
Roma, Italy
South Lorrain, Ontario, Canada; Germany; Morocco; Japan; Sardinia; Sweden
California, USA
L†ngban, Sweden
Sainte-Marie aux mines, Alsace, France; Bohemia, Czech Republic
middle and lower Paleozoic dolomites, Siberia, FSU
Tien Shan Mts. (W), Russia, FSU
Honshu, Japan
California, Hawaii, Pennsylvania, USA; Italy; Sicily and elsewhere
Arizona, South Dakota, USA; Rum Jungle, Australia; Brazil; France; Germany; Portugal; Democratic Republic of Congo
Chuquicamata, Chile

Ilmen Mts., Russia, FSU
Chuquicamata, Chile; Australia; Austria
Harz Mountains, Germany
New Hampshire, USA
Liguria, Italy
common mineral; widespread
San Juan, Argentina
San Luis, Argentina
Santa Clara and Stanislaus counties, California, USA
New Mexico, USA
Sierra Gorda, Chile
Larderello, Tuscany, Italy
Michigan, Minnesota, Utah, USA; Canada; Czech Republic; England; Japan; Scotland; South Africa; Sweden and elsewhere

Westchester, New York, USA; Canada; Greenland; India; Italy; Madagascar; South Africa and elsewhere
Sarabau mine, Sarawak, Malaysia
Mt. Vesuvius, Italy
Silesia, Poland
L†ngban and Pajsberg, Sweden
Barreal Dept., Argentina
Canton Valais, Switzerland
FSU
Transvaal, South Africa
California, Nevada, Wyoming, USA; Germany; Italy
Kungur strata, Kazakh, FSU

Yukon Territory, Canada
Pennsylvania, USA
Shinkolobwe, Shaba, Democratic Republic of Congo

Kola Peninsula, FSU
Death Valley region, California, USA; Larderello, Italy
Mt. Vesuvius, Italy
South Bay, Scarborough, Yorkshire, England
Arizona, California, Montana, USA; Ireland; Japan; New Zealand
Rheinland-Pfalz, Germany
Pernek, Slovakia; Apuan Alps, Italy
San Bernardino County, California, USA
Sussex County, New Jersey, USA
Tsumeb, Namibia
Widespread USA; Australia; Austria; Bolivia; Brazil; Burma; Canada; Czech Republic; England; France; Germany; Italy; Japan
Skipton Caves, Ballarat, Victoria, Australia
Iveland, Norway
Tombstone, Arizona, USA
Colorado, USA
Sonora, Mexico; Shaba province, Democratic Republic of Congo
Tsumeb, Namibia; Morocco; South Dakota, USA
Nevada, USA
Brooks Mountain, Alaska, USA; FSU
Bavaria, Germany; USA; Katanga, Democratic Republic of Congo
Deep Space
South Australia; Czech Republic; Bayern, Germany; South Dakota, USA; FSU
New Hampshire, USA
Widespread common mineral; USA Afghanistan; Brazil; Canada; Czech Republic; England; Greenland; Japan; Madagascar;
California, USA; Israel; Japan; Scotland, UK; Siberia, FSU
Commentry and Cranzac, France; Greenland; Deep Space
Voi, Kenya
Arizona, Utah, Wyoming, USA; Argentina; Austria; Czech Republic; Germany
Mounana, Gabon
California, Idaho, Nevada, USA

Democratic Republic of Congo
Hartz mountains, Germany
Tsumeb, Namibia
Sachsen, Germany
Cashinal, Atacama desert; Caracoles district and northern Chile
Riverside County, California, USA; Widespread
Widespread USA; Africa; Asia; Algeria; Broken Hill, Australia; Brazil; Europe; Mexico
Minas Gerais, Brazil
Leadhills, Scotland, UK
Iron River, Iron County, Michigan, USA
San Bernardino County, California, Nevada, New Mexico, Wyoming, USA
Kuusamo, Finland
FSU
Sierra Gorda, Chile

South Dakota, USA; Milgun Station, Western Australia
Broken Hill, Australia
Kola Peninsula, Russia, FSU
Vaasa, Finland
western Moravia, Czech Republic
central western USA; Czech Republic
central Tschukotka, FSU
Utah, Montana, USA; Kalgoorlie, Western Australia; Austria; Italy; Namibia; Switzerland
Schwarzwald, Germany; Brazil; France; Italy; Norway
Greenland
Oruro, Bolivia; England; Germany; Romania; Peru; Scotland; Colorado, USA
Minas Gerais, Brazil
California, South Dakota, Utah, Washington, USA; Algeria; Canada; France; Germany; Italy; Sardinia
Senegal
Democratic Republic of Congo
central western USA; Czech Republic; Greece; Morocco; Turkey
Queensland, Australia; Mont St. Hilaire, Quebec, Canada; Guinea; Japan; New Mexico, USA
Sri Lanka
FSU
(Antigorite) Widespread. Washington, USA
Australia; Killarney, Ireland; Germany; Greece; Namibia; New Zealand; FSU; Democratic Republic of Congo
Siberia, Russia, FSU
Siberia, Russia, FSU
Kola Peninsula, Russia, FSU
Kelyan deposit, Buryat ASSR, FSU
Nullagine, Western Australia and Trial Harbour, Tasmania, Australia
Democratic Republic of Congo
Arizona, USA
Kola Peninsula, Russia, FSU
Kamchatka, FSU; El Salvador
Colorado, USA
Shiga Prefecture, Japan; Australia
Utah, Wyoming, USA; Canada; eastern Uganda
Ural Mts., Russia, FSU
Arizona, California, Maine, South Dakota, USA; Wodgina, Western Australia; Sweden
Mt. Vesuvius, Italy
Widespread common mineral; USA; Australia; Austria; Bolivia; Brazil; Canada; England; Germany; Greenland
Bolivia; Canada; Sierra Gorda, Chile; England; Poland; California, USA
Colorado, USA
Arizona, California, Nevada, Utah, USA and elsewhere
Kola Peninsula, FSU
Colorado, USA
Missouri, USA; Kalgoorlie district, Western Australia; Czech Republic; France; Germany; Japan; Katanga, Democratic Repub
Mt. Oxide Mine, Queensland, Australia
Potos¡, Bolivia
Trinity County, California, USA
Durango, Mexico
Widespread USA; Burma, Canada; Czech Republic; France; Germany; India; Ireland; Kenya; North and South Korea; Madag
Broken Hill, Australia; Norway; Bolivia; Widespread

Toscana, Italy
FYRO Macedonia
Richelsdorf, Hesse, Germany
Colorado, Utah, USA
Western Australia, Australia
South Dakota, Idaho, USA; Peru; FSU
Bancroft, Ontario, Canada; Sri Lanka; Tanzania; New York, USA
South Dakota, USA
Canton Wallis, Switzerland
Deep Space
Japan; L†ngban, Sweden; New Jersey, USA
Ilimaussaq alkaline intrusion, southern Greenland

Arizona, Colorado, USA; Canada; Germany; Iran; Morocco; Norway
Czech Republic

Wallowa County, Oregon USA; Japan
Kazakhstan, FSU
Canton Wallis, Switzerland
Widespread USA; Algeria; Australia; Belgium; France; Greece; Italy; Mexico; Tsumeb, Namibia; Spain; Tunisia
Bou Azzer, Morocco
California, Indiana, USA; Australia; Canada; Germany; Japan; Switzerland; FSU
Kola Peninsula, FSU
Noril'sk region, FSU
Lower Silesia, Poland
Widespread USA; Angola; Brazil; Burma; Canada; Germany; Greenland; Italy; Korea; Norway; Romania; Scotland; South Afri
Arizona, New Hampshire, New Mexico, Utah, Wyoming, USA; South Africa; Democratic Republic of Congo
San Bernardino, California, USA
South Dakota, USA; FSU
FSU
FSU
Honshu, Japan
Marda, Western Australia, Australia
FSU

Utah, USA
Tadzhikistan, FSU
Tsumeb, Namibia
Solongo, Buryat ASSR, FSU
France; L†ngban, Sweden; New Jersey, North Carolina, USA
Sonora, Mexico; Arizona, Nevada, USA
Monchegorsk Pluton, FSU
Madoc, Ontario, Canada
Ilimaussaq alkalic intrusive, southern Greenland
Kola Peninsula, Russia, FSU
western Bohemia, Czech Republic
Minas Gerais, Brazil
Arizona, New Mexico, Nevada, Utah, USA; Australia; England; Sardinia
British Columbia, Canada; Yorkshire, England

North Carolina, Wyoming, USA; Kambalda, Western Australia; Canada; Finland; eastern Siberia; South Africa
Richmond County, Quebec, Canada
Widespread USA; Afghanistan, Broken Hill, Australia; Brazil; Czech Republic; England; Finland; Madagascar; New Zealand; F
Schneeberg, Sachsen, Germany; Italy; Australia; Democratic Republic of Congo
Widespread common zinc mineral; USA; New South Wales, Australia; Brazil; Canada; Czech Republic; England; France; Ger
British Antarctic Territory, Antarctica
Widespread USA; Afghanistan; Australia; Burma; Cambodia; Canada; Finland; Germany; India; Italy; Madagascar; Sri Lanka;
south-western Alberta, Canada
Sonora, Mexico
Widespread USA; Afghanistan; Brazil; Madagascar; Manitoba; Sweden; FSU and elsewhere
Riverside County, California, New Mexico, USA; Ireland; Israel; Japan; Turkey; FSU and elsewhere
Southern Urals, FSU
Sabaragamova, Sri Lanka
Deep Space
Minasragra (near Cerro de Pasco), Peru
Alaska, South Dakota, Washington, USA; Brukunga, South Australia; Bolivia; Canada; China; Czech Republic; England; Norw
Okayama Prefecture, Japan
Tammela, south-western Finland
Paraiba, Brazil
Arizona, California, Colorado, Missouri, USA; Hanover, Germany; Turkey
Widespread metamorphic mineral; USA; Ivory Coast, Australia; Brazil; Canada; Finland; France; Greenland; Ireland; Uganda;
Mont St. Hilaire, Quebec, Canada

Greenland
Sardinia, Italy; Oregon, USA; Australia
V„rmland, Sweden
Ivigtut, Greenland
Lena River, FSU
Western USA; Bolivia; Chile; Czech Republic; England; Germany; Hungary; Mexico; Norway; Sardinia; Spain; Switzerland;
Guanape Islands, Peru; Ichaboe Island, Namibia
New Jersey, USA
Arizona, Colorado, USA; Czech Republic; Finland; Germany
Madoc, Ontario, Canada
Arizona, Nevada, USA; Peru
Arizona, New Jersey, New York, North Carolina, Pennsylvania, USA; Japan
Alabama, Arizona, California, Maine, New Hampshire, South Dakota, USA; Brazil; Germany; France
Broken Hill, New South Wales, Australia; Sweden
central western USA; Algeria; Australia; Bolivia; Borneo; Canada; China; England; Italy; Peru; Romania; Turkey; Spain; FSU
Czech Republic
San Diego County, California, USA
Transvaal, South Africa; Canada; Western Australia; Ethiopia; FSU
California, Colorado, USA; Greenbushes, Western Australia; Canada; Mozambique; Sweden; FSU
Lake George deposit, New Brunswick, Canada
Widespread USA; Algeria; Bolivia; Canada; China; Czech Republic; France; Italy; Japan; Mexico; New Zealand; Peru; Romar
Dundas, Tasmania, Australia; Quebec, Canada; Transvaal, South Africa
Widespread USA; Australia; Austria; Canada; Czech Republic; Faeroe Islands; Iceland; India; Mexico; New Zealand; Norway
Katanza, Democratic Republic otes
Stillwater Complex, Montana, USA; Ontario, Canada
Mt. Isa, Queensland, Australia; Canada; Greenland; Norway

Widespread USA; Broken Hill, Australia; Canada; Czech Republic; Finland; Germany; Greenland; Italy; Japan; Poland; Scotla
Arizona, USA; Krivoi Rog region, Ukraine
Elkiaidan river, eastern North Nuratin Range, Uzbekistan
El Salvador, central America
Brazil; Czech Republic; Cornwall, England, UK; Japan; Morocco; California, USA
Arizona, Massachusetts, Pennsylvania, Utah, USA; Broken Hill, Australia; Brazil; England; Germany; Namibia; Nigeria; Sardin
Tsumeb, Namibia
Garland Co., Arkansas, USA
Tsumeb, Namibia
western Stara-Planina, Bulgaria; northern Schwarzwald and Thuringia, Germany
Mayen-Eifel, Germany
Desert and arid regions of FSU
Widespread USA; Australia; Belgium; Brazil; Germany; Liberia; Portugal; Rwanda; Sweden
Milford, Utah, USA
Colorado, USA; Australia; Namibia
Kochi City, Japan
Widespread USA; Austria; Canada; Germany; India; Italy; Mexico; Scotland; Switzerland
Central Japan
Kungur strata, FSU
Concepcion and Amambay, Paraguay
Qu,bec, Canada
Reyershausen, northern Germany
California, USA

Russia, FSU
Brazil; Bavaria, Germany; widespread USA
South Dakota, USA; Bulgaria; Finland; Italy; Switzerland
Skipton Caves, Ballarat, Victoria, Australia; South Africa; California, USA; Denmark; Germany
Katanga, Democratic Republic of Congo; Germany
Transvaal, South Africa
Cape Province, South Africa
Transylvania, Romania
Suan district, North Korea
Frood mine, Sudbury, Ontario, Canada
Negaunee, Michigan, USA; Germany; Japan
Deep Space
Ehime Prefecture, Japan
Yorkshire, England, UK; Sachsen, Germany; Kazakhstan, FSU
San Bernardino County, California, USA; Namibia
Yakut, FSU
California, USA; Italy
Utah, USA; Argentina; Burra-Burra district, South Australia; Italy; Namibia
L†ngban, Sweden
FYRO Bosnia; Inner Mongolia
Bakhuis Mountains, western Surinam
Rio Negro, Argentina
Graub□nden, Switzerland
Lanarkshire, Scotland
Michigan, New Jersey, USA; Japan; Switzerland

Gumma Prefecture, Japan
V„rmland, Sweden
V„rmland, Sweden
Territorio Fedral Amazonas, Venezuela, South America
L†ngban, Varmland, Sweden
Rhodope Mts., Bulgaria
Ural Mountains, FSU
Shaba, Democratic Republic of Congo
Arizona, USA
L†ngban, Sweden
Derbeyshire, England
North Carolina, USA
Kings Mountain, North Carolina, USA
Widespread western USA; Western Australia; Canada; Fiji Islands; Indonesia; Romania; FSU
south-eastern New Mexico, Texas, USA; Canada; Chile; Germany; Italy; Peru; Poland; Sicily
South Dakota, USA; Tasmania, Australia; Austria; Canada; Czech Republic; Germany; Italy; Mexico; Morocco; Romania
Nordmarksberg, Sweden
California, Colorado, Massachusetts; Montana; USA; Canada; Italy; Mongolia; Transvaal, South Africa; Switzerland
Bohemia, Czech Republic; bauxite deposit, Serbia
Colorado, New Jersey, USA
Maui, Hawaiian Islands, USA; Western Australia; China; Italy; Germany
California, Michigan, Nevada, USA; Canada; China; Germany; Japan; Korea; Morocco; Poland; Sweden; FSU
Hokkaido Prefecture, Japan; Felsobanya, Romania
Arizona, Colorado, South Dakota, Utah, USA; Argentina; Chile; Slovakia
Mount Painter Province, South Australia; Hunan Province, China; Eastern Siberia
Portree, Isle of Skye, Scotland, UK; Italy; Tasmania, Australia
Sachsen, Germany; Brazil; Congo; Gabon

Tadzhikistan, FSU
Arkansas, California, USA; Canada; Greenland; FSU
South Island, New Zealand
Taikan Mountains, far-eastern FSU
Noril'sk region, FSU
Shikoku, Japan
V„rmland, Sweden
Kambalda, Western Australia; Greece; New Caledonia; Takova, Siberia
Widespread common mineral; USA; Australia; Austria; Brazil; Canada; China; England; France; Germany; Italy; India; Norway
Canada; Anarak, central Iran; France; Morocco; Utah, USA; FSU
Noril'sk, western Siberia, FSU
Missouri, USA; Chile; Cyprus; Italy and elsewhere
Bernic Lake, Manitoba, Canada
Yatsushiro-gun, Kumamoto Pref., Japan
Para¡ba, Brazil

Western Australia, Australia
Kola Peninsula, FSU
Arizona, Maine, South Dakota, Wyoming, USA; Western Australia; Brazil; Canada; Czech Republic; Finland; France; Morocco
Novara, Piemonte, Italy
Ukraine, FSU

Virginia, USA; Moorba Cave, Jurien Bay, Western Australia; France; Italy; Japan; Korea; New Zealand
Antofagasta, Atacama and Tarapaca provinces, Chile
Tarasovka, Donbas region, Ukraine, FSU
Broken Hill, Zambia; Reaphook Hill, South Australia
Canton Uri, Switzerland; Szomolnok, Former Czechoslovakia
Aldan, FSU
South Dakota, USA; Brazil; Czech Republic; Germany; Madagascar
west of Lake Baikal, Siberia, FSU
Oruro, Bolivia; Sachsen, Germany
Lake County and San Bernardino County, California, USA
Tein gold-ore deposit, Hokkaido, Japan
Noril'sk region, FSU
Matagami, Quebec, Canada
Colorado, Nevada, USA; Japan; Sonora, Mexico; Romania; FSU
California, Colorado, Nevada, USA; Australia; Japan; Romania; Turkey
Colorado, Georgia, Montana, New Mexico, Virginia, USA; Canada; Japan; Sweden
Sudbury district, Ontario, Canada
Stillwater Complex, Montana, USA
Temagami, Ontario, Canada
Colorado, USA; Canada; Japan; Norway; Sweden
central western USA; England; Germany; Korea; Mexico; Namibia; Norway; Peru; Poland; Sweden; Switzerland
Widespread USA; Bolivia; Chile; Czech Republic; England; France; Germany; Italy; Namibia; Romania; Scotland; Spain; FSU
California, Colorado, New Jersey, USA; Antarctica; Australia; England; France; Japan; Sweden; Wales, UK
Brewster County, Texas, USA
Kola Peninsula, FSU
Province of Jujuy, Argentina
Guanape Islands, Peru; Saldanha Bay, South Africa
south-western and north-eastern China

Xinjiang Autonomous Region, China
Widespread USA; Australia; Bolivia; Canada; Slovakia; Japan; Norway; Romania; Sweden; Zimbabwe
Widespread throughout western USA; Algeria; Australia; Bolivia; Canada; Chile; England; France; Germany; Mexico; Peru; R
Tuscany, Italy
Mont St. Hilaire, Quebec, Canada
Deep Space
Kings Mountain, North Carolina, USA
Panasqueira, Beira Baixa, Portugal
Noril'sk region, FSU
Arizona, Colorado, Texas, USA; Japan; Norway; FSU
Siberia, Russia, FSU
J„mtland, Sweden
Colorado, USA
Arizona, California, Nevada, USA; Chile; Egypt; Italy; Sicily; Spain; FSU
Vermion region, northern Greece; Tasmania, Australia
California, USA; Egypt; Mt. Vesuvius, Italy; Hungary; FSU
Tsumeb, Namibia
Colorado, USA; Greenland; FSU
central western USA; Australia; Canada; Czech Republic; Faeroe Islands, Germany; Greenland; India; Ireland; Italy; Scotland
Eastern Siberia, FSU

Kivu, Democratic Republic of Congo
Alaska, California, Montana, Easton, Pennsylvania, USA; Canada; Madagascar; Siberia; South Africa; Sri Lanka;
Attik¡, Greece
central western and Alaska, USA; Canada; Italy; Madagascar; Norway; Scotland; Sicily; Sri Lanka; FSU
Texas, USA
Eastern Siberia, FSU
Iveland Parish, Norway; Japan; Madagascar; FSU
FSU
Kobokobo, Kivu, Democratic Republic of Congo
Utah, USA; Harz Mountains, Germany
southern Tienshan, Middle East
Tuva, FSU
Arizona, USA; India; Sweden
Riverside County, California, USA; Carlingford, Ireland; Australia
Oban, New South Wales, Australia; Beaver Lodge, Saskatchewan, Canada; Islands of Volcano and Stromboli
north-western Aldan, FSU
San Bernardino County and Kern County, California, USA
Tip Top mine, Custer, South Dakota, USA
Tintina, Yukon Territory, Canada
Canton Graubunden, Switzerland; Liguria, Italy
South Dakota, USA
Molinello, Liguria, Italy
New York, North Carolina, USA; Canada; France; Ghana; India
Kola Peninsula, Russia, FSU
Widespread USA; Austria; Brazil; Canada; Czech Republic; Finland; France; Greenland; India; Italy; Madagascar, New Zeala
Piemonte, Italy
Lakeview mine, Kalgoorlie, Western Australia
Moctezuma, Sonora, Mexico
Moctezuma, Sonora, Mexico
Japan
California, Nevada, North Carolina, Utah, USA; Austria; Canada; Germany; Israel; Italy; Japan; Island of Mull; Scotland; Taiwa
FSU
Widespread USA; Austria; Bikini Atoll; Brazil; Cuba; France; Ghana; Mexico; Japan; Philippines; Saipan Island; South Africa
Murunian alkaline massif, FSU
Kamchatka, Russia
Tolovaka River Basin, north-eastern FSU

Kalgoorlie, Western Australia
Henan and Tibet, China
Widespread USA; Australia; Brazil; Burma; Ireland; Japan; Mexico; Namibia; Nigeria; Norway; Pakistan; Sri Lanka; FSU and e
North Carolina, USA; South Australia; Czech Republic; Cornwall, England; France; Gabon; Sachsen, Germany; Mexico and e
V„stmanland, Sweden
New Jersey, USA
Ukraine, FSU
(Elbaite) Widespread; Minas Gerais, Brazil
Found on the Moon
Fresno County, California, USA
Hikuai, Coromandel, New Zealand; Canton Valais, Switzerland
Widespread western USA; Austria; Brazil; Burma; Canada; Italy; Sierra Leone; Tanzania; Switzerland

Transvaal, South Africa
Kobokobo, Democratic Republic of Congo
central western USA; France; Germany; Italy; Japan; Mexico; Scotland; FSU
V„rmland, Sweden
North Kivu, Democratic Republic of Congo
Sweden at three manganese deposits; Harstigen, Jacobsberg and L†ngban, V„rmland, Sweden
California, Maine, New Hampshire, South Dakota, USA; Brazil; Canada; Finland; France; Germany; Sweden
Haute-Vienne, France
Connecticut, South Dakota, USA; Czech Republic
Copper deposits near Copiap¢, Chile
Algeria; Argentina; Brazil; Japan; Sonora, Mexico; FSU
Cornwall, England
Langesundfjord, Norway
Ontario, Canada
Sachsen, Germany
near Lautenthal, Harz, Germany
Del Norte County, California, USA; Deep Space
Mono County, California, USA; buranga pegmatite, Rwanda; Kristianstad, Sweden
California, Nevada, Wyoming and other western states of USA; Armenia; Chad; China; Greenland; Iran; Kenya; Mongolia; Ta
Hatrurim Formation, Israel; Shizuoka Prefecture, Japan; South Sumatra; Wyoming, USA
Kuusamo, north-eastern Finland
California, Utah, Wyoming, New Mexico and Pennsylvania, USA; Hungary; Italy; Democratic Republic of Congo; FSU
California, New Mexico, Pennsylvania, Utah, Wyoming, USA; Czech Republic; Hungary; Italy; Sicily; FSU; Democratic Repub
Thasos, Greece; Tsumeb, Namibia; South Dakota, USA
Otavi, Namibia
Tsumo mine, Hiroshima City, Japan
Kanowna, Western Australia; Witwatersrand, South Africa
eastern Siberia, FSU
Ilimaussaq, Greenland; Kola Peninsula, FSU
Opo Bay, Mayor (Tuhu) Island, New Zealand
southern-central British Columbia, Canada

Kola Peninsula, Russia, FSU
Death Valley region, California, USA; Sarikaya, Eskiscehir, Turkey

Utah, USA; Canada; Tsumeb, Namibia
Widespread USA; Tasmania, Australia; Bolivia; Bulgaria; Canada; England; France; Sardinia
Tunisia; France; FSU
Il¡maussaq intrusive, Greenland
L†ngban, Varmland, Sweden; New Jersey, New York, USA
Widespread USA; Australia; Chile; Egypt; England; France; Germany; FSU
Toscana, Italy
Tusion River Valley, Pamir Mountains, FSU
Georgian SSR, FSU

Madoc, Ontario, Canada
San Bernardino County, California, USA; Lake Katwe, Uganda

Siberia, Russia, FSU
Arizona, Nevada, Utah, USA; Austria; Czech Republic; England; France; Germany; Italy; Romania; Tunisia; Spain; FSU

Goldfields district, Saskatchewan, Canada; western Moravia, Czech Republic
central western USA; Turkestan, FSU
Uchuc-Chacua, Peru
lower Amu-Darya River, FSU
California, Nevada, USA; Argentina; Canada; Chile; Peru; Turkey; FSU
Colorado, USA; Australia; Austria; England; France; Germany; India; Italy; Japan; Norway; Sardinia; Sweden
Lake Boga, Victoria, Australia
Minnesota, Essex County, New York, USA; Angola; Canada; Finland; Germany; Greenland; Mozambique; South Africa; Swed
Baber Lake, Northwest Territories, Canada
Kola Peninsula, FSU
Kola Peninsula, Russia, FSU
Arizona, Utah, Wyoming, USA; Harvey Range, North Queensland, Australia; FSU; Democratic Republic of Congo
Chuquicamata, Chile
Democratic Republic of Congo
Urals, FSU
Urals, FSU; Maine, North Carolina, USA
FSU
Shaba, Democratic Republic of Congo
Widespread USA; Northern Territory, Australia; Canada; Bohemia, Czech Republic; Germany; Democratic Republic of Congo
Minas Gerais, Brazil; North Carolina, USA
Mounana, Gabon; Schwarzwald, Germany; Arizona, South Dakota, USA
Widespread USA; Canada; Germany; Democratic Republic of Congo and uranium deposits throughout the world
Widespread USA; Argentina; Canada; Czech Republic; France; Germany; Japan; Portugal
Bohemia, Czech Republic
southern Schwarzwald, Germany
Cornwall, England, UK; Southern Schwarzwald, Germany
Sachsen, Germany
Utah, USA; Argentina; Mount Painter, South Australia; Germany
Baden-W□rttemberg, Germany
North Carolina, USA

Noril'sk region, FSU
Tippin Hill, Western Australia
Western Australia, Australia
Bavaria, Germany; Sandamab, Namibia; New Hampshire, USA; Urals, FSU
Upper Noiby river, Yenisei region, Siberia, FSU
Kangerdluasuk, Greenland; Kola Peninsula, FSU
Arizona, Utah, USA
northern California, Oregon, Washington, USA; Finland; Norway; South Africa; Turkey; FSU and elswhere
Uva, Sri Lanka
Sumatra, Indonesia; Nevada, USA; Altai, FSU
Kamchatka, FSU
Bulgaria; Germany; Italy; Japan; Arizona, Missouri, USA; Katanga, Democratic Republic of Congo
California, Idaho, Oregon, Utah, Washington, USA; Algeria; Bolivia; Brazil; Canada; Czech Republic; France; Germany; Gree
Nya-Kopparberg, Sweden
central western USA; Algeria; Argentina; Broken Hill, Australia; Austria; Morocco; Namibia; Scotland; Sardinia; Tunisia; FSU
Kazakhstan, FSU
Katanga, Democratic Republic of Congo
Canada; Arizona, North Carolina, South Dakota, USA; Katanga, Democratic Republic of Congo

Democratic Republic of Congo
Imperial County, California, USA; China; Germany
Mounana, Gabon

Widespread USA; Antilles; Western Australia; Austria; Brazil; Czech Republic; France; Germany; England; Poland
South Dakota, USA; Algeria; North Queensland, Australia; England; Malaysia; Democratic Republic of Congo
V„sterbotten, Sweden
Nevada, USA; Brazil; Slovakia; Germany; Hungary
Ballycraigy, Larne, Northern Ireland; Hatrurim Formation, Israel
Australia; Urals, FSU; Musonoi, Shaba, Democratic Republic of Congo;
Llallagua, Bolivia
Finland; Ognevsk-Bakena region, Kazakhstan, FSU
Los Angeles, California, USA; New Brunswick, Canada; Turkey
K□tahya, Turkey
Madoc, Ontario, Canada
Kirghizia, FSU
FSU
California, USA
Toscana, Italy
Viterbo, Italy
Perm, Urals, FSU; Australia; Czech Republic; England; Germany; Morocco; Arizona, USA
Widespread USA; Australia; Canada; Czech Republic; Finland; France; Italy; Japan; Kenya; Korea; Mexico; Norway; Pakistan
Banat, Romania
Piemonte, Italy
Orivesi, Finland
Ivigtut, Greenland
Le¢n, Spain
Canada; Greenland; Kenya; Guinea, West Africa; New Mexico, USA; FSU;
Sainte-Marie aux mines, France
Urals, FSU
Saone-et-Coire, France; Huaron, Peru
Kola Peninsula, FSU
Widespread USA; Canada; Norway
Macusani, Peru
LiŠge, Belgium

Trudov and Mushiston deposits, central Asia, FSU
southern Greenland; Kola Peninsula, FSU
Widespread USA; Australia; Brazil; Canada; Czech Republic; England; France; Germany; Mexico; Japan; Romania; Scotland
Bou-Azzer district, Morocco; Tuva, FSU
Ascension Island; Kola Peninsula, FSU
Arizona, Utah, USA; Czech Republic
Arizona, Utah, USA; Canada; Chile; England; Italy; FSU
Penobsquis, southern New Brunswick, Canada
Arizona, California, Utah, USA; Mt Isa, Australia; Bolivia; Cyprus; Czech Republic; Germany; Italy; Japan; Spain
Armenia, FSU; Kambalda, Western Australia; India; Japan
California, New York, USA; China; Spain; FSU
FSU
FYRO Macedonia

Taurus Mountains, south-western Turkey
Colorado, USA
Kola Peninsula, FSU
Bergslagen, central Sweden
unspecified locality in FSU
Noril'sk deposits, FSU; Ontario, Canada
Kola Peninsula, FSU
Walgidee Hills, Western Australia; Kola Peninsula, FSU
Deep Space
Antarctica; Salzburg, Austria; Germany; Italy; Norway; Sweden; Colorado, USA
North Island (Wairakei), New Zealand; California, Washington, Wyoming, USA
Wairau Valley, South Island, New Zealand; Canada
Nevada, USA; Japan; France; FSU
Democratic Republic of Congo

Wakefield, Quebec, Canada
South Dakota, USA
Valais, Switzerland
New Jersey, USA
Bohemia, Czech Republic; Sachsen and Schwarzwald, Germany
Fresno County, California, USA
California, Maine, New Hampshire, South Dakota, Utah, USA; Yukon, South and Western Australia; Brazil; Canada; France
California, USA
Tsumeb, Namibia
near Warwick, New York, USA; Ontario, Canada
Widespread USA; Tasmania, Australia; Bolivia; Bulgaria; Czech Republic; England; France; Germany; Ireland; Portugal; Rom
Buganda, Uganda
Colorado, USA; Greenland; FSU
Weddell Sea, Antarctica; Oregon, USA
Widspread USA; Afghanistan; France; Japan; FSU
Wyoming, USA
Falun, Sweden
Schwarzwald, Germany
France; Germany
Nevada, USA
Colorado, USA; Kalgoorlie, Western Australia; Japan; Sweden; FSU
L†ngban and Grythyttan, Sweden
Green river formation of Colorado-Wyoming-Utah, North Carolina, USA; FSU
Montreal Island, Quebec, Canada
L†ngban, Sweden
New Jersey, USA; Morocco; Mexico
Candoglia, northern Italy
L†ngban, Sweden
Manitoba, Canada; Greenland; M lage, Spain
near Phoenixville, Pennsylvania, USA
Arizona, USA
Czech Republic; Sachsen, Germany; France; Hungary; Montana, South Dakota, Utah, USA; FSU

Minas Gerais, Brazil

Maine, New Hampshire, South Dakota, USA; Western Australia; Algeria; Namibia
Maine, New Hampshire, South Dakota, USA; Bavaria, Germany
Arizona, USA
L†ngban, Sweden; Morocco; Norway; FSU
Big Fish River area, Yukon Territory, Canada
Lahr, Germany
Widgiemooltha 132 nickel mine, Western Australia
California, USA
New Mexico, USA
Bayern, Germany
Kuusamo, north-eastern Finland
central western USA; Algeria; Belgium; Canada; Greece; Greenland; Iran; Mexico; Namibia; Sweden; FSU; Democratic Repu
Transvaal, South Africa
Eifel, Germany; Umbria, Italy
Broken Hill, Australia; Norway; FSU
Madhya Pradesh, India
Arizona, USA
Gonzen, Switzerland
Arizona, California, Illinois, Kentucky, Montana, USA; Austria; Czech Republic; England; France; Germany; Japan; FSU
Arizona, Colorado, Montana, USA; Australia; Bulgaria; Germany; Japan; Norway; Peru; Sweden; FSU
Kopparberg, Sweden
Western Australia, Australia
Langesundfjord, Norway
New Hampshire, USA
Western USA; widespread

California, Colorado, New York, USA; Canada; China; Finland; Greece; Italy; Mexico; Romania;
Bavaria, Canada; Germany; Greenland; France; Pennsylvania, USA; Democratic Republic of Congo
Vermont, USA
California, USA
New Jersey, USA; Mysore, India
Massachusetts, USA; England; Germany
Widespread USA; Algeria; Australia; Austria; Czech Republic; Germany; Mexico; Morocco; Namibia; Sardinia
central western USA; Bolivia; Czech Republic; England; Italy; Namibia; Peru; Romania
Germany
Shaba, Democratic Republic of Congo
Cornwall, England, UK; Germany
Idaho, USA; Canada; Chile; Czech Republic; France; Germany; Switzerland
New Hampshire, USA; Bavaria, Germany

Alabama, California, Colorado, Georgia, North Carolina, New York, USA; Brazil; Germany; India; Japan; Madagascar, New Z
China
Yanshan area, China
Chaobuleng, Inner Mongolia Autonomous Region, China
China
Qaidam Basin, Qinghai Province, China
Sonora, Mexico
Arizona, California, North Carolina, Virginia, USA; Canada; Mexico; Puerto Rico; Scotland and elsewhere

Central Aldan, FSU
Deep Space
Siberia, FSU
south-western Alberta, Canada; Germany
Arizona, USA
Dead Sea, Israel
New Jersey, USA
Sonora, Mexico
Arizona, USA

Russia, FSU
Shandong, China
China
central Tanzania
Mont St. Hilaire, Quebec, Canada
Honshu, Japan
North-West Karelia, FSU
California, USA

Karelia (NW), Russia, FSU
Norway, Falun, Kopparberg, Sweden; Arizona, USA

Perak, Malaya
Alaska, USA; Canada; Iceland; India; Kanagawa Prefecture, Japan; Sardinia
Yukon Territory, Canada
Kola Peninsula, Russia, FSU
Ural Mts., Russia, FSU
Salt Range, Pakistan
Kivu, Democratic Republic of Congo
Kola Peninsula, FSU
Sonora, Mexico
California, Pennsylvania, USA; Australia; Austria; Czech Republic; Greenland; India; Italy; New Zealand; Shetland Islands; So
East Transbaikal, FSU
Okanogan County, Washington, USA
New Mexico, Wyoming, USA
Sonora, Mexico
Bohemia, Czech Republic; Germany; Italy; Norway
Arizona, Utah, USA; Brazil; France; Germany;

Chaitumussk deposits, near Lena River, FSU
Bayan Obo, inner Mongolia, China
El Salvador, Mexico
Kazakhstan, FSU
Victoria, Australia; Keno Hill, Yukon Territory, Canada; Chile; FSU

Colorado, USA; Attika, Greece
Colorado, New Jersey, USA; Tasmania, Australia; Italy; Namibia; Poland; Spain
China
Tsaidam Basin, China
central Kazakhstan, FSU

Arkansas, Colorado, Nevada, South Dakota, Washington, USA; Tasmania, Australia; Bolivia; Canada; Czech Republic; Engla
Alaska, Arizona, San Diego County, California, Colorado, Virginia, USA; Algeria; England; Germany; Greenland; Italy; Scotlar
Arizona, Colorado, New Mexico, Utah, Washington, USA; Canada; Czech Republic; England; Germany; Democratic Republic
Widespread USA; Australia; Brazil; Burma; France; Germany; Italy; Korea; Madagascar; Norway; Sri Lanka; Thailand; FSU; Z
Tuva, Russia, FSU
Korgeiedabin alkalif masif, south-eastern Tuva ASR, FSU
Sao Paulo, Brazil; Germany
Khibina massif, FSU
Widespread USA; Austria; Finland; Germany; Greenland; Italy; Japan; Tanzania; Scotland; Switzerland; FSU
Kola Peninsula, FSU
Bohemia, Czech Republic
Arizona, Colorado, USA; Algeria; England; Japan; South Africa
California, USA
Noril'sk region, Siberia, FSU
Bayern, Germany
Bohemia, Czech Republic

ORIGIN,C,250
In honour of P. H. Abelson.
Named after Mr Jess Abernathy, who found the mineral.

From the Greek "akantha" meaning "thorn".
Named after synthetic compound.
Named after Prof. Luis Achaval (1870-1938) of Cordoba.
From the Greek "aktinos", "ray", in reference to the common radiate habit of prismatic crystals.
Named in honour of Gilbert-Joseph Adam (1795-1881), French mineralogist.

Named after the locality.

From Norway, named after Aegir, the Teutonic God of the Sea. Acmite from the Greek "akme", "point", a reference to the ste

Named for locality.

Named after Alpheus Fuller Williams of Kimberley, S.A. finder of the mineral.
Named for J. Agard.
Named for J. Agard.

Named after Dr S. O. Agrell.
Named after H. Agrinier.

Named after Dr Fredrich Ahlfeld, of Marburg, Germany.
Named after Arthur Aikin (1773-1854).
Named after locality.
Named for locality.
Named for locality.

Named after Anders Richard Akerman (1837-1922), Swedish metallurgist.
Named from the Greek meaning "wart".
Named for locality.
Named for locality.

Named for locality.
From the Latin "albus", "white", in allusion to its colour.

Named for locality.

"Another" from the Greek and "argentum" for silver.
Named for locality.

Named for locality.
Named for locality.
Named for Professor E. Althaus.

Named from composition.
Analogous to pharmacosiderite with al in place of fe.

Named for the composition al from aluminium and va from vanadate.
Named from the Amakin Expedition.

Named for locality.

From the Greek "amblygonios", "blunt angle".
Named for F. and G. Ameghino.

Named for Dr Gregori Aminoff (1883-) Stockholm.
Named for composition.
Analogous to jarosite.
Analogous to leucite.
From the Greek prefix an- "not" and "alkimos", "strong", in reference to its weak pyroelectricity.
Named for Ananda Coomaraswamy.
Named for locality.

Named for the Spanish province of Andalusia.
Named after Charles Alfred Anderson (1902-) of the USGS.
Named after a locality in the Andes.

Named in honour of J. B. de Andrada e Silva (1763-1838), Brazilian geologist.
Named after Andre Meyer.

Named after Dr. V. Angelelli, Director of the Geological Survey of Argentina.
From the Isle of Anglesey, Wales, where it was discovered.
From the Greek and means "without water".
Named for locality.

Compounded from the Greek negative prefix an- with "orthos", "upright", in allusion to the oblique crystal form.

Named for locality.
Named after Raymond Anthoine, mining geologist, Bruxelles.
Named for Prof. John W. Anthony.

Named after the locality of Antigorio in Italy.

From the medieval Latin "antimonium", originally applied to stibnite.

From the Greek "apate", "deceit", in allusion to its being confused with other minerals such as aquamarine, olivine and fluorite

After A. P. Low.

Named after Aragon province, Spain, where it was first found.
Named for Mr Don Aramayo, Managing Director of Animas mine.

Named for M. Archer.

Named for locality.
Named for locality.

From the Latin "argentum", "silver".
Named for composition and relationship to jarosite.
Named for composition and relationship to pentlandite.
Named for composition and relationship to pyrite.
Named for locality.

Named for locality.
Named after Dr L. F. Aristarain.
Named for N. Armstron, E. Aldrin and M. Collins, Apollo 11 crew.
Named from the composition "ar" arsenate, "mang" from manganese.
Named for locality.
Named for Neil Armstrong.
Named after Brazilian geologist Dr Miguel Arrojado.
Named for compositon and relationship to brackenbuschite.
Arsenate analogue of descloizite.
From the Greek "arsenikon", the original name for orpiment or trisulphide of arsenic.
Named for composition.
Named for composition.
Named from the Greek for "orpiment" and breaking in reference to red cleavages.
Named for compositon and relationship to crandallite.
Named for compositon and relationship to goyazite.
Named for compostion and relationship to hauchecornite.

Named for composition.
Contraction of "arsenical pyrites".
Named for compostion and relationship to sulvanite.
Named for composition and relationship to polybasite.
Named for composition and relationship to tsumebite.
Named for composition and relationship to uranospathite.
Named for composition and relationship to uranylite.
Named for Sir Arthur Russell and Mr Arthur Kingsbury.
Named after Prof. Ettore Artini of Milan.

Named after the locality.

Named after Mr Fredrick N. Ashcroft of London.

Named after the locality.

Named after the locality.
Named in reference to palladium content, from pallas, athene.
Named after the locality.

From the Greek "augites", "brightness", in reference to the luster of the crystals.

Name reflects composition.
Named after the locality.
Named for the composition.
Named in honour of Austin F Rogers (1877-1957), Stanford University.
Named after the locality at Autun, Sa“ne-et-loire, France.
Named after alchemist Avicenna from Bukhara.
Named after Italian physicist Amedo Avogadro (1776-1856).
Named after the locality.
From the Greek "axine", "ax", in allusion to the sharp-edged tabular crystals resembling a cutting tool.

From the characteristic azure-blue colour.
Named from the composition.
Named in honour of William Babington (1757-1833), English mineralogist.

Named from the composition.
Named after the locality Baghdad.
Named after the locality.
Named after the finder Mr R. C. Baker of Nutfield.
Named after the locality.
Named from the composition.

Named after the locality.

Named after the locality.
Named from the formula.
Named after Mark C. Bandy, mining engineer who collected the mineral.

Named for F. M. Bannister.
Named after the locality.
Named after the locality.
Named for R. B. Baratov.
Named after the locality.
Named after Prof. A. L. De M. Barbosa, School of Mines, Minas Gerais.

Named after P. Bariand, Sorbonne.
Named after Dr L. Baric, Zagreb.
Named after composition and relationship to orthojoaquinite.
Named after composition and relationship to microlite.
Named after compositon and relationship to pyrochlore.
From the Greek "barys", "heavy", in allusion to the mineral's high specific gravity.
Named after compostion and relationship to pharmacosiderite.
Named after W. H. Barnes.
Named for Dr. R. M. Barrer.

Named after the locality.

Named after composition.
Barium analogue of lamprophyllite.
Named in reference to being more basic than aluminite.
Named after Prof. Francesco Bassani, University of Naples.
Named after the locality.
Named after the locality.
Named after compostion and relationship to bastnasite.
Named from composition ba-ti-si.
Named after Prof. Heinrich Baumhauer, Freiberg, Switzerland.

Named after the locality of Baux (or Beaux), France.
Named after the locality.

Named after K. J. Bayer.

Named after William S. Bayley, University of Illinois.

Named from the composition ba-zr.
Named after E. Bazzi who collected the mineral.
Named from composition.

Named for the locality.
Named after Antoine Henri Becquerel (1852-1908).
Named after M. Jean Behier, geological survey Madagascar.
Named from composition.
Named after the locality.
Named for E. Bellido Bravo.
Named for Mr Herman C. Bellinger, Chile Exploration Co.
Named after N. V. Belov.

Named after the occurrence in San Benito Co., California.
Named after Dr Marcus Benjamin, US National Museum.
Named after O. J. Benston.

Named from the composition.

Named after the locality.

Named after Dr Harry Berman, Harvard University.

Named after F. Berndt.
Named for L. G. Berry.

From the Greek "beryllos", indicating any green gemstone.

Named after the locality.
Named after Prof. A. G. Betekhtin, mineralogist, Moscow.

Named for Prof. A. Beus.
Named after Adolph Beyer, mining engineer (1743-1805) finder of the mineral.
Named after Prof. Angelo Bianchi of Padova.
Named for the Bicchu township, Japan.
Named after Richard A. Bideaux.

Named after the locality.
Named after Valere Louis Billiet, (1903-1945), Ghent.

Named for P. Billingsley.

Named in honour of J. B. Biot (1774-1862), French physicist, astronomer and mathematician.

Named for alchemist V. Biringucci (1480-1539).
Named after the locality.

Named after composition.
Named for the composition biocl.
From the German "Wismut", origin unknown.
Origin uncertain.

Named for composition and relationship to microlite.
Named for composition and relationship to stibiconite.
Named for composition and relationship to tantalite.
Named for locality.
Named in honour of Maynard Bixby.

Named after William Phipps Blake (1826-1910).
Named after Dr Ragnar Blix.

Named after Bob Ferguson.

Named after Ove Balthasar Boggild (1872-) Copenhagen, Denmark.

Named for I. I. Boky.
Named after the locality.
Named after Ignacio Bolivar, Spanish entomologist.
Named after Bertram Borden Boltwood.
Named for the locality.
Named after Prof. Stephano Bonatti, Pisa, Italy.
Named after George Bonchev, University of Sofia, Bulgaria.

Named after Mr Edward Booth, University of California.

From the Arabic "buraq", which referred both to borax and to "niter" (potassium nitrate).
Named for the composition.

Nmed for I. D. Borneman-Starynkevich.
Named after Dr W. Bornhardt, mine manager.
Named in honour of Ignaz Von Born (1742-1791), famous Austrian mineralogist.
Named after I. B. Borovsky.

Named after the locality.

Named in honour of C. L. Boulanger (1810-1849), a French mining engineer.
Named in honour of Count J. L. De Bournon (1751-1825), a French crystallographer and mineralogist.

Named for the locality.
Named for S. Bracewell.

Named after Wilmot Hyde Bradley (1899-) USGS.
Named after Sir William Henry Bragg and Prof. William Lawrence Bragg, discovers of x-ray diffraction methods.
Named for Prof. Otto Braitsch.
Named for Alfred Brammall (1879-) Imperial College, London.

Named after Dr John Casper Branner (1850-1922) Stanford University.
Named for K. C. Brannock.
Named for R. Brasse.

Named after Jos J. Bravo, Lima, Peru.
Named after locality.
Named after Max Albert Bredig (1902-), New York, USA.

Named after the locality.

Named for Aristides Brezina.
Named after Brian Mason, Smithsonian.

Named after G. W. Brindley.

Named in honour of a T. M. Brochant De Villiers (1731-1840), a French mineralogist and geologist.
Named for M. Brock, USGS.
Named after compostion.
Named after Magnus Von Bromell (1679-1731).

Named after Thomas Brownmiller(1902-).
Named in honour of Archibald Bruce (1777-1818), an American mineralogist who first described the mineral.

Named after Luigi Brugnatelli, University of Pavia, Italy.
Named after Prof. Bruno Geier.

Named for V. Buchwald, iron meteorite expert.

Named for M. J. Buerger.
Named after Johann Adam Otto Bntschli, Heildelberg, Germany who first recognised the compound.
Named for the locality.
Named after Prof. Antonin Bukovsky.

Named for the locality.

Named for the locality.
Named after Tolbachifter Wilbur Swett Burbank (1898-) USGS.

Named after Mr W. E, Burke, chemist, American Trona Corporation.
Named for the locality.

Named after Prof. Gurdon M. Butler (1881-1961) University of Arizona.
Named after Prof. Henri J. F. Buttgenbach (1874-) Bruxelles, Belgium.

Named from the compostion.
Named after Charles M. B. Cadwalader, President of the Academy of Natural Sciences, Philadelphia.

Named from composition.
Named for M. Lazard Cahn, Colorado Springs.
Named from the first reported occurrence in Calaveras Co., California.
Named from composition.
Named from the composition and relationship to copiapite.

Named for the compostion.

From the Greek "chalx", "lime".

Named for composition and relationship to catapleiite.
Composition and relationship to jarlite.
Named from compostion.
Named from compostion.

Named after Frank Cathcart Calkins (1878-) USGS.
Dr Eugene Callaghan, New Mexico mines Dept.

Named for the locality.
Named from the compostion ca-zr-ti.
Named for the locality.

Named from the compostion ca-na-si.
Named for the locality.

Named after Italian chemist Stanislao Cannizzaro (1826-1910).

Named from the compostion.
Named from the compostion.

Named for composiiton and relationship to cyanotrichite.
Named from compostion and relationship to apatite.
Named from compostion and relationship to apatite.
Named for Carleton University, Ottawa, Canada.
Named for Carl Fries.

Named for the locality.

Named for the Carlsberg Foundation.
Named for the colour.

Named in honour of Marie-Adolfe Carnot (1839-1920), French engineer and chemist.
Named after Prof. Greido Carobbi of Florence, Italy who first described the material from Vesuvius.

Named for the locality.
Named for the locality.

Named after William Cassidy, meteorite worker.
From the Greek "kassiteros", "tin".

Named after Felicien Cattier, Chairman of the Union Miniere Du Haut Katanga.
Named from the compostiion.
Named for the composition ca-y-si-c-h.

Named after the locality.

Name derived from the Latin "caelestis", "of the sky", in allusion to the mineral's blue colour.

Named for relationship to thorianite and uraninite.

Named for composition and relationship to pyrochlore.

Named for P. Cerny.
Named for composition, ce analogue of yttrotungstite.
Named from the Latin "caeruleus", skyblue.
From the Latin "cerussa", "ceruse", a white lead pigment.

Named after the locality.
Named for F. Cesbron.
Cs analogue of kupletskite.
From the Greek "chabazios", an archaic term for "stones".

From the Greek "chalkos", "copper" and "anthos", "flower".
Named derives from Chalcedon, an ancient Greek city of Asia Minor.
Named for the composition.
From the Greek "chalkos", "copper".
Named from the Greek "chalco" for copper and " kyan" dark blue.

Named from the Greek "chalkos" for copper and "natron" for sodium.

From the Greek "chalkos", "copper", and "pyrites", "fiery".

Named for the composition.

Named after the locality.

Alternate group name chlorite from the Greek "chloros", "green", in reference to the mineral's characteristic colour.
Named after the locality.
Named for the discoverer's wife.
Named after E. C. T. Chao.
Named for Edward J. Chapman, mineralogist, Toronto, Canada.

Named after the locality.
Named after the locality.

Named for Chera (Kerala) an ancient kingdom in S.W. India.

Named for A. A. Chernov.
Named for V. V. Chernykh.
Named for J. Chervet.

After Russian General, Konstantin Vladimirovich Chevkin (1802-1875).
Named for the locality.

Named after the Polar aviator, Valery Pavlovich Chaklov.
Named for its composition.
Named for composition and relationship to apatite group minerals.
From the mineral's chlorine content and the Greek "argyros", "silver".

Named for its composition.
Named for its composition.
Named from the Greek for its colour properties.

Named from the Greek for "green" and for "blade" or "straight sword" in allusion to the crystal shape.

From the Greek "chondros", "grain", in reference to the generally granular appearance of the mineral.
Named for C. L. Christ.
Named for its composition.
Group name tourmaline from the Singhalese "touramalli", "mixed coloured stones", in reference to vari-coloured water-rolled g
Derived from the mineral's chromium content (from the Greek "chroma", "colour".
Named for its composition.
From the Greek "chrysos" and "beryllos", in allusion to its golden-yellow colour and to beryl, of which it was once considered a
From the Greek "chrysos", "gold", and "kolla", "glue", in reference to a similar-looking material that was used in soldering gold

Named after Prof. K. F. Chudoba.
Named for its composition and relationship to chukhrovite.
Named after Dr. F. K. Chukhrov.

India.

Named after the type locality.
Named for G. F. Claringbull.
Named for the type locality Clausthal, Germany.
Named for US mineralogist Dr Clifford Frondel.

Named for the composition and symmetry.
Named for composition and relationship to chalcomenite.
Alternate group name chlorite from the Greek "chloros", "green", in reference to the mineral's characteristic colour.
Named for symmmetry and relationship to chrysotile.

Dimorphous with enstatite.
Named for symmetry and relationship to ferrosilite.

Named for symmetry and relationship to holmquistite.
Named for symmetry and relationship to humite group minerals.
Named for J. Thompson and in allusion to its symmetry.

Named for optical properties.
Named for cymmetry and relationship to safflorite.
Named for symmetry and relationship to tyrolite.
Combined from the greek "klinein", "to incline" (a reference to the inclined axis of the monoclinic crystals), and zoisite.

Named for the nearby town of Coalinga, New Idria, California.

Named for composition and relationship to pentlandite.
Named for composition and relationship to zippeite.
From the German "kobold", "underground spirit" or "goblin".
Composition and relationship to koritnigite.

Named for composition and relationship to chromite.

Named for Coconino County, Arizona, USA.

Named for L. Coes who first artifically produced coesite.
Named after Reuben Clare Coffin of the Colorado geological survey.

Named in honour of William T. Coleman, a San Francisco merchant and mine owner.
Named for Dr William Henry Collins (1878-) Director of the geological survey of Canada.
Named after the state of Colorado, USA.

Named for the Colusa Claim, Butte District, Montana, one of the first copper claims in the area.

Named after Arthur Delmar Coombe (1893-1949), geological survey of Uganda.

Named after the locality.
Named for the locality.
From the Greek "konis", "powder" and chalx, "lime".

Alternate group name chlorite from the Greek "chloros", "green", in reference to the mineral's characteristic colour.
Named for R. A. Cooper, by whom the mineral was first described.

From the Greek "kyprios", "cyprus", where copper was mined.

Named for the locality.
Named in honour of P. L. A. Cordier (1777-1861), French geologist.

Named for the locality Cork, Ireland.
Named after Belgium geologist, Jules Cornet.
Named from the locality, Cornubia, medieval Latin for Cornwall.
Named after locality, Cornwall.
Named after the Spanish explorer, Francisco Vasquez De Coronado who visited the Arizona region in 1540.
From the Tamil word "kuruntam", derived from "sanskrit kuruvinda", "ruby".

Named for the composition cobalt and stibnite.

Named after Dr Arthur Lennox Coulson, geological survey of India.
Named in honour of Niccol• Covelli (1790-1829), an Italian mineralogist.
Named for John Cowles.
Named after the locality.
Named after Mr M. L. Crandall, mining engineer of Provo, Utah.
Named for S. C. Creasey.

Named after the Creede Quadrangle of the USGS.

Named in honour of Emit Riebeck (D.1885), German explorer and mineralogist.
From the Greek "kr¢kos", "saffron", in reference to the mineral's deep orange colour.

From the Greek "kryos", "frost" and "lithos", "stone".
Named for its relation to cryolite and the large amount of lithium it contains.

Named for its compostiion.

Named for Mr E. Cumenge.

From the Latin "cuprum", "copper".
Named for composition.
Named for composition and relationship to copiapite.
Named for composition.
Named for composition and relationship to pavonite.
Named for composition.
Named for supposed relation to rivaite.
Named for composition and relation to sklodowskite.
Named for composition and relation to spinel.
Named from the composition.
Named for composition.
Named for mineral collectors Forrest and Barbara Cureton.
Named for Prof. Hubert Curien.
Named for Pierre Curie (1859-1906).

From the Greek words "kyanos" and "thrix", "blue" and "hair", in reference to the colour and typical tufted or hair-like habit.
Named for the cylindric habit of the crystals.
Named for Cymru, the Welsh name for Wales.
Named for the locality.
Named for G. D'achiardi.
Named for A. S. Dadson.
Named for Reginald Aldworth Daly (1871-) Emeritus Professor of Geology, Harvard University.

Named for locality.

Named for the locality.

From the Greek "dateisthai", "to divide", because the granular aggregates crumble easily.

Named for the locality.

Named for Prof. T. W. Edgeworth David, Sydney University.

Named for Prof. W. A. Deer.

Named for F. Delhaye, a Belgian geologist and explorer of the North Kivu area.
Named for A. M. Del Rio, who first discovered vanadium in North America.

Named for M. G. Demesmaeker.

Prof. R. M. Denning.

Named for J. Derriks.
Named after Dr Henri Derville, Strassbourg University.
Named after J. Desautels, Curator of minerals, Smithsonian Institute.
Named in honour of Alfred L. O. L. Des Cloizeau (1817-1897), a French mineralogist.
Named for P. Despujols.

Named after Belgian geologist Dr Jean Dewindt.
Named from the Greek for "apart dia", or distinct from boleite.

From the Greek "adamas", "invincible".

Named for Allan Brugh Dick (1833-1926) of London, who first described the mineral.

From the Greek prefix "di", "two", and "opisis", "appearance", in allusion to the fact that crystals of diopside commonly occur w
From the Greek "dia", "through", and "optasia", "view", in reference to the fact that cleavage planes could be seen in the cryst
Named for Prof. William Dittmar (1833-1892) Anderson's College, Glasgow.
Named from the Greek for "twince" and for a stranger, in allusion to the unusual association of silica and arsenic trioxide.
Named for D. J. Fisher.
Named for S. Djurle who described the synthetic equivalent.

Named in honour of Deodat De Dolomieu (1750-1801), a French mineralogist.
Named for the Dolores River, Colorado.

Named for Mr M. Doanth who described the material in 1930.

Named for the mineralogist Don Peacor.

Named for the locality.
Named for W. F. Downey.

Group name tourmaline from the Singhalese "touramalli", "mixed coloured stones", in reference to vari-coloured water-rolled g
Named for J. A. Dresser.

Named for J. R. Drysdall.

Named after Mr G. Duft, Director of Otavi mines, Namibia.

Named after Belgian geologist Andr, Hubert Dumont (1809-1857).
Named in honour of Eugene Dumortier, 19th-century French paleontologist.
Named for the locality.
Named for the locality.
Named for the locality.
Named for Mr Dussert.
Named for Clarence Edward Dutton (1841-1912) geological survey of Colorado.

Named for the locality.

Named for the locality.
Named for J. Eaker.
Named after Arthur Earland (London) who isolated the material.

Named for Prof. Claes Walter Harry Von Eckermann (1886-?) Stockholm.

Named after Prof. Thomas Egleston, Columbia University.

Named after the Eifel region.
Named after Wilhelm Eitel (1891-?) Director of the Institute of Silica Research, University of Toledo, Ohio.
Named after the discoverer, Mr F. L. D. Ekanayake.

Group name tourmaline from the Singhalese "touramalli", "mixed coloured stones", in reference to vari-coloured water-rolled g

Named for J. Ely.
Named for P. G. Embrey, mineralogist British Museum.

Named for the locality.
From the Greek "enargos", "visible".
Named for Prof Kurt Endell (1887-) Technical High School, Berlin, Germany.

Named after Mr George Letchworth English, of Rochester, New York.

Named for the locality Ephesus, Turkey.

From the Greek "epi", "over", and "didonai", "to give".

Name is from an occurrence at Epsom, England.

Named for J. Erlichman.
Named for T. Ernst.

From the Greek "erythos" "red", a reference to the mineral's colour.

Named for the locality.
Named for the orginal inhabitants of Greenland.
Named after Prof. Pentii Eskola.
Named for Esper S. Larsen, Jr.

Isostructural with adamite, named in allusion to this relation.
Named for the locality.
Named for P. P. Ewald.
Named for Mrs Van Wambeke.
Named after Juan Manuel De Ezcurra, mine manager.

Named for the geologist H. J. Fabian.
Named after Dr Joseph John Fahey (1901-) geochemist USGS.

Named after John Gifford Fairchild (1882-) USGS.
Named for the locality.
Named for the Falcondo mining company.

Named for the locality, Famatina, Argentina.

Named for Dr George Tobias Faust (1908-) USGS.
After Fayal, an island in the Azores.
Named after E. S. Fedorov.

Named in honour of Adolph Ferber of Gera, Germany.

Named for Dr Lewis Leigh Fermor, geological survey of India.
Named from the composition, ferrum, oxygen, hydrogen.

Named for its compositon and relation to annite.
Named for its composition and relation to copiapite.
Named for its composition and relation to dravite.
Named after Dr Walter F. Ferrier of Ottawa who discovered the mineral.
Named from the composition.

Named for its compostion and relation to lotharmeyerite.
Named for composition.
Named for its composition.
Named for its composition and relation to sicklerite.
Named for its composition.
Named for composition and relation to actinolite.

Named for composition and relation to alluaudite.
Named for compostion and relation to anthopyllite
.
Group name axinite from the Greek "axine", "ax", in allusion to the sharp-edged tabular crystals resembling a cutting tool.
Named for its composition and relation to bustamite.
Named for its composition and relation to carpholite.
Named for its columbium content.
Named for its composition and relation to gedrite.
Named for its compostion and relation to glaucophane.

Alternate name hornblende from the German miners' term "horn", possibly with reference to the colour of horn, and "blenden"
Named from the composition.
Named for composition and relation to pargasite.
Named for composition and relation to richterite.
Named for the composition.
Named for composition and relation to strunzite.
Named for its tantalum content.
Named for composition and relation to tschermakite.

Named for composition and relation to wyllieite.
Named for Prof. Ferruccio Zambonini (1880-1932) of Napoli.
Named from the composition.
Named after Prof. Aleksandr Evgenievich Fersman of Leningrad, USSR.
Named after Prof. Aleksandr Evgenievich Fersman of Leningrad, USSR.

Named after Mr K. J. Finneman, L†ngban, Sweden, who discovered the mineral.
Named for R. Fischesser.
Named after Sandor Fizely, mining engineer and finder of the mineral.
Named for the locality.
Named for Dr Michael Fleischer, USGS.
Named for the locality.

Named for the composition and relation to florencite.

Named for the composition.
Named for the composition.
Named for the composition.
Named for the composition and relation to apatite group.
Alternate group name apophyllite from the ggreek "apo", "off", and "phyllon", "leaf", in allusion to the fact that the mineral flake

From the Latin "fluere", "to flow" because fluorite melts easily.
Named for Mr F. F. Fogg.

Named for Francis Gloster Forman, government geologist, Western Australia.

Named after Johann R. Forster (1729-1798), a German naturalist.
Named after Dr William Foshag, Smithsonian Museum, Washington, USA.
Named for Prof. Paul Fourmarier, Belgian geologist.
Named after Julien Jean Joseph Fraipontite (1857-1910), a Belgian zoologist and Charles Fraiport.
Named for the locality.
Named for the locality.

Named for Franco Anelli.
Named for the locality.
Named for Dr Frank W. Dickson.
Named for the locality.

Named for the locality.
Named after Johann Karl Freiesleben (1774-1846) Mining Commissioner, Saxony, Germany.

Named for the locality.
Named for Prof. Wilhem Freudenberg, author of Monograph on Katzenbuckel Rocks.

Named after Prof. Ing O. M. Friedrich, Mining University, Leoben, Styria, Austria.

Named for Dr Max Hans Frohberg, mining geologist, Toronto, Canada.
Named after Prof. Clifford Frondel (1907 -) Harvard University.
Named for the locality.
Named for the locality.
Named for Nobuyo Fukuchi (1877-1934) Japanese mineralogist.
Named after Dr B. F□l”pp, a Hungarian mineral collector.

Named for the locality.
Named for O. Gabrielson.

Named for Yu A. Gagarin (cosmonaut).
Named after Mr R. B. Gage, New Jersey, who collected and analysed the mineral.

Named for Gabrielle Donnay.
Named for R. Gaines.

Named for the locality.
Named after Mr W. A. Gale.
From the Latin "galena", given to lead ore.
Named for the composition.
Named for type locality Gal-Khaya.
The name refers to it being the first mineral with gallium as an essential element.
Named for the locality.

For Prof. C. L. Garavelli, Italian mineralogist.
Named after Robert A. Garrels, Harvard University.
Named after Blair Gartrell, who collected the mineral.
Named after Gary Ansell.
Named for the locality.
Named for Dr Brian Gatehouse, crystal chemist, Monash University, Australia.
Named for the locality.
Named for C. Gaudefroy.

For Adam Geer, who first collected the mineal, of Utica, New York, USA.
Named for Jacques Geffroy, metallurgist, French Atomic Energy Commission.

Named for Dr A. D. Genkin, Soviet mineralogist.

Named from helvite and Prof. Fredrick Genth (1820-1893) of Philadelphia who first described the material.
From the Greek for "earth" and "saturn", the alchemistic name for lead.

Named for Mr Georgiades, Director of the mines at Laurium.

Named for the germanium content of the mineral.
Named for the Von Gersdorffs, owners of the nickel mines at Schladming, Austria (c1842).
James Mack Gerstley (1907-) President of the Pacific Coast Borax Company.
Named for E. Gersmann.
Named for the locality.
Named for T. W. Gevers, South African mineralogist.
Named for V. P. Gianella.

Named for the locality.
Named after the locality.
Named after the collector, Mr Frank Gillespie.

Named after Prince Piero Ginori Conti, of Florence, Italy.
Roger Giraud, Orleans, France.

For the locality, Gladhammer.
Named in honour of Johann Rudolf Glauber (1604-1668), German chemist.

From the Greek for "blue", in reference to its use in the dark blue glass called smalt.

From the Greek "glaukos", "bluish grey", and "phainelein", "to appear", in allusion to its colour.
Named for the colour and habit.

Named for the locality.
Named for M. N. Godlevskii, Russian economic geologist.
Named for Dr V. L. Goedken.
Named in honour of Johann Wolfgang Von Goethe (1749-1832), German poet, philosopher and amateur mineralogist.
Anglo-Saxon word for the metal.
Named for the composition.
Named after Samuel S. Goldich (1909-) University of Minnesota.
Named for M. I. Goldman.

Named for Forest A. Gonyer, Harvard University.
Named for the locality.
Named for Prof. Henri Gorceix, former Director of School of Mines, Outo Preto, Brazil.
Named after Mr Samuel Geroge Gordon, Academy of Sciences, Philadelphia.
Named after Dr Rolf G”rgey Von V”rg” (1886-1915) who wrote on salt deposits.

Named for the locality.

Named for Count G. A. Von G”tzen, German explorer of East Africa.

Named after Harrsion B. Gower.

Named for R. Graem.
Named for the locality.
Named after Mr Alfred Grandidier, an authority on the natural history of Madagascar.
Named for the locality.
From the Greek "graphein", "to write" in allusion to its use as a crayon.
Named for Louis Caryl Graton (1880-1970), Prof of Economic Geology, Harvard, University.

Named for Lord Greenock, Charles Murray Cathcart (1783-1859).
Dr Joseph Wilson Greig (1895-1977) Pennsylvannia State University.
Named for F. Grimaldi.
Named for locality.

From the new Latin "grossularia", "goosberry", because some grossular crystals are pale green like the fruit.
Named after Prof. Frank Fitch (1880-?) Grout, University of Minnesota.

Named after V. S. Gruzdev (1938-1977) Russian mineralogist.
For the locality.
Named for its source of bat guano.
For the locality.
Named for H. Guerin, who synthesized this material.
For Jean Etienne Guettard (1715-1786) French geologist.
Named for the locality.
Named after Prof. Frank Nelson Guild (1870-?) University of Arizona.
Named for Prof. C. Guillemin (Ecole Des mines, Paris).
Named for H. C. Gunning.

For Gustav Adolf Hageman, chemical engineer, Ivigtut, Greenland.
Named for the locality.
From the Greek "gypsos", "gypsum or plaster".

Named after Paavo Haapala, chief geologist, Otuokumpu Co., Finland.
Named by analogy with zircon.
Named for the locality.
Named for Prof. Gunnar H„gg, Uppsala University.

Named for the locality.
For Jaroslav Hak, mineralogist, Czechoslovakia.
From the Greek "hals", "salt".
Named for Dr A. F. Hallimond.

Named for the locality.

James Ballantyne Hannay (1855-1931).

Named for the locality.

Named for the locality.
Named after Dr. P. F. Hast, mining engineer.
Named for Dr Fredrick Henry Hatch (1864-1932).
Named for the locality.
Named for Dr William Hauchecorn (1828-1900) Director of geological survey, Berlin.

Named after Joseph Ritter Von Hauer (1778-1863) and his son Franz Von Hauer (1822-1899) Austrian geologists.

Named after Prof. James E. Hawley, Queens University, Canada.
Named for H. Axon.
Named for M. H. Haycock head of mineral section, Dept of Energy, Mines and Resources, Ottawa, Canada.
Named for the locality.
Named for the locality.
Named in honour of Ludwig Hedenberg, early 19th-century Swedish chemist.
Named for the locality.

Named for Prof. Fritz Heide (1891-1973) German meteoriticist.
Named after Dr. Fritz Heidorn, geologist of Bentheim.
Named for Prof. E. William Heinrich.

Named after Prof. Armund Helland.
Named after Henry Hellyer, surveyor and explorer.

From the Greek "haimatites", "bloodlike".

Named for the symmetry.
From the Greek prefix "hemi-", "half", and "morphe", "form", in allusion to the fact that opposite ends of a hemimorphite crysta
After an ancient name for the Balkan Mountains.
Named for E. P. Henderson, US National Museum (Smithsonian).
Named for S. B. Hendricks.

Named for Prof. Norman Fordyce Mckernon Henry (1909-1983) Cambridge University.

Named for Robert Herzenberg (1885-?) German chemist of Oruro, Bolivia.
Named for Germain Henri Hess (1802-1850) Swiss-Russian chemist of Leningrad, USSR.

From the Greek "different" and "form".

Named in honour of Henry Heuland, 19th-century English mineralogist.
Named after Mr D. Foster Hewitt, USGS.
Named after the artifical compound.

Named for the crystal system and composition.
Named for M. H. Hey, British mineralogist.
For Jaroslac Heyrovsky, Czech Nobel Laureate in chemistry.
Named after P. Hibon who found the mineral.
Named from the locality.

Named for the locality.
Named after Prof. Eugene Waldermar Hilgard (1833-1916) who first studied the salt deposit in Louisiana.
Named after Dr. William Francis Hillebrand, Washington DC.

Named from the locality.

Named after Prof. Raymond Hocart, University of Paris, France.
Named after Mr H. H. Hodgkinson, of Franklin Furnace.
Named for the locality.
Named after Mr Adolf Hoel, leader of the norwegian scientific expedition to Spitsbergen.
Named after Prof. Arvid Gustav H”gbom, of Upsala.

Named after Albert Fairchild Holden (1866-1913) mineral collector.
Named after Thomas Henry Holland, Director of the geological survey, India.
Named for Prof. Sidney Ewart Hollingworth (1899-1966), geologist, University College, London.
Named for Prof. Per Johan Holmquist, Stockholm.

Named for H. E. Holt.

Named for Dr R. A. Howie.

Named in honour of Henry How (D. 1879), the Nova Scotia chemist, geologist and mineralogist who first described the minera

Named for the locality.
Named in honour of Adolph Huebner, a metallurgist of Freiberg, Saxony.
Named after Baron H□gel.
Named after Alfred Hulse Brooks, USGS.
Named for J. T. Humberstone.

Named for the locality.
Named for Prof. Chang Hung-Chao.
Named for Dr. Walter Frederick Hunt (1882-?) University of Michigan.

Named for Dr Cornelius Searle Hurlbut Jr (1906-) Harvard University.
Named after Dr Arthur Hutchinson, Cambridge University.
Named for Prof. Colin Osborne Hutton, Stanford University.

Named for relation with astrophyllite.
Named for composition and relation to boracite.
Named from the composition.
Named for the relation to cerussite.
Named from the composition.
Named for its relation to dresserite.
Named for relation to grossular.
Named for relation to hetaerolite.
Named for relation to honessite.
Named for relation to magnesite.
Named for relation to molysite.

Named for the composition and relation to jarosite.

Named for relation to scarbroite.

Named for relation to tungstite.
Named for its composition and relationship to grossular and andradite garnet.
Named for its composition and relationship to apophyllite group minerals.
Named for composition and relationship to apatite group minerals.
Named for relation to bastn„site.
Named for relation to ellestadite.
Named for relation to herderite.

Named for relation to cinnabar.
Named from the Greek for violet colour.

Named for the locality.
Named after the locality.
Named after Takeo Imori and Satoyasu Iimori (1885-?), Japanese mineralogists.

Named after the locality.
Named after the locality.

Named after the locality.
Named for the state of Illinois.
Named after the locality.
Name from a locality in the Ilmen Mts. of USSR.
Named for relation to ilmenite.
From the Latin name "ilva", for the Island of Elba (type locality).
Named after the locality.
Named for the Institute of Mineralogy, Geochemistry and Crystal Chemistry or Rare Elements (IMGRE).
Named for Josef Imhof (1902-1969) professional mineral collector of Binn, Switzerland.
Named after the locality.
Named after the locality.
Named for the incas.
Named after the locality.
Named after the locality.
Named after the locality.
Named for the indium in its composition.
Named for the indigo blue emission spectra.
Named from the Greek for "flesh fibres" in allusion to its colour and structure.
Named after the locality.
From the Yakut name "Inneli" for the Inagli River.
Named after the locality.
Named after the locality.
Named after the composition.
Named after the locality.

Named after the locality.

Named after the locality.
Named for the composition ir (iridium) ars (arsenic).
Named after the locality.
Named for the composition.
From the Latin "iris" meaning rainbow as the element's compounds are often highly coloured.
For the composition.

Old English word for the metal.
Named after the locality.
Named for the composition and structure.
Named after the locality.
Named for its chemical similarity to mertieite.
Named after Prof. Tei-Ichi Ito of Tokyo.
Named after the locality.

Named after the locality.

From the Spanish "piedra de ijada", "stone of the side", in allusion to the belief that jade could cure kidney disorders if applied

Named for John B. Jago (1909-) mineral collector, California, USA.
Named for J. A. Gower.

Named for R. H. Jahns.
Named for the locality.
Named for John L. Jambor.

Named in honour of Robert Jameson (1774-1854), of Edinburgh, Scotland.
Named for the locality.
Named for Jan Haug who first observed the mineral.
Named after Mr C. F. Jarl.

Named from the original locality in the Jaroso Ravine, Sierra Almagrera, Spain.
Named for Prof. Stanislaw Jaskolski (1896-1981) Poland.
Named for Prof. Karl Jasmund former Director of the Mineralogical Institute, University of Cologne, Germany.

Named for the locality.
Named for Colonel Clarence M. Jenni (1896-1974), Director of the Geological Museum, University of Missouri.

Named for Prof. Gerald V. Gibbs, Virginia.
Named for William P. Jervis, Curator, Torino, Italy.
Named for Prof K. Jimbo.
Named for Prof. James Burleigh Thompson.
Named for the locality.
Named for the locality.
Named for Joaquin Ridge near the Gem mine, California.
Named for Joseph Victor Smith (1928-) University of Chicago.
Named for the locality.

Named for Prof. A. Johannsen (1871-1962) University of Chicago.

Named for the locality.
Named for J. F. and I. Joliot-Curie.
Named for Francis Tucker Jones (1905-1993), Berkeley, California.
Named for Dr H. Jordan (1808-1887) Saarbrucken Germany, who provided the orginal specimens.
Named for Eduard Freidrich Jordis (1868-1917) colloidal chemist.
Named for the locality.
Named for relationship to joseite.
Named for G. Jouravsky.

Named for Prof. Julian Royce Goldsmith (1918-) University of Chicago.
Named for Henry Julien (D. 1920).

Named for Jun Ito (1926-1978) Harvard University.
Named for the locality.

Named for Joseph Jurban.
Named for the locality.
Named for the locality.
Named from the composition.
Named for Dr Fritz Kahler, Carinthian Museum at Klagenfurt, Austria.

Named from the Greek for "unusual" for its rarity and exotic composition.
Named for the composition, k, al, bor and si.

Named for P. I. Kalinin, Russian mineralogist.
From the Greek for potassium and for "friend" recognizing the presence of k.

Named for the composition.
Named from the composition.
From the Greek for "shaft".
Named for the locality.
Named for the locality.

Named for the locality.
Named for the locality.
Named for Dr Hiroshi Kano, Akita Univeristy, Japan.
Named for the locality.
Name "serpentine" alludes to the surface pattern of serpentinite rock, which recalls the skin of a serpent.
Named for the locality.
Named for the locality.

Named for the locality.

Named for A. P. Karpinsky.
Named for S. A. Kashin, Russian mineralogist.
Named for the locality.
Named for N. G. Kassin.
Named after Akira Kato, National Science Museum, Tokyo.

Named for the locality.
Named for M. E. Kazakov.
Named after Mr Eric Keck, mineralogist, Hagendorf, Germany.
Named for F. W. Kegel.
Named for Mr Keith Conn, geologist who worked on the Stillwater Complex.

Named for the locality.

Named after M. V. Keldysh (1911-) President of the Academy in USSR.
Named for W. C. Kelly, geologist, University of Michigan.
Named for the locality.
Named for the locality.
Named for James Furman Kemp, Columbia University.
Named for Prof. W. Q. Kennedy, Leeds, England.

Named from the Greek for "spike' or "thorn" for its prismatic habit.
Named for the locality.
Named from the Greek "kermes" for crimson in allusion to the colour.
Named for the locality.

Named after the locality.
Named after Prof. Radim Ketter, Karlova University, Czechoslavakia.
Named for C. L. Key.

Named after the locality.
Named after the locality.
Named after the locality.

Named after the locality.
Named for A. L. Kidwell.

Named after the locality.
Named after the locality.
Named after Kim Robinson.

Named after the Kimzey family.
Named after Mr D. King, geologist, Dept of Mines, South Australia.
Named after the locality.

Named for Fr. E. F. Kino (1645-1711) Jesuit pioneer of Arizona.
Named for K. Kinoshita.
Named after the locality.
Named after the locality.
Named for Dr Egon Kirschstein, pioneer geologist of Kivu, Zaire.
Named for the river Kitkaite.
Derived from "kittatinny", which means "endless hills" in the Algonquin Indian language.
Named after the locality.
Named after the locality.
Named for Count Kuno Klebelsberg, Hungarian Minister for Education.

Named for Prof. Carl Klein (1842-1907) of Berlin.
For Prof. Friedrich Klockmann (1858-1937) German mineralogist.
Named for Oleg Von Knorring, University of Leeds.
Named after the locality.
Named after the locality.
Named for Wolfgang Franz Von Kobell (1803-1882).
Named after Dr Rudolf Koechlin, curator, Natural History Museum, Vienna.
Named after Prof. Adolf Von Koenen of Gottingen.
Named for L. N. Kogarko.
Named after Dr Jaroslav Kokta.
Named for the locality.
Named for Prof. Friedrich Kolbeck, Mining Academy, Frieberg, Germany.

Named for John Kolic, who discovered the mineral.

Named for the locality.
Named for the locality.
Named for V. M. Komarov.
Named for the locality.

Named for the locality.

Named for Andreas N. Kornerup (1857-1883). Dannish geologist.
Named for the locality.
From the German "kosmisch" for "cosmic" in allusion to its meteoritic orgin.
Named for Prof. Ivan Kostov, Bulgarian mineralogist.
Named for Ekaterina E. Kostyleva-Labuntsova (1894-1974) Russian mineralogist.
Named for Prof. B. Koto (1856-1935) Japanese geologist.

Named for Vladimir K. Kotul'skii, USSR economic geologist.
Named for J. Koutek, University of Prague.
Named for the locality.
Named after Prof. Shukusuke Kozu (1880-1955) Tohoku University, Japan.
Named for Frederick Kraissl Jr. (1899-1986) and Alice L. Kraissl (1905-1986). Collectors of Sterling Hill minerals.
Named after Prof. Josef Kratochvil, University of Karlovy, Prague.
Named after Prof. Edward Henry Kraus, University of Michigan.
Named for K. B. Krauskop.
Dr F. Kraut.

Named for Joseph A. Krenner (1839-1920) Hungary.
Named for Evgeny Leonidovich Krinov, USSR meteorite worker.

Named for the locality.
Dr T. Kruta, Moravian Museum, Czechoslovakia.
Named after Georgi A. Krutov, Gosdarst University, Moscow.
Named after Vladimir Ilich Kryzhanovskite, Russian Academy of Science.
Named after Constantine A. Ktenas (1885-1935) University of Athens.

Named for A. Kulan.
Named for Dr. Holger Kulke, geologist from Germany who discovered the mineral.
Named for Gunnar Kullerud, geophysical laboratory, Washington D.C.
Named after Georg Fredrick Kunz, New York.
Named for Mr Boris M. Kupletsky (1894-?) and Elsa M. Bohnshtedt-Kupletskaya (?-1974) Russian geologists.
Named for the locality.
Named for the locality.
Named for I. V. Kurchatova.
Named for N. S. Kurnakov, USSR Academy of Sciences.
Named after Dr J. Kutina, Charles University, Prague, Czechoslovakia.
Named for the locality.

Named for the locality.
From the Greek "kyanos", "dark blue".
Named for the locality.
Named for the locality.
Named for A. N. and E. E. Labuntsov, Russian mineralogists.
Named after Prof. Alfred Lacroix, Paris.
Named for Pierre Laffitte, Director National School of Mines, Paris.
Named for the locality.
Named for Aarne Laitakari, Director of the geological survey of Finland.

a = 19.76, b = 7.06, c = 5.40, \b = 96.5
Named for the locality.
Named after L. D. Landau.
Named after Prof. Kenneth Landes, University of Kansas.

Named for the locality.

Named for the locality.
Named for its composition.
Named for its composition.
Named for its composition.
Named for Dr. Davis Lapham (1931-1974). Pennsylvania geological survey.
Named for the locality.
Named for the locality.
Named for the locality.
Named for the locality.
Fred Larose, one of the discoverers of silver ore at Cobalt.
Named after Prof. Esper Signius Larsen (1879-?) Harvard University.
Named for the locality.
Named for the locality.
Named after Dr Heinrich Laubmann, German mineralogist.
Named for Prof. Max Von Laue (1879-) of Berlin.
Named in honour of Gillet De Laumont (1747-1834),French mineralogist.
Named after Prof. Louis De Launay (1860-1938), French geologist.
Named for the locality.
Named for Laura R. Joy.

Named for the locality.
Named in allusion to its colour.

Named in honour of Professor Andrew C. Lawson (1861-1952) of the University of California.

From an old Arabic word "lazaward", "heaven", a reference to the mineral's blue colour.
From the Arabic "lazaward", "heaven".
Old English word for the metal.
Named for the composition.
Named for the locality.

Named in honour of a Belgian mine manager, Legrand, who first collected the material at the Flor De Pena Mine.
Named after Scandinavian explorer, Leif Ericsson (CC 1000AD).
Named after Dr. Thomas Leighton, University of Santiago, Chile.
Named after L. Teixeira-Leite.
Named for Charles Lemoyne (1625-1685).
Named for the locality.
Named for Lenni Lenape Indians who inhabited the Franklin area.

Named for Jacques Lepersonne, Royal Museum of Central Africa, Belgium.

From the Greek "lepidos", "scale", in allusion to the scaly aggregates in which the mineral commonly occurs.
Named for the locality.
From the Greek "leukois", "white", in reference to the common hue of the mineral.
From the Greek for "white" and "to appear" in allusion to its common colour.
From the Greek for "pale" and "purplish red" in reference to its colour.

From the Greek for "white" and "wedge", its colour and crystal habit.
Named for Armand Levy (1794-1841). French mineralogist.

Named for the composition li be.
Named for the locality.
Named after Richard John Liddicoat, Jr. (1918-) American gemologist.
Named for W. R. Liebenberg.

Named for the locality.
Named for the locality.

Named after the locality at Linares, Jaen Province, Spain.
Named after Prof. Waldemar Lindgren (1860-?).

Named after Gustav Lindstom (1838-1916) Swedish mineralogist, Museum of Natural History, Stockholm.
For Carolus Linnaeus (1707-1778) Swedish taxonomist.
Named for mineral collector Luciano Liotti.
Named for Prof. William Nunn Lipscom (1909-), University of Minnesota.

From the Greek "philos", "friend", in allusion to the mineral's affinity for lithium.

Named for the composition.
Named for the composition.
Named from the Greek "lithos" for "stone" as the mineral is composed of the most abundant chemical elements in the earth's

Named for Dr George D. Liveing (1827-1924) Cambridge University, England.
Named after David Livingstone (1813-1873) Scottish explorer.
Named after the locality.

Named after the locality.

Named for Mikhail V. Lomonsov (1711-1765). Russian mineralogist.
Named after the locality.
Named for Prof. Kathleen Y. Lonsdale (1903-1971), British crystallographer.

Named after Dr Emiliano Lopez.

Named for eötvös lorand (1848-1919) physicist, hungary.
.
Named for Johannes Theodor Lorenzen (1855-1884), Danish mineralogist.
Named after the locality.
Named after Samuel R. Losey (1883?-1906?), a local collector.

Named after the locality.
From the Russian "gift of lovozero".
Named for J. F. Lovering University of Melbourne, Australia.
Named after the locality.

Named for Raymond W. Ludden, geologist, Western Exploration, Phelps Dodge Corp.

Named for F. Ludlow Smith III and C. Locke Key.

Named after the locality.
Named for R. D. Luethite.

Named after the locality.

Named after the locality.
Named after the locality.
Named after the locality.
Named for Macaulay Institute for soil research, Aberdeen, Scotland.

Named after the locality.
Named for Russell P. Macfall, mineral collector.
Named for F. Machatschki.
Named after John William Mackay (1831-1902) an Irishman who made a fortune on the Comstock Lode, Nevada.
Named after the locality.

Named after Louis Charles Henry Macquart (1745-1803), French chemist.
Named after the locality.
Named after the locality.
Named for its magnetism and relation to hematite.
Named for its composition and relation to anthophyllite.
Named for its composition and relationship to arfvedsonite.
Group name axinite from the Greek "axine", "ax", in allusion to the sharp-edged tabular crystals resembling a cutting tool.
Named for its composition and relationship to chloritoid.
Named for its composition and relationship to chromite.
Named for its composition and relationship to copiapite.
Named for its composition and relationship to cummingtonite.
Named for its composition and relationship to magnesioferrite.

Alternate name hornblende from the german miners' term horn, possibly with reference to the colour of horn, and blenden, "to
Named for its composition and relationship to riebeckite.
Named for its composition and relationship to sadanagaite.
Named for its mg content.
Named for its composition and relationship to astrophyllite.
Named for its composition and relationship to chlorophoenicite.
Named for its composition and relationship to zippeite.
Named derived from "magnesia", an ancient district bordering on Macedonia.
Named for its magnetism and composition.
Named for its composition and relationship to triplite.
Named for its composition and relationship to columbite.
Named after Nils H. Magnusson, Director of the geological survey of Sweden.
Named after the locality.
Named for Alan Major.
For the Masai word "emakut" meaning "soda" in allusion to its composition.
Named after Eero M„kinen, Finnish geologist.
From the Greek "moloche", "mallow", in allusion to the mineral's leaf-green colour.

Named after the locality.
Named after the locality.
Named after Prof. Alessandro Malladra, conservator of the Vesuvius Observatory.

Named after the locality.
Alternate group name chlorite from the Greek "chloros", "green", in reference to the mineral's characteristic colour.
Named after Ernesto Manasse (1875-1922).
Named for J. Mandarino.
Named for its composition and relation to neptunite.
Named for its composition.
Group name axinite from the Greek "axine", "ax", in allusion to the sharp-edged tabular crystals resembling a cutting tool.
Named for its composition and relation to babingtonite.
Named for its composition and relation to berzeliite.
Named for its composition and relation to h”rnesite.
Named for its composition and relation to shadlunite.
Named for its composition and relation to humite.
Named for its manganese content.
Named for its composition and relation to chromite.
Named for its composition and relation to columbite.
Named for its composition and relation to langbeinite.
Named for its composition.
Named for its composition.
Named for its composition and relation to tantalite.
Named for its composition and relation to tapiolite.
Named for its composition and relation to pyrosmalite group.
Named for Prof. Manjiro Watanabe.

Named after Dr. George Mansfield (1875-) geologist with the USGS.

Named after the locality.
From an Arabic word once used for pyrite.

From the Greek for "pearly" for its pearly lustre.
Named from the Greek for "pearl" and "tablet", in reference to its lustre and habit.
Named for Maria Rosa Vom Rath, wife of Gerhard Vom Rath, German mineralogist who named the mineral.
Named for L. Maric.
Named after the locality.
Named for Dr. John Edward Marr of Cambridge University.
Named after Charles Marsh, who discovered the mineral.
Named for Marion Stuart, Bellevue, Idaho, USA, benefactor of USA mineral collections.
Named for A. Marthoz.

Named after Dr. G. P. Maslov (1915-1968).

Named for Dr. Kazunosuke Masutomi, Japanese mineralogist.
Named for Gustave Masuy.

Named after the locality.
Named after the locality.
Named after the locality.
Named after the locality.
Named after Vittorio Matteucci (1862-1909) former director of the Vesuvius Observatory.

Named for William Maucher (1879-1930), Munich mineral dealer.
Named after Sir Maurice Mawby, former Chairman of C.R.A. Ltd.
Named after Sir Douglas Mawson (1882-1958) Australian geologist and Polar explorer.
Named after the locality.
Named for Prof. Fiorenzo Mazzi, University of Pavia, Italy.
Named after the locality.
Named for J. F. Mcallister.
Named after D. McConnell.
Named for McGill University, Quebec, Canada.
Named after J. J. Mcgovern, mineral collector.

Named for V. E. Mckelvey.
Named after Prof. Hugh Exton Mckinstry (1896-1961), Harvard University.

Named after Dr. Francesco Meda (1926-1977), amateur mineralogist from Turin, Italy.
From the Greek for "less" referring to its less acute pyramidal from compared with vesuvianite.
Named from the Greek for "black" and for the cerium in its composition.
From the Greek for "black" and "to be burned" in allusion to the fact that some specimens turn black when heated.
Named for its composition.
Named from the Greek for "black" and "to melt or glass" for the black bead formed under the blowpipe.

Named from the Greek for "black" and from the composition.
From the Greek "melanteria", a black metallic pigment made with melanterite.
From the Greek for "honey-yellow" and "to appear" in allusion to its colour.

Named after the locality.

Named for Joseph M‰lon.
Named after the locality.

Named after the locality.
Named for Prof. Giuseppi Meneghini (1811-1889) of Pisa, Italy who first observed the mineral.
Named after Giuseppe Mercalli (1850-1914) a former director of the Vesuvius Observatory.
From the Latin "mercurius". The mythological Messenger of the Gods, in allusion to its mobility in the liquid form.
Named after Dr. Hans Merensky (1871-1952) who was instrumental in discovering the Merensky Reef.
Named after Stefano Merlino (1938-), University of Pisa, Italy.
Named after Craig M. Merrihue (?-1965), Smithsonian Institute.
Named after John B. Mertie, Jr. (1888-1980) USGS geologist who discovered the mineral.
Named after John B. Mertie Jr. (1888-1980). USGS geologist.
Named after Dr. Herbert E. Merwin (1878-1963), Carnegie Institute.
From the Greek "mesos", "middle" and "lithos", "stone" in allusion to the fact that it falls in composition midway between two o

Named for its composition.
Named for its relationship to ankoleite.
Named for its relationship to autunite.
Named for its relationship to uranocircite.
Named for its relationship to uranospinite.
Named for its relationship to borite.
Named for its relationship to cinnabar.
Named for its relationship to delrioite.
Named for its relationship to haiweeite.
Named for its relationship to heinrichite.
Named for its relationship to hewettite.
Named for its relationship to kahlerite.
Named after Dr. F. Kirchheimer.
Named for its relationship to koettigite.
Named for the locality.
Named for its relationship to novacekite.
Named for its relationship to rossite.
Named for its relationship to schoderite.
Named for its relationship to schoepite.
Named for its relationship to sideronatrite.
Named for its relationship to stibnite.
Named for its relationship to studite.
Named for its relationship to switzerite.
Named for its relationship to toridized Zones, weathering products

Named for its relationship to vandendriesscheite.
Named for its relationship to vanmeersscheite.
Named for its relationship to vanuralite.
Named for its relationship to variscite.
Named for its relationship to vauxite.
Named for its relationship to vivianite.
Named for its relationship to voltaite.
Named for Howard D. Zeller.
Named for its relationship to zeunerite.

Named after Wilheim Meyehoffer (1864-1906) who artifically prepared the mineral.
Named after the locality.
Named from the Moscow geological exploration institute.
From the Greek for "less" and "silver" as it contains less silver than other red sulphosalt minerals.
Named for Dr. C. E. Michener, who discovered the mineral.
Named from the Greek for "little" and "inclined" for the small deviation of the clevage planes from 90 degrees.

From the Greek for "small" in allusion to the crystal size and for the locality.

Named after the locality.
Named after the locality.
Named in honour of W H Miller (1801-1880), an English mineralogist.
Named afteer F. T. Millis from Lehi, Utah.
Named after Pro. Federico Millosevich, of Florence, Italy.
From the Greek "mimetes", "imitator", from its resemblance to pyromorphite.

Named after the locality.
Named after the locality.
Named for Mine Hill at Franklin, New Jersey.
Named after Carlo Minguzzi (1910-1953), Italian mineralogist.

Named after the locality.
Named after the journal, The Mineralogical Record.
Named after the locality.

Named after the locality.
Named for Dr. Hugh Dinsmore Miser (1884-1969), USGS.
Named after the locality.
Named after Eilhardt Mitscherlich (1794-1863), who prepared it artifically.

Named after the locality.
Named after the locality.
Named after Gunter Moh, University of Heidelberg, Germany.
Named after K. F. Mohr.
Named after Prof. Henri Moissan (1852-1907).
Named for the composition.
From the Greek "molybdos", "lead".
Named for the composition.
Named for the composition and relation to fornacite.

Named from the Greek "molybdos" for lead and "phllos" for leaf in allusion to its composition and foliated habit.

From the Greek "monazein","to be alone", in reference to its rarity when first found.
Named after M. V. Keldysh (1911-) President of the Academy in USSR.

Named after the locality.
Named after the locality.
Named after Mongolia.

Named from the composition.
Named after the Latin name for the locality.
Named after the locality.
Named after the locality.

Named after the locality.

Named after the Monte Region Hills, of which Mont St Hilare is part.

Named after Mr Arthur Montgomery of New York.
Named after the Italian mineralogist Teodoro Monticelli (1759-1845).
Named after the locality Montmorillion, France.
Named after the locality.

Named after Mr Montroy Sharpe, one of the owners of the mines at Terlingua, Texas.
Named after the locality.
Named after the locality.
Named after Gideon Emmet Moore (1842-1895) mineral chemist, New York.
Named after W. W. Moorhouseite.
Named after the locality.
Named after Dr. Luciano J. De Moraes, Brazilian geologist.
Named after the locality.

Prof. Josef Morozewicz (1865-1941), Jagellonian University, Poland.

Named after the locality.
Named after Prof. Alfred J. Moses, Columbia University.
Named after the locality.
Named after the locality.
Named after the locality.
Named for Prof. Edgar Donald Mountain (1901-) Rhodes University, South Africa.
Named after the locality.

Named after M. E. Mrose.
Named for Mr John Muir (1834-1914), American naturalist.
A. S. Mukhin, Siberian geological survey.
Named after the locality.

Named after the locality.

Named after K. J. Murata.
Named after Prof. Joseph Murdoch (1890-?) University of California, L.A.
Named for the Murman Coast, Kola Peninsula.
Named after the locality.

From the popular name "muscovy glass" because of its use as a glass substitute in Russia.

Named after the locality.
Named for the locality.

Named for the composition.
Named for the composition.
From the French "nacre", for "mother of pearl" in allusion to its appearance.
Named for the locality.
Named for Otochicki Nagashima (1890-1969) Japanese amateur mineralogist.
Named for Guenther Nagelschmidt, chemist who first reported the mineral in slags.
Named after the locality.
Named from the chemical formula.
Named from the chemical formula.
Named for the locality.
Named for Prof. Matsuo Nambu, Tohoku University, Japan.
Named after the country, Namibia.

Named after the locality.
Named for the locality.
Named after the locality.
Named for R. Nasini.
Named for Frank Lewis Nason (1856-1928), geological survey, New Jersey.

Named after Natalya Vasil'evna Frolova (1907-1960), USSR geologist.

Named for the composition.
Named for the composition.
Named after the composition.
Named from the composition and relation to other apophyllite group minerals.
Named from the composition.
Named for the composition.
Named for the composition and relation to dufrenite.

Named for its composition and relation to jarosite.
From the latin "natron", for the sodium content.
Named for the composition and relation to montebrasite.
Named for the composition.
For sodium, "natrium" in its composition, and its relation to nambulite.

Named for the composition.
Named for the composition.
Named for the composition.
Named for the locality.
Named after Carl Friedrich Naumann (1797-1873), German mineralogist.
Named in honour of the Navajo Indians.

Named after Mr FrankNeighbor, geologist.
An anagram of okenite, for which it was orignally mistaken.
Named for I. Y. Nekrasov, Russian mineralogist.
In honor of Joseph A. Nelen, Smithsonian Institute, Washington.
Named for Louis Nelter, geologist.
Named after Konstantin A. Nenadkevich, Russian mineralogist.
From the Greek "nephele", "cloud", because the mineral becomes clouded when placed in strong acid.
Named after the locality.
Named after Neptune, the Roman God of the Sea.

Named after the locality.
Named after J. Cosmo Newbery, mineralogist, National Museum of Victoria, Australia.
Named for Charles Stewart Ney (1918-1975), geologist at Lime Creek.
Named for the locality.
From the Latin "nicolum", referring to its composition.
From the German "nickel", demon, from "kupfernickel" meaning devil's copper as the mineral was believed to contain copper
Named for its composition and relation to boussingaultite.
Named for its composition and relation to skutterudite.
Named for its composition and relation to zippeite.
Named for its composition and relation to chalcoalumite.
Named for its composition and relation to bischofite.
Named for its composition and relation to blödite.

Named for its composition and relation to hexahydrite.
Named after R. V. Nifontov, Russian geologist.
Named after Nigeria.
Named after Prof. Paul Niggli (1888-1953), Zurich, Switzerland.
An acronym for National Institute of Metallurgy of South Africa.
Named after the locality.
Named after Harvey Harlow Nininger (1887-1986) for his contribution to meteoritics.
Named for its composition and relation to aeschynite.

For its niobium content and from the Greek word "phyllite" meaning "leaf" in allusion to its micaeous habit.
For niobium and calcium in the composition.
Named for its composition.
Named for W. H. Nisson.
Named for its composition.
Named for its composition.
Named for its composition.
Named for its composition.
Named for its composition.
Dr Levi F. Noble, USGS.
Named after Thomas Bennan Nolan (1901-) Director of the USGS.
Named for the locality.
Named for the locality.

Named from the minerals "northern origin".
Named for R. A. Van Nordstand who synthesized the mineral.

Named after T. Nordstr”m.
Named after Mr Keith Norseth, geologist.

Named after Mr Karl Wilhelm Nose (1753?-1835), German mineralogist.
Named after Radim Novacek (1905-1942) Czech mineralogist.
Named for Prof. Jiri Novak, Charles University, Czechoslovakia.
Named after Prof. Werner Nowacki (1909-), University of Berne, Switzerland.
Named after the locality.
Named after Prof. Edward Wilfrid Nuttfield (1914-), University of Toronto, Canada.
Named after the locality.
Named after the locality.

Named after Prof. Albert Jules Joseph Offret (1857-?) Lyons, France.
Named after the locality.
Named after the locality.

Named after the locality.
Named after the German naturalist, Lorenz Ocken (1779-1851).
Named after Thomas Oldham (1816-1878).

From the Greek "oligos", "little" and "klasis", "fracture", since it was thought to have a less perfect cleavage than albite.
From the German "olivenerz", "olive ore", with reference to its colour.
Named for its olive-green colour.
Named for Milo Olmstead.
Named for Prof. Juan A. Olsacher.

Named for Omeishan, a mountain in Sichuan Province.
From the Greek for "unripe grape" in allusion to its colour.
Named for E. Onorato.

Named for M. R. Oosterbosch, who was involved in mining in Zaire.
From the Sanskrit "upala", meaning "precious stone".
Named after Ezequiel Ordonez, Mexican geologist.
Named after the locality.
Named after the locality.
Named after the locality.
Named after the locality.

From the Latin "auripigmentum", in reference to the mineral's vivid gold hue.
Named for its crystal structure and relation to brannerite.
Named for its orthorhombic structure and relation to chrysotile.
From the Greek "orthos", "upright", and "klasis", "fracture", in allusion to its two prominent cleavages at right angles to each ot
Named for its crystal structure and relation to ericsonnite.
Named for its orthorhombic structure and relation to joaquinite.
Named for its crystal structure and relation to pinakiolite.
Named for the locality.

Named for the osmium and arsenic content.

Named from the composition.
Named from the Greek word for "odour" in reference to the pungent odour when heated in air.
Named after the Osumi Province in Kyushu, Japan.
Named after the Osumi Province in Kyushu, Japan.
Named after the locality.

Named for J. Ottemann, German mineralogist.
Named after the locality.
Named after the locality.
From the French "oursin" meaning "sea urchin", in allusion to the mineral's appearance.
Named after Mr Edwin Over, Colorado Springs, USA.
Named after the locality.

Named for Dr. Jiro Oye, Okayama University, Japan.
Named after Viekko P„„kk”nen.
Dr Adolf Pabsite (1899-1990), University of California.

Named for Dr K. Padera, Charles University, Czechoslovakia.

Named from the composition.
Named after the locality.
Named for the planetoid pallas.
Named for its composition.
Named for its composition.
Named for its composition.
Named after Luigi Palmier (1807-1896).
Named for the locality.
Named after the locality.
Named for F. A. Paneth.
Named for palladium and "olovo", tin.
Named for the tribe of Indians that formerly inhabited the region of Ajo.
Named for its compositional similarity to bariomicrolite.
Named for its relation to butlerite.
Named for its relation to celsian.
Named for its relation to coquimbite.
Named for its relation to costibnite.
Named for its relation to adamite.
From the Greek "unexpected alloy".
From the Greek "paragon" for "misleading", as it looks like talc.
Named for its relation to guanajuatite..
Named for its relation to hilgardite.
Named for its relation to hopeite.
Named for its relation to keldyshite.
Named for its relation to khinite.
Named for its relation to laurionite.
Named for its relation to alstonite.

Named for its relation to mendozavilite.
Named for its relation to montroseite.
Named for its relation to natrolite.
Named for its relation to pierrotite.
Named for its relation to rammelsbergite.
Named for its relation to realgar.
Named for its relation to schachnerite.
Named for its relation to schoepite.
Named for its relation to scholzite.
Named for its relation to spurrite.
Named for its relation to symplesite.
Named for its relation to atacamite.
Named for its relation to tellurite.
Named from the Greek "para" for "near" and its relation to umbite.
Named for its relation to vauxite.
Named for its relation to wollastonite.
Named after the locality.

Named after Prof. Robert L. Parker, Zurich Switzerland.

Named for the locality.
Named after Prof. Arthur Leonard Parsons, Toronto, Canada.
Named for Prof. Erwin Parth‰, University of Geneva, Switzerland.

Named for Alexander Parwel, who first analysed the mineral.
Named for the locality.
Named after Anenor Rizo Patron, who detected the vanadium during smelting of ore.
Named after Prof. Linus Pauling.
Named after Paul Kerr, mineralogist.
Named after Paul B. Moore, German mineralogist.
Named from the Latin "pavonis" for "peacock" after Prof. Martin A. Peacock (1898-1950), University of Toronto, Canada.
Named from the Latin "pax" meaning "peace".
Named for Richard Pearce (1837-1927), chemist, Denver, USA.
Named after William T. Pecora.
From the Greek "pektos", "compacted", in allusion to the mineral's compact fibrous nature.

Named after Vince Peisley, mineral collector and finder of the material.
Named after Peko Wallsend, the company which operated the Juno mine.
Named after the locality.
Named for Mr G. Penikis.
From the Lapp "penk", for "curly", and "vikis" for "white", for its typical appearance.
Named for Thomas Pennant (1726-1798), Welsh zoologist and mineralogist.
Named after Dr Richard Alexander Fullerton Penrose, (1863-?) mining engineer, Pennsylvania, USA.
Named for the unusual pentagonal habit of the twinned crystals.
Named for the number of water molecules in the formula..
Named in honour of J. B. Pentland (d. 1873), an Irish scientist.

Named for the locality.

Named for F. C. Perham.

Named after Prof. Per Geijer.
Named for Lily Alekseeva Perekrest, Kirov Mining School, USSR.
Named for L. Perloff.
Named for F. Permingeat.

Named after Mr Carlo Perrier (1886-1948).
Named after Mr Pierre Perroud (1943-) Voltaire College, Switzerland.
Named for S. H. Perry.
From the Greek for "leaf", in allusion to its perfect basal cleavage.
Named after Dr. Peter Tarasoff, amateur mineralogist, Quebec, Canada.
Named after Dr. Pete Dunn, mineralogist, Smithsonian, Washington D.C.

Named for the locality.
Named for Nina Petrovkaya, Russian mineralogist.

Named for W. Petz who first analysed the mineral.

From the Greek "phenakos", "deceiver", because it was formerly mistaken for quartz.

Named for the locality.
Named after William Phillips (1775-1829), British mineralogist.
From the Greek "phlogopos", "fiery-looking", in allusion to its red-brown colour.

Named from the composition.

Named for the composition.
Named for the composition and fibrous habit.
Named for the composition and from the greek for "leaf" for the micaeous cleavage.
Named for the composition and relation to r”sslerite.
Named for its composition.
Named for the composition.
Named for the composition.
Named for the composition.

Named for Paul Picot, French mineralogist.

Named after the locality.
Named for Roland Pierrot, B.R.G.M. Orleans, France.
Named for the occurrence.
Named for the locality.

Named for W. W. Pinch.

Named after the locality.

From the Greek for "oblique", in reference to the crystal shape.
Named for Mr Planche, who provided the original material.
Named for the composition.
Named for the composition.
From the Spanish "plata", "silver".

From the Greek "to broaden", in allusion to its platy habit.
Named after Prof. John Playfair (1748-1819), Edinburgh, Scotland.
Named after the locality.

Named for the composition and relation to betafite.
Named for its composition.

Named for its composition and relation to jarosite.
Named for the composition and relation to microlite.

Named for the composition.
Named for the composition and for the relation to pyrochlore.
Named for the composition.
Named for the composition and the locality.
Named for D. Poitevin.

Named for the locality.
Named after Clyde Polhemus Ross, US economic geologist.
Named for the locality.
From "Pollux" of classical mythology, brother of Castor, for its common association with "castorite" = petalite.
From the Greek for "many" and "base", in allusion to the many metallic bases present.

From the Greek for "many" and "twin" as the mineral is observed in twinned forms.
From the Greek for "many" and for salts, alluding to the number of salts present.
From the Greek for "many" and in allusion to its high lithium content.

Named for the island of Portland, Dorsetshire, England.
Named for E. W. Posnjak.
Named after the locality.
Named for the composition.
Named for Prof. Z. Pouba, Charles University, Czechoslovakia.
Named after Dr. Fredrick H. Pough.

Named after Colonel Van Prehn, who brought the first specimens to Europe from South Africa in 1774.

Named after Prof. H. Preiswerk (1876-1940), Basel, Switzerland.
Named after Paul Ivanovich Preobrazhensky (1874-1944), investigator of Russian salt deposits.

Named after Prof. Rex Tregilgas Prider, University of Western Australia.
Named after Prof. Frank Holman Probert, University of California.

Named in honour of Joseph Louis Proust (1754-1826), French chemist.
Named after Nikolai Przhevalsky (1839-1888), Russian explorer.
Named for its similarity to autunite.
Named for its similarity to bol,ite.
Named for its similarity to brookite.
Named for its similarity to laueite.
Named for its similarity in appearance to malachite.
Named for its similarity to rutile.
Named for its similarity to wollastonite.

Named for Raphael Pumpelly (1837-1923), US geologist.
Named for its Mn content and for its relation to pumpellyite.
Named from the Latin for purple.
Named for Putoran Mountain, Siberia, FSU.
From the Greek "pyr", "fire" and "argyros", "silver" in allusion to its composition and colour.
From the Greek "pyr", "fire" as sparks can be struck from it.

Named form the Greek for "fire" and "needle" in allusion to its colour and shape.

From the Greek "pyr", "fire" and "louein", "to wash".
From the Greek "pyr", "fire" and "morphe", "form".
From the Greek Pyropos, "fire-eyed".

From the Greek "pyr", "fire", and "phyllon", "leaf", in allusion to its exfoliating when heated.

From the Greek for "fire" and "shining", in allusion to its colour and luster.
Named from its composition and relation to pyroxmangite.
Named for its composition.
From the Greek "pyrrhotes", "redness".

Named for the locality.
Named for the locality.
Origin uncertain; Frist applied to Gangue in Saxony, Germany.
Named for Clive S. Queit, mineral dealer, Namibia.
Named after Prof. Percy Dudgeon Quensel (1881-) of Stockholm.

Named for the Toltec God Quetzalcoatl.
John Charles Rabbitt, USGS.
Named after B. P. Radhakrishna, Indian geologist.
Named after Prof. E. Raguin, Ecole Des Mine, Paris, France.
Named after Thor Heyerdahl's papyrus ship Ra (1969-1970).

Named after Prof. Paul Ramdohr (1890-1985), German mineralogist.
Named for J. Rameau.
Named after Karl Friedrich Rammelsberg (1813-1899), Berlin, Germany.
Named for the locality.
Named after Prof. Lewis Stephen Ramsdell (1895-) University of Michigan.
Named after the locality.

Named after Prof. Kalervo Rankama.
Named after Dr. Geroge Atwater Rankin (1884-?), geophysical laboratory, Washington D.C.
Named after Prof. Frederick Leslie Ransom (1868-?) California Insitute of Technology.

Named for the locality.
Named after Charles Rasp (1947-1907), discoverer of the Broken Hill deposit, Australia.
Named after the locality.
Named after Prof. Gerhard Von Rath (1830-1888), Bonn, Germany.
Named for the rauenthaler vein system at Sainte-Marie-aux-Mines, Alsace, France.

Named after Prof. Santosh K. Ray, President College, Calcutta, India.
From the Arabic "rahj alghar", "powder of the mine".

Named for the locality.
Named after Frank S. Reed and John L. Mergner, USGS.

Named after the locality.
Named after Mr Willy Reiner.
Dr. Reinhard Brauns (1861-1937), University of Bonn, Germany.
Named after Prof. Alphonse Francois Renard (1842-1903).
Named after Prof. Armand Renier director of, Howie and Zussman, Rock Forming Minerals, v. 4, p. 276-288, New York, Wiley
Named after Jan Willem Retgers (1856-1896), Dutch crystallographer.

Named for its composition and relation to retzian.
Named for its composition and relation to retzian.
Named for Revda, a town in the Murmansk District nearby the mineral type locality.
Named for Prof. Eduard Reyer (1849-1914), geologist, Vienna, Austria.

Named for Cecil John Rhodes (1853-1902), founder of Debeers mining co., South Africa.
Named from the Greek "rhodon", "rose".

From the Greek "rhodon", "rose" and "chros", "colour" in reference to the rose-red colour of the mineral.
From the Greek "rhodon", "rose", in reference to the mineral's usual colour.
Named from the Greek "rhodon" meaning "rose", inallusion to its colour; and for its affinity to stannite.
Named for its shape.
Named for the locality.
Named after Dr. Paul H. Ribbe, Virginia Polytechnic Institute, USA.
Named after the locality.

Named for the locality.
Named after Emile Richet (d1939), geologist Katanga, Democratic Republic of Congo.
Named for Prof. Theodore Richter (1824-1898).
Named after Thomas Arthur Rickard (1864-1953), mining engineer.
Named in honour of Emit Riebeck (d. 1885), German explorer and mineralogist.
Named after A. E Ringwood, Australian National University.
Named after Prof. Frtiz Rinne.
Named for B. Rivadavia.
Named for the locality.

Named after Willard L. Roberts.
Named after Dr. Stephen Clive Robinson (1911-), geological survey of Canada, who first synthesized the material.
Named form the locality.
Named after the locality.
Named after Colonel Washington Augustus Roebling (1837-1926), Trenton, New Jersey, USA, mineral collector.
Named for E. W. Roedder, USGS.
Named for Aldo G. Roggiani, who first discovered the mineral.
Named for John Rose-Hansen, University of Copenhagen, Denmark.

Alternate name psilomelane from the Greek words "psilos", "smooth" and "melas", "black".
Named for the Royal Ontario Museum of Archaeology.

Named after Franklin Delano Roosevelt (1882-1945), US President.
Named for Prof. Maurice Roques, University of Clairmont-Ferrand, France.
Named for the locality.
Named after Mr Walter Roscher, German mineral collector.
Named for Henry Enfield Roscoe (1833-1915), Manchester, England, who first prepared vanadium.

Named after Prof. Carl Harry F. Rosenbusch (1836-1914) German geologist.
Named after Leo Rosenhahn (1906-1991), discoverer of the mineral.
Named after Prof. Vojtech Rosicky, Masaryk University, Czechoslovakia.
Named after Dr. Samuel Ross (1880-?), USGS.

Named for M. Roubault.

Named for P. Routhier, University of Paris, France.
Named for Mr George Rowe, mine captain at Franklin Furnace.
Named after Henry Agustus Rowland (1848-1901), John Hopkins University, USA.

Named for the composition.

Named for Dr J. C. Rucklidge, University of Toronto, Canada.
Named for Joe Ana Ruiz, Mammoth Arizona who discovered the mineral.
Named after Sir Arthur Edward Russell (1878-?) famous British mineral collector and mineralogist.
Named after the locality.

Named for Rustum Roy (1924-) Pennsylvania State University, USA.
Named for the composition.
Named for the composition.
From the Latin "ruthenia", for ukranine, as the element was found in the Urals, FSU.
Named for the composition.
Named for Prof. Ernest rutherford, pioneer worker on radioactivity.
From the Latin "rutilus", "reddish".

Named for Germain Sabatier, director of research, C.N.R.S. Orleans, France.
Named for the locality.

Named for the locality.
Named for the locality.
From "safflower", in allusion to its use as a pigment.
Named for Prof. Thure Georg Sahama (1910-), Helsinki, Finland.
Named after Dr. Carl Sahlin, manger of iron works at Laxa, Sweden.
Named after P. Sainfeld.
Named for the locality.
Named for the Soviet mineralogist, M. S. Sakharova.
Named for Dr Kin-Ichi Sakurai, Japanese amateur mineralogist.

Named after Prof. Achille Sal,e.
Named for Mr Reno H. Sales, geologist, Anaconda mining company.

Named after Mr Mat Sample, of Chuquicamata, Chile.
Named for the locality.
Named for P. B. Samuelson.
Named for Prof. Edoardo Sanero, University of Genova, Italy.
From the Greek for "tablet", in allusion to the mineral's common habit.
Named for the province.
Named for the locality.
Named for the locality.
Named after the Santa Fe Railroad Co.
Named for the locality.
Named for Giorgio Santi.
From the latin for "soap", in allusion to its appearance.

Named for its typical sapphire-blue colour.
Named for the locality.
From the greek for "flesh", alluding to the colour.

Named after Domingo Faustino Sarmiento (1811-1888), former President of Argentina.
Named for Prof. Sartorius Von Waltershausen (1809-1876), University of Goettingen, Germany, who first recognised the mine
Named after the locality.
Named for the South African Speleological Association.

Named for the locality.

Named for the locality.

Named after Nikolai Petrovich Sazhin (1898-1969), founder of soviet rare earth industry.
Named for Umberto Sborgi (1883-1955), University of Milano, Italy.

Named for the locality.
Named for the locality.
Named for Prof. Doris Schachner, ore mineralogist, Westphalian Technical School, Germany.
Named after Prof. Ferencz Schafrzik, Budapest, Hungary.
Dr John Frank Schairer, Geophysical Laboratory, Washington, USA.
Dr. Waldermar Theodore, USGS.

Named in honour of Karl Wilhelm Scheele (1742-1786), Swedish chemist, who determined the presence of tungstic oxide in s
Named after Prof. Arnulf Schertel (1841-1902).
Named after Prof. Jakob G. C. Schetelig (1875-1935), Oslo, Norway.

Named for J. H. L. Schirmer, US Mint, Denver, USA.
Named for E. Schmitter Villada.
Named for H. Schneiderh”hn.
Named after William P. Schoder.
Named after A. M. Schoenflies.
Named after prof. Alfred Schoep, of Gehnet, Austria.
Named after Prof. Robert Sch”llhorn Munster University, Germany.
Named after Dr. Adolf Scholz.
Named for R. Schooner.
From the old german "schorl", perhaps meaning impurities.
Named for its resemblance to schorl.

Named for W. Schreyer.

Named H. J. Schubnel.
Named after Curt Nicholas Schuette.

Named after H. J. Schuiling, geologist, Haut-Katanga.

Named after Baron August Benjamin de Dchulten (1856-1912) who prepared artifical crystals of the mineral.

Named from the greek for "worm", alluding to its curling action when heated.

Named after Dr. Evaristo Scorza, Mineral Survey of Brazil.
Named for Scotland.
Named for Prof. Arthur E. Seaman, Michagan College of Mining and Technology, Michigan.
Named after Mr. John Searles, who put down a deep well from which the type material was collected.
Named for J. J. Sederholm, Director of the Geological Survey of Finland.

Named for E. Seelinger.

Named for Curt G. Segel.
Named for E. R. Segnit, Australian mineralogist.
Named for the locality.
Named for the locality.
Prof. Josef Sekanima (1901-), Czech mineralogist.
From the greek "selene", "the moon", in allusion to its similarity to tellurium, named for the earth.
Named for its composition and similarity to stephanite.
Named for Gustav Seligmann (1849-1920), a mineral collector from koblenz, Germany.

Named after E. I. Semenov, Russian mineralogist.
Named for Andor Von Semsey (1833-1923), Hungarian collector and nobleman.

Named for the locality.
Named after Edgard Sengier, Director of the Union Mine du Haut-Katanga.
From the greek for "cuttle-fish", the bone of which resembles the mineral in being light and porous.
Named J. M. Serand who aided collection of type material.
From the old arabic name "Serendib", for Sri Lanka.

Name "serpentine" alludes to the surface pattern of serpentinite rock, which recalls the skin of a serpent.

Named after Tatanya Shadlun, Soviet mineralogist.
Prof. Ilarion Ilarionovich Shafranovskii, Mining Institute, St. Petersburg, FSU.

Named after Prof. Samuel James Shand (1882-1957), Columbia University, USA.
Named after Major R. R. Sharp who discovered the uranium deposits at Shinkolobwe.
Named after the Shattuck Mine in Arizona.
Named after Demitrii Ivanovich Shcherbakov (1883-1966), Russian mineralogist.
Named for V.V. Shcherbina.
Named after Dr Alexander Sherwood, USGS.
Named for the locality.
Named after Prof. Maxwell Naylor Short (1889-?), University of Arizona.
Named after V. P. Shuisk, Ural Scientific Centre, USSR.
Named after the Sickler family, Pala, California.

From the greek "sideros", "iron" in reference to its composition.
Named for its composition.
From the greek for "iron" and "leaf" for its composition and habit.

Named for the locality.
Named for R. Sielecki, who discovered the mineral.
Named for the locality.
Named for the composition.
Named for Dr Lars Gunnar Sill,n, Stockholm, who prepared the material artificially.
Named in honour of Benjamin Silliman (1779-1864), first Professor of Mineralogy at Yale University.
Anglo-saxon related to "silber" and dutch "zilver".

Named after Prof. Vittorio Simonelli who collected the material.

Named after J. R. Simplot, former owner of the peanut mine.
Named after Dr. Edward Simpson (1875-1939), mineralogist, Western Australia.
Named for the locality.
Named for the Sanskrit name for Sri Lanka.
Named for John Sinkankas.
Named for Rudolph Von Sinner (1890-1960), Bern Museum, Switzerland.
Named from the composition.
Named for Sten Anders Hjalmar Sj”gren (1822-1893), Stockholm, Sweden.
Named for Prof. Brian J. Skinner, Yale Univeristy, USA.

Named for its original locality in Skutterud, Norway.
Named for Prof. Frantisck Slavik (1876-?), Prague, Czechoslovakia.

Named for Prof. Chester Baker Slawson (1898-1964), University of Michigan, USA.

Named for George Frederick Herbert Smith (1872-1953), British Museum of Natural History, England.
Named in honour of James Smithson (1765-1829), founder of the Smithsonian Institution.
Named after Prof. N. A. Smolyaninov.
Named after Prof. Charles Henry Smyth (1866-1937), Princeton University, USA.
Named for Vladimir S. Sobolev (1908-1982), former President of the International Mineralogical Association.
Named for Petr Grigorevich Sobolevski (1781-1841), Russian metallurgist.
Named for the locality.
Named in allusion to its sodium content.
Named for Frederick Soddy (1877-1956) British radiochemist.
Named for the composition.
Named for its composition and relation to autunite.
Named for its composition and relation to betpakdalite.
Named for its composition and relation to boltwoodite.
Named for its composition and relation to dachiardite.
Named for its composition and relation to pharmacosiderite.
Named for its composition and relation to uranospinite.

Named for its composition and relation to zippeite.
Named for Sogdiana, an ancient Central Asian state.
Named for G. S”hnge.
Named for the locality.
Named for the locality.
Named for the locality.
Named for the locality.
Named for Henry Clifton Sorby (1826-1908), founder of metallography.
Named for Prof. Henning Sorensen, University of Copenhagen, Denmark.

Named for Frantisek Soucek, Charles University, Czechoslovakia.
Named for Dr. Antonio Jose Alves de Souza, former director of Mineral Survey, Brazil.

Named after Leonard James Spencer, Mineral Dept. British Museum, England.

Named for Francis L. Sperry (?-1906), chemist of Sudbury Canada, who first found the mineral.

Named after an occurrence in the Spessart District, Bavaria, Germany.
Named for the composition.
From the greek "sphaleros", "treacherous".

Origin uncertain; probably from the Latin "spina", "thorn", in reference to its sharply pointed crystals.
Named for the locality.
Named for Prof. K. Spiroff.
From the Greek for "ash-coloured", in allusion to its colour.
Named for Joseph Edward Spurr (1870-1950), US geologist.

Named for the locality.
Named for Mr Stanley Field.

From the Latin "stannum" for tin.
For its physical and chemical similarity to stannite.
Named for its composition and relation to microlite.
Named for Dr. W. H. C. Staring.
Named for the locality.
From the green "stauros", "cross", in reference to the commonly crosslike twinned form.
Named for Harold R. Steacy, Geological Survey of Canada.

Named for Knud Johannes Vogelius Steenstrup (1842-1913), Danish geologist.
Named for Georg Wilhelm Steller (1709-1746), explorer.
Named for Brian Mason, from the Swedish "Stenhuggar" for stonemason.
Named for N. Steensen.

Named in honour of Archduke Stephan (d. 1867), an early mining director of Austria.

Named for the locality.
Named after Count Casper Maria Sternberg (1761-1838), National Museum of Prague, Czech Republic.
Named for Mr T. Sterry Hunt (1826-1892) first mineralogist with the Geological Survey of Canada.

Named for E. A. Stevens, founder of the Stevens Institute of Technology, Hoboken, New Jersey, USA.
Named after Mr James Stewart, manager of diamond processing plant, Kimberley, South Africa.
Named for the composition.
Named for the composition.
Named for the composition and relation to betafite.
Named for the composition and relation to columbite.
Named for the composition.
Named for the composition and relation to tantalite.
Named for the composition.
From the greek "stibi", used for antimony.
Named after Mr. Robert Stich, mining engineer, Dundas, Tasmania.
From the Greek "stilbein", "to glitter", in allusion to the mineral's luster.
Syenites, Alkali intrusions
Named for the locality.
Named after Dr. Frank L. Stillwell, CSIRO, Melbourne, Australia.

From the greek for "shining" and "black" in allusion to its colour and luster.
Named after Sergei Mikhailovich Stishov, who first synthesized the material.
Named from the composition, stibium, antimony and stannum.

After Sir George Gabriel Stokes (1819-1903), Cambridge University, England.

Named after Mr Charles E. Stott.

Named after Prof. I. N. Stranski, Berlin, Germany.
Named for Strashimir Dimitrov of Bulgaria.
Named for W. Str„tling who described the artificial compound in 1938.
Named for M. F. Strelkin.

Named after Prof. Bronson Ferrin Stringham (1907-1968), University of Utah, USA.
Named for Friedrich Stromeyer (1776-1835), Gottingen, Germany, who first analyzed the mineral.
Named form the composition.
Named after the locality of Strontian, Argyll, Scotland.
Named for the composition and relation to orthojoaquinite.
Named for the composition and relation to borite.
Named for the composition and relation to chevkinite.
Named for the composition and relation to dresserite.
Named for the composition and relation to ginorite.
Named for the composition and relation to joaquinite.

Named for the composition and relation to apatite group minerals.
Named after Prof. Hugo Strunz, Berlin Germany.
Named after Prof. Giovanni Strnver, Rome, Italy.

Named after F. E. Studt, geologist, Tanganyika.
Named after Prof. E. F. Stumpf, University of Hamburg, Germany.

Named after Andreas Stntz (1747-1806), mineralogist, Vienna, Austria.
Named for the locality.
Named for the locality.
Named for Prof. Toshio Sudo, (1911-), University of Tokyo, Japan.

Named for Prof. Ken-Ichi Sugi (1901-1948), Japanese petrologist who discovered the mineral.
Named for the composition.
Named for the composition.
Named for the composition and its relation to tsumoite.
From the Latin, "sulfur".
Named for the composition.

Named for the locality.
Named for the locality.
Named for the locality.
From the Roman name for Oberhalbstein, "Sursass", Switzerland.
Named for the locality.
Named for the locality.

Named after Dr. Jun Suzuki (1896-1970), Hokkaido University, Japan.

Named after Sweden, "Sverige" in Swedish.
Named for Svetlozar I. Bontev.

Named after the locality.
Named after Prof. Charles Kephart Swartz, (1861-?), John Hopkins University, USA.
Named after the Swedish philospher, Emmanuel Swedenborg (1688-1772).

Named for Dr. Ada Swineford (1917-1993), Western Washington State College, USA.
Named for G. Switzer.
Named from Transylvania.

Named from the Greek "confounding" in allusion to its complex twinning.
Named for its composition and relation to synchysite.
Named for its composition and relation to synchysite.

Named after the locality.
Named for Count Edward Charles Richard Taaffe (1898-), Dublin, who first detected the mineral.
From the Gaelic "tacharan" meaning changeling, as the mineral converts to others on exposure to air.

Named for the locality.
Named form the Greek for "ribbon" in reference to the mineral's tabular crystals.
From the Greek for "band" or "strip", in allusion to its platy structure.
Named for the locality.
Named for the locality.

Named for the locality.
From the Arabic "talq", "mica".
Named for the locality.
Named for the locality.

Named for the locality.
Named for the locality.
Named for the composition and for its relation to aeschynite.

Named for the composition and for its relation to euxenite.
Named for the composition.

Named for Torquato Taramelli (1845-1922), Italian geologist.
Named after the locality.

Named after the locality.
Named after the locality.
Named after Mr Percy Coventry Tarbutt, director of mining company at Broken Hill, Zambia.

Named for Prof. Elysiaro Tavor, University of Brazil.
Named after the locality.
Named after Dr. J.J. Harris Teall, Director of the Geological Survey of Britain.
Named after Dr. John E. Teeple, who discribed the artificial compound.
Named after the locality.
Named from the composition.
Named from the composition.
Named from the composition.
Named from the Latin "tellus" meaning "from the earth".
Named from the composition.
Named from the composition and relation to haucheconite.
Named from the composition.
Named for the locality.

Named in honour of Smithson Tennant (1761-1815), an English chemist.

From the Greek "tephros", "ash-coloured".
Named for the locality.
Named for the Tersk Shore, SE Kola Peninsula.
Named for Prof. Mario Teruggi.

Named for the composition.

Named for the composition and symmetry.
From the Greek for "fourfold", an allusion to the twin crystals.
Named for its predominant crystal form, the tetrahedron.
Named for the crystal system and relation to kalsilite.
Named for its tetragonal symmetry and relation to natrolite.
Named for its tetragonal symmetry and relation to taenite.
Named for its tetragonal symmetry and relation to wickmanite.

Named for its composition.
Named for prof. Tobias Robert Thalen (1827-1905), Swedish physicist.
Named for its composition.
From the Greek "to be surprised" because of its unusual composition.

Named in honour of Louis Thenard (1777-1857), French chemist.
Named after early Greek mineralogist Theophrastus.

Named after Dr. Thomas Thomson (1773-1852), Scottish chemist who first anlyzed the mineral.
Named for its composition and relation to bastn„site.

Named for Prof. Jacques Thoreau, Louvain, Belgium.
Named for its composition.

Named for its composition.
Named for its composition and gum-like appearance.
Named for its composition and relation to steenstrupine.
Named for Olaus Thortveit, Norwegian mineralogist and discoverer of the mineral.

Named after Dr. Ian Threadgold, mineralogist CSIRO, Australia.
Named for Johann Carl Wilhelm Tiemann (1848-1899), chemist, Berlin Germany who discovered the mineral.
Named after the locality.
Named for I. P. Tikhonenkov.

Named for Ceceil Edgar Tilley (1894-1973), Cambridge University, USA.
An Old English word, related to the dutch "tin" and the german "zinn".
Named for the composition.

Named after the locality.
Named after the locality.
Named after the locality.
Named for Paolo Tiragallo (1905-?), amateur mineralogist, Ligura, Italy.
Named after the locality.
Named from the composition.
Named for its titanium content. The alternate name, "sphene", comes from the Greek "sphen", "wedge", an allusion to the cha
Named for its titanium content and its relation to taramellite.
Named from the composition.
Named for Tlaloc, the God of Rain in Aztec and Toltec mythology.
Named from the Nahua word "tlapalli" meaning paint.
Named for the locality.
Named for the locality.
Named for Prof. Mitrofan Stephanovich Tochilin, Voronezh University, USSR.
Named for the locality.
Named for the locality.
Tolbachifter Wilbur Swett Burbank (1898-) USGS.
Named for the locality.
Named for Prof. Thomas Fredrik Weiby Barth (1899-1971), University of Oslo, Norway.

Named for the locality.
From the Greek "topazion" meaning "to seek", in allusion to the island of Zabargad, the location of which was long hidden and
Named in honour of Torbern Bergmann (1735-1784), a Sewdish chemist.
Named after Alfred Elis T”rnebohm (1838-1911) former director of the Geological Survey of Sweden.
Named after Mr. John Torrey (1796-1873), American botanist and mineralogist.
Named after Prof. Toshio Sudo (1911-), University of Tokyo, Japan.
From the Singhalese "touramalli", "mixed coloured stones", in reference to vari-coloured water-rolled gem pebbles from place
Named after the Sea of Tranquillity on the Moon, Apollo landing sites.
Named after Dr. John Boardman Trask (1824-1879), first California State Geologist.
Named for Charles O. Trenchman (1851-1917), Britsih crystallographer.
From the occurrence in Val Tremolo in the Swiss Alps.

Named after Major Tudor G. Trevor inspector of mines in the Pretoria Region, South Africa.
Named for the shape of the crystals.
From the Greek meaning "three-twin", in allusion to the common occurrence of trillings.
Named from the Greek for "triangle" because of the triangular habit of the crystals.
Named for its relation to kalsilite and the lenght of the [100] axis being three times that of kalsilite.
Named from the Greek for "three parts", in allusion to the trilling twinning.
From the Greek "phylon", "tribe", and can be interpreted as "threefold family", a reference to the three related cations in the m

Named for the locality.

From the Greek for "three-fold" and "to cut" describing the triangular, pseudotetragonal cavities left by the mineral in the gang
Named for its composition and relation to tritomite.

Named for the locality.
Named after Dominico Troili, who described in 1766, a meteorite which fell in Albareto, Italy, which contained the mineral.

Named after Prof. Samuel John Truscott (1870-?), English geologist and manager of the Leong Donok Mine Sumatra where t
Named after O. Tr□sted, whose prospecting methods lead to the discovery of the Outokumpu Ore Deposit.
Named after Gustav Tschermak Von Seysenegg (1836-1927), Austrian mineralogist.

Named for the Tsumeb Corporation.
Named for the locality.
Named for the locality.
Named for Dr. Karel Tucek, National Museum, Prague, Czech Republic.

Named for the locality.
Named for the locality.
Named for the locality.

Named for the locality.
Named for Prof. G. Tunell.

Named for the composition.
Named for the composition.
Named for the locality.
Named for the locality.

From the French word "turquoise", "turkish", originally referred to material from Persia (now Iran), which passed through Turke
Named for the locality.
Named for the locality.
Named for A. A. Tvalchrelidze founder of the Georgian Mineralogical-Petrological School, FSU.
Named for J. Tveit.
Named for Robert Mitchell Thompson (1918-1967), University of British Columbia, Canada; Thompson is "son of thomas"; the
From the Greek for "luck" due to the luck occurence in finding this rare mineral.

Named for the locality.
Named for the locality.

Named after Joseph Burr Tyrrell (1858-1957), first geologist to vist the region where the mineral was discovered.
Named for the locality.
Named for the locality.
Named after A. S. Uklonskii.
Named in honour of Georg Ludwig Ulex (1811-1883), a German chemist.
Named after Johan Christoph Ullman (1771-1821), German mineralogist who first discovered the mineral.
Named after George Ulrich, mineralogist, Victoria, Australia.
Named for the locality.
Named for the locality.
Named for the locality.
Named for the locality.
Named from the composition.
Named from Dr Henri I. Ungemach (1879-1936), Strassbour, Germany.

Named from the locality and the composition.
Named for the locality.
Named for the composition.
Named for the composition.
Named for the composition.
Named after the composition and its relation to microlite.

Named for the composition and from the Greek "to appear".
Named for its dimorphous relation to uranophane.

Named from the composition.
Named from its composition and from the Greek for "broad blade" in allusion to its crystal habit.
Named for its composition and crystal habit.

Named from its composition.
Named for its composition and relation to pyrochlore.

Named for Prof. Nikolai Nikolaevich Urantsev (1893-), who discovered the Noril'sk deposits.
Named for the synthetic compound.
Named for the composition.

Named for M. A. Usov.
Named after Niels Vigo Ussing (1864-1911),Copenhagen, Denmark.
Named for the composition.
Named in honour of Count S S Uvarov (1785-1855), Russian statesman and mineral collector.
Named after the locality.
Named for Prof. Willem Uytenbogaardt, Delft, Netherlands.
Named for the locality.
Named after Johannes Vaes, mineralogist with Union Miniere du Haut-Katanga.

Named for Goran Wallerius (Vallerius) (1683-1742), Swedish mining geologist.
Named for the composition.
Named for the composition.
Named after P. Van Den Brande, of the Geological Survey of Katanga.
Named after Adrien Vandendriessche (1914-1940), Ghent, Austria.

Named after Prof. J. H. Van't Hoff, who artificially prepared the mineral.
Named for the composition.
Named for the composition.
Name is from Variscia, an ancient district in Germany where the mineral was first found.
Named after Nicholas Varlamoff, mining engineer Zaire, who first discovered the mineral.
Named for the locality.
Named for the locality.
Named after Prof. Heinrich Vater, Geramny.

Named after Mr George Vaux, Pennsylvania, USA.
Named after Dr. Heikki V„yrynen, Helsinki, Finland.
Named after Dr John Veatch who first detected borates in California.
Named for its realation to veatchite.
Named after R. W. Van Der Veen, metallographer.

Named after Prof. Vladimir Ivanovich Vernadsky, St. Petersberg, Russia.
Named after William E. Ver Planck (1916-1963), geologists, Division of Mines, California.
Named after the locality.
Named for Vertumnus, the God worshipped by the ancient Etruscan people who inhabited the region where the mineral was f
Named after John Paul Louis V,signi, (1870-1954), mineral collector from Paris, France, who supplied the original material.
From the locality at Mt. Vesuvius, Italy. The alternate name idocrase comes from the Greek "eidos", "form", and "krasis", "mix

Named for the locality.
Named after the locality.
Named after the Vikings.
Named after the locality.
Named after Mr ? Villiaum, who collected the orginal material.

Named after Prof. Henri Vincienne (1898-1965), who first noted the mineral.
Named after the Russian geochemist Alexander Pavlovich Vinogradov.
Named in allusion to the mineral's colour in polished section.
Named after Prof. Virgil Everett Barnes (1903-), University of Texas, USA.
Named after the locality.

Named in honour of J. G. Vivian, 19th-century English mineralogist.

Named after of Kuzma Aleksevich Vlasov (1905-1964).

Named for I.S. Volynskii (1900-1962), former director of mineragraphic laboratory Institute of Mineralogy and Geochemistry, M
Named after Mr. M. Vonsen of Petaluma, California who collected the mineral.
Named for the locality.
Named after Karl Vrba (1845-1922), Czech mineralogist.

Named after Prof. Mark Bernard Vuagnat (1922-), University of Geneva, Switzerland.
Named for the locality.
Named for the locality.

Named after N. K. Vysotskii, who first found platinum at Noril'sk, FSU.
Named after the locality.
Named after Dr. Arthur Wade, Australian geologist who first collected the material.
Named after Dr. A. D. Wadsley.

Named after the locality.
Named after the locality.
Named after Yaichiro Wakabayashi (1874-1943), mineralogist for Mitsubishi Mining Co., Japan.
Named for the composition and relation to wakefieldite.

Named after the locality.
Named after Kurt Walenta, German mineralogist.
Named for Wallis, German name for the Canton Valais.

Named for Robert E. Walstrom, minral collector of Fresno, USA who first recognised the mineral.

Named for Ward C. Smith.

Named after the locality.
Named in honour of William Wavell (d. 1829), an English physician who discovered the mineral.
Named after E. J. Wayland, former director of the Uganda Geological Survey.
Named after Theobald Weber who founded the Cryolite Works in Greenland in 1857.
Named after the locality.
Named after Dr. Mary Alice Dowse Weeks (1909-1988), mineralogist USGS.
Named after Mr R. Wegscheider, who synthesized the compound in 1913.
Named after Mr. Mats Weibull (1856-1923), who first described the mineral.
Named after the locality.
Named for R. Weil.
Named after Dr. Byron G. Weissberg, D.S.I.R. , New Zealand.
Named after Louis Weiss, owner of the Good Hope Mine.
Named for Dr. Eric Welin, Swedish Museum of Natural History, Stockholm.
Named after Prof. Horace Lemuel Wells (1855-1925), Yale Univeristy, USA.
Named for Sir William E. Logan.
Named after Mr. Wilfred R. Welsh, amateur mineralogist, New Jersey, USA.
Named after Dr. Wendel Wilson, editor of the mineralogical record.
Named for Prof. Eduard Wenk (1907-) University of Basel, Switzerland.
Named for the province V„rmland.
Named after Dr. Jan Westerveld (1905-1962), University of Amsterdam, the Netherlands.
Named after the locality.
Named after Prof. Edgar Theodore Wherry (1885-) University of Pennsylvania, USA.

Named for J. S. White, Smithsonian Institute, Washington DC, USA.

Named after Mr. Herbert Percy Whitlock (1868-?), American Museum of Natural History, New York.
Named after R. W. Whitmore.
Named after the locality.
Named for F. E. Wickman.

Named after J. F. Widenmann (1764-1798) who first discovered uraninite in Schwarzwald.
Named after the locality.
Named for R. H. Wightman.

Named for W. W. Wilkman.
Named in honour of Willem I (1772-1843), King of the Netherlands.
Named for Prof. Johannes Willemse.
Named after Wil Henderson, micromount collector and mineralogist.
Named after the Willyama District where Broken Hill is situated.
Named after Howard F. Winch who discovered the mineral.

Named in honour of W. Withering (1741-1799), an English mineralogist.
Named after the locality.
Named for T. Witt, Swedish mining engineer.
Named after the locality.
Named for Prof. Freidrich W”hler (1800-1882) German chemist.
Named for Prof. Caleb Wroe Wolfe, Boston University, USA who first noticed the mineral.
From Tungsten (wolfram in German) volf, "wolf", and rahm, "cream".
Named for its relation to ixiolite and wolframite.

Named in honour of W. H. Wollaston (1766-1828), British chemist and mineralogist.
Named for the locality.
Named for David R. Wones (1932-1984), Virginia Polytechnic, USA.
Named after Mr. C. D. Woodhouse, Santa Barbara, USA.
Named after Samuel Woodruff, miner at Sterling Hill and keen collector of minerals.
Named for C. Wroe Wolf.
Named in honour of Franz Xaver Von Wulfen (1728-1805), Austrian mineralogist.
Named for Charles Adolphe Wurtz (1817-1884), French chemist.
Named after Geheimrat F. W□st, Dussledorf, Germany.
Named after Prof. Wyart.

From the Greek for "yellow" and "powder" in allusion to its colour.
From the Greek for "yellow" and "a stranger" in allusion to its colour and relation to cacoxenite.

Named for the locality.

Named for the locality.
Named for the locality.

Named for the locality.

Named after Prof. Kenzo Yaggi, Hokkaido University, Japan.

Named for the locality.
Named for the locality.

Named for Pope Yeatman (1861-1953), mining engineer, Franklin, New Jersey, USA.
Named after the locality.
Named for N. Yedlin.

Named from the composition.
Named after the locality.

Named after Hatten Schuyler Yoder Jr. (1921-), geophysical laboratory, Washington D.C.
Named for Yves Oscar Fortier (1914-?) former director of the geological survey of Canada.
Named after Prof. Toyofumi Yoshimura, Kyushu University.
Named for the composition and relation to betafite.
Named for its composition and similarity to polycrasite.

Named for its composition and similarity to pyrochlore.
Named for its composition and similarity to tantalite.

Named for its compostion and similarity to tungstite.
Named for the locality.
Named for the locality.
Named for the locality.

Named for M. A. Zaher.
Named for the country, Zaire.
Named for E. E. Zakharov (1902-1980) Director of the Geological Exploration Insititute, Moscow.
Named for E. Zapata.

Named for A. N. Zavaritsky.
Named for Jack Zektzer (1936-), Seattle Washington, who first recognised the mineral.

Named after Mr. J. Zeaman.
From the Greek "to boil" and "a leaf" in allusion to its habit.

Named for Yu. A. Zhemchuzhnikovi
(1885-1957).

Named from the composition.
From the German "zink".

Named from the composition and relation to melanterite.
Named derived from the mineral's composition.
Named from the composition and relation to botryogen..
Named from the composition and relation to melanterite.
Named from the composition.

Named for J. K. L. Zinken (1798-1862), German mineralogist.
Named for the locality.

Named from the Persian zargun, "gold-coloured".
Named from the composition and from the Greek for "leaf" in reference to its foliated habit.
Named for the composition.
Named for Dr. Zirkel Director of the Potash Works Northern Germany.
Named for the composition.
Named in honour of Baron S. Zois Van Edelstein (1747-1819), Austrian mineral collector who provided the original specimens
In reference to the Russian for "the rosy radiance of the sky at dawn" for the colour.
Named after Vladimir Zoubek former Director of the geological survey of Czechoslocakia.
Named for the locality.
Named for Jack Zussman (1924-) mineralogist, Manchester University, England.
Prof. Orest Evegenevich, Zvyagintsev, geochemist.

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TYPELOCN,C,254
Green River Formation, Uintah Co., Utah, USA
Fuemrole Mine #2, Temple Mt., Emery Co., Utah, USA
Sharm Abhur, Red Sea, Jiddah (N of), Saudi Arabia

L'vov-Volynskiy Basin, Ukraine, FSU
Cacheuta, Argentina

Cha¤arcillo, Chile
L†ngban mine, Filipstad (near), V„rmland, Sweden
Schildmaur, Admont (near), Styria, Austria

Skaadoe, Brevig, Norway
Kangerdluarsuk, Il¡maussaq intrusive, Greenland (S)
Johanngeorgenstadt, Sachsen, Germany
Miass, Zlatoust region, Ilmen Mts., Urals, FSU
Bayan Obo, Inner Mongolia, China
Urstad, Hitter” (island), Flekkefjord (near), Norway
Lapis-lazuli mine, Sar-e-Sang, Badakshan, Afghanistan

Dutoitspan Mine, Kimberley, South Africa
L vrion, (Laurium), Attik¡, Greece
Bou Skour mine, Jebel Sarhro, Morocco

Kipawa River, Villedieu Twp. T,miscamingue Co., Qu,bec, Canada
Margnac Mine, Compreignac, Haute-Vienne, France
San Carlos mine, Guanajuato, Mexico
Colquechaca, Potos¡, Bolivia
Beresovsk dist., Ekaterinburg (Sverdlovsk) (near), Ural Mts., FSU
New Cornelia mine, Ajo, Pima Co., Arizona, USA
Akagan, Mine, Iwate, Japan
Akatore Creek, Eastern Otago, Dunedin, South Island, New Zealand
Solvech fluorite deposit, Karaganda, Kazakhstan, FSU

L†ngban mine, Filipstad (near), V„rmland, Sweden
Ak-Sai, Kazakhstan, FSU
Aktash mercury deposit, Gorno Altai, Russia, FSU
Sacarimb (Nagy g), Transylvania, Romania
Alamos, Sonora, Mexico

Moculta quarry, Angaston (near), South Australia, Australia
Unspecified locality, FSU
Alekseev Mine, Sutamskii region, Stanovoi Range, Russia, FSU
Big Creek, Fresno Co., California, USA
Algodones, Coquimbo, Chile
Moss Mine, Nordmark, Sweden
Iglorsoit, Greenland
Cadesky vein, Hi-Ho Mine, Cobalt, Ontario, Canada
Bold Hill, Alleghany Co., North Carolina, USA

Elizabeth mine, Oravita (Oravicza), Banat, Romania
Gr„fenthal, Saalfeld (near), Th□ringen, Germany
La Vilate quarry, Chanteloube, Haute-Vienne, France
Alabanda, Caria, Aydin, Turkey
Brownley Hill mine, Alston (near), Cumberland, England
Savodinsky mine, Zyrianovski, Altai Mts., Mongolia
Modum, Buskerud, Norway
Temple Rock, Utah, USA and Island Mt., Trinity Co., California, USA
Tsepochechniy intrusive, Siberia, FSU
Khakassy dist., Siberia, FSU
Guanaco (NE), Chile
Kola Peninsula, Russia, FSU
Tolfa, Roma (near), Italy

Kurumsak and Balasanskandyk, Kara Tau, Kazakhstan, FSU
Udachnaya Vostochnaya kimberlite pipe, Yakutia, Russia, FSU
Sierra Gorda, Caracoles, Chile (?)
Tierra Amarilla, Copiap¢ (near), Chile

Chursdorf and Arnsdorf, Penig, Sachsen, Germany
Tincalayu Borax Deposit, Salar Del Hombre Muerto, Salta, Argentina
Mount Sobotka, Silesia (lower), Poland

H”wenegg, Hegau, Germany
L†ngban mine, Filipstad (near), V„rmland, Sweden
Larderello, Val di Cecina, Pisa, Toscana, Italy
Kaibab Fault, Utah, USA
Tatarazawa, Fujioka, Gumma Pref., Japan
Cyclopean Islands, Catania (near), Sicily, Italy
Wilagedera prospect, North Western Province, Sri Lanka
Anapa, Taman Peninsula, FSU
St. Christope, Bourg d'Oisans, Isere, France
Narsarsuaq, Julianehaab district, Greenland

Andalusia, Spain
Hillside Mine, Bagdad, Yavapai Co., Arizona, USA
Marmato, Cauca, Colombia (Andes Mts.)
Baia Sprie, Maramures, Romania

Mt. Nyiragongo, Democratic Republic of Congo
West Phoenix Mine, Liskeard, Cornwall, England
Anduo Cr deposit, Tibet
Cerro Pululus, Jujuy, Argentina
Parys mine, Anglesey, Wales
Hall, Innsbruck (near), Tyrol, Austria
Ani mine, Akita, Japan
Styria, Austria
Annaberg, Sachsen, Germany

Cape Anne, Essex Co., Massachusetts, USA
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
Pantelleria Island, Italy
Don Juan Pond, Victoria Land, Antarctica
Mt. Misobo, Kalima dist., Maniema, Democratic Republic of Congo
Centennial Mine, Calumet, Houghton Co., Michigan, USA
Kongsberg, Norway
Valle di Antigorio, Domodossola, Piemonte, Italy
Sonora and Guanajuato, Mexico

Antler Mine, Mohave Co., Arizona, USA
Christmas mine, Christmas, Gila Co., Arizona, USA

Mt. Vesuvius, Napoli, Campania, Italy
Lourenco Marques (Delagoa) Bay, Maputo, Mozambique
Magnet Cove Barium Corp. mine, Walton (S), Hants Co., Nova Scotia, Canada
Buca della Vena mine, Stazzema, Alpe Apuane (Apennines Alps), Toscana, Italy

Molina and Valencia, Migranilla (near), Aragon, Spain
Animas Mine, Chocoya, Potos¡, Bolivia
Santa Ana Tin Mine, Trabuco Canyon, Orange Co., California, USA
Petrogale cave, Madura, Western Australia, Australia
Khibina massif, Vuonnemi river, Kola Peninsula, Russia, FSU
Madyarovo deposit, Bulgaria
Pestera Cioclovina, Transylvania, Romania
Ottr,, Ardennes, Belgium
Kangerdluarsuk, Il¡maussaq intrusive, Greenland (S)

Tintic Standard Mine, Dividend, Utah Co., Utah, USA
Oktyabr and Talnaka deposits, Noril'sk (near), Siberia (N), FSU
J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Argut Plain, Pyrenees, France
Himmelsf□rst Mine, Freiberg, Sachsen, Germany
Arhbar mine, Bou Azzer, Morocco
Tincalayu Borax Deposit, Salar Del Hombre Muerto, Salta, Argentina
Tranquillity Base, Moon
L†ngban mine, Filipstad (near), V„rmland, Sweden
Armen mine, Kongsberg, Buskerud, Norway
Khan-Bogdinskiy massif, Gobi, Mongolia
Serra Branca pegmatite, Picuhy, Paraiba, Brazil
Tsumeb, Namibia; also Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Tsumeb, Namibia

RomanŠche-Thorins, Mƒcon (near), Sa“ne et Loire, France
Mammoth Mine, Tintic dist., Utah, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Neubulach, Schwarzwald (N), Baden-W□rttemberg, Germany
Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Vermilion mine, Denison Twp., Sudbury, Ontario, Canada

Palmbaum mine, Marienberg, Sachsen, Germany

Itabira, Minas Gerais, Brazil

Unspecified locality, Mongolia
Neuer Morgenstern mine, Freiberg, Sachsen, Germany
Tsumeb, Namibia
Sophia mine, Menzenschwand, Wittichen, Schwarzwald, Germany
Unspecified locality, FSU
Hingston Down Consols, Calstock, Cornwall, England
Campo Franscia, Val Lanterna, Val Malenco, Val Tellina, Sondrio, Lombardia, Italy
Cherbadung, Binntal, Valais (Wallis), Switzerland

Ascham Alm, Untersulzbachtal Valley, Salzburg, Austria
Altai Mts., Mongolia
Narsarsuaq, Julianehaab district, Greenland
Walpurgis Vein, Weisser Hirsch mine, Neust„dtel, Schneeberg, Sachsen, Germany
Loven Island, Brevik (near), Langesundfjord, Norway
Atacama, Chile
Neuhilfe Mine, Schneeberg, Sachsen, Germany
Martin Lake mine, Beaverlodge Lake, Saskatchewan, Canada
Itabira, Minas Gerais, Brazil
Atok mine, Merensky Reef, Bushveld Igneous Complex, South Africa
Vestan† mine, N„stum (near), Kristianstad, Sweden
Quetena Mine, Calama, Antofagasta, Chile
Vestan† mine, N„stum, Kristianstad, Sweden

Loktevsk, Altai, Siberia, Russia, FSU
Oktyabr deposit, Talnakh, Noril'sk (near), Siberia (N), Russia, FSU
Aurora mine, Treasure Hill, Hamilton, Nevada, USA
Giant Yellowknife mine, Northwest Territories and Chesterville, Ontario, Canada
Gold Hill, Tooele Co., Utah, USA
L'Ouche d'Jau, Saint-Symphorien-de-Marmagne, Autun, Sa“ne-et-Loire, France
Dzhuzumli, Mt. Zirabulak, Bukhara, Tadzhikistan, FSU
Mt. Vesuvius, Napoli, Campania, Italy
Gorge river, New Zealand

Tazheranskiy massif, Baikal, Siberia, FSU

Siberia, Russia, FSU
Arendal, Norway
Kollonnagam, Rakwana, Sri Lanka
Bayan-Obo deposit, Baotou (Paotow), Inner Mongolia, China
Dupezeh Mt., Hero Town (near), Qala-Dizeh (Qala-Diza), Iraq (NE)
Serra Das Almas and Serra Da Mangaheira, Paramirim, Bahia, Brazil
Furnace Creek, Death Valley, Inyo Co., California, USA
San Vittore mine, Balangero serpentinite, Lanzo massif, Lanzo Valley, Piemonte, Italy
Hsianhualing area, Linwu, Hunan, China

Sedmochislenitsi mine, Vratsa district, Balkan Peninsula, Bulgaria
Pionersk deposit, Sayan (E) and Aginsk deposit, Kamchatka, FSU
Moctezuma mine, (La Bambolla), Moctezuma, Sonora, Mexico
Benallt mine, Rhiw, Lleyn Peninsula, Caernavonshire (Gwynedd), Wales
Quetena Mine, Calama, Antofagasta, Chile

Izalco Volcano, MR and L Fumaroles, El Salvador
Benallt mine, Rhiw, Lleyn Peninsula, Caernarvonshire (Gwynedd), Wales
Baotou (Paotow), Inner Mongolia, China
Barari colliery, Jharia coalfield, Bengal, India
Dara-Pioz massif, Tadzhikistan, FSU
Kaapsche Hoop, Barberton, Transvaal, South Africa
Sapucaia Pegmatite, Galileia, Minas Gerais, Brazil
Mt. Restinyon, Khibina massif (NE), Kola Peninsula, Russia, FSU
Mounana mine, Franceville, Haut-Ogoou,, Gabon
Rapid Creek, Big Fish River-- Blow River Area, Yukon Territory, Canada

Panda Hill, Mbeya (near), Tanzania

Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Cactus Rat mines, Thompson (near), Grand Co., Utah, USA
Cagliari, Capo Pula, Efisia Tower (S), Sardegna (Sardinia), Italy
Ollague Pallasite Meteorite, Tops, New South Wales, Australia
Rainbow Falls, Semphill Creek, Barrington Tops, New South Wales, Australia
Tsumeb, Namibia
Coyote Peak, Humboldt Co., California, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Harstigen mine, Pajsberg, V„rmland, Sweden
Blagill mine, Alston Moor, Cumberland, England
Lovozero massif, Kola Peninsula, Russia, FSU
Lodge pit, Irchester, Northamptonshire, England
Mt. Vesuvius, Napoli, Campania, Italy
Basset mines, Redruth, Cornwall, England
Bastn„s, Riddarhyttan, V„stmanland, Sweden
Kazakhstan, FSU
Inagli massif, Aldan Region, Yakutia, FSU
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Buckwheat Dump, Franklin, Sussex Co., New Jersey, USA

Baveno, Lago Maggiore, Piemonte, Italy
Idermeg-Bayan-Khan-Ula, Mongolia
Hartrurim formation, Dead Sea (W of), Israel
Penberthy Creft mine, St. Hilary, Cornwall, England
Hillside Mine, Bagdad, Yavapai Co., Arizona, USA
Gerstenegg (Kabelstollen Gerstenegg-Grimsel I), Grimsel, Bern, Switzerland
Rockall Island, Inverness-shire, Scotland
Baveno, Lago Maggiore, Piemonte, Italy
Kazakhstan, FSU

Horn Silver Mine, Frisco, Beaver Co., Utah, USA
Shinkolobwe (Kasolo), Shaba, Democratic Republic of Congo
Manjaka, Madagascar
Rode Ranch pegmatite, Llano Co., Texas, USA
Beidell, Saguache Co., Colorado, USA
Habr¡, Morava (Moravia) (W), Czech Republic
Chuquicamata, Antofagasta, Chile
Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia, FSU
Franklin Furnace, Sussex Co., New Jersey, USA
Uchucchacua, Oyon, Cajatambo Prov., Peru
Benito Gem mine, Diablo Range, San Benito Co., California, USA
Outlaw Mine, Nye Co., Nevada, USA
National Lead Company, Baroid Division pit, Hot Springs Co., Arkansas, USA
Hatrurim Formation, Dead Sea (W of), Israel
Hrbek mine, Svat Dobrotiv , Bohemia, Czech Republic
Lupikko shaft, Pitk„ranta mineral field, Karelia, FSU
Lasamba Hill, Kwale Dist., Voi, Kenya
Bergen, Vogtland, Sachsen, Germany
L†ngban mine, Filipstad (near), V„rmland, Sweden
Vestan† mine, N„sum, Kristianstad, Sweden
7-U-7 Ranch, Bagdad Copper Mine (near), Hillside, Yavapai Co., Arizona, USA
Proprietary mine, Broken Hill, New South Wales, Australia
Cerro de Potos¡, Bolivia
Missouri Mine, Hall's Valley, Park Co., Colorado, USA

Stanion Lane pit, Corby, Northamptonshire, England
Chazelle, Pontgibaud, Puy-de-D“me, France
Buranga pegmatite, Rwanda
Petit-Port and Barbin, Nantes, Loire-Atlantique, France

Kola Peninsula (?), Russia, FSU
McKean Mt., Stoneham (near), Oxford Co., Maine, USA
Skrikerum, Sweden
L†ngban mine, Filipstad (near), V„rmland, Sweden

Betafo, Madagascar
Mansfeld, Halle, Germany
Bet-Pak-Dal desert, Kazakhstan, FSU
Louise mine, Horhausen, Rheinland-Pfalz, Germany
Los Aleros, San Luis, Argentina
Stewart Mine, Pala, San Diego Co., California, USA and Schneeberg, Sachsen, Germany
Predil Mine, Tarvisia, Raibl, Trentino-Alto, Italy
Bicchu, Okayama, Japan; Carneal, Co. Antrim, Northern Ireland
Mammoth-St. Anthony Mine, Tiger, Pinal Co., Arizona, USA
Bieber, Hanau (near), Hessen, Germany
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo

Bikita, Fort Victoria, Zimbabwe
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo

North Lily Mine, East Tintic Dist., Utah, USA
Nerchinsk, Siberia, FSU
Mt. Vesuvius, Napoli, Campania, Italy
Gua¤ape Islands, Peru

Birness, Aberdeenshire, Scotland
Leopoldshall, Stassfurt, Magdeburg, Germany
Colavi, Potos¡, Bolivia
Jackal's Water, Steinkopf (NNE), Namaqualand, South Africa

Arme Hulfe mine, Ullersreuth, Vogtland, Sachsen, Germany
Schneeberg, Sachsen, Germany
Wampewo Hill, Busiro Co., Buganda, Uganda
Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Busiro Co., Gamba Hill, Uganda
Mt. Bity (Ibity), Maharitra, Madagascar
Maynard's claim, Thomas Range, Delta (near), Juab Co., Utah, USA
Palermo pegmatite, North Groton, New Hampshire, USA
Mohawk mine, Goldfield, Esmeralda Co., Nevada, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Ischl, Austria
Cross Lake, Manitoba, Canada
Mejillones, Chile
Baux, Arles, France
Unspecified locality, Kazakhstan (?), FSU
Ivigtut, Greenland (SW)
Kletno deposit, Sudetes Mts., Poland
Balasauskandyk, Kara Tau, Kazakhstan, FSU
Bol‚o, Santa Rosalia (near), Baja California, Mexico
Pontevedra, Spain
Pick's Delta mine, San Rafael Swell, Emery Co., Utah, USA
Scotia Talc Mine, Bon Accord, Barberton Dist., Transvaal, South Africa
Elba, Toscana, Italy
Rhodope Mts., Bulgaria
Kovdor massif and Khibina massif, Vuonnemi river, Kola Peninsula, Russia, FSU
Alma Mine, Leona Heights, Alameda Co., California, USA
L□neberg, Hannover, Germany
Ladakh, Kashmir; Rudok, Tibet
Snezhnoye deposit, Verkhoyansk Region (E), Sakha-Yakutia Republic, Siberia, Russia, FSU
Nenacovice, Bohemia, Czech Republic
Oktyabr and Talnakh (Tylnakh) deposits, Noril'sk (near), Siberia (N), FSU
Yubileinaya (Jubilejnaja) pegmatite, Mt. Karnasurt, Lovozero, Kola Peninsula, Russia, FSU
Trogtal quarry, Lautenthal (near), Harz, Niedersachsen, Germany

Hautovaar Cu-Ni deposit, Karelian, FSU
Franklin, Sussex Co., New Jersey, USA
Wheal Cock, Botallack, St. Just., Cornwall, England
Falun, Kopparberg, Sweden

MoliŠres, Gard, France
Wheal Boys, St. Endellion, Cornwall, England
Travale, Montieri, Grosseto, Toscana, Italy
Kropbach quarry, M□nstertal, Schwarzwald (S), Germany
Brabant pegmatite, Karibib Dist., Namibia
Merume River, Kamakusa (near), Mararuni dist., Guyana
Venus mine, Sierra de C¢rdoba, C¢rdoba, Argentina
John Hay Jr. Well #1, Green River formation, Green River (W), Sweetwater Co., Wyoming, USA
Potgietersrust dist., Transvaal, South Africa
Cane Creek potash mine, Moab, Grand Co., Utah, USA
Llandybie, Dyfed, Wales
Harstigen mine, Pajsberg, V„rmland, Sweden
Kelly Gulch, Custer Co., Idaho, USA
Foote Mineral Company spodumene mine, Kings Mt., Cleveland Co., North Carolina, USA
J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Oehrenstock, Ilmenau, Germany
Mina Ragra (Minasragra), Cerro de Pasco (near), Pasco dept., Peru
Conselheira Pina (near), Minas Gerais, Brazil
Scawt Hill, Co. Antrim, Northern Ireland
St. Andreasberg, Harz, Germany
Schellkopf, Brenk, Eifel, Rheinland-Pfalz, Germany
Strontian, Argyllshire, Scotland
Tucson Meteorite, Pima Co., Arizona, USA
Dayton meteorite, Montgomery Co., Ohio, USA
Prince Leopold Mine, Kipushi, Shaba, Democratic Republic of Congo

Marmara bauxite mine, Megare, Greece
From the Greek "to be surprised" because of its unusual composition.
Abukuma range, Fukushima, Japan
Bank mines, Sverdlovsk (Ekaterinburg), Ural Mts., FSU
Bassick mine, Wet Mountains, Custer Co., Colorado, USA
Plateros, Mexico
L†ngban mine, Filipstad (near), V„rmland, Sweden
Prenteg, Tremadog, Caernarvonshire (Gwynedd), Wales
Ettringer Bellerberg, Mayen, Laacher See Area, Eifel, Rheinland-Pfalz, Germany
Hoboken, Hudson Co., New Jersey, USA
Pampa del Pique, Oficina Lautaro, Antofagasta, Chile
Val Malenco, Valtellina, Sondrio, Lombardia, Italy
Tsumeb, Namibia
Aves Island, Caribbean Sea
Agpalilik fragment, Cape York Meteorite, Greenland
Sulphur Bank quicksilver mine, Lake Co., California, USA
Mexquitic, San Luis Potos¡, Mexico

Bukov deposit, Morava (Moravia), Czech Republic
Kank, Kutn Hora (near), Stredoceský kraj, Bohemia, Czech Republic
Neubulach, Schwarzwald (N), Baden-W□rttemberg, Germany
Bultfontein Mine, Kimberley, South Africa
Johanngeorgenstadt, Sachsen, Germany

Buranga pegmatite, Rwanda
Volcano, Kamchatka, Russia.
Moctezuma Mine, Moctezuma, Sonora, Mexico
Searles Lake, San Bernardino Co., California, USA
Ulu-Dag, Bursa, Turkey
El Hamman, Morocco
Franklin Furnace, Sussex Co., New Jersey, USA
United Verde Mine, Jerome, Yavapai Co., Arizona, USA

La Fortuna Mine, El Antimonio, Sonora, Mexico
Ottawa (Bytown), Ontario, Canada
Oktyabr deposit, Talnakh (Tyllakh), Noril'sk (near), Siberia (N), FSU
Hrbek mine, Sv. Dobrotiv , Bohemia, Czech Republic
Ust'Khannin intrusive, Vilini River basin, Siberia (E), Russia, FSU
Unspecified locality, FSU
Cerro Pintados, Iquique, Tarapac , Chile
Monte Leone, Cherbadung, Binntal, Valais (Wallis), Switzerland
Afrikanda, Kola Peninsula, Russia, FSU
Franklin Furnace, Sussex Co., New Jersey, USA
Stanislaus Mine, Calaveras Co., California, USA
Ural Mts., FSU
Dashkesan, Middle Caucasus, Azerbaijan, FSU
Battenberg, Bayern, Germany
Unspecified locality, Kola Peninsula, Russia, FSU
Friedrichroda, Th□ringen, Germany

Burpala massif, Zabaikal`ye (N), FSU

Eniseisk Mts., Yenisei region, Siberia, FSU
Museums, Ca-rich objects in oak boxes
Unspecified locality, FSU
Otjosondu, Namibia
Wanlockhead, Leadhills, Lanarkshire, Scotland
Rocky Boy's Reservation, Big Sandy Creek, Bearpaw Mtns., Hill Co.(SE), Montana, USA

Gabbs, Ney Co., Nevada, USA
Landsberg (Moschellandsberg), Obermoschel (near), Rheinland-Pfalz, Germany
Centennial Mine, Calumet, Houghton Co., Michigan, USA
Siberia (E), FSU
Temperino Mine, Campiglia Marittima, Toscana, Italy
Haledon, Passaic Co., New Jersey, USA
Yukspor Mts., Khibina Tundra, Kola Peninsula, Russia, FSU
Brosso Fe mine, Canavese dist, Torino, Piemonte, Italy

Avilargus, La Paz (near), Bolivia
Vulcano Island, Eolie (Lipari) Islands, Sicilia (Sicily), Italy
Lille Ar”, Langesundfjord, Telemark, Norway
Beatriz mine, Caracoles, Sierra Gorda, Chile
Mt. Vesuvius, Napoli, Campania, Italy

Unspecified locality, China
Vuorij„rvi, Kola Peninsula, Russia, FSU
Carboire, AriŠge, Pyrenees, France
Kara Tau, Dzhambul (near), Kazakhstan, FSU

™degaard, Bamble, Norway
Mont Saint-Hilaire, Rouville Co., Qu‚bec, Canada
Bambollita mine (La Oriental), Sierra La Huerta, Moctezuma, Sorona, Mexico
Hagendorf pegmatite, Waidhaus, Oberpfalz, Bayern, Germany
Carlin mine, Elko (NW), Eureka Co., Nevada, USA
Val Varaita, Sempeyre (near), Piemonte, Italy
Agpalilik fragment, Cape York meteorite, Greenland
Luise Mine, Horhausen, Rheinland-Pfalz, Germany
Stassfurt deposit, Sachsen, Germany
Montrose Co., Colorado, USA
Mt. Vesuvius, Napoli, Campania, Italy
Slavkov, Bohemia, Czech Republic
Carr Boyd mine, Kalgoorlie (NNE), Western Australia, Australia
Patapsco mine, Finksburg, Carroll Co., Maryland, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Harstigen mine, Pajsberg, V„rmland, Sweden
Cava Diverio, Baveno, Italy
Wolf Creek meteorite crater, Western Australia, Australia

Norton County meteorite, Kansas, USA
L†ven, Langesundfjord, Norway
Shinkolobwe mine, Jadotville (near), Shaba, Democratic Republic of Congo
Charles W. Chapman Quarry, Columbia Co., Oregon, USA ; Lake Owyhee State Park, Malheur Co., Oregon, USA
Evans-Lou mine, St-Pierre-de-Wakefield (near), Portland Tp., Papineau Co., Qu‚bec, Canada
Bayan Obo, Inner Mongolia, China
Iron Hill, Cebolla Creek area, Powderhorn (near), Gunnison Co., Colorado, USA
Vrancice, Pr¡bram (near), Stredocsky kraj, Bohemia, Czech Republic
Planitz, Zwickau, Poland
Bellwood, Blair Co., Pennsylvania, USA
Jakobsberg mine, V„rmland, Sweden
Firetown area, Nemegos (NE), Lackner Township, Sudbury, Ontario, Canada
Wausau, Marathon Co., Wisconsin, USA

Bastn„s, Riddarhyttan, V„stmanland, Sweden
Tanco mine, Bernic Lake, Manitoba, Canada and Hugo Mine, Keystone, Pennington Co., South Dakota, USA
Kirwa mine, Kigezi Dist., Uganda
Huanaco, Chile
Vicentin, Italy
Cervantes, Galicia, Spain
Cesano #1 Well, Cesano Geothermal Field, Lazio (Latium), Italy
Bambollita mine (La Oriental), Sierra La Huerta, Moctezuma, Sonora, Mexico
Alai alkalic province, Alai Mts., Tadzhikistan, FSU

Jas Roux mine, Valgaudemar, Hautes-Alpes, France; Abuta, Hokkaido, Japan

Bisbee, Cochise Co., Arizona, USA
Mina Maria, Quebrada Puquios, Atacama, Chile
Mt. Vesuvius, Napoli, Campania, Italy
Cerro de Cacheuta, Mendoza, Argentina
On artifacts, Egypt
Passaic Mine, Sterling Hill, Ogdensburg, Sussex Co., New Jersey, USA

Sayn (Siegen), Westphalia, Germany; and West Phoenix mine, Cornwall, England [neotype locality)
Wolfsberg, Harz, Germany
Nakalaq, Il¡maussaq intrusive, Greenland (S)

Barkers Hill Salt Dome (NW), Mont Belvieu, Chambers Co., Texas, USA
Cham‚ane, Vernet-la-Varenne, Livardois Mtns., Puy-de-D“me, France
Chamoson, St. Maurice, Valais (Wallis), Switzerland
Changbai Mt., Kirin (E), China
Covur Yokusutepe Hill, Doganbaba, Burdur, Taurus Mts., Turkey (SW)
Ries Crater, Mottingen, Bayern, Germany
Keeley mine, South Lorrain Twp., Timiskaming Dist., Ontario, Canada
Franklin Mine, Franklin, Sussex Co., New Jersey, USA
Charo River, Murun Massif, Aldan (NE), Yakutia, FSU
Chatkal-Kuramin Mts., Uzbekistan (E), FSU
Chelkar, Kazakhstan, FSU
Wheal Gorland, St. Day, Cornwall, England
Leadhills, Lanarkshire, Scotland
Kuttakuzhi, Travancore, Kerala, India (SW)
Koryak-Kamchata fold zone, Russia (E), FSU
Nyarta-syu-yu River, Telpos-iz (E), Ural Mts., FSU

Kara Tau, Kazakhstan, FSU
Ilmen Mts., Ural Mts., Russia, FSU
Maine mine, Autun, Sa“ne-et-Loire, France
Ilmen Mts., Ural Mts., Russia, FSU
Chiavenna, Sondrio, Lombardia, Italy ; also Langangen, Langesundfjord, Telemark, Norway
Tavistock (near), Devon, England
Miass, Ilmen Mts., Ural Mts., FSU
Mt. Punkarnayv, Lovozero tundra, Kola Peninsula, Russia, FSU
Mt. Vesuvius, Napoli, Campania, Italy
Norway
Marienberg, Sachsen, Germany
Kosoibrok, Ekaterinburg (Sverdlovsk), Ural Mts., Russia, FSU
Kapaev pipe, Angara River, Siberian platform (S), Russia, FSU
Mt. Vesuvius, Napoli, Campania, Italy
Franklin, Sussex Co., New Jersey, USA
Mt. Vesuvius, Napoli, Campania, Italy
Higher Pitts mine, Priddy, Mendip Hills, Somerset, England
Bambollita mine (La Oriental), Sierra La Huerta, Moctezuma, Sorona, Mexico

Pargas, Finland
Carlin mine, Elko (NW), Eureka Co., Nevada, USA
Jerusalem-Jericho Highway, Jordan
Onega depression, Karelia, FSU

Unspecified locality, Sichuan, China
Brazil

Tsumeb, Namibia
Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Kara-Oba deposit, Kazakhstan (Central), FSU
Tretoil mine, Lanivet, Cornwall, England
Khaidarkan deposit, Kirghizia (Kirgizia), FSU

Lone Creek Fall Cave, Sabie (near), Transvaal (E), South Africa
Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Nchanga mine, Zambia; M'sesa mine, Kambowe, Shaba, Democratic Republic of Congo
Lorenz mine, Clausthal, Harz, Niedersachsen, Germany
San Miguel Mine, Moctezuma, Sonora, Mexico
Canyon Diablo meteorite, Arizona, USA
Yinnietharra Station, Pyramid Hill (S), Western Australia, Australia
Gansu, China
West Chester, Chester Co., Pennsylvania, USA
Reichenstein, Silesia, Poland
Wheal Gorland, St. Day, Cornwall, England

Obsidian Cliff, Yellowstone National Park, Wyoming, USA or Lake Naivasha, Kenya
Trotter Mine, Franklin Furnace, Sussex Co., New Jersey, USA
Siberia, FSU
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
Carlton Mine, Chester, Windham Co., Vermont, USA
Sayak-IV deposit, Kazakhstan, FSU
Yukspor Mts., Lovozero massif; Mt. Koashva, Khibina massif, Kola Peninsula, FSU
Hoodoo Mts., Wyoming, USA
Cobalt, Ontario, Canada
Dongchuan mine, Yunnan, China
Goslerwand, Pr„gratten, Tyrol, Austria
Amity, New York, USA
New Idria serpentine, Coalinga (near), Fresno Co., California, USA
Varislahti deposit, Karelia (N), Finland

Happy Jack mine, Emery Co., Utah, USA

Erzgebirge, Sachsen, Germany
Cerro de Cacheuta, Mendoza, Argentina
Bon Accord, Barberton Dist., Transvaal, South Africa

Sun Valley mine and Huskon No. 7 mine, Coconino Co., Arizona, USA
Rindsberg Mine, Katzenellnbogen (near), Nassau, Germany
Canyon Diablo meteorite, Meteor Crater, Coconino Co., Arizona, USA
La Sal No. 2 mine, Gateway, Mesa Co., Colorado, USA
Oravsk Magura (Arvai-Magura) Mts., Slovakia
Furnace Creek Dist., Death Valley, Inyo Co., California, USA
Francois Lake, Coast Dist., British Columbia, Canada
Keystone, Mountain Lion and Smuggler mines, Boulder Co., Colorado, USA
Colquiri mine, Colquiri, Bolivia
New London (near), Connecticut, USA
Colusa claim, Butte, Silver Bow Co., Montana, USA
Mariposa Mine, Terlingua Dist., Brewster Co., Texas, USA
Mt. Shaheru, Volcanos Area, Rutshuru territory, Kivu, Democratic Republic of Congo
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Margnac Deposit, Compreignac, Haute-Vienne, France
Brazzaville, Congo
Hinojosa de Cordoba, Andalusia, Spain
Wheal Providence [? Wheal Gorland, St. Day], Cornwall, England
Hebron, Maine, USA
Bushveld, Transvaal, South Africa
Copiap¢, Atacama, Chile

Coquimbo, Chile
McDermitt Mine (Old Cordero Mine), Humboldt Co., Nevada, USA
Bodenmais, Bayern, Germany
Narsarsuaq, Julianehaab district, Greenland
Glandore mines, Co. Cork, Ireland
L'etoile du Congo mine, Lubumbashi (Elizabethville), Shaba, Democratic Republic of Congo
Wheal Carpenter, Gwinear, Cornwall, England
Wheal Gorland, St. Day, Cornwall, England
J. Horse-Shoe Shaft (W), Coronado Lode, Clifton-Morenci Dist., Arizona, USA
Bombay (near), India
Cosala Mine, Sinaloa, Mexico
A.B.H. Consols Mine, Broken Hill, New South Wales, Australia
Mt. Vesuvius, Napoli, Campania, Italy
Bihar, India
Mt. Vesuvius, Napoli, Campania, Italy
Goble, Columbia Co., Oregon, USA
Coyote Peak, Orick (near), Humboldt Co., California, USA
Brooklyn Mine dump, Tintic Dist., Silver City (NW), Utah, USA
Mammoth mine, Tiger, Pinal Co., Arizona, USA
Friedrichroda, Th□ringen, Germany
Wagon Wheel Gap, Creede Quad., Mineral Co., Colorado, USA
St. Christophe, Bourg d'Oisans, IsŠre, France
Cerro San Crist¢bal, Pachuca, Mexico

Berezov, Ekaterinburg (Sverdlovsk), Ural Mts., FSU
Wheal Jane, Kea, Cornwall, England
Skrikerum, Sweden

Berkeley (N), Alameda Co., California, USA

Ivigtut, Greenland (SW)
Mt. Vesuvius, Napoli, Campania, Italy
Tombstone, Cochise Co., Arizona, USA
Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Barracanao, Cuba
Amelia mine, Bol,o, Santa Rosalia (near), Baja California, Mexico
Cummington, Hampshire Co., Massachusetts, USA
Listvenitovy¡, Koriakskhiye Mts., FSU

Missouri Mine, Hall's Valley, Park Co., Colorado, USA
Chuquicamata, Chile
Kond‰r massif, Aldan shield, Siberia, FSU
Alaska mine, San Juan Co., Colorado, USA
Kond‰r massif, Aldan shield, Russia; Kamchatka, FSU
Mt. Vesuvius, Napoli, Campania, Italy
Kalongwe, Shaba, Democratic Republic of Congo
Consolidated Rambler mine, Baie Verte (near), Newfoundland, Canada
Mt. Nakalak, Il¡maussaq intrusive, Greenland
Llamuco, Santiago, Chile
Barite Mine, Golconda (near), Humboldt Co., Nevada, USA
Mounana mine, Franceville, Haut-Ogoou,, Gabon
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
Bambolla mine, Moctezuma, Sonora, Mexico
Mt. Vesuvius, Napoli, Campania, Italy
Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany

Moldava Noua (Ujmoldova), Banat, Romania
Mina Santa Cruz, Poop¢, Bolivia
Benallt mine, Rhiw, Lleyn Peninsula, Caernavonshire (Gwynedd), Wales
Cyrilov (near), Velk, Mezir¡c¡, Moravia, Czech Republic
San Piero di Campo, Elba, Toscana, Italy
Yellowknife, Madoc, Ontario, Canada ; Wolfsberg, Harz, Germany ; Pershing Co., Nevada, USA
Green Mountain, Ascension Island
Rockport, Cape Ann, Essex Co., Massachusetts, USA
Danba, Sichuan, China
Danbury, Fairfield Co., Connecticut, USA
Dannemora, Sweden
Dao (Tao) and Ma Districts, China
Bayan Obo Iron mine, Baotou (Paotow), Inner Mongolia, China
Dara-Pioz, Tadzhikistan (N), FSU
Pampa del Toro, Oficina Lautaro, Atacama desert, Chile

Arendal, Norway
Constancia mine, Tazna, Bolivia
Coahuila Meteorite (Bolson de Mapimi), Coahuila, Mexico
Davan Spring (near), Murun massif, Yakutia (W), FSU

Radium Hill mine, Olary Province, South Australia, Australia

Ottrez, Ardennes, Belgium
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
Siena, Toscana, Italy and/or Trenton limestone, McGill University, Montreal, Qu,bec, Canada
Laytonville Quarry, Laytonville (S), Mendocino Co., California, USA
G□neyce-Ikizdere, Trabzon, Pontides (E), Turkey
Nizhniy Tagil, Ekaterinburg (Sverdlovsk), Ural Mts., FSU
Mt. Shaheru, Kivu, Democratic Republic of Congo
Jo Dandy mine, Paradox Valley, Montrose Co., Colorado, USA
Berneau, Vis,, LiŠge, Belgium

Musonoi, Shaba, Democratic Republic of Congo
Eveslogchorr Mt. and Yukspor Mt., Khibina massif, Kola Peninsula, Russia, FSU
Moctezuma mine, Moctezuma (near), Sonora, Mexico
Tripuhy, Ouro Preto, Minas Gerais, Brazil
Musonoi, Shaba, Democratic Republic of Congo

Cedar Hill Quarry, Lancaster Co., Pennsylvania, USA
Sierra de Cordoba, Argentina
Tachgagalt, Morocco
Ste.- Marie-aux-Mines, Vosges Mtns., Haut-Rhin, Alsace, France
Kasolo, Shaba, Democratic Republic of Congo
Higher Pitts mine, Priddy, Mendip Hills, Somerset, England
Ansbach, Gr„fenthal, Saalfeld, Th□ringen, Germany

Vrancice, Pr¡bram (near), Stredocsky kraj, Bohemia, Czech Republic and Braunsdorf, Freiberg (near), Sachsen, Germany
Mramorskoi, Kossoibrod (S), Ural Mts., Russia, FSU
Branchville, Fairfield Co., Connecticut, USA
Amlwch, Anglesey, Wales
Lautaro, Atacama Desert, Antofagasta, Chile
Sangershausen, Th□ringen, Germany
Campi Flegrei, Naples (W. of), Italy

Altyn-Tyube, Karaganda (E), Kirghizia, FSU
Skipton Caves, Ballarat (near), Victoria, Australia
L†ngban mine, Filipstad (near), V„rmland, Sweden
Kota-Kota meteorite, Marimba district, Malawi and St. Mark's meteorite, St. Mark's Mission Station, Transkei, Cape Province,
Barranca de Cobre, Chihuahua, Mexico
Mt. Vesuvius, Napoli, Campania, Italy
Tyrol (S), Italy
La Sal no. 2 mine, Lumsden Canyon, Gateway (near), Mesa Co., Colorado, USA
Algodones mines, Coquimbo (Calabozo), Chile
Hestmand” Island, Norway
Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada
Balmat, St. Lawrence Co., New York, USA
Khibina massif and Lovozero massif, Kola Peninsula, FSU
Douglashall, Westeregeln (near), Stassfurt (NW), Sachsen, Germany
Forestville, Pennsylvania, USA

Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada and/or Kola Peninsula, Russia, FSU
Unterdrauburg, Drave, K„rnten (Carinthia), Austria
Francon quarry, St.-Michel Dist., Montreal Island, Qu,bec, Canada
Hirschhorn, Rheinland-Pfalz, Germany
Richelle, LiŠge (N), Belgium
Kapijimpanga deposit, Solwezi (SE), Northwestern Province, Zambia
Hirschberg, Gera, Germany
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Tsumeb, Namibia
Emerald Mine, Tombstone, Cochise Co., Arizona, USA
Lousy Gulch, Payson (near), Gila Co., Arizona, USA
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Beaunan, Chaponost, Lyons (near), France
Adelaide Prop. mine, Dundas, Tasmania, Australia
Coneto, Durango, Mexico
Duranus, Alpes-Maritimes, France
Jebel Debar, Qacentina (Constantine), Algeria
Peanut mine, Montrose Co., Colorado, USA
Minasragra, Jun¡n, Peru
Dypingdal, Snarum, Norway (S)
St. Andreasberg, Harz, Germany
Dzhalind ore deposit, Little Khingan Ridge, Siberia, Russia, FSU
Foote Mineral Company spodumene mine, Kings Mt. (near), Cleveland Co., North Carolina, USA
Weddell Sea, Antarctica
Foote Mineral Company spodumene mine, Kings Mt. (near), Cleveland Co., North Carolina, USA ; Hagendorf pegmatite, Wai
L†ngban mine, Filipstad (near), V„rmland, Sweden
Norra K„rr, Gr„nna, Sweden
B„renbad, Hollersbachtal, Salzburg, Austria
Edenville, New York, USA
Old Kilpatrick, Dumbartonshire, Scotland
Big Rock Quarry, Little Rock, Pulaski Co., Arkansas, USA
Terlingua, Brewster Co., Texas, USA
Tip Top Pegmatite, Custer (near), Custer Co., South Dakota, USA
Ettringer Bellerberg, Mayen, Eifel, Rheinland-Pfalz, Germany
Green River Formation, Duchesne Co., Utah, USA
Eheliyagoda, Ratnapura Dist., Sri Lanka
Korshunovsk deposit, Ilim, Irkutsk, Siberia, Russia, FSU
Elba, Toscana, Italy
Carlin deposit, Elko (NW), Eureka Co., Nevada, USA
Cincinnati Mine, St. Peter's Dome, Pikes Peak Region, El Paso Co., Colorado, USA
Narsarsuaq, Julianehaab district, Greenland
Silver King Mine, Ward, White Pine Co., Nevada, USA
Berezov, Ekaterinburg (Sverdlovsk), Ural Mts., Russia, FSU

Tombstone, Cochise Co., Arizona, USA
Tannenbaum, Schwarzenberg, Sachsen, Germany
Empress Josephine Mine, Bonanza, Kerber Creek Dist., Saguache Co., Colorado, USA
S. Francisco vein, Morococha, Jauli, Peru
Angleu, LiŠge, Belgium

Clay Canyon, Fairfield (near), Utah Co., Utah, USA
Branchville, Fairfield Co., Connecticut, USA
Gumuch-dagh, Ephesus, Izmir (near), Turkey
Narsarsuaq, Julianehaab district, Greenland
Bourg d'Oisans, Dauphin,, France
Teigarhorn, Berufjord, Iceland
Narsarsuaq, Julianehaab district, Greenland
Epsom, Surrey, England
Coyote Peak, Humboldt Co., California, USA
Wathlingen-H„nigsen, Hannover (NE), Germany
L†ngban mine, Filipstad (near), V„rmland, Sweden
Mt. Vesuvius, Napoli, Campania, Italy
Durkee, Baker Co., Oregon, USA
Harhada deposit, Jining-Erlian railway (near), Inner Mongolia, China
MacIntosh Mine, Trinity River, Willow Creek, Humboldt Co., California, USA
Davib-East farm, Karibib (near), Namibia
Altay pegmatite mine, Xinjiang, China
Allemont, IsŠre, France
Mt. Vesuvius, Napoli, Campania, Italy
Eskeborn adit, Tilkerode, Harz, Germany
Ivigtut, Greenland (SW)
Outokumpu mine, Finland
Franklin, Sussex Co., New Jersey, USA
Durham Ranch, Gillette (S), Reno Junction (NE), Wyoming, USA

Ettringer Bellerberg, Ettringen, Mayen, Eifel, Rheinland-Pfalz, Germany
Skrikerum copper mine, Kalmar, Sweden
Mt. Vesuvius, Napoli, Campania, Italy
Lubietov (Libethen), Bansk Bystrica (Neusohl), Stredoslovensky kraj, Slovakia
Ouro Preto, Minas Gerais, Brazil
Branchville, Fairfield Co., Connecticut, USA
Kangerdluarsuk, Il¡maussaq intrusive, Greenland (S)
Larvik, Vestfold, Norway
Sindo and Luanda, Lake Victoria, Kenya; Konya Basin, Anatolia, Turkey
Neugl□ck mine, Schneeberg, Sachsen, Germany
J”lster, S”ndfiord, Norway
Zelezn¡k, Sirk (near), Slovakia
L†ngban mine, Filipstad (near), V„rmland, Sweden
Evenki region, Lower Tunguska River, Siberia, Russia, FSU
Green River Formation, Sweetwater Co., Wyoming, USA
Named for Dr Egon Kirschstein, pioneer geologist of Kivu, Zaire.
Tincalayu Borax Mine, Salta, Argentina
Bambolla mine, Moctezuma, Sonora, Mexico
Diepholz (near), Rehden, Germany
Sapucaia Pegmatite, Galileia (near), Minas Gerais, Brazil
Grand Central Mine, Tombstone, Cochise Co., Arizona, USA
Coolin, Kaniksu National Forest, Bonner Co., Idaho, USA ; Grand Canyon National Park, Coconino Co., Arizona, USA
Branchville, Fairfield Co., Connecticut, USA
Bonao, Dominican Republic

Sierra de Famatina, La Rioja, Argentina
Springwater pallasite meteorite, Springwater, Saskatchewan, Canada
Sasbach, Kaiserstuhl, Germany
Copper King Mine, Maggie Creek Dist., Eureka Co., Nevada, USA
Fayal Island, Azores, Portugal
Tur`yiy Peninsula, Kola Peninsula, Russia, FSU
Solongo deposit, Buryat AR, Russia, FSU
Khibina, Kola Peninsula, Russia, FSU
Sierra Almagrera, Spain (S)
Zachativsk station (near), Donets region, Ukraine, FSU

Novopoltavsk massif, Russia, FSU
Bayan Obo, Inner Mongolia, China
Sermers“q island, Kangeq, Julianeh†b dist., Greenland
Sitapur deposit, Chindwara Dist., Madhya Pradesh, India
Pacific Ocean (iron-manganese concretions)
Gabe Gottes vein, Rautenthal, Ste.- Marie-aux-Mines, Vosges Mtns., Haut-Rhin, Alsace, France
Dales Gorge member of Hamersley Group, Wittenoom, Western Australia, Australia
Atacama, Chile

Kamloops Lake, British Columbia, Canada
Belousovsk and Leninogorsk, Altai, Russia, FSU

Tsumeb mine, Tsumeb, Namibia
Tatar AR, Siberia, Russia, FSU
Mina la Compania, Sierra Gorda (S), Atacama Desert, Chile
Varutr„sk, Sweden
Germania Tungsten Mine, Deer Trail Mining Dist., Stevens Co., Washington, USA

Pleasant Valley Pegmatite, Custer (near), Custer Co., South Dakota, USA

Coeur d'Alene, Kootenai Co., Idaho, USA

Scawt Hill, Co. Antrim, Northern Ireland or Skye, Scotland
Tomata (W. of), Celebes (East Central), Indonesia
Greens Well, Wodgina, Western Australia, Australia

Tatar AR (NE), Russia, FSU

Unspecified locality, Koryak-Kamchatka region, Russia, FSU

Tuva, FSU
Racoon Creek, Mullica Hill, Gloucester Co., New Jersey, USA

Khibina massif, Kola Peninsula, Russia, FSU

Victory Mine, Custer (near), Custer Co., South Dakota, USA
Mt. Vesuvius, Napoli, Campania, Italy
Zachativsk station (near), Donets region, Ukraine, FSU
Khibina massif, Kola Peninsula, Russia, FSU
Vishnevye Mts., Ural Mts., FSU
Tierra Amarilla, Copiap¢, Chile
L vrion (Laurium), Attik¡, Greece
Branchville, Fairfield Co., Connecticut, USA
Izalco Volcano, El Salvador
L†ngban mine, Filipstad (near), V„rmland, Sweden
Predborice, Stredocesky kraj, Bohemia, Czech Republic
Chiuzbaia (Kisb nya), Judetul, Maramures, Romania
Flagstaff, Arizona, USA
Tsumeb, Namibia
Fletcher Mine, Viburnum Trend, Reynolds Co., Missouri, USA
Harstigen mine, Pajsberg, V„rmland, Sweden
Tripuhy, Ouro Preto, Minas Gerais, Brazil
Shituru deposit, Likasi (near), Shaba, Democratic Republic of Congo
Ste.- Marie-aux-Mines, Vosges Mtns., Haut-Rhin, Alsace, France
Stennagwyn mine, St. Austell (near), Cornwall, England
Tallgrufvan, Kallmora, Norberg, Sweden
Finbo and Broddbo, Dalarne, Sweden
Kazakhstan (central), FSU

Christmas, Gila Co., Arizona, USA
Kopeysk, Chelyabinsk, Ural Mts. (S), Russia, FSU

Palermo #1 Mine, North Groton, Grafton Co., New Hampshire, USA
Cooglegong, Western Australia, Australia

Ren,ville, Djou,, Democratic Republic of Congo
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
Crestmore, Riverside Co., California, USA
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Moresnet, Vieille Montagne, Belgium (E)
Mounana mine, Franceville, Haut-Ogoou,, Gabon
Pennsylvania Mine, San Antonio Valley, Santa Clara Co., California, USA
Veta del Cuandro and San Juan mine, Las Animas dist., Chocaya (SE of), Bolivia
Grotte di Castellana, Puglia, Italy
Francon quarry, St.-Michel Dist., Montreal, Qu,bec, Canada
Carlin mine, Elko (NW), Eureka Co., Nevada, USA
Franklin, Sussex Co., New Jersey, USA
Tip Top Pegmatite, Custer (near), Custer Co., South Dakota, USA
Pitigliano, Grosseto, Toscana, Italy
Steinbruch Trogtal, Lautenthal (near), Harz, Germany
L†ngban mine, Filipstad (near), V„rmland, Sweden
L†ngban mine, Filipstad (near), V„rmland, Sweden
Freiberg, Sachsen, Germany
Himmelsf□rst mine, Freiberg, Sachsen, Germany

Big Creek - Rush Creek area, Fresno Co., California, USA
Katzenbuckel, Odenwald, Germany
Adervielle mine, Louron valley, Hautes Pyr,n,es, France
Habachtal, Sedl, Oberpinzgau, Salzburg, Austria
Autun, France
Robb-Montbray mine, Abitibi Co., Qu,bec (NW), Canada
Sapucaia Pegmatite, Conselheiro Pena, Galileia, Minas Gerais, Brazil
Frood Mine, Sudbury Dist., Ontario, Canada
Fuka, and Mihara, Okayama Pref., Japan
Hanawa Mine, Iwate, Hanawa, Honshu, Japan
Dealul Crucii (Kereszethegy) mine, Baia Mare, (Nagyb nya), Maramures, Romania
Hunan, China
Furutobe mine, Akita, Japan
L†ngban mine, Filipstad (near), V„rmland, Sweden
Skien, Oslo (near), Norway
Ytterby feldspar quarry, Resar” island, Stockholm (near), Sweden
Kazakhstan, FSU

Franklin, Sussex Co., New Jersey, USA
Falun, Sweden
Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada
Lower Pit and Twin Tunnels, Newry, Oxford Co., Maine, USA
Tsumeb, Namibia
Bald Knob, Sparta, Alleghany Co., North Carolina, USA
Searles Lake, San Bernardino Co., California, USA

Ko mine, Nordmark, V„rmland, Sweden
Gal-Khaya, Yakutia, Russia; Khaidaikan Hg deposits, Kirghizia, FSU
Tsumeb, Namibia
Postmasburg Mn deposits, Gamagara ridge, Cape Province, South Africa
L†ngban mine, Filipstad (near), V„rmland, Sweden
Harstigen mine, Pajsberg, V„rmland, Sweden
Valle de Frigido, Apuane (Appenine) Alps, Toscana, Italy
South Ouray No. 1 Well, Ouray, Uintah Co., Utah, USA
Anticline prospect, Ashburton Downs, Western Australia and Broken Hill, New South Wales, Australia
Rapid Creek, Lake Creek (near), Yukon Territory, Canada
Lemieux Township, Gasp, Peninsula, Gasp,-ouest Co., Qu,bec, Canada
Iron Monarch open cut, Iron Knob, South Australia, Australia
Buranga pegmatite, Gatumba, Rwanda
Tachgagalt, Morocco
Lagunillas, Merida (near), Venezuela
Ivigtut, Greenland (SW)
Tsumeb, Namibia
H,as, GŠdres, France
Dekalb (near), St. Lawrence Co., New York, USA
Cham,ane, Vernet-la-Varenne, Livardois Mtns., Puy-de-D“me, France
Mt. Monzoni, Fassathal, Bolzano, Tyrol, Italy
Rakwana, Sri Lanka
Onverwacht (#330) Mine, Lydenberg Dist., Transvaal, South Africa

Cheyenne Canyon (W), El Paso Co., Colorado, USA
Sala, V„stmanland, Sweden; Falun, Kopparberg, Sweden
Wind Mt., Otero Co., New Mexico, USA
Carr Boyd mine, Kalgoorlie (near), Western Australia, Australia
L vrion (Laurium), Attik¡, Greece
United Verde mine, Jerome, Yavapai Co., Arizona, USA
Tsumeb, Namibia
Commercial Ore kyanite mine, South Carolina, USA
Baker and Jennifer mines, Kramer dist., Kern Co., California, USA
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Getchell Mine, South Pit Extension, Humboldt Co., Nevada, USA
Driekop Mine, Transvaal, South Africa
Mariposa Mine, Terlingua Dist., Brewster Co., Texas, USA
Richmond, Berkshire Co., Massachusetts, USA
Turtschi, Giessen, Binntal, Valais (Wallis), Switzerland
Christmas Mine, Christmas, Gila Co., Arizona, USA
Dry Delta, Alaska Range, Alaska, USA
Sandamab, Usakos (near), Namibia
Sasso Pisano, Val di Cecina, Pisa, Toscana, Italy
Cham,ane, Vernet-la-Varenne, Livardois Mtns., Puy-de-D“me, France
Grand Central mine, Tombstone, Cochise Co., Arizona, USA
Capo di Bove, Roma, Italy
Kipawa River complex, Villedieu Twp., T,miscamingue Co., Qu,bec, Canada
Sacrofano, Lazio (Latium), Roma, Italy
Gladhammar, Sm†land, Kalmar, Sweden
Villarubia, Ocana (near), Toledo, Spain
Franklin Furnace, Sussex Co., New Jersey, USA
Huasco, Valparaiso, Chile
L vrion (Laurium), Attik¡, Greece

Syra island, Kikl dhes (Cyclades Islands), Greece
Hampton East Location 48, Kambalda, Western Australia, Australia
Arctic, Russia, FSU
Little Deer Park, Co. Antrim, Northern Ireland
The Gobbins, Island Magee, Co. Antrim, Northern Ireland
Talnakh (Tylnakh), Noril'sk (near), Siberia (N), FSU
Palermo #1 Mine, North Groton, Grafton Co., New Hampshire, USA
Hollerter Zug, Kirchen, Rheinland, Germany

Hongshila, Hebei, China
Dexter 7 Mine, Emery Co., San Rafael Swell, Calf Mesa, Utah, USA
Laguna, Valencia Co., New Mexico, USA
Chaux de Bergonne, Gignat, Puy-de-D“me, France
L†ngban mine, Filipstad (near), V„rmland, Sweden
Luck Goose Creek Quarry, Loudoun Co., Virginia, USA
Rio Abaeto, Minas Gerais, Brazil
Clay Canyon, Fairfield (near), Utah Co., Utah, USA
Ischl salt mine, Ober”sterreich, Austria
Rapid Creek, Big Fish River - Blow River Area, Yukon Territory, Canada

Gortdrum orebody, Co. Tipperary, Ireland
Rammelsberg mine, Goslar, Harz, Germany
Volcanos Area, Rutshuru territory, Kivu, Democratic Republic of Congo
Majuba Hill Mine, Pershing Co., Nevada, USA
Hard Scrabble Claim and Debley Mine (NNW), Death Valley National Monument, Inyo Co., California, USA
Serra de Congonhas, Diamantina, Minas Gerais, Brazil
Cole Shaft, Bisbee, Cochise Co., Arizona, USA
Grafton (near), Melvin Mt., New Hampshire, USA
Andrahomana, Taolagnaro (Fort-Dauphin), Madagascar
F-33 mine, Grants, Valencia Co., New Mexico; also Colorado and Utah, USA

Excelsior mine, Cerro de Pasco, Pasco dept., Peru
Zimbabwe
Mesabi Dist., St. Louis Co., Minnesota, USA
Bishopton, Renfrewshire, Scotland
Kramer-Four Corners Area, San Bernardino Co., California, USA
Merume River, Kamakusa (near), Mazaruni dist., Guayana
Gerstenegg (Kabelstollen Gerstenegg-Grimsel I), Grimsel, Bern, Switzerland
Everly mine, Harney City, Pennington Co., South Dakota, USA
Falotta, Sursass (Oberhalbstein), Tinizong (Tinzen), Grischun (Graub□nden), Switzerland
Siberia, FSU
Mahnomen mine, Cuyuna Range, Crow Wing Co., Minnesota, USA
CollobriŠres, Var, France
Chauvai Sb-Hg deposit, Kirghizia (S), FSU
Santa Catarina mine, Sierra de Santa Rosa, Guanajuato, Mexico
North Chincha Island, Peru ; Murra-el-elevyn Cave, Nullarbor Plain, Western Australia, Australia
Gudmundstorp, Sala, Sweden
Daniel Mine, Schneeberg, Sachsen, Germany
Taylor pit, Huntingdon twp., Hastings Co., Ontario, Canada
Gugia, China
United Verde Mine, Jerome, Yavapai Co., Arizona, USA
Musonoi, Shaba, Democratic Republic of Congo
Calumet mine, Keno Hill - Galena Hill area, Yukon Territory, Canada
Yanshan, China
Ivigtut, Greenland (SW)
Merume River, Kamakusa (near), Mazaruni dist., Guyana

Storr, Portree, Skye, Scotland
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo

Kokka serpentinite, Outokumpu (NNW), Finland
Morro, Conco, Moneia, and Muiane mines, Zambezia dist., Mozambique
Hagendorf (S) pegmatite, Waidhaus, Oberpfalz, Bayern, Germany
Carlile, Crook Co., Wyoming, USA
J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Haiwee Reservoir, Coso Mts., Inyo Co., California, USA
Predborice, Stredocesky kraj, Bohemia, Czech Republic

Michael mine, Reichenbach (near), Schwarzwald, Germany

Angleur, LiŠge, Belgium

Kungursk, Inder basin(?), Russia, FSU
Barkevik (near), Langesundfjord, Vestfold, Norway
Gladhammar, Sm†land, Kalmar, Sweden
Franklin Furnace, Sussex Co., New Jersey, USA
Searles Lake, San Bernardino Co., California, USA
Skipton Caves, Ballarat (SW), Victoria, Australia
Yamato Mine, Kagoshima, Japan
North Hill Mine, Franklin, Sussex Co., New Jersey, USA
Camas Malag, Broadford, Isle of Skye, Scotland
St. Andreasberg, Harz, Germany
Harstigen mine, Pajsberg, V„rmland, Sweden
Lisdan-Siwaga Fault (along the), Hashem region, Amman (near), Jordan (EC)
Dungannon Twp., Hastings County, Ontario, Canada
Trogtal Quarry, Lautenthal (near), Harz, Niedersachsen, Germany
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Hatrurim formation, Dead Sea (W. of), Israel
Freidrich mine, Wissen an der Sieg, Rheinland-Pfalz, Germany
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Kalinka, Neusohl, Slovakia
Ilfeld, Harz, Germany and/or Raddusa, Sicilia (Sicily), Italy
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
Hector-Calumet mine, Galena Hill, Yukon Territory, Canada
Toluca meteorite, Xiquipilco, Mexico state, Mexico and Canyon Diablo meteorite, Coconino Co., Arizona, USA
Mooihoek Farm, Lydenburg District, Transvaal, South Africa
Waratah Dist., Heazlewood Mining Area, Tasmania, Australia
Hector Bentonite Mines, San Bernardino Co., California, USA
Mormors mine, Tunaberg, Sweden
Good Hope Claim, Hedley, Similkameen Dist., British Columbia, Canada
L†ngban mine, Filipstad (near), V„rmland, Sweden
Bustee meteorite, Gorakhpur (near), Basti dist., Uttar Pradesh, India
Nordhorn, Hannover, Germany
Lakeview (near), Lakeview Co., Oregon, USA and/or Schwarzwald, Germany

Harstigen mine, Pajsberg and/or Langban, V„rmland, Sweden
Lindvikskollen dike, Kragero (near), Norway (S)
Lord Brassy mine, Heazlewood, Tasmania, Australia
Tsumeb, Namibia
Schwarzenberg, Sachsen, Germany

Moss Mine, Nordmark, Sweden
Jakobsberg mine, Finnmossen, V„rmland, Sweden
Florence Mine, Pinal Co. and Pack Rat Claim, Wickenburg, Maricopa Co., Arizona, USA
Baita Bihorului (R‚zb nya), Romania
Chelopech deposit, Balkin Mts., Bulgaria
JJ Mine, Paradox Valley, Montrose Co., Colorado, USA and Unspecified locality, New Mexico, USA
Franklin, Sussex Co., New Jersey, USA
Fuka Mine, Okayama, Honshu, Japan

Tachgagalt Mine, Morocco
Campbell orebody, Bisbee, Cochise Co., Arizona, USA
Reichenbach, Bensheim (near), Odenwald, Hessen, Germany
Nacet¡n, Pobezovice (Ronsberg), Bohemia, Czech Republic
Ehrenfriedersdorf, Sachsen, Germany
Aci Castello, Sicilia (Sicily), Italy
Maria Teresa mine, Huari (near), Bolivia
Zavodinsk mine, Ziryanovskiy (near), Altai Mts., Siberia, FSU
Sterling Hill, Sussex Co., New Jersey, USA
Schneeberg, Sachsen, Germany
Wolfsberg, Harz, Germany
Limoges (near), Haute-Vienne, France

Minasragra, Jun¡n, Peru
Lillooet dist., British Columbia, Canada
Solongo deposit, Ural Mts., FSU
China (SW)
Betty Jo Claim, Ely (near), White Pine Co., Nevada, USA
Hurky, Stredocesky kraj, Bohemia, Czech Republic
Esivia, Fort-Dauphin, Madagascar
San Pasquale Mine, Zimapan Mining Dist., Hidalgo, Mexico
Vulcano Island, Eolie (Lipari) Islands, Sicilia (Sicily), Italy
Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada
Choctaw Salt Dome, Iberville Parish, Louisiana, USA
Terneres mine, Velarde¤a, Durango, Mexico
Heilongjiang, China
Kola Peninsula, Russia, FSU
Golden Fleece Mine, Lake City (near), Hinsdale Co., Colorado, USA
Mittel-Ar” island, Langesundfjord, Norway
Riddarhyttan, Sweden
Tacama, Hocaya, Bolivia
Franklin, Sussex Co., New Jersey, USA
Bansk -Hodrusa, Stredocesky kraj, Slovakia
Spitsbergen, Svalbard, Norway
Perseus claim, Routevaara, Kvikkjokk (near), Lapland, Sweden
Union Mine, Paposa (near), Sierra Gorda, Copiap¢, Chile
Franklin, Sussex Co., New Jersey, USA
Kajlidongri, Jhabua State, India (central)
Driekop Mine, Transvaal, South Africa
Ut”, Sweden
Tingelstadtjern deposit, Modum, Norway
Greenbushes, Western Australia, Australia
Stok”, Langesundfjord, Norway
Tao dist., China
Hong dist., China
Altenberg, Moresnet dist., Belgium (E)
Oravita (Oravicza), Banat, Romania
Hotson sillimanite quarry, Pofadder (W), Bushmanland, Cape Province, South Africa
Laytonville Quarry, Laytonville (S), Mendocino Co., California, USA

Brookville, Windsor (near), Hants Co., Nova Scotia, Canada
Hunan, China
Bayan-Obo mine, Huangho river, Baotou (Paotow), Inner Mongolia, China
Erie and Enterprize veins, Ellsworth, Mammoth dist., Nevada, USA
Lahr, Reichenbach, Baden, Germany
Brooks Mt., Seward Peninsula, Alaska, USA
Oficina Alemania, Antofagasta, Chile
Kolosoruk, Bilin, Bohemia, Czech Republic
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
Hummer Mine, Paradox Valley, Montrose Co., Colorado, USA
China
Ala-Mar deposit, Current Creek, Ely (SW), Nye Co., Nevada, USA
Hur,aux quarry, St. Sylvestre, Haute-Vienne, France
Smith mine, Newport, New Hampshire, USA
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Gillespie's Beach, Salt Water Creek, South Westland, New Zealand
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
L†ngban mine, Filipstad (near), V„rmland, Sweden
Sichuan (Szechuan), China
Caucasus, FSU
Scawt Hill, Co. Antrim, Northern Ireland
L†ngban mine, Filipstad (near), V„rmland, Sweden
China
Francon quarry, St.-Michel Dist., Montreal Island, Qu,bec, Canada
Champion Creek, Dun Mountain, New Zealand
Wolftone mine, Leadville, Lake Co., Colorado, USA
Otter Shoot Nickel Mine, Kambalda, Western Australia, Australia
Hoboken, Hudson Co., New Jersey, USA
Rio Marina, Elba, Italy
Staszic Mine, G¢ry Swittokvzyskia (Holy Cross Mt.), Poland

L□neberg, Hannover, Germany
Boundary Falls, Winnipeg River, Ontario, Canada
South Bay, Scarborough, North Yorkshire, England
Snarum, Norway
Oruro, Bolivia

Ore Knob Mine, Jefferson, Ashe Co., North Carolina, USA

Vuorij„rvi, Kola Peninsula, Russia
Chichibu mine, Saitama Pref., Japan
Paris, Maine, USA
Bleiberg, K„rnten (Carinthia), Austria
Mount Diablo mine, Contra Costa Co., California, USA
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo

Ida Mine, Khan, Namibia
Idrija (Idria), Slovenia
Fusamata, Kawamatamachi, Fukushima Pref., Honshu, Japan

Ikafjord, Ivigtut, Greenland (SW)
Ikuno Mine, Hyogo, Honshu, Japan
Hall Valley, Park Co., Colorado, USA
Nakalqk, Ilimaussaq intrusive, Greenland
Maquoketa Shale, Gilead (near), Calhoun Co., Illinois, USA
Ilmajok River, Lovozero Tundra, Kola Peninsula, Russia, FSU
Ilmen Mts., Miass, Ural Mts., FSU
Miass, Ilmen Mts., Ural Mts., Russia, FSU
Rio la Marina and Capo Calamita, Elba, Toscana, Italy
Khibina deposits, Lake Imandra (near), Kola Peninsula, Russia, FSU
Nittis-Kumuzhya deposit, Monchegorsk, FSU
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Imiter mine, Jebel Sarhro, Anti-Atlas, Morocco
Inagli massif, Aldan Region, Yakutia, FSU
Poop¢, Bolivia
Inder Lake, Kazakhstan (W), FSU
Kzyl-tau deposit, Inder Lake, Kazakhstan (W), FSU
India
Dzhalind deposit, Little Khingan Ridge, Siberia (E), Russia, FSU
Unspecified locality, Zabaikal'ye (E), FSU
Nanzenbach, Dillenburg (near), Germany
Carrock mine, Brandy Gill, Cumberland, England; Ingoda deposit, Zabaikal'ye, FSU
Inagli massif, Aldan Region, Yakutia, Russia, FSU
Insizwa deposit, Waterfel Gorge, Transvaal, South Africa
Mt. Blanco Deposit, Furnace Creek, Death Valley, Inyo Co., California, USA
Abarradon, Mazapil, Mexico
Sioux Co., Iowa, USA
Zapiga, Tarapac , Chile
Sebarz mine, Anarak (NE), Iran
Shakhi-Rash Mt., Hero, Qala-Dizeh (Qala-Diza), Iraq (N)

Onverwacht deposit, Transvaal, South Africa
Irhtem and Bou Azzer deposits, Anti-Atlas, Morocco
Papua New Guinea

Brazil
U--Mo ore deposit, Russia (?), FSU

Irtysh River Area, Kazakhstan (E), FSU
Tulameen River, British Columbia, Canada
Isoka, Zambia
Itabira, Minas Gerais, Brazil
Tsumeb, Namibia
Gozaisho mine, Iwaki, Fukushima Pref., Japan

Skogb”le, Kemi”, Finland
Izok Lake, Northwest Territories, Canada
Jakobsberg mine, Nordmark, Sweden

L†ngban mine, Filipstad (near), V„rmland, Sweden
Hess River, Yukon Territory, Canada
Tip Top Pegmatite, Custer, Custer Co., South Dakota, USA

Jalpa, Mexico
Bologna and Modena, Italy
Tsumeb, Namibia
Cornwall, England
Janggun Mine, Bonghwa, Korea
Lake Gjerdingen (ESE), Nordmarka, Oslo, Norway
Ivigtut, Greenland (SW)
Franklin, Sussex Co., New Jersey, USA
Jaroso ravine, Sierra Almagro, Ciudad Real dist., Spain
Vena Cu-Co Mine, Askersund, ™rebro, Sweden ; Izok Lake Mine, Mackenzie, Northwest Territories, Canada
Ettringer Bellerberg, Mayen, Eifel, Rheinland-Pfalz, Germany
Contacto vein, Llallagua, Potos¡, Bolivia
Jeffrey pit, Asbestos, Shipton Twp., Richmond Co., Qu‚bec, Canada
Crestmore quarry, Riverside Co., California, USA
Walgidee Hills, Fitzroy Basin, Kimberley, Western Australia, Australia
Mt. Soktui, Dauria, Nerchinsk dist., Siberia, FSU
Franklin, Sussex Co., New Jersey, USA
Cava Diverio, Baveno, Italy
Kaso mine, Kanuma city, Tochigi, Japan
Carleton talc quarry, Chester, Windham Co., Vermont, USA
Jinshajiang River (near), Sichuan, China (SW)
Jixian, Ji Co., Hebei, China
Benito Gem mine, Diablo range, San Benito Co., California, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Johachido District, Kisshu Co., Kankyo Hodu Pref., North Korea

J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Bohemia mining dist., Lane Co., Oregon, USA; Schio-Vincenti mine, Schio (near), Venezia, Italy
Tsumeb, Namibia
Palmer Shaft (S), Franklin, Sussex Co., New Jersey, USA
Glen Cosaidh, Loch Quoich, Inverness, Scotland
Champion Mine, Keystone, Pennington Co., South Dakota, USA
Jokoku Mine, Hiyama, Hokkaido, Japan
Menzenschwand, Schwarzwald, Germany
Benitoite Gem mine, San Benito Co., California, USA
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Himmelsf□rst mine, Freiberg, Sachsen, Germany
San Jos‚, Mariana (near), Minas Gerais, Brazil and/or Hudson Bay mine, Hazelton (N), British Columbia, Canada
Glacier Gulch, Hudson Bay Mt., Smithers (near), British Columbia, Canada
Tachgagalt no. 2 vein, Anti-Atlas, Morocco
L†ngban mine, Filipstad (near), V„rmland, Sweden

Chamitumba, Kambove (near), Shaba, Democratic Republic of Congo
Hagendorf (S) pegmatite, Waidhaus, Oberpfalz, Bayern, Germany
Christmas Mine, Christmas, Gila Co., Arizona, USA
Juno mine, Tennant Creek, Northern Territory, Australia

San Manuel mine, Pinal Co., Arizona, USA
Kaatiala pegmatite, Kuortane, Finland (W)
Kaersut, Umanaq dist., Greenland (N)
Medvezhii Log Mine, Olkhovsk, Sayan (E), Russia, FSU
H□ttenberg, K„rnten (Carinthia), Austria
Stassfurt deposit, Sachsen, Germany
Igeltjern, Hitter”, Norway
Mt. Rasvumchorr, Khibina massif, Kola Peninsula, Rissia, Russia, FSU
Stassfurt, Sachsen, Germany
Chippis, Valais (Wallis), Switzerland
Slyudyanka complex, Lake Zabaikal'ye (S) (Transbaikal), FSU
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
Goma (N), Lueshe, Kivu, Democratic Republic of Congo
Alshtan, Bashkiria, Russia, FSU
Lake Mafuru/ Chamengo Crater, Uganda

Kamaishi mine, Japan
Otter Shoot, Kambalda, Western Australia, Australia

Kobokobo, Kivu, Democratic Republic of Congo
Andaija, Lake Chad (NE), Kanem Region, Chad
Kank, Kutn Hora (Near), Stredocesky kraj, Bohemia, Czech Republic
Tatehira Mine, Oshima peninsula, Hokkaido, Japan
Kanona (N), Serenje, Zambia

Outokumpu, Karelia, Finland
Karibib pegmatite, Namibia
Schlegeistal, Furtschaglhaus, Zillertal Alps, Austria

Transcarpathia, Russia, FSU
Nizhniy-Tagilsk massif, Ural Mts., Russia, FSU
Nizhniy Tagilsk massif, Ural Mts., Russia, FSU
Kasolo, Shaba, Democratic Republic of Congo
Afrikanda massif, Kola Peninsula, Russia, FSU
Cava Campomorto, Montalto di Castro, Viterbo, Lazio, Italy
Brattfors mine, Nordmark, V„rmland, Sweden
Kawazu mine, Shizuoka, Honshu, Japan
Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia, FSU
Hagendorf pegmatite, Oberpfalz, Bayern, Germany
Tsumeb, Namibia
Stillwater Complex, Montana, USA
Kola Peninsula, Russia, FSU

Bald Knob, Sparta (near), Alleghany Co., North Carolina, USA
Kelyan deposit, Buryat, Ural Mts., Russia, FSU
Kemmlitz deposit, Sachsen, Germany
Alum Rock Park, San Jose (near), Santa Clara Co., California, USA
Mateke Hills area, Zimbabwe

Chile (S) and/or L†ngban mine, Filipstad (near), V„rmland, Sweden
Lake Magadi, Rift Valley, Kenya

Rich Station, Boron (near), Kern Co., California, USA
Friedrichsgl□ck mine, Hildburghausen (near), Th□ringwald, Germany
K‰ster deposit, Magadan, Yakutia, Siberia (NE), FSU
Krupka, Severocesky kraj, Bohemia, Czech Republic
Tsumeb, Namibia
Unspecified locality, Arashan Mts., Chatkal Ranges, Kirghizia, FSU
Khanneshin, Afghanistan
Listvenitov, Khatyr massif, Khatyrka river, Koriakskhiye Mts., FSU
Gakman Valley, Khibina massif, Kola Peninsula, Russia, FSU
Old Guard mine, Tombstone, Cochise Co., Arizona, USA
Kidd Creek mine, Timmins, Ontario, Canada; Campbell orebody, Bisbee, Arizona, USA
Fodderstack Mt., Montgomery Co., Arkansas, USA
Stassfurt deposit, Sachsen, Germany
Kilchoan, Ardnamurchan, Scotland
Inishcrone, Killala Bay, Co. Sligo, Ireland
Mt. Holland, Western Australia, Australia

Kimzey quarry, Magnet Cove, Hot Spring Co., Arkansas, USA
Fairview phosphate deposit, Robertstown, South Australia, Australia
Foote Mineral Company spodumene mine, Kings Mt. (near), Cleveland Co., North Carolina, USA
Kawazu mine, Shimoda City, Izu Peninsula, Japan
Santa Rita Mts., Pima Co., Arizona, USA
Misago ore body, Noda-Tamagawa mine, Iwate, Japan
Kipushi, Shaba, Democratic Republic of Congo
Aghios Philippos deposit, Kirki (near), Thrace, Greece

Kitka river, Kuusamo, Oulu, Finland
Franklin, Sussex Co., New Jersey, USA
Kobokobo pegmatite, Kivu, Democratic Republic of Congo
Kladno, Praha (near), Stredocsky kraj, Bohemia, Czech Republic
Baia-Sprie, Maramures Co., Romania
Weissel basin, Germany
Iron Monarch quarry, Iron Knob, South Australia, Australia

Terlingua, Brewster Co., Texas, USA
Sierra de Umango, La Rioja, Argentina; Harz, Germany
Kao kimberlite pipe, Lesotho
Mt. Koashva, Khibina massif, Kola Peninsula, Russia, FSU

Vena mine, Nerika, Hammar, Askersund (near), Sweden
Daniel Mine, Schneeberg, Sachsen, Germany
Justus I mine, Volpriehausen, Hannover, Germany
Hortense Hot Spring and Wright's Well, Chalk Creek, Mt. Princeton, Chaffee Co., Colorado, USA
Zeravice, Kyjov (near), Moravia, Czech Republic
Champion Reef lode, Kolar goldfields, Karnataka, India
Sadisdorf, Schmiedeberg, Sachsen, Germany

Unspecified locality, Kola Peninsula, Russia, FSU
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA

Kolwezi, Shaba (S), Democratic Republic of Congo
Krokhalin mine, Magadan region, Kolym river basin, FSU
Mt. Karnasurt, Lovozero, Kola Peninsula, Russia, FSU
Kond‰r massif, Aldan shield, Siberia, Russia (E), FSU
Richelle, Vis, (near), LiŠge, Belgium
Great Konya Basin, Turkey

Tsumeb, Namibia
Szomolnok (Smoln¡k), Slovakia
Fisken„s, Nuuk area, Greenland (SW)
Korshunovsk deposit, Ilim, Irkutsk, Russia, FSU
Toluca meteorite, Xiquipilco, Mexico, Mexico
Chelopech deposit, Bulgaria
Khibina massif, Vuonnemi river, Kola Peninsula, Russia, FSU
Hol Kol Gold Mine, Suan, Korea
Daniel cobalt mine, Schneeberg, Sachsen, Germany
Monchegorsk, Lake Imandra, Murmansk, FSU
Cerny Dul (Schwarzenthal), Krkonose (Giant Mts.), Vychodocesky kraj, Bohemia, Czech Republic
Kovdor massif, Kola Peninsula, Russia, FSU
Tanohata mine, Iwate Pref., Japan
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Kladno, Praha (near), Stredocesky kraj, Bohemia, Czech Republic
Sulfur Hole, Calico Hills, Borate, San Bernardino Co., California, USA
Big Creek and Rush Creek, Fresno Co., California, USA
Sacarimb (Nagyag), Transylvania, Romania
Mt. Vesuvius, Napoli, Campania, Italy
Sacarimb (Nagy g), Transylvania, Romania
Canyon Diablo, Coconino Co, Arizona, USA; Wichita Co., Texas, USA; and Youndegin, Avon, Western Australia, Australia me

Krupka, Severocesky kraj, Bohemia, Czech Republic
Petrovice Zd'ar, Jihomoravsky kraj, Moravia, Czech Republic
Geshiber vein, J chymov (St. Joachimsthal), Bohemia, Czech Republic; Khomahs deposit, Tuva, FSU
Kalbinsk pegmatite, Russia, FSU
Kamariza mine, L vrion (Laurium), Attik¡, Greece

Rapid Creek (Cross-cut Creek), Big Fish River -- Blow River Area, Yukon Territory, Canada
Ksar el Boukhari (W), Perrag, Algeria
Kuusamo, Finland

Lovozero, Kola Peninsula, Russia, FSU
Unspecified locality, Kuramin mountains, Uzbekistan, FSU
Kuranakh gold deposit, Yakutia (S), FSU
Solongo deposit, Buryat, Russia, FSU
Inder, Kazakhstan, FSU
Cerny dul (Schwarzenthal), Krkonose (Giant Mtns.), Vychodocesky kraj, Bohemia, Czech Republic
Kank, Kutn Hora (near), Stredocesky kraj., Bohemia, Czech Republic
Arzak deposit, Tuva, Russia; Khaidarkan deposit, Kirghizia, FSU

Kvanefjeld Plateau, Il¡maussaq intrusive, Greenland (S)
Greiner, Zillerthal, Austria
Kyzyl-Kum, Uzbekistan, FSU
Paul Island, Labrador (coast), Newfoundland, Canada
Khibina tundra, Kola Peninsula, Russia, FSU
Greifenstein, Ehrenfriedersdorf, Sachsen, Germany
Jas Roux, Hautes-Alpes, France
Lai-He Village, China (NE)
Orij„rvi mine, Orij„rvi, Finland (SW)
Sica Sica, Laurani, Veta Negra, La Paz, Bolivia

Susanna mine, Leadhills, Lanarkshire, Scotland
Burpala Alkaline Complex, Zabaikal'ye (N) (Transbaikal), Russia, FSU
Berry quarry, Portland, Androscoggin Co., Maine, USA
Wilhelmshall, Halberstadt, Germany
Langis mine, Harris twp., Timiskaming dist, Ontario, Canada
Fowey Consols mine, Tywardreath (St. Blazey), Cornwall, England
Lone Pine mine, Catron Co., New Mexico, USA
Nesquehoning, Lansford (near), Carbon Co., Pennsylvania, USA
Britannia mine, Snowdon, Caernarvonshire (Gwynedd), Wales

Curitiba, Paran , Brazil
Burnside, Northumberland Co., Pennsylvania, USA
Lapie River and Glacier Creek, St. Cyr Ranges, Yukon Territory, Canada

Larderello, Val di Cecina, Pisa dist., Toscana, Italy
Larne, Co. Antrim, Northern Ireland
Foster Mine, Coleman Twp., Cobalt, Ontario, Canada
Franklin Furnace, Sussex Co., New Jersey, USA
Albano, Lazio (Latium), Italy
La Trappe, Oka, Qu,bec, Canada
Shady, Polk Co., Arkansas, USA
Hagendorf pegmatite, Oberpfalz, Bayern, Germany
Huelgoat mine, Brittany, France
Taylor Pit, Madoc, Huntingdon Twp, Hasting Co., Ontario, Canada
L vrion (Laurium), Attik¡, Greece
Borneo, Malaysia
Pampa del Pique III, Oficina Lautaro, Atacama desert, Antofagasta, Chile
Rudolfschacht mine, Lauta, Marienberg (near), Sachsen, Germany
Annaberg, Sachsen, Germany
Tazewell meteorite, Tennessee, USA
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Tiburon Peninsula, Marin Co., California, USA
Siberia (W), Russia, FSU

Badakhstan, Afghanistan (NE) (?)

Shiaonanshan, Inner Mongolia, China
Leadhills, Lanarkshire, Scotland

Las Piedras (cave), Comayagua (near), Honduras
Flor de Pena Mine, Lampazos, Nueva Leon, Mexico
Narsarsuaq, Julianehaab district, Greenland
Chuquicamata, Antofagasta, Chile
Tsumeb, Namibia
Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada
Lengenbach, Binntal, Valais (Wallis), Switzerland
Franklin, Sussex Co., New Jersey, USA
Westerregeln, Leopoldshall, Stassfurt, Germany

Eisenzeche, Eiserfeld, Siegen, Rheinland-Westfalen, Germany
Rozhn deposit, Moravia, Czech Republic
Letovice, Moravia, Czech Republic
Named after Prof. Armand Renier director of, Howie and Zussman, Rock Forming Minerals, v. 4, p. 276-288, New York, Wiley
L†ven, Langesundfjord, Norway
Franklin, Sussex Co., New Jersey, USA
Wheelhamby Lake, Ninghanboun Hills, Western Australia, Australia
Narsarsuaq, Julianehaab district, Greenland
Dalsnipa, Sandoy, Far”e Islands, Denmark
Tripuhy, Ouro Preto, Minas Gerais, Brazil
Antsakoa I pegmatite, Berere region, Tsaratanana (near), Madagascar
Nan ling Range, China (S)
Lubietov (Libethen), Bansk Bystrica (Neusohl), Stredoslovensky kraj, Slovakia
Antsirabe, Madagascar
Scotia Talc Mine, Bon Accord, Barberton Dist., Transvaal, South Africa
Edirne, Adrianople (near), Turkey
Likasi Copper Mine, Shaba, Democratic Republic of Congo
Lillian Mining Co., Printerboy Hill, Leadville (near), Lake Co., Colorado, USA
Mt. Vesuvius, Napoli, Italy
Linares, Ja,n, Spain
Chuquicamata, Antofagasta, Chile
de Beers diamond mine, Kimberley, South Africa
Gladhammar, Sm†land, Kalmar, Sweden
Bastn„s, Riddarhyttan, V„stmanland, Sweden
Pitigliano, Grosseto, Toscana, Italy
Sapucaia pegmatite, Counselheiro Pe¤a, Minas Gerais, Brazil
Wheal Gorland, Gwennap, Cornwall, England
Cuamongo Peak, San Bernardino Co., California, USA
Branchville, Fairfield Co., Connecticut, USA
Schneeberg, Sachsen, Germany
Rare Metals pegmatite, Woroniy Tundra, Kola Peninsula, Russia, FSU
Kazakhstan (E), FSU
Vuonnemiok region, Khibina massif, Kola Peninsula, Russia, FSU
Mt. Vesuvius, Napoli, Campania, Italy
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Huitzuco, Guerrero, Mexico
Kennack Cove, Lizard, Cornwall, England

Wolfbauer mine, L”lling, H□ttenberg, K„rnten (Carinthia), Austria

Lovozero massif, Kola Peninsula, Russia, FSU
Lone Creek Fall Cave, Sabie, Transvaal (E), South Africa
Canyon Diablo meteorite, Meteor Crater, Coconino Co., Arizona, USA
Named after Prof. Achille Sal,e.
Oficina Maria Elena, Tocopilla and Oficina Rosario, Iquique Pampa, Tarapac , Chile

Alsar (Allchar), Rozden (near), FYRO Macedonia
Narsarsuaq, Julianehaab district, Greenland
Loretto, Lawrence Co., Tennessee, USA
Franklin, Sussex Co., New Jersey, USA
Mapimi, Durango, Mexico
Goose Creek Quarry, Loudoun Co., Virginia, USA
Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia, FSU
Jimberlana intrusion, Norseman (near), Western Australia, Australia
Lovozero, Kola Peninsula, Russia, FSU
Ischl salt mine, Ober”sterreich, Austria
Artillery Peak, Mohave Co., Arizona, USA
Wheal Jane, Truro, Cornwall, England
Tsumeb, Namibia
Ocna de Fier (Vask” or Moravica), Banat, Romania
Lueshe, Goma, Democratic Republic of Congo
Patagonia Mining Dist., Santa Cruz Co., Arizona, USA
Lun`ok River, Kola Peninsula, Russia, FSU
L□neburg, Hannover, Germany
Lusungu, Kobokobo, Kivu, Democratic Republic of Congo
Mancayan, Lepanto district, Luzon island, Philippines
L†ngban mine, Filipstad (near), V†rmland, Sweden
L†ven island, Langesundfjord, Norway
Bennachie, Inverurie (near), Aberdeenshire, Scotland
Big Creek and Rush Creek, Fresno Co., California, USA
Crni Kamen, Prilep (near), FYRO Macedonia
Copper Harbor, Lake Manganese (near), Keeweenaw Co., Michigan, USA
Anton Mine, Schiltach (near), Heubachtal, Schwarzwald, Germany
Mowhawk mine, Goldfield, Esmeralda Co., Nevada, USA
Mackinaw mine, Snohomish Co., Washington, USA
Leadhills, Lanarkshire, Scotland; Aregentolle mine, Saint-Prix, Sa“ne-et-Loire, France
Mammoth Mine, Tiger, Pinal Co., Arizona, USA
Taylor pit, Madoc, Huntingdon twp., Hastings Co., Ontario, Canada
Lake Magadi, Rift Valley, Kenya
Iron Mt. Mine, Redding (near), Shasta Co., California, USA
Edwards, St. Lawrence Co., New York, USA
Japan
Tanzania
Ghiacciaio di Verra, Mezzalama refuge (E), Monte Rosa massif, Italy

Blythe, Riverside Co., California, USA ; Las Vegas (near), San Miguel Co., New Mexico, USA
Kongsberg, Buskerud, Norway (S)
Mt. Vesuvius, Napoli, Campania, Italy

Japan
Yuge Island and Myojin Island, Japan
Magnesia, Thessalia, Greece and/or Baldissero Canavese, Piemonte, Italy
Unspecified locality, Khibina, Kola Peninsula, Russia, FSU
Franklin, Sussex Co., New Jersey, USA
Lucky Strike #2 mine, Emery Co., Utah, USA
Magnesia, Thessalia, Greece
L†ngban mine, Filipstad (near), V„rmland, Sweden
Turkestan ridge, Tadzhikistan or Kirghizia, FSU
Kugi-Lyal, Pamir (SW), Russia, FSU
L†ngban mine, Filipstad (near), V„rmland, Sweden
Majak mine, Talnakh, Noril'sk (near), Siberia (N), Russia, FSU
Coorara meteorite crater, Rawlinna (near), Western Australia, Australia
Lake Magadi, Rift Valley, Kenya
Kuusamo, Finland (NE)

Unspecified locality, China
Sungei Lok, Chenderiang, Perak, Malay Peninsula, Malaysia (Malaya)
Nuggety Reef, Maldon, Victoria, Australia
Mt. Vesuvius, Napoli, Campania, Italy
Lucky Boy Mine, Butterfield Canyon, Salt Lake Co., Utah, USA
Mammoth Mine, Tiger, Pinal Co., Arizona, USA
Antandrokomby pegmatite, Manandona River, Sahatany Valley, Madagascar
Snarum and Kongsberg, Norway; Amity, New York, USA
Pacajake Mine, Colquechaca (Near), Potos¡, Bolivia
Lovozero massif, Kola Peninsula, Russia, FSU
L†ngban mine, Filipstad (near), V„rmland, Sweden
Harz Mts., Germany
Rudnyi Kaskad deposit, Sayan (E), Russia, FSU
L†ngban mine, Filipstad (near), V„rmland, Sweden

Brattfors mine and L†ngban mine, Filipstad (near), V„rmland, Sweden
Ilfeld, Harz, Germany
Nairne deposit, Adelaide (E), South Australia, Australia
New London, New London Co., Connecticut, USA
Mt. Vesuvius, Napoli, Campania, Italy
L†ngban mine, Filipstad (near), V„rmland, Sweden
Moss Mine, Nordmark, V†rmland, Sweden
Ut”, Sweden
Viitaniemi, Er„j„rvi, Orivesi, Finland
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Kohare Mine, Iwate, Japan
Rough Claims, Sifton Pass (N), Kechica River, British Columbia, Canada
Hobart Butte, Lane Co., Oregon, USA
Anloua, Cameroon
Ojuela mine, Mapimi, Durango, Mexico

Margarita's Deposit, Pena Blanca Dist., Chihuahua (near), Chihuahua, Mexico
Mt. Greiner, Sterzing, Tyrol, Austria
Franklin, Sussex Co., New Jersey, USA
Pianura, Napoli (Naples), Campania, Italy
Big Fish River, Yukon Territory, Canada
Tachgagalt, Ouarzazate, Morocco
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Broken Hill, New South Wales, Australia
Franklin, Sussex Co., New Jersey, USA
Musunoi deposit, Shaba, Democratic Republic of Congo
Mt. Vesuvius, Napoli, Campania, Italy; Mt. Etna, Sicily
Oktyabr deposit, Talnakh, Noril'sk (near), Siberia (N), Russia, FSU
Mexico
Tanakamiyama, Otsu, Shiga Pref., Japan
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Jagesfontein diamond mine, Orange Free State, South Africa
Matilda Mine, Morococha (near), Peru
Cromford, Matlock (near), Derbyshire, England
Matra Mts., Gy”ngy”soroszi, Hungary
Mattagami Lake Mine, Galin,e Twp., Abitibi Co., Qu,bec, Canada
Mt. Vesuvius, Napoli, Campania, Italy
LCA pegmatite mine, Gaston Co., North Carolina, USA
Eisleben, Th□ringen (Thuringia), Germany
Kintore open cut, Broken Hill, New South Wales, Australia
Tingha, New South Wales, Australia and Mt. Lyell, Tasmania
Ettringer Bellerberg, Mayen, Eifel, Rheinland-Pfalz, Germany
Mont Semiol (Mt. Semiouse), Montbrison, Loire, France
Mbobo Mkulu Cave, Nelspruit dist., Transvaal (E), South Africa
Mott colemanite prospect, Twenty Mule Team Canyon, Furnace Creek, Death Valley, Inyo Co., California, USA
Merume River, Kamakusa (near), Mazaruni dist., Guyana
Sullivan mine, Kimberley, British Columbia, Canada
Stirling Hill mine, Ogdensburg, Sussex Co., New Jersey, USA
Red Mountain (locality #2), Mendocino Co., California, USA
Diamond Alkali Daco No. 3, Green River formation, Sweetwater Co., Wyoming, USA

Foster Mine, Coleman Twp., Cobalt, Ontario, Canada
Ste.- Marie-aux-Mines, Vosges Mtns., Haut-Rhin, Alsace, France
Molinello mine, Val Graveglia, Liguria, Italy
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy

Giona mine, Racalmuto, Agrigento, Sicily
Sj”gruvan, Grythyttan (near), ™rebro, Sweden
L†ngban mine, Filipstad (near), V„rmland, Sweden
Mt. Vesuvius, Napoli, Campania, Italy
Minasragra, Jun¡n, Peru

Frediksv„rn (near), Norway
Artern, Th□ringen, Germany
Stanislaus Mine, Carson Hill, Calaveras Co., California, USA

D'Angarf-sud pegmatite, Anti-atlas, Plaine des Zenaga, Morocco
Churchill, Mendip Hills, Somerset, England
Cumobabi Mo deposit, Cumpas, Sonora, Mexico
St. Juan, Mendoza (near), Argentina
Bottino mine, Serravezza, Alpe Apuane, Toscana, Italy
Mt. Vesuvius, Napoli, Campania, Italy

Rustenburg mine, Merensky Reef, Pretoria, Transvaal, South Africa
Cupaello quarry, Rieti, Santa Rufina (near), Lazio (Latium), Italy
Mez”-Madaras meteorite, Harghita Co., Romania

Wet Weather quarry, Crestmore, Riverside (near), Riverside Co., California, USA
Far”e Islands, Denmark
Messel (near), Hessen, Germany
Fuemrole Mine, Temple Mt., Emery Co., Utah, USA
Mungenyi pegmatite, Ankole district, Uganda (SW)

Sophia mine, Wittichen, Schwarzwald, Germany
Unspecified locality, Kazakhstan(?), FSU
Reddington Mine, Lake Co., California, USA
Jo Dandy Mine, Montrose Co., Colorado, USA
Haiwee Reservoir, Coso Mts, California, USA
White King Mine, Lakeview (near), Lake Co., Oregon, USA
Jo Dandy Claim, East Paradox Valley, Montrose Co., Colorado, USA ; Henry Mountains, Utah, USA ; Thompsons (SE), Yellow
Sophia mine, Wittichen, Schwarzwald, Germany
Sophia mine, Wittichen, Schwarzwald, Germany
Ojuela mine, Mapimi, Durango, Mexico
LodŠve, H,rault, France
Anton mine, Schwarzwald, Germany
Wm. O'Neill's Claim, Dolores River, Bull Pen Canyon, San Miguel Co., Colorado, USA
Van-Nav-Sand claims, Fish Creek Range, Eureka (S), Nevada, USA
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Sierra Gorda, Chuquicamata, Antofagasta, Chile
Steamboat Springs, Washoe Co., Nevada, USA
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Foote Mineral Company spodumene mine, Kings Mt. (near), Cleveland Co., North Carolina, USA
2/m
Jo Dandy Mine, Montrose Co., Colorado, USA
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Kobokobo pegmatite, Kivu, Democratic Republic of Congo
Mounana mine, Franceville, Haut-Ogoou,, Gabon
Edison-Bird Mine, Utahlite Hill, Lucin (NW), Box Elder Co., Utah, USA
Llallagua, Potos¡, Bolivia
Big Chief pegmatite, Glendale (near), Pennington Co., South Dakota, USA
Madeni Zakh (near), Iran
Lucky MC Mine, Gas Hill Deposit, Fremont Co., Wyoming, USA
Weisser Hirsch mine, Schneeberg, Sachsen, Germany

Mt Blanco Deposit, Furnace Creek, Death Valley, Inyo Co., California, USA
Nzombe, Kivu, Democratic Republic of Congo
Erzgebirge (SW), Sachsen, Germany
Braunsdorf, Freiberg (near), Sachsen, Germany
Frood Mine, McKim Twp., Sudbury Dist., Ontario, Canada
Fredriksv„rn, Norway
Chesterfield, Hampshire Co., Massachusetts, USA
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
Broken Hill, New South Wales, Australia
Mihara mine, Yoshii-cho, Shitsuki-gun, Okayama, Japan
Val Giuf, Tavetsch, Grischun (Graub□nden), Switzerland
J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Clay Canyon (near), Fairfield, Utah Co., Utah, USA
Alum Grotto, Vulcano Island, Lipari Islands, Italy

Jacuaracu pegmatite, Lavra de Sr. Jose Pinto, Municipo de Timoteo, Jacuaracu, Minas Gerais, Brazil

Mina Ragra (Minasragra), Cerro de Pasco (near), Pasco dept., Peru
Franklin, Sussex Co., New Jersey, USA
Elba, Toscana, Italy
Langenheck, Hesse-Kassel, Germany
Mesabi and Cuyuna iron ranges, Minnesota, USA
Tsumeb, Namibia
Dandaragan, Minyulo Well (near), Western Australia, Australia

Cape Miseno, Napoli (Naples), Campania, Italy
Wilson Mineral Springs, Hot Springs Co., Arkansas, USA
Mitridat Mts., Kerch peninsula, Crimea, Ukraine, FSU
Mt. Vesuvius, Napoli, Campania, Italy
J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Moctezuma Mine, Moctezuma, Sonora, Mexico
Modderfontein mine, Witwatersrand, Transvaal, South Africa
Kochbulak deposit, Uzbekistan (E), FSU
Travale, Montieri, Grosseto, Toscana, Italy
Canyon Diablo meteorite, Meteor Crater, Coconino Co., Arizona, USA
Unspecified locality, FSU
Bispberg Fe mine, S„ter, Dalarne (Kopparberg), Sweden
Krupka, Stredocesky kraj, Bohemia, Czech Republic
Tsumeb mine, Tsumeb, Namibia
Cacheuta, Mendoza, Argentina
L†ngban mine, Filipstad (near), V„rmland, Sweden
Mt. Vesuvius, Napoli, Campania, Italy
Zlatoust, Ilmen Mts., Russia, FSU

Monchegorsk deposit; Monche Tundra, Russia, FSU

Moneta Island, Mayeguez(S), Puerto Rico, West Indies
Dotozhny pegmatite, Khan-Bogda massif, Gobi, Mongolia
Harstigen mine, Pajsberg, V„rmland, Sweden

Lake Issyk-Kul, Kirghizia (Kirgizia), FSU
Rotmundi vein, Baia Sprie (Fels”b nya), Maramures, Romania
Robb-Montbray mine, Montbray Twp., Abitibi Co., Qu,bec, Canada
Mont-Dore, La Bourboule (near), Puy-de-D“me, France
Montebras, Soumans, Creuse, France
Monteponi mine, Iglesias, Cagliari, Sardegna (Sardinia), Italy
Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada

Clay Canyon (near), Fairfield, Utah Co., Utah, USA
Mt. Vesuvius, Napoli, Campania, Italy
Montmorillon, Vienne, France
Bitter Creek Mine, Paradox Valley, Montrose Co., Colorado, USA
Francon quarry, St.-Michel Dist., Montreal Island, Qu,bec, Canada
Terlingua, Brewster Co., Texas, USA
Mooihoek Farm, Lydenberg Dist., Transvaal, South Africa
Bunbury Well (N), Mooloo Downs, Western Australia, Australia
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Magnet Cove Barium Corp. Mine, Walton, Hants Co., Nova Scotia, Canada
Mopung Hills, Churchill Co., Nevada, USA
Sapucaia pegmatite, Galileia, Minas Gerais, Brazil
Morden (E), Kings Co., Nova Scotia, Canada
Kobokobo, Kivu, Democratic Republic of Congo
Jakobsberg mine, Filipstad, Nordmark (near), V„rmland, Sweden
Cap Ortegal, Galicia, Spain
Montebras, Soumans, Creuse, France
Zechstein shales, Lower Silesia, Poland
L†ven island, Langesundfjord, Norway
Landsberg (Moschellandsberg), Obermoschel (near), Rheinland-Pfalz, Germany
Terlingua, Brewster Co., Texas, USA
Mottram St. Andrew, Cheshire, England
Brown's Island, Waitemata Harbour, Auckland, New Zealand
Mounana mine, Franceville, Haut-Ogoou,, Gabon
Bultfontein Mine, Kimberley, South Africa
Mount Keith deposit, Agnew, Western Australia, Australia
Russia, FSU

Lubietova (Libethen) Cu deposit, Slovakia
Moctezuma Mine, Sonora, Mexico
Big Creek and Rush Creek, Fresno Co., California, USA
Tashelginsk iron deposit, Gornaya Shoriya, Siberia (W), Russia, FSU
Seabank Villa, Isle of Mull, Scotland
Kobokobo, Kivu, Democratic Republic of Congo
Petrogale cave, Madura, Western Australia, Australia
Siwalik sandstone, Bhimber, Azad Kashmir, Pakistan
St. Peter's Dome, El Paso Co., Colorado, USA
Mammoth mine, Tiger, Pinal Co., Arizona, USA
Kola Peninsula, Russia, FSU
Murun massif, Olekminsk (near), Yakutia, Russia, FSU

Steben, Oberfranken, Germany

Enderby Land, Mcintyre Island (near), Zircon Point, Antarctica (E) and/or Ernabella Mission (NNE), Musgrave range, South Au

Mushiston deposit, Tadzhikistan, FSU
Muskox Intrusion, Coppermine River area, Northwest Territories, Canada

Yukspor Mts., Khibina massif, Kola Peninsula, Russia, FSU
Mt. Rasvumchorr, Khibina massif, Kola Peninsula, Russia, FSU
Einigkeit mine, Brand-Erbisdorf, Freiberg (near), Sachsen, Germany
Jebel Nador, Qacentina (Constantine), Algeria
Mogurazawa Mine, Kiryu, Gumma pref., Honshu, Japan
Hatrurim formation, Israel

Stufe de Nerone (near), Baja, Campi Flegrei, Napoli, Campania, Italy
Big Fish River, Yukon Territory, Canada
Nakauri Mine, Aichi, Shinshiro, Honshu, Japan
Tunakozowa Mine, Kitakami Mts., Japan
Khorixas, Namibia (NW)
Aberllyn mine, Betws-y-coed (near), Caernarvonshire (Gwynedd), Wales
Nan Ling area, China
Nantoko, Copiap¢, Chile
Narsarsuaq, Julianehaab district, Greenland
Larderello, Val di Cecina, Pisa, Toscana, Italy
Franklin Furnace, Sussex Co., New Jersey, USA
Alluaiv, Lovozero massif, Kola Peninsula, Russia, FSU
Slyudyanka complex, Lake Baikal region, Zabaikal'ye (S) (Transbaikal), FSU
Trudov and Mushiston deposits, Tadzhikistan, FSU
Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia, FSU
Khibina massif and Lovozero massif, Kola Peninsula, Russia, FSU
National Bell mine, Silverton (near), Hinsdale Co., Colorado, USA
Sampo Mine, Takahashi (W), Okayama, Honshu, Japan
Kok-togoy pegmatites, Xinjiang, China
Chuquicamata, Antofagasta, Chile
Rochefort-en-Terre, Morbihan, France
Vourij„rvi massif, Kola Peninsula, Russia, FSU
Soda Springs Valley, Esmeralda Co., Nevada, USA
Hohentweil, H”gau (Hegau) dist., W□rttemberg, Germany
Canyon City, Fremont Co., Colorado, USA
Egypt
Tanohata mine, Iwate, Japan
Branchville, Fairfield Co., Connecticut, USA
Yukspor Mts., Khibina massif, Kola Peninsula, Russia, FSU
Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia, FSU
Kola Peninsula, Russia, FSU
Naujakasik, Il¡maussaq intrusive, Greenland (S)
Tilkerode, Harz, Germany
Monument #2 Mine, Monument Valley, Apache Co., Arizona, USA
L vrion (Laurium), Attik¡, Greece

Yukspor Mt. and Kuniok River, Khibina massif, Kola Peninsula, Russia, FSU
Green River Formation, South Ouray, Uintah Co., Utah, USA
Wet Weather Quarry, Crestmore, Riverside Co., California, USA
Kairagach deposit, Kuramin Mts., Uzbekistan (E), FSU
Trotter shaft, Franklin, Sussex Co., New Jersey, USA
Tachgagalt, Morocco
Kola Peninsula, Russia, FSU
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
N,poui, New Caledonia
Narsarsuaq, Julianehaab district, Greenland
Nesquehoning, Lansford (near), Carbon Co., Pennsylvania, USA
Nevskiy deposit, Russia (NE), FSU
Skipton Caves, Ballarat, Victoria, Australia
Lime Creek Molybdenum Deposit, Patsy Creek, Alice Arm (S), British Columbia, Canada
Niah Great Cave, Sarawak, Malaysia

Bogota, Canala, New Caledonia

J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Mbobo Mkulu Cave, Nelspruit dist., Transvaal (E), South Africa
Dumont Intrusion, Amos (W), Launay Twp., Abitibi Co., Qu,bec, Canada
Carr Boyd mine, Kalgoorlie and Durkin nickel mine, Kambalda, Western Australia, Australia
Severnyi deposit, Noril'sk, Russia, FSU

Tur'insk region, Ural Mts. (N), Russia, FSU
Egbe district, Kabba province, Nigeria
Waterfall Gorge, Insizwa, Griqualand East, South Africa
Scotia Talc Mine, Bon Accord, Barberton Dist., Transvaal, South Africa
Ningyo-Toge Mine, Tottori, Honshu, Japan
Six chondrite meteorites; Abee, St. Sauveur, Adhi-Kot, Indarch, St. Marks and Kota-Kota

Ten Mile Lake (near), Seal Lake area, Labrador, Canada
Bond zone, Oka, Deux-Montagnes Co., Qu,bec, Canada
Trout Bay, Red Lake area, Mulcahy Township, Kenora District, Ontario, Canada
Panoche Valley, Benito Co., California, USA

Unknown locality, Chile

Nicojack Cave, Marion Co., Tennessee, USA
De Bely Mine (NNW), Death Valley National Monument, Inyo Co., California, USA
Fish Hook Bay, Lake Athabasca, Beaverlodge region, Saskatchewan, Canada
Saint-Pardoux, Nontron, Dordogne, France
Norberg, Sweden
Ar”, Langesundfjord, Norway
Chinglusuai River, Lovozero massif, Kola Peninsula, Russia, FSU

Bau, Gunony Kapor, Sarawak, Malaysia ; Mt. Alifan-Mt. Lamlan Ridge, Guam (S)

Falun, Kopparberg, Sweden
Westvaco Trona Mine, Green River Formation, Sweetwater Co., Wyoming, USA
Searles Lake, San Bernardino Co., California, USA
Laacher See, Germany
Schneeberg, Schwarzwald, Germany
Cerny Dul (Schwarzenthal), Krkonose, Vychodocesky kraj, Bohemia, Czech Republic
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Nsuta, Ghana
Patsy Creek, Lime Creek stock, Alice Arm (S), British Columbia, Canada
Undu Mine (dumps), Vanu Levu, Nukundamu, Fiji
Otway Ni deposit, Nullagine dist., Western Australia, Australia
Carbonatite lava (1963 flow), Ol Doinyo Lengai Volcano, Tanzania
Tsumeb, Namibia
Grand Central Mine, Tombstone, Cochise Co., Arizona, USA
Chuquicamata, Antofagasta, Chile
Mont Semiol (Simiouse), Montbrison (near), Loire, France
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Ohmi, Niigata, Japan
Oju,la mine, Mapimi, Durango, Mexico

Disko Island, Greenland (W)
Bustee meteorite, Gorakhpur (near), Basti dist., Uttar Pradesh, India
Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia, FSU
Danviken, S”dermalm, Stockholm (SE), Sweden
Carharrack mine, Gwennap, Cornwall, England

Hesnard pegmatite, Custer (near), Custer Co. and Big Chief pegmatite, Glendale (near), Pennington Co., South Dakota, USA
Pacajake mine, Colquechaca (near), Potos¡, Bolivia
Mt. Rasvumchorr, Khibina massif, Kola Peninsula, Russia, FSU
Omeishan Mt. (near), Sichuan (Szechuan), China
Hof (near), Bayern, Germany
Cetine di Cotorniano mine, Rosia, Siena, Toscana, Italy

Musonoi deposit, Shaba, Democratic Republic of Congo

Santin Mine, Santa Catarina, Cerro de las Fajas, Guanajuato, Mexico
Sj”gruvan, Grythyttan (near), ™rebro, Sweden
Josephine Creek, Oregon, USA
Coyote Peak, Humboldt Co., California, USA
Oriente Province, Cuba
Madyarovo deposit, Rhodope Mts. (E), Bulgaria

Yunan and Szechuan, China
Cuddapah, Madras, India

L†ngban mine, Filipstad (near), V„rmland, Sweden

L†ngban mine, Filipstad (near), V„rmland, Sweden
Osarizawa mine, Akita, Japan

Gold Bluff, Humboldt Co., California, USA
Bustee meteorite, Gorakhpur (near), Basti dist., Uttar Pradesh, India
Ural Mts., Russia, FSU
Borneo
Sakurazima Mt., Sakkabira, Hayasaki, Tarumizumati, Kagosima, Japan
Tieveragh, Co. Antrim, Northern Ireland
Tsumeb, Otavi, Namibia
Tsumeb, Namibia
Cerro de Potosi, Bolivia
Ottr,, Ardennes, Belgium
Otway deposit, Nullagine dist., Western Australia, Australia
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Clay Canyon (near), Fairfield, Utah Co., Utah, USA
Poorman Mine, Silver City Dist., Owyhee Co., Idaho, USA
Gua¤ape Islands, Peru
Fuka, Bitchu, Okayama Pref., Honshu, Japan
Kalliosalo deposit, Sein„joki, Finland
Pacific Limestone Products Quarry, Santa Cruz, Santa Cruz Co., California, USA
Ivigtut, Greenland (SW)
Baita Bihorului (R,zb nya), Romania
Tip Top Pegmatite, Custer (near), Custer Co., South Dakota, USA
Ohngaing (near), Mogok dist., Myanmar (Burma)
Talnakh deposit, Noril'sk (near), Siberia (N), Russia, FSU
Palermo mine, North Groton (near), Grafton Co., New Hampshire, USA
Brazil
Oktyabr deposit, Talnakh, Noril'sk (near), Siberia (N), Russia, FSU
Stillwater Complex, Montana, USA
Itabira, Minas Gerais, Brazil
Mt. Vesuvius, Napoli, Campania, Italy
Palygorsk, Perm mining district, Ural Mts., Russia, FSU
Panasqueira mine, Panasqueira, Beira Baixa, Portugal
Dayton meteorite, Montgomery Co., Ohio, USA
Oktyabr deposit, Talnakh, Noril'sk (near), Siberia (N), Russia, FSU
New Cornelia mine, Ajo, Pima Co., Arizona, USA
Alto do Giz, Equador, Rio Grande do Norte, Brazil
Alcaparrosa, Ceritos Bayos, Antofagasta, Chile
Candoglia, Piemonte, Italy
Tierra Amarilla, Copiap¢(near), Atacama, Chile and Alcaparrosa and Quetana, Chile
Trout Bay, Red Lake area, Mulcahy Township, Kenora Dist., Ontario, Canada
Ojuela mine, Mapimi, Durango, Mexico
Broken Hill, New South Wales, Australia
Pizzo Forno, Alpe Sponda, Faido (W of), Ticino, Switzerland
Sierra de Sta. Rosa, Santa Catarina mine, Guanajuato (near), Mexico

Kabwe (Broken Hill), Central province, Zambia
Lovozero and Khibina massifs, Kola peninsula, Russia, FSU
Emerald mine, Tombstone, Cochise Co., Arizona, USA
L vrion (Laurium), Attik¡, Greece
Minerva #1 Mine, Cave-in-rock, Hardin Co., Illinois, USA

Copper Queen Mine, Bisbee, Cochise Co., Arizona, USA
Cumobabi, Sonora, Mexico
Bitter Creek mine, Paradox Valley, Montrose Co., Colorado, USA
Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada
Alsar (Allchar), Rozden (near), FYRO Macedonia
Moose Horn mine, Hudson Bay mine and Keeley mine, Cobalt, Ontario, Canada
Mount Washington copper deposit, Vancouver Island, British Columbia, Canada
Vertrauen auf Gott mine and Moschellandsberg, Obermoschel, Rheinland-Pfalz, Germany
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Hagendorf pegmatite, Waidhaus, Oberpfalz, Bayern, Germany
Darwin (near), Inyo Co., California, USA
Kiura, Ohita, Japan
Sierra Gorda, Copiap¢ (near), Chile
Cananea, Sonora, Mexico
Mt. Eveslogchorr, Khibina massif (E), Kola Peninsula, Russia, FSU
Llallagua, Potos¡, Bolivia

Pargas quarry, Pargas, Finland

Waterfall Gorge, Insizwa, Griqualand East, South Africa
Majuba Hill Mine, Pershing Co., Nevada, USA
Tinizong (Tinzen), Alp Parsettens, Sursass (Oberhalbstein), Grischun (Graub□nden), Switzerland
a = 19.76, b = 7.06, c = 5.40, \b = 96.5
Belenk”ysirti Hill, Doganbaba, Burdur, Taurus Mts., Turkey (SW)
Blind Spring Hill dist., Benton (near), Mono Co., California, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Mina Ragra (Minasragra), Cerro de Pasco (near), Pasco dept., Peru
Mina Ragra (Minasragra), Cerro de Pasco (near), Pasco dept., Peru
Rock Island Dam, Columbia River, Wenatchee, Douglas Co., Washington, USA
Bagdad Copper Mine (near), 7-U-7 Ranch, Hillside, Yavapai Co., Arizona, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Bolivar mine, Cerro Bonete, Sur-Lipez, Bolivia
Cerny Dul (Schwarzenthal), Krkonose, Vychodocesky kraj, Bohemia, Czech Republic
Mollie Gibson mine, Aspen, Pitkin Co., Colorado, USA
Wolf Creek meteorite crater, Western Australia, Australia
Montemaldo, Tyrol (S), Italy
Kemi” island, Finland (SW)
Tom's phosphate quarry, Kapunda (near), South Australia, Australia
Peko or Juno mine, Tennant Creek, Northern Territory, Australia
Ross River and Pelly River, Gillespite Lake (SW), Yukon Territory, Canada
Rapid Creek, Big Fish River -- Blow River area, Yukon Territory, Canada
Lovozero massif, Kola Peninsula, Russia, FSU
Benallt mine, Rhiw, Lleyn Peninsula, Caernavonshire (Gwynedd), Wales
Pacajake Mine, Colquechaca (Near), Potos¡, Bolivia
Owyhee Dam, Lake Owyhee State Park, Malheur Co., Oregon, USA
Cripple Creek, Teller Co., Colorado, USA
Craignure, Inverary, Argyllshire, Scotland
Pengina River, Kamchatka (N), Russia, FSU
Pereta Mine, Grosseto, Toscana, Italy

Bell Pit, Newry, Oxford Co., Maine, USA
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
L†ngban mine, Filipstad (near), V„rmland, Sweden
Mt. Eveslogchorr and Yukspor Mts., Khibina massif, Kola Peninsula, Russia, FSU
Big Chief Mine, Glendale (near), Pennington Co., South Dakota, USA
Predborice, Stredocesky kraj, Bohemia, Czech Republic
Achmatovsk, Zlatoust dist., Ural Mts., Russia, FSU

Cap Garonne, Le Pradet, Var, France; Broken Hill, New South Wales and Coppin Pool, Western Australia, Australia
Horse Creek iron meteorite, Baca Co., Colorado, USA and St. Mark's enstatite chondrite, Transkei, Cape Province, South Afr
Ut”, Sweden
Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada
Franklin, Sussex Co., New Jersey, USA
Laurel Hill, Secaucus, Hudson Co., New Jersey, USA
Petrovice Zd'ar, Jihomoravsky kraj, Moravia, Czech Republic
Maikan deposit, Kazakhstan (central), FSU
Antsakoa, Berere, Tananarive (NNW), Madagascar
Sacarimb (Nagy g), Transylvania, Romania
Wittichen, Schwarzwald, Germany
Carharrack mine and Tincroft mine, Cornwall, England
Gabe-Gottes vein, Ste.- Marie-aux-Mines, Vosges Mtns., Haut-Rhin, Alsace, France
Takovaya, Ekaterinburg (Sverdlovsk), Ural Mts., FSU
Dundas, Tasmania, Australia
Black Pine Mine, Philipsburg (near), Granite Co., Montana, USA
Near Aci Castello and Acireale, Catania prov., Sicilia (Sicily), Italy
Antwerp, Jefferson Co., New York, USA
Berezov, Ekaterinburg (Sverdlovsk), Ural Mts., Russia, FSU
Cromford (near), Derbyshire, England
Mt. Karnasurt, Lovozero massif and Mt. Koashva, Khibina massif, Kola Peninsula, Russia, FSU
Gua¤ape Islands, Peru
Hagendorf pegmatite, Oberpfalz, Bayern, Germany
Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Hagendorf pegmatite, Oberpfalz, Bayern, Germany
Schellgaden (near), Salzburg province, Austria
Kalterborn mine, Eiserfeld (near), Siegen, Germany
Flat Rock pegmatite and Buchanan pegmatite, Mitchell Co., North Carolina, USA
Kobokobo, Kivu, Democratic Republic of Congo
Bergen an den Trieb, Sachsen, Germany
Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Cerro Pintados, Iquique, Tarapac , Chile (N)
Alsar (Allchar), Rozden (near), FYRO Macedonia
Mt. Vesuvius, Napoli, Campania, Italy
Richelsdorf, Hessen, Germany
Prabnora mine, St. Marcel, Val d'Aosta, Piemonte, Italy
Jas Roux mine, Valgaudemar, Hautes-Alpes, France
Pigeon Point, Minnesota, USA
Nagyb”rzs”ny (Deutsch-Pilsen), B”rzsony hills, Esztergom (Gran), Hungary
L†ngban mine, Filipstad (near), V„rmland, Sweden
Terlingua, Brewster Co., Texas, USA

Stassfurt, Sachsen-Anhalt, Germany
Pirquitas deposit, Rinconada, Jujuy province, Argentina
Searles Lake, San Bernardino Co., California, USA
Tolbachik volcano, Kamchatka, Russia, FSU
Graf Jost-Christina mine, Wolfsberg, Harz, Germany
Mindouli, Congo
Onverwacht (#330) Mine, Lydenberg Dist., Transvaal, South Africa
Nizhniy Tagil, Ural Mts., Russia, FSU

Leadhills, Lanarkshire, Scotland
Falun, Kopparberg, Sweden
Taylor pit, Madoc, Huntingdon Twp, Hastings Co., Ontario, Canada
PlombiŠres river region, Vosges, France
Ukraine, FSU
Burpala massif, Zabaikal'ye (N), Transbaikal, Russia, FSU

Huelgoat, FinistŠre, Brittany, France
Cooks Peak, Luna Co., New Mexico, USA
Kivu, Democratic Republic of Congo
Wanlockhead, Dumfries-shire, Scotland
Mayak mine, Talnakh (Tyllakh), Noril'sk (near), Siberia (N), Russia, FSU
Ural Mts., Russia, FSU
Zhana-Tyube, Kazakhstan (N), FSU
Tsumeb, Namibia
Avoca claim, Hat Creek, Bonaparte River, Lillooet Dist., British Columbia, Canada
Zlatogorsk intrusive, Kazakhstan, FSU
Talnakh, Noril'sk (near), Polar Urals, Siberia (N), Russia, FSU
B and B deposit, Big Creek dist., Valley Co., Idaho, USA
Zechstein shales, Lower Silesia, Poland
Elba, Toscana, Italy
Guarisamey, Durango, Mexico

Gr□nau, Sayn-Altenkirchen, Nordrhein-Westfalen, Germany
Ischl salt mine, Ober”sterreich, Austria
Kangerdluarsuk, Il¡maussaq intrusive, Greenland (S)

Scawt Hill, Co. Antrim, Northern Ireland
Nura-Talinsk tungsten deposits, Kazakhstan, FSU
Kaietur Falls, Potaro River, Guyana

Oldrichov, Tachov (near), Bohemia, Czech Republic
Moctezuma Mine, Moctezuma, Sonora, Mexico ; El Plomo Mine, Ojonjona Dist., Tegucigalpa, Honduras
Peacock lode, Seven Devils dist., Adams Co., Utah, USA
Khaidarkan deposit, Kirgiz Steppe, FSU
Cape of Good Hope, South Africa
San Francisco de los Andes and Cerro Negro de la Aguadita, Calingasta Dept., San Juan, Argentina
Geisspfad, Binntal, Valais (Wallis), Switzerland
Inder, Kazakhstan, FSU
Chetko (near), Curry Co., Oregon, USA

Walgidee Hills, Fitzroy Basin, Kimberley, Western Australia, Australia
Baker Mine, Kramer dist., Kern Co., California, USA
Altenberg, Sachsen, Germany
Tsumeb, Namibia
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo

Unspecified locality, FSU

Bol,o, Santa Rosalia (near), Baja California, Mexico
Magura Uroiu, (Aranyi-hegy or Aranyer Berg), Uroiu (Arany), Transylvania, Romania
Hagendorf pegmatite, Oberpfalz, Bayern, Germany

South Neptune Island, South Australia, Australia

Pucher shaft, Wolfgang Mine, Schneeberg, Sachsen, Germany
Keweenawan copper deposits, Lake Superior region, Michigan, USA
Ochiai mine, Yamanashi, Japan
Faires tin mine, Kings Mt., Gaston Co., North Carolina, USA; Pala, San Diego Co., California, USA
Oktyabr deposit, Talnakh, Noril'sk (near), Siberia (N), Russia, FSU

L†ngban mine, Filipstad (near), V„rmland, Sweden
Fredriksv„rn, Norway
Psjsberg, Filipstad (near), V„rmland, Sweden

Czech Republic
Harstigen mine, Pajsberg, V„rmland, Sweden

Bjelkegruva, Nordmark, V„rmland, Sweden
Kurprinz mine, Freiberg, Sachsen, Germany
Tranquillity Base, Moon
Iva, Anderson Co., South Carolina, USA

Qandil rocks, Dupezeh Mt., Hero Town, Qala-Dizeh (Qala-Diza) region, Iraq(NE)
Qinghe Co.(NW), Altai, Xinjiang, China
Qitianling, Hunan Province, China

Tsumeb, Namibia
L†ngban mine, Filipstad (near), V„rmland, Sweden
Tierra Amarilla, Copiap¢ (near), Chile
Bambollita mine (La Oriental), Sierra La Huerta, Moctezuma, Sorona, Mexico
Lucky Strike #2 Mine, Emery Co., Utah, USA
Champion reef lode, Kolar deposits, India
Alsar (Allchar), Rozden (near), FYRO Macedonia
Mt. Karnasurt, Ilmajok Valley, Lovozero Tundra, Kola Peninsula, Russia, FSU
Lone Pine Mine, Silver City, Grant Co., New Mexico, USA
Arksuk Fjord, Ivigtut, Greenland (SW)

Guadeloupe Mine, Nor-Chichas, Chocaya la Viega, Potos¡, Bolivia
Margnac Mine, Compreignac, Haute-Vienne, France
Schneeberg, Sachsen, Germany
Bastenberg mine, Ramsbeck, Nordrhein-Westfalen, Germany
Lake Valley, Sierra Co., New Mexico
Ranci,, Sem, Vicdessos, AriŠge, France
Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Mumba area, Kivu, Democratic Republic of Congo
Scawt Hill, Co. Antrim, Northern Ireland
United Verde Mine, Jerome, Yavapai Co., Arizona, USA
Kobokobo, Kivu, Democratic Republic of Congo
Rapid Creek area, Yukon Territory, Canada
Broken Hill, New South Wales, Australia
Rasvumchorr deposit and Kukisvumchorr deposit, Khibina massif, Kola Peninsula, Russia, FSU
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Gabe Gottes vein, Rauenthal, Sainte-Marie-aux-Mines, Vosges Mtns., Haut-Rhin, Alsace, France
San Rafael Swell, Temple Rock, Emery Co., Utah, USA
Rajpura-Dariba, Rajasthan, India
Alacr n mine, Pampa Larga dist., Copiap¢ (Near), Atacama, Chile
Alsar (Allchar), Rozden (near), FYRO Macedonia
Branchville, Redding, Fairfield Co., Connecticut, USA
Red Ledge mine, Washington dist., Nevada Co., California, USA
Joseph Smith #1 well (Sun Oil Co.), Duchesne, Duchesne Co., Utah, USA
Wolf Creek meteorite crater, Western Australia, Australia
Montorio al Vomano, Teramo, Abruzzi, Italy
Borstein, Reichenbach, Bensheim, Odenwald, Hessen, Germany
Tsumeb, Namibia
Ettringer Bellerberg, Mayen (near), Laacher See, Eifel, Germany
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo

Minasragra, Jun¡n, Peru, and/or Cottonwood Canyon, Churchill Co., Nevada, USA

Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia, FSU
Niakornak, Nuussuaq, Greenland
Fowey Consols mine, Cornwall, England
Salisbury, Litchfield Co., Connecticut, USA
Zabaikal'ye, Russia, FSU
Bultfontein Mine, Kimberley, South Africa
Stillwater Complex, Montana, USA
Sarapulsk and Shaitansk, Mursinsk (near), Ekaterinburg, (Sverdlovsk), Ural Mts., Russia, FSU
Cavnic (Kapnikb nya or Siebenb□rgen), Transylvania, Romania

Vila Apacheta, Bolivia
Szomolnok (Smolnik), Slovakia
Platz, Br□ckenau, Rh”n Mts., Hessen, Germany
Kombat mine, Tsumeb, Otavi (E), Namibia
Richelle, Vis,, LiŠge, Belgium

Bauhaus Mine, Richelsdorf (near), Hessen, Germany
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
L†ngban and Pajsberg, V„rmland, Sweden
Good Hope Mine, Vulcan, Gunnison Co., Colorado, USA
Socotra island, Indian Ocean (Yemen)
Tenham meteorite, South Gregory, Queensland, Australia
Nordhausen and Hildesheim salt deposits, Sachsen, Germany
Tincalayu Borax Deposit, Salar del Hombre Muerto, Salta, Argentina
Crestmore, Riverside Co., California, USA
Jerslev and Youndegin meteorites
Tip Top Pegmatite, Custer, Custer Co., South Dakota, USA
Red Bird Mine, Pershing Co., Nevada, USA
South Mountain (near), Midvale, Rockbridge Co., Virginia, USA
Rodalquilar deposit, Almeria, Spain
Franklin Furnace, Sussex Co., New Jersey, USA
Indarch meteorite, Shusha, Elisavetpol, Azerbaijan, FSU
Alpe Rosso, Val Vigezzo, Druogno (near), Orcesco, Novara, Piemonte, Italy
Il¡maussaq intrusive, Kvanefeld, Greenland (S)
Salzdetfurth and Siegfried- Giesen mines, Zechstein basin, Germany
RomanŠche-Thorins, Mƒcon (near), Sa“ne et Loire, France
Boundary Falls, Winnipeg River, Kenora dist., Ontario, Canada
Paraborne mine, St. Marcel, Val d'Aosta, Piemonte, Italy
Rammelsberg mine, Harz, Germany
Narsarsuaq, Julianehaab district, Greenland
Maragua (near), Santiaguilla, Potos¡, Bolivia
Charrier, Allier, France
Rosas mine, Narcao, Cagliari, Sardegna (Sardinia), Italy
Greifenstein, Ehrenfriedersdorf (near), Sachsen, Germany
Stuckslacker Mine, Coloma (near), El Dorado Co., California, USA
Rappold Mine, Schneeberg, Sachsen, Germany

Barkevik (?), Langesundfjord, Norway
Russian River, Mendocino Co., California, USA
Hav¡rna, Letovice (near), Moravia, Czech Republic
Wm. O'Neill's Claim, Bull Pen Canyon, San Miguel Co., Colorado, USA
Bieber, Hanau (near), Hessen, Germany
Schoeller mine, Kladno, Praha (near), Stredocesky kraj, Bohemia, Czech Republic
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
L†ngban mine, Filipstad (near), V„rmland, Sweden
Jas Roux, Valgaudemar, Hautes-Alpes, France
Franklin, Sussex Co., New Jersey, USA
Barringer Hill, Blufton (near), Llano Co., Texas, USA
Ornak, W. High Tatra, Poland ; Staszic mine, Rudki, Poland
Tibet (N), China

Zod mine, Armenia; and Kochkar mine, Ural Mts., Russia, FSU
Christmas Mine, Christmas, Gila Co., Arizona, USA
Castle-an-Dinas wolfram mine, St. Columb Major, Cornwall, England
Rustenburg mine, Merensky Reef, Transvaal, South Africa

Kilchoan, Ardnamurchan, Scotland
Papua New Guinea
Hokkaido, Japan
Horokanai placer, Hokkaido, Japan
Japan
Morogoro, Uluguru Mountains, Tanzania
Cajuelo, Burgos, Spain
Himalaya Mine, Mesa Grande Dist., San Diego Co., California, USA
Bukov deposit, Moravia, Czech Republic
Lone Creek Fall Cave, Sabie, Transvaal (E), South Africa
Francon quarry, St.-Michel dist., Montreal Island, Qu‚bec, Canada
Mina de Quarta Seira, Sabugal, Beira Alta, Portugal; Kariz, Minho, Portugal
Sacrofano, Lazio (Latium), Roma, Italy
Nordmark, V†rmland, Sweden
Mountain Pass mine, San Bernardino Co., California, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Gabe Gottes vein, Rauenthal, Ste.- Marie-aux-Mines, Vosges Mtns., Haut-Rhin, Alsace, France
Ural Mts. (N), Siberia, Russia, FSU
Ustarasaisk deposit, Tien Shan Mts. (W), Russia, FSU
Ikuno mine, Hyogo, Honshu, Japan

Cachinal, Atacama desert, Antofagasta, Chile
Miass, Zlatoust reg., Ilmen Mts., Russia, FSU

Chuquicamata, Antofagasta, Chile
Samson Mine, St. Andreasberg, Harz, Germany
Palermo #1 Mine, North Groton, Grafton Co., New Hampshire, USA
Gumbatesa and Molinello, Val Greveglia, Liguria, Italy
Drachenfels, Eifel, Rheinland, Germany
Sierra Chica de Zonda, Dept. Pocito, San Juan, Argentina
San Martin (W), Los Corrillos, San Luis, Argentina
Diablo Range, Santa Clara Co., California, USA
Grants (N), McKinley Co., New Mexico, USA
Santa Ana Mine, Caracoles, Sierra Gorda, Chile
Larderello, Val di Cecina, Pisa, Toscana, Italy
Lizard Point, Cornwall, England
Fiskenaesset harbour, Greenland (SW)

Sarabau Mine, Kuching (near), Sarawak, Malaysia
Monte Somma, Mt. Vesuvius, Napoli, Campania, Italy
G¢ry Sowie (Michelsdorf), Silesia, Poland
Harstigen mine, Pajsberg, V„rmland, Sweden
Santa Elena mine, La Alcaparrosa, between San Juan and Calingasta, Barreal Dept., Argentina
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Unspecified locality, Kazakhstan(?), FSU
West Driefontein cave, Carlstonville, Transvaal, South Africa
Sasso, Castelnuovo di Val di Cecina (near), Toscana, Italy
Unspecified locality, Kazakhstan(?), FSU

Big Fish River, Yukon Territory, Canada
Ueberroth mine, Saucon Valley, Pennsylvania, USA
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia, FSU

Larderello, Val di Cecina, Pisa dist., Toscana, Italy
Mt. Vesuvius, Napoli, Campania, Italy
South Bay, Scarborough, North Yorkshire, England
Scawt Hill, Co. Antrim, Northern Ireland
Vertrauen auf Gott mine and Moschellandsberg, Obermoschel, Rheinland-Pfalz, Germany
Pernek, Pezinok(near), Z padoslovensky kraj, Slovakia
Well G 75, Searles Lake, San Bernardino Co., California, USA
Franklin, Sussex Co., New Jersey, USA
Tsumeb, Namibia
Bispberg Fe mine, S„ter, Dalarne (Kopparberg), Sweden
Skipton, Caves, Ballarat, Victoria, Australia
Iveland, Norway
Joe Mine, Tombstone, Cochise Co., Arizona, USA
Red Cloud mine, Goldhill, Boulder Co., Colorado, USA
Moctezuma Mine, Moctezuma, Sonora, Mexico
Tsumeb, Namibia
Eureka (S), Fish Creek Range, Eureka Co., Nevada, USA
Brooks Mt., Seward Peninsula, Alaska, USA
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Norton County meteorite, Norton Co., Kansas, USA
Hagendorf-nord pegmatite, Pleystein (near), Oberpfalz, Bayern, Germany
Palermo #1 Pegmatite, North Groton, Grafton Co., New Hampshire, USA

Magnet Cove, Hot Spring Co., Arkansas, USA
Copiap¢ (Deesa) meteorite, Atacama, Chile
Kwale dist., Voi (S), Kenya
Jachymov (St. Joachimsthal), Zapadocesky kraj, Bohemia, Czech Republic
Mounana mine, Franceville, Haut-Ogoou,, Gabon
Oceanic Mine, San Luis Obispo Co., California, USA
Kalompe, Shaba, Democratic Republic of Congo

Gl□cksrad mine, Oberschulenberg, Harz, Germany
Otavi, Tsumeb, Namibia
Schneeberg, Sachsen, Germany
Paposo, Atacama desert, Chile
Berufjord, Iceland

Corrego Frio pegmatite, Minas Gerais, Brazil
Susanna vein, Leadhills, Lanarkshire, Scotland
Chicagon mine, Iron River (near), Iron Co., Michigan, USA
Searles Lake, San Bernardino Co., California, USA
Kuusamo, Finland (NE)
Unspecified locality, FSU
Santa Ana Mine, Caracoles, Sierra Gorda, Chile

Tip Top Pegmatite, Custer, Custer Co., South Dakota, USA
Broken Hill orebody, New South Wales, Australia
Seidozero, Lovozero tundra, Kola Peninsula, Russia, FSU
Sein„joki, Vaasa, Finland
Doln¡ Bory, Moravia, Czech Republic

Chukhotka (Central), Russia, FSU
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Les Allues, Gebroulaz glacier, Movtiers (near), Savoie (Savoy), France
Taseq slope, Il¡maussaq intrusive, Greenland (S)
Baia Sprie (Fels”b nya), Romania
Diamantina (diamond-bearing sands of), Minas Gerais, Brazil
Djebel Haminate mine, Ain Beida, Qacentina (Constantine), Algeria
Kouroudiako Fe deposit, Faleme River, Senegal
Luiswishi, Shaba, Democratic Republic of Congo
Baldissero Canavese, Piemonte, Italy
Roma Island, Los Islands, Guinea
Gangapitiya, Ambakotte (near), Sri Lanka
Tyrnyauz deposit, Caucasus, Russia (?), FSU

L vrion (Laurium), Attik¡, Greece
Korshunov magnetite mine, Angaro-Ilim region, Irkutsk, Siberia, Russia, FSU
Mayak mine, Talnakh, Noril'sk (near), Siberia (N), Russia, FSU
Khibina massif, Lovozero massif, Kola Peninsula, Russia, FSU
Kelyan deposit, Buryat, Russia; Khaidarkan deposit, Kirghizia (Kirgizia), FSU
Trial Harbour, Tasmania, Australia
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Shattuck Mine, Bisbee, Cochise Co., Arizona, USA
Khibina tundra, Kola Peninsula, Russia, FSU
Mt. Rasvumchorr, Beizymyanni (Bezymyanni) volcano, Kamchatka, Russia, FSU
Peanut Mine, Montrose Co., Colorado, USA
Ioi Mine, Shiga, Honshu, Japan
Green River formation, West Vaca, Green River (W), Sweetwater Co., Wyoming, USA
Bisersk deposit, Ural Mts., Russia, FSU
Naylor-Vanderburg Mine, Pala (near), San Diego Co., California, USA
Mount Etna, Sicilia (Sicily), Italy

San Simon mine, Huantajaya, Tarapac , Chile
Pike's Peak, Park Co., Colorado, USA
Idrija (Idria), Slovenia
Mt. Alluaiv region, Lovozero massif, Kola Peninsula, Russia, FSU
Lake Como, Hinsdale Co., Colorado, USA
Jungfer mine, M□sen, Siegen dist., Nordrhein-Westfalen, Germany
Mt. Oxide mine, Mt. Isa (N), Queensland, Australia
Siglo XX mine, Llallagua, Potos¡, Bolivia
Bonanza King Quad., Trinity Center (E), Trinity Co., California, USA
Durango, Mexico
Saybrook, Middlesex Co., Connecticut, USA

Fognano, Toscana, Italy
Alsar (Allchar), Rozden (near), FYRO Macedonia
Richelsdorf foundry slag heap, Hesse, Germany
Peanut Mine, Montrose Co., Colorado, USA
Tabba Tabba, Western Australia, Australia
Sincos, Peru
Sri Lanka
Barker Pegmatite, Keystone (near), Pennington Co., South Dakota, USA
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Jajh deh Kot Lalu meteorite, Sind Province, Pakistan
Sjo or L†ngban mine, Filipstad (near), V„rmland, Sweden
Il¡maussaq intrusive, Greenland (S)

Skutterud, Modum, Norway
Valachov Hill, Skrivan (near), Bohemia, Czech Republic
Martin Bridge formation, Wallowa Co., Oregon, USA

Zod deposit, Armenia ; Aksu (N), Kazakhstan, FSU
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Mendip Hills and Derbyshire, England
Bou Azzer, Morocco
Bloomington crushed stone quarry, Monroe Co., Indiana, USA
Mt. Alluaiv, Lovozero massif (NW), Kola Peninsula, Russia, FSU
Oktyabr deposit, Talnakh (Tyllakh), Noril'sk (near), Siberia (N), Russia, FSU
Wiry, Lower Silesia, Poland
Kangerdluarsuk, Il¡maussaq intrusive, Greenland (S)
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo

Unspecified locality, Russia (?), FSU
Unspecified locality, FSU
Unspecified arid regions, FSU
Alpe di Siusi, Italy; Tsugawa, Niigata, Honshu, Japan (NE)
Marda, Western Australia, Australia
Unspecified Locality, Russia (?), FSU
Numerous localities, Utah, USA

Alai Mts., Turan dist., Tadzhikistan, FSU
Tsumeb, Namibia
Solongo deposit, Buryat, FSU
Sono mine and Hanawa mine, Japan
Moctezuma Mine, Moctezuma, Sonora, Mexico
Sopcha massif, Monchegorsk pluton, Kola Peninsula, Russia, FSU
Taylor pit, Madoc, Huntingdon twp., Hastings Co., Ontario, Canada
Nakalaq, Il¡maussaq intrusive, Greenland (S)
Unspecified locality, Kola Peninsula, Russia, FSU
Oldrichov, Tachov (near), Bohemia, Czech Republic
Corrego Frio Pegmatite, Divino (near), Minas Gerais, Brazil
Globe dist., Tombstone (near), Cochise Co., Arizona, USA
Hudson Bay Zn mine, Salmo, West Kootenay Dist., British Columbia, Canada

Vermilion mine, Denison twp., Sudbury Dist., Ontario, Canada
Jeffrey mine, Shipton twp., Richmond Co., Qu‚bec, Canada
Aschaffenburg, Spessart, Germany
Danile mine, Neust„dtel, Freiberg, Sachsen, Germany

Elephant Island, British Antarctic Territory, Antarctica

Yarrow Creek -- Spionkop Creek deposit, Alberta (SW), Canada
Moctezuma mine, Moctezuma, Sonora, Mexico
Ut”, S”dermanland, Sweden
Velarde¤a, Durango, Mexico
Kopeysk, Chelyabinsk coal basin, Ural Mts. (S), Russia, FSU
Rakwana mine, Sabaragamuva, Sri Lanka
Estherville meteorite, Emmet Co., Iowa, USA
Mina Ragra (Minasragra), Cerro de Pasco (near), Pasco dept., Peru
Wheal Rock, St. Agnes, Cornwall, England
Konjo Mine, Aida, Mito-cho, Okayama, Honshu, Japan
Sukula, Tammela, Finland (SW)
Serid¢zinho and Pedra Lavreda pegmatites, Joazeiro (near), Paraiba, Brazil
Starkey Mine, Madison Co., Missouri, USA

Mont Saint-Hilaire, Rouville Co., Qu‚bec, Canada
Kangerdluarsuk, Il¡maussaq intrusive, Greenland (S)

Komandor Islands, Bering Sea
L†ngban mine, Filipstad (near), V„rmland, Sweden
Ivigtut, Greenland (SW)
Tallakh (Tylnakh) coal deposit, Lena river, Russia, FSU
Freiberg, Sachsen, Germany
Ichaboe Island, Namibia
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
J cymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Taylor pit, Madoc, Huntingdon twp., Hastings Co., Ontario, Canada
Combination claim, Belmont dist., Tonopah, Nye Co., Nevada, USA
Bergen Hill, New Jersey, USA
Stewart Mine, Pala, San Diego Co., California, USA
Varutr„sk pegmatite, Boliden mines (SE), Skellefte† (near), V„sterbotten, Sweden
Goldkronach, Bayern, Germany
Vezn (Vezna), Moravia, Czech Republic
Himalaya mine, Mesa Grande, San Diego Co., California, USA
Farm Tweefontein, Potgietersrust, Bushveld Complex, Transvaal, South Africa
Greenbushes, Western Australia, Australia
Lake George antimony deposit, York Co., New Brunswick, Canada

Adelaide mine, Stichtite Hill, Dundas, Tasmania, Australia

622
Beartooth Mts. (N), Stillwater Complex, Sweetwater Co., Montana, USA

Obergrund, Zuckmantel (near), Silesia, Poland
Coconino sandstone, Meteor Crater, Coconino Co., Arizona, USA
Elkiaidan river, Uzbekistan, FSU
Izalco Volcano, El Salvador
Stamps and Jowl Zawn, Roscommon Cliff, St. Just, Cornwall, England
C¡novec (Zinnwald), Krusn, Hory (Erzgebirge), Bohemia, Czech Republic
Tsumeb, Namibia
Union Carbide mine, Wilson Springs, Garland Co., Arkansas, USA
Tsumeb, Namibia
Zapachitsa Cu deposit, Stara-Planina, Bulgaria
Ettringer Bellerberg, Mayen, Eifel, Rheinland-Pfalz, Germany
Unspecified locality, Russia (?), FSU
Eleonore mine, Giessen (near), Hessen, Germany
Bawana Mine, Milford (near), Beaver Co., Utah, USA
Zmeinogorsk mine, Kolyvan (near), Siberia, Russia, FSU
Kochi, Rendai, Japan
Strontian, Argyllshire, Scotland

Caspian region, Kazakhstan (?), FSU
Sarambi carbontite complex, Concepcion and Amambay, Paraguay
Francon quarry, St.-Michel dist., Montreal Island, Qu,bec, Canada
K”nigshall-Hindenburg mine, Reyershausen, Niedersachsen, Germany
Numero Uno Mine, Clear Creek, San Benito Co., California, USA
Inaglia massif, Yakutia (S), Russia, FSU

Hagendorf pegmatite, Oberpfalz, Bayern, Germany
Craveggia, Val Vigezzo, Piemonte, Italy
Hamburg, Germany
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Driekop, Transvaal, South Africa
Kuruman (near), Cape Province, South Africa
Sacarimb (Nagy g), Transylvania, Romania
Hol Kol mine, Suan dist., Korea
Copper Cliff South mine, Sudbury dist, Ontario, Canada
Knollenbergel-Keuper formation, L□tzelbach, Plochingen, Baden-W□rttemberg, Germany
North Haig meteorite, Sleeper Camp (N), Haig(N), Western Australia, Australia
Iwagi Islet, Ochi Gun, Ehime Prefecture, Japan
B□cking, Westeregeln, Prussia, Germany
Searles Lake, San Bernardino Co., California, USA
Magadan and Egerlyakh deposits, Yakutia, Russia, FSU

Edelweiss mine, Burra, South Australia, Australia
L†ngban mine, Filipstad (near), V„rmland, Sweden
Suolun, Inner Mongolia, China
Bakhuis Mts., Surinam
Cruz del Sur Mine, Rio Negro, Argentina
Tinzen, Alp Parsettens, Oberhalbstein, Graub□nden, Switzerland
Susanna vein, Leadhills, Lanarkshire, Scotland
Franklin Hill Mine, Sussex Co., New Jersey, USA

Mogurazawa mine, Gumma prefecture, Honshu, Japan
Harstig mine, Pajsberg, V„rmland, Sweden
Horrsj”berg, V„rmland, Sweden
Autana cave, Amazonas, Venezuela
L†ngban mine, Filipstad (near), V„rmland, Sweden
Zvezdel, Rhodope Mts., Bulgaria
Miass, Ilmen Mts., Ural Mts., FSU
Swambo deposit, Shaba, Democratic Republic of Congo
Hillside Mine, Bagdad, Yavapai Co., Arizona, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Milltown quarry, Ashover, Derbyshire, England
Foote Mineral Company spodumene mine, Kings Mt. (near), Cleveland Co., North Carolina, USA
Foote Mineral Company spodumene mine, Kings Mt. (near), Cleveland Co., North Carolina, USA
Baia de Aries (Aranyosb nya) and Sacarimb (Nagy g), Transylvania, Romania
Mt. Vesuvius, Napoli, Campania, Italy
Lobenstein, Voigtland, Germany
Moss Mine, Nordmark, Sweden
Narsarsuaq, Julianehaab district, Greenland
Grebnik Bauxite Deposit, Serbia, FSU
Scrub Oaks mine, Dover, Morris Co., New Jersey, USA
Kalusz, Galicia, Poland
Baita Bihorului (R,zbanya), Romania
Leppen Szent Mih ly mine, Baia Sprie (Fels”b nya), Maramures Co., Romania
Szomolnok (Smoln¡k), Slovakia
Unknown locality, Sri Lanka (?)
Portree, Skye, Scotland
Stassfurt salt mines, Sachsen, Germany
Turkestana, Tadzhikistan, FSU

Narsarsuaq, Julianehaab district, Greenland
Gorge River, South Island, New Zealand
Ir-Nimi Mn deposit, Taikan Mts., Russia, FSU
Talnakh deposit, Noril'sk (near), Taimyr Peninsula, Siberia (N), Russia, FSU
Nomura mine, Ehime pref., Shikoku, Japan
L†ngban mine, Filipstad (near), V„rmland, Sweden
Takovo, Serbia

Talmessi mine, Anarak, Iran
Talnakh deposit, Noril'sk (near), Siberia (N), Russia, FSU
Cerro Pintados, Iquique (near), Tamarugal Pampa, Tarapac , Chile
Tanco Mine, Bernic Lake, Lac-du-Bonnet (ENE), Manitoba, Canada
Taneyama mine, Toyo-mura, Yatsushiro-gun, Kumamoto Pref., Japan
Raposa pegmatite, Sao Jos, do Sabug¡, Para¡ba, Brazil
Cooglegong, Pilbara region, Western Australia, Australia

Kola Peninsula, Russia, FSU
Kulmala farm (near), Sukula, Tammela, Finland
Candoglia, Novara, Piemonte, Italy
Walli-Tarama, Azov Sea, Mariupol Dist., Ukraine, FSU

Sugar Loaves, Taranaki, New Zealand
Tarapac , Chile
Nagolnaya Tarasovka, Donbas region, Ukraine, FSU
Kabwe (Broken Hill), Central province, Zambia
Wingdalle, Canton d'Uri, Switzerland
Murun massif, Olekminsk (near), Aldan (NW), Yakutia, FSU
Sapucaia pegmatite, Galileia, Minas Gerais, Brazil
Tazheranskiy alkaline massif, Lake Baikal, Siberia (S), Russia, FSU
Santa Rosa mine, Antequera, Oruro, Bolivia
Searles Lake, Lake Co., California, USA
Teine mine, Hokkaido, Japan
Oktyabr deposit, Talnakh, Noril'sk (near), Siberia (N), Russia, FSU
Mattagami Lake mine, Mattagami area, Galin,e twp., Abitibi Co., Qu,bec, Canada
Fata Baii (Faceb j or Faceb nya) Zlatna (near) Transylvania, Romania
Fata Baii (Faczeb j or Faceb nya), Zlatna, Transylvania, Romania
Field's vein, Dahlonega, Lumpkin Co., Georgia and/or Little Mildred mine, Hildalgo Co., New Mexico, USA
Strathcona mine, Levack Twp., Sudbury dist., Ontario, Canada
Stillwater Complex, Montana, USA
Temagami mine, Temagami Island, Timiskaming Mining Div., Ontario, Canada
Hundholmen, Norway
Redruth/ St. Day area, Cornwall, England
Mt. Vesuvius, Napoli, Campania, Italy
Sterling Hill, Sussex Co., New Jersey, USA
Terlingua, Brewster Co., Texas, USA
Mt. Alluaiv and Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia, FSU
Loma Blanca borate deposit, Jujuy, Argentina
Saldanha Bay, Cape Province, South Africa
Unspecified Localities, China (SW and NE)
Sardala, Marneshi Co., Xinjiang Region, China

Zupkov (Schubkau, Zsubk¢), Slovakia

Named after Prof. Henri J. F. Buttgenbach (1874-) Bruxelles, Belgium.
Il¡maussaq intrusive, Greenland and Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada
Estherville, Santa Catharina and 16 other meteorites
Foote Mineral Company spodumene mine, Kings Mt. (near), Cleveland Co., North Carolina, USA
Panasqueira mine, Panasqueira, Beira Baixa, Portugal
Talnakh deposit, Noril'sk (near), Siberia (N), Russia, FSU
Baringer Hill, Llano County, Texas, USA
Oktyabr deposit, Talnakh, Noril'sk (near), Siberia (N), Russia, FSU

Durango (near), La Plata Co., Colorado, USA
Espartinas salt lake, Aranjuez, Madrid, Spain
Vermion, Makedhonia (Macedonia), Greece
Desert Region, Sudan, Egypt
Tsumeb, Namibia
Ivigtut, Greenland (SW)
Old Kilpatrick, Dumbartonshire, Scotland
Siberia (E), Russia, FSU

Manono, Shaba, Democratic Republic of Congo
Balangoda, Sabaragamuwa prov., Sri Lanka
L vrion (Laurium), Attik¡, Greece
L”v”, Brevik, Langesundfjord, Norway
Bluffton, Llano Co., Texas, USA
Siberia (E), Russia, FSU
Iveland, Setersdalen, Norway
Unspecified locality, FSU
Kobokobo, Kivu, Democratic Republic of Congo
Clausthal, Harz, Germany
Turkestan-Alai, Tien Shan Mts. (S), Kirghizia (?), FSU
Karasug, Tannu-Ola Mts., Tuva, Russia, FSU
L†ngban mine, Filipstad (near), V„rmland, Sweden
Crestmore, Riverside Co., California, USA
Aberfoil and Sam rivers, Oban, New South Wales, Australia
Murun massif, Olekminsk (near), Aldan (NW), Yakutia, Russia, FSU
Searles Lake, San Bernardino Co., California, USA
Tip Top Pegmatite, Custer, Custer Co., South Dakota, USA
Tintina silver mines, Watson Lake (NW), Whitehorse Div., Yukon Territory, Canada
Tinizong (Tinzen), Alp Parsettens, Sursass (Oberhalbstein), Grischun (Graub□nden), Switzerland
Tip Top Pegmatite, Custer (near), Custer Co., South Dakota, USA
Molinello mine, Val Graveglia, Liguria, Italy
Tirodi, Madhya Pradesh, India
Koashva Mt., Khibina massif, Kola Peninsula, Russia, FSU
Passau, Bayern, Germany
Candoglia, Piemonte, Italy
Kalgoorlie, Western Australia, Australia
Bambollita mine (La Oriental), Sierra La Huerta, Moctezuma, Sonora, Mexico
Bambollita mine (La Oriental), Sierra La Huerta, Moctezuma, Sonora, Mexico
Ohgidani deposit, Tobe, Ehime, Japan and Horo deposits, Toyosaka, Hiroshima, Japan
Tobermory, Isle of Mull, Scotland
Lower Mamon complex and Staromelovatskiy intrusive, Voronezh region, Russia, FSU
Todoroki mine, Hokkaido, Japan
Murun massif, between the Charo and Tokko rivers, Yakutia (SW), Russia, FSU
Named A L P and Filatov S K, Am. Min. 69:408 (1984).
Ust`-Bel`skiy massif, Tolovka river basin, Russia (NE), FSU

Kalgoorlie, Western Australia, Australia
Liu Zhuang, Tongbai Co., Henan, China

J chymov (St. Joachimsthal), Z padocesky kraj, Czech Republic
Bastn„s, Riddarhyttan, V„stmanland, Sweden
Sterling Hill, Sussex Co., New Jersey, USA
Alushta, Crimea peninsula, Ukraine, FSU

Tranquillity Base, Moon
Big Creek and Rush Creek, Fresno Co., California, USA

Tremola Valley, St. Gotthard, Switzerland

Barberton, Transvaal, South Africa
Kobokobo, Kivu, Democratic Republic of Congo
Cerro San Crist¢bal, Pachuca, Mexico
L†ngban mine, Filipstad (near), V„rmland, Sweden
Kabfumu, Kivu (N), Democratic Republic of Congo
Harstigen mine, Pajsberg, V„rmland, Sweden
H□hnerkobel, Rabenstein (near), Bayern, Germany
Chanteloube, Limoges, Haute-Vienne, France
Branchville, Fairfield Co., Connecticut, USA
Copiap¢, Chile
Tripuhy, Ouro Preto, Minas Gerais, Brazil
Wheal Trewavas, Breage, Cornwall, England
L†ven island, Brevik (near), Langesundfjord, Norway
Cardiff township, Haliburton Co., Ontario, Canada
Weisser Hirsch mine, Neust„dtel, Schneeberg, Sachsen, Germany
Trogtal quarry, Lautenthal (near), Harz, Niedersachsen, Germany
Albareto meteorite, Albareto, Modena, Italy
Vestan† mine, N„stum, Kristianstad, Sweden (S)

Lebong Donok mine, Benkulen, Sumatra, Indonesia
Kuusamo, north-eastern Finland

Cerm¡ky (Tschermig), Bohemia, Czech Republic
Tsumeb, Namibia
Tsumeb, Otavi, Namibia
Tsumo mine, Hiroshima (NW), Shimane pref., Honshu, Japan
Kanowna, Western Australia, Australia and Vaal Reefs mine, Klerksdorp, South Africa
Siberia (E), Russia, FSU
Tugtup agtakorfia, Il¡maussaq intrusion, Greenland (S)
Mayor Island, Opo Bay, North Island, New Zealand
Similkameen River and Tulameen River, Similkameen Dist., British Columbia, Canada
Mt. Nepkha, Lovozero tundra, Kola Peninsula, Russia, FSU

U. S. Borax Corp open pit, Boron, Kern Co., California, USA
Emma Mine, Little Cottonwood dist., Salt Lake Co., Utah, USA

Lanes' Mine, Monroe, Fairfield Co., Connecticut, USA
Sakiet Sidi Yousseff deposit, El Kef, Tunisia
Tuperssuatsiat Bay, Il¡maussaq intrusive, Greenland (S)
L†ngban Mine, Filipstad (near), V„rmland, Sweden ; Balmat, St. Lawrence Co., New York, USA ; Franklin, Sussex Co., New J

Pitigliano, Grosseto prov., Toscana, Italy
Tusion River valley, Pamir Mts. (SW), Russia (?), FSU
Gomi deposit, Georgia (N), FSU

Taylor pit, Huntingdon twp., Hastings Co., Ontario, Canada
Searles Lake, San Bernardino Co., California, USA
Tyret, Siberia (E), Russia, FSU

Galkenstein or Schwatz, Tyrol, Austria

Beaver Lodge Lake, Goldfields district, Saskatchewan, Canada
Tyuya Muyun, Fergana, Uzbekistan, FSU
Uchucchacua mine, Oyon, Cajatambo, Peru
Amu-Darya River, Kara-Kalpakiy, Kara Tau, Kazakhstan, FSU
Iquique, Tarapac , Chile
Freusburg, Siegen (Near), Nordrhein-Westfalen, Germany
Lake Boga, Victoria, Australia
Ulv” Islands, Sweden
Sierra de Umango, La Rioja prov., Argentina
Lake Umba (near), Khibina massif, Kola Peninsula, Russia, FSU
Umbozero, Kola Peninsula, Russia, FSU
Freedom #2 mine, Marysville, Piute Co., Utah, USA
Chuquicamata, Antofagasta, Chile
Kobokobo, Kivu, Democratic Republic of Congo
Turinsk, Ural Mts., Russia, FSU
Ural Mts., Russia, FSU
Unspecified locality, FSU
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Posse farm, Conteicao Co., Minas Gerais, Brazil and/or Mitchell Co. mica mines, North Carolina, USA
Bergen, Falkenstein (near), Vogtland, Sachsen, Germany
Miedzianka (Kupferberg), Silesia, Poland

J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Menzenschwand, Schwarzwald (S), Germany
Basset mines (near), Redruth, Cornwall, England
Walpurgis vein, Weisser Hirsch mine, Neust„dtel, Schneeberg (near), Sachsen, Germany
Weisser Hirsch mine, Neust„dtel, Schneeberg (near), Sachsen, Germany
Menzenschwand, Schwarzwald (S) and Clara mine, Wolfach, Schwarzwald, Baden-W□rttemberg, Germany
Mitchell Co. mica mines, North Carolina, USA
Majak mine, Talnakh deposit, Noril'sk (near), Russia, FSU

Tippin Hill, Western Australia
Dingo Donga Cave, Western Australia, Australia
Lake Bol'shoy Tatkul, Ilmen Mts., Ural Mts., Russia, FSU
Upper Noiby River, Yenisei region, Siberia, Russia, FSU
Kangerdluarsuk, Il¡maussaq intrusive, Greenland (S)
San Rafael Swell, Temple Rock, Emery Co., Utah, USA
Bissersk, Saransk (Near), Mordovskaya, Russia, FSU
Uva, Sri Lanka
Comstock Lode, Storey Co., Nevada, USA; Smeinogorski, Altai, Russia (?), FSU; Tambang Sawah, Benkoelen dist., Sumatra
Uson caldera, Kamchatka, Russia, FSU
Kasompi mine, Shaba, Democratic Republic of Congo
Chalanches, Allemont (near), Dauphin,, France
Aurora mine, Nya-Kopparberg, Sweden
Zimapan, Hildalgo, Mexico
Kara Tau, Dzhambul (near), Kazakhstan, FSU
Kalongwe, Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Kalongwe, Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo

Kobokobo, Kivu, Democratic Republic of Congo
Wilhelmshall, Stassfurt, Sachsen, Germany
Mounana mine, Franceville, Haut-Ogoou,, Gabon

Messbach, Plauen (near), Vogtland (Variscia), Thuringen, Germany
Kalima, Kivu, Democratic Republic of Congo
Varutr„sk pegmatite, Boliden mines (SE), Skelleftе† (near), V„sterbotten, Sweden
Zelenzn¡k, Vashegy mine, Szirk (near), Slovakia
Ballycraigy, Larne, Co. Antrim, Northern Ireland
Berezov, Ekaterinburg (Sverdlovsk), Ural Mts., FSU
Siglo XX mine, Llallagua, Potos¡, Bolivia
Viitaniemi, Er„j„rvi, Orivesi, Finland
Tick Canyon, Lang (near), Los Angeles Co., California, USA
Killik and Hisarcik colemanite deposits, K□tahya, Turkey
Taylor pit, Madoc, Huntingdon twp., Hastings Co., Ontario, Canada
Khaidarkan deposit, Kirghizia, FSU
FSU
Big Creek and Rush Creek, Fresno Co., California, USA
Buca della Vena mine, Stazzema, Alpe Apuane, Toscana, Italy
Campo Morto, Montalto di Castro, Viterbo, Toscana, Italy
Freidrichsroda, Th□ringen, Germany; Perm, Ural Mts., Russia; Agalik, Uzbekistan, FSU
Mt. Vesuvius, Napoli, Campania, Italy
Ocna de Fier (Moravica or Vask”), Banat, Romania
Alpe Rosso and Pizzo Marcio, Orcesco (near), Valle Vigezzo, Novara, Piemonte, Italy
Viitaniemi, Er„j„rvi, Orivesi, Finland
Ivigtut, Greenland (SW)
Providencia mine, C rmenes, Villaman¡n (near), Le¢n, Spain
Roma Island, Los Islands, Guinea
Ste.- Marie-aux-Mines, Vosges Mtns., Haut-Rhin, Alsace, France
Ural Mts., Russia, FSU
Chizeuil, Bourbon-Lancy, Sa“ne-et-Loire, France
Khibina massif and Lovozero massif, Kola Peninsula, Russia, FSU
Vermilion mine, Sudbury (near), Ontario, Canada
Macusani, Peru
Vis,, LiŠge (near), Belgium

Trudov and Mushiston deposits, Tadzhikistan, FSU

St. Agnes, Cornwall, England
Kovouaksi, Tuva, Russia, FSU
Mt. Varnbed (near), Lovozero massif, Kola Peninsula, Russia, FSU
Elias mine, Jachymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic
Sisersk and Nizhnii Tagilsk, Ural Mts., Russia, FSU
Inder, Kazakhstan, (?), FSU
Pozzuoli, Napoli (Naples), Campania, Italy
Armenia, FSU
Old City quarry, Riverside, Riverside Co., California, USA
Vozhmin massif, Karelia (NE), Russia, FSU
Alsar (Allchar), Rozden (near), FYRO Macedonia

B”g□rtlencik Tepe, Doganbaba, Burdur, Taurus Mts., Turkey (SW)
Good Hope Mine, Vulcan, Gunnison Co., Colorado, USA
Vuonnemi River Valley, Khibina massif, Kola Peninsula, Russia, FSU
St„ta (Doverstorp) pyrite deposit, Bergslagen, Sweden (central)
Unspecified locality, Uzbekistan (?), FSU
Noril'sk, Siberia (N), Russia, FSU
Vyuntspakh Mt., Kola Peninsula, Russia, FSU
Walgidee Hills, Fitzroy Basin, Kimberley Div., Western Australia, Australia
Peace River meteorite, Alberta, Canada
H”llengraben, Werfen (near), Salzburg, Austria
Wairakei, Lake Taupo (near), North Island, New Zealand
Red Hill, Wairau Valley, South Island, New Zealand
Nishinomaki mine, Gumma pref., Japan and/or WhiteCaps Mine, Manhattan, Nye Co., Nevada, USA
Kusu Deposit, Kinshasa (SW), Democratic Republic of Congo
Evans-Lou mine, St-Pierre-de-Wakefield (near), Portland twp., Papineau Co., Qu,bec, Canada

White Elephant Mine, Pringle, Custer Co., South Dakota, USA
Lengenbach quarry, Binntal, Valais (Wallis), Switzerland
Sterling Hill Mine, Ogdensburg, Sussex Co., New Jersey, USA
Walpurgis vein, Weisser Hirsch mine, Neust„dtel, Schneeberg (near), Sachsen, Germany
Big Creek and Rush Creek, Fresno Co., California, USA
Clay Canyon, Fairfield (W), Utah Co., Utah, USA
Hard Scrabble claim, Death Valley National Monument, Inyo Co., California, USA
Tsumeb, Namibia
Warwick, Orange Co., New York, USA
High Down quarry, Heddon, Filleigh, South Molton (near), Devon, England
Wampiro Hill, Busiro Co., Buganda, Uganda
Ivigtut, Greenland (SW)
Weddell Sea, Antarctica
Autunite #8 Claim, Thomas Range, Delta (near), Juab Co., Utah, USA
Perkins Well #1, Sweetwater Co., Wyoming, USA
Falun, Kopparberg, Sweden
Michael vein, Weiler bei Lahr, Schwarzwald, Germany
Schneeberg, Sachsen, Germany
Carlin mine, Elko (NW), Eureka Co., Nevada, USA
Good Hope Mine, Vulcan, Gunnison Co., Colorado, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Cullakanee Mine, Buck Creek, Clay Co., North Carolina, USA
Francon quarry, St.-Michel, Montreal Island, Qu,bec, Canada
L†ngban mine, Filipstad (near), V„rmland, Sweden
Bou Azzer, Morocco; Sterling Hill mine, Ogdensburg, Sussex Co., New Jersey, USA; Coahuila, Mexico
Candoglia, Novara, Piemonte, Italy
L†ngban mine, Filipstad (near), V„rmland (Wermland), Sweden
La Gallega mine, Oj,n (near), Marbella (N), Malaga, Spain
Wheatley Mine, Phoenixville (near), Chester Co., Pennsylvania, USA; Nishimomaki mine, Gumma pref., Japan
Mammoth Mine, Tiger, Pinal Co., Arizona, USA

Unknown
Ilha de Taquaral, Minas Gerais, Brazil

Palermo #1 Pegmatite, North Groton, Grafton Co., New Hampshire, USA
Big Chief pegmatite, Glendale, South Dakota; Palermo #1 Mine, North Groton, Grafton Co., New Hampshire, USA
Potter-- Cramer claim, Wickenburg (near), Maricopa Co., Arizona, USA
L†ngban mine, Filipstad (near), V„rmland, Sweden
Big Fish River, Yukon Territory, Canada
Michael mine, Weiler bei Lehr, Schwarzwald, Baden-W□rttemberg, Germany

Crestmore, Riverside Co., California, USA
Lone Pine Mine, Silver City, Grant Co., New Mexico, USA
Hagendorf pegmatite, Oberpfalz, Bayern, Germany
Kuusamo, Finland (NE)
Franklin Furnace or Sterling Hill, Sussex Co., New Jersey, USA
Scotia Talc Mine, Bon Accord, Barberton Dist., Transvaal, South Africa
San Venanzo quarry, Terni, Umbria, Italy
A.B.H. Consols Mine, Broken Hill, New South Wales, Australia
Kajlidongri, Jhabua, India (central)
Grand Central mine, Tombstone, Cochise Co., Arizona, USA
Gonzen Fe mine, Sargans (near), St. Gallen, Switzerland
Alston Moor, Cumberland, England
Neugl□ck mine, Wittichen (near), Schwarzwald, Baden-W□rttemberg, Germany
Falun, Kopparberg, Sweden
Wodgina, Western Australia, Australia
Langesundfjord, Norway
Palermo pegmatite, North Groton, Grafton Co., New Hampshire, USA

Dognecea, Banat, Timisoara (SE), Banat, Romania

W”lsendorf, Bayern, Germany
Post Pond volcanics, Mt. Cube Quadrangle (SW), Vermont, USA
Champion andalusite mine, Mono Co., California, USA
Sterling Hill, Sussex Co., New Jersey, USA
Loudville lead mine, Loudville, Hampden Co., Massachusetts, USA
Bleiberg, Villach (near), K„rnten (Carinthia), Austria
Oruro, Bolivia
Scharnha□sen, W□rttemberg, Germany
Kasolo (Shinkolobwe), Shaba, Democratic Republic of Congo
Johanngeorgenstadt, Sachsen, Germany
Himmelsf□rst mine, Freiberg, Sachsen, Germany
Palermo pegmatite, North Groton, Grafton Co., New Hampshire, USA
Lindesnes, Norway

Xiangjiang (Hsiang) River, China
Yanshan, China
Chaobuleng dist., Xilingola League, Inner Mongolia, China
Unspecified locality, China
Xitieshan deposit, Qaidam basin, Qinghai, China
Bambollita mine (La Oriental), Sierra La Huerta, Moctezuma, Sorona, Mexico
Tetela de Xonotla, Mexico

Kuranakhsk-type gold deposit, Aldan, Yakutia, Russia, FSU
Colomera iron meteorite, Granada, Spain
Unspecified locality, Siberia, Russia, FSU
Yarrow Creek, Spionkop Creek deposit, Alberta (SW), Canada
United Verde Mine, Jerome, Yavapai Co., Arizona, USA

Franklin, Sussex Co., New Jersey, USA
Maria Elena mine, Yecora, Sonora, Mexico
Mammoth Mine, Tiger, Pinal Co., Arizona, USA
Kola Peninsula, Russia, FSU

Yimengshan area, Shandong, China
Unspecified locality, Tao dist., China
Mautia Hill, Kongwa, Tanzania
De-Mix quarry, Mont Saint-Hilaire, Rouville Co., Qu,bec, Canada
Noda-Tamagawa Mine, Misago Ore Body, Iwate, Honshu, Japan
Alakutti, North-West Karelia, FSU
Southern Pacific silica quarry, Nuevo, Riverside Co., California, USA
Alakurtti region, Karelia (NW), Russia, FSU

Rade, Berg (near), Norway
Kramat Pulai mine, Kinta dist., Perak, Malaysia

Yugawara hot spring and Hudo-No-Taki waterfall, Kanagawa pref., Honshu, Japan
Windy Arm (W), Tagish Lake, Yukon Territory, Canada
Yukspor Mts., Khibina massif, Kola Peninsula, Russia, FSU
Pay-Khoi, Silova-Yakha River, Ural Mts., Russia, FSU
Salt Range, Pakistan
Eta-Etu , Kivu (N), Democratic Republic of Congo
Mt. Karnasurt, Lovozero massif, Yukspor Mts., Kola Peninsula, Russia, FSU
Naco, Cerro Morita, Sonora, Mexico
Texas, Lancaster Co., Pennsylvania, USA
Sherlovye Gora, Zabaikal'ye (E), Russia, FSU
Washington Pass (near), Okanogan Co., Washington, USA
Lucky MC Mine, Gas Hills Deposit, Fremont Co., Wyoming, USA
Moctezuma Mine, Moctezuma, Sonora, Mexico
Gross-Priesen, Bohemia, Czech Republic
Weisser Hirsch mine, Neust„dtel, Schneeberg (near), Sachsen, Germany

Chaitumusuk deposits, Lena River, Siberia, Russia, FSU
Bayan Obo iron mine, Baotou (Paotow), Inner Mongolia, China
Izalco Volcano, El Salvador
Akdzhal and Achisai deposits, Kazakhstan, FSU

Good Hope Mine and Vulcan Mine, Vulcan, Gunnison Co., Colorado, USA

Sterling Hill and Franklin Furnace, Sussex Co., New Jersey, USA
Tsaidam Basin (N), China
Chaidamupendi (Tsadam Basin), Qinghai (Chinghai), China
Batystau, Kazakhstan, FSU

C¡novec (Zinnwald), Krusn, Hory (Erzgebirge), Bohemia, Czech Republic
J chymov (St. Joachimsthal), Z padocesky kraj, Bohemia, Czech Republic

Korgeredabinsk, Tuva, Russia, FSU
Korgeredabin massif, Tuva (SE), FSU
Afrikanda massif, Kola Peninsula, Russia, FSU
Mt. Koashva, Khibina massif, Kola Peninsula, Russia, FSU
Saualpe, K„rnten (Carinthia), Austria
Mt. Karnasurt, Ilmajok valley, Lovozero, Kola Peninsula, Russia, FSU
Pr¡bram (near), Stredocesky kraj, Bohemia, Czech Republic
Zuni Mine, Anvil Mt., Silverton, San Juan Co., Colorado, USA
Laytonville quarry, Laytonville (S), Mendocino Co., California, USA
Talnakh, Noril'sk, Siberia (N), Russia, FSU
Rabenstein, Zwiesel, Bayern, Germany
Kank, Kutn Hora (near), Stredocesky kraj, Bohemia, Czech Republic

OPTICAL,C,165

Uniaxial (-). w = 1.597,e = 1.570.
Uniaxial (+).e ~ 2.11, w = 2.06.

Uniaxial (-). w = 1.495, e = 1.460.

Biaxial. a = 1.599-1.688, b = 1.612-1.697, g = 1.622-1.705, 2V large.
Biaxial (+). a = 1.722, b = 1.742, g = 1.763, 2V = 88ø.
Biaxial (+). a = 1.712, b = 1.721, g = 1.731, 2V ~90ø, 6826ø'.
Biaxial (-). a = 1.442, g = 1.504, 2V ~30ø.

Biaxial (-). a = 1.750-1.776, b = 1.780-1.820, g = 1.800-1.836, 2V = 60-70ø.
Biaxial (+). a = 1.790-1.81, b = 1.805-1.826, g = 1.87-1.90, 2V = 27-55ø.

Isotropic. N = 2.26.
Isotropic (metamict) to biaxial with 2V = 78-82ø.
Isotropic (metamict). N = 2.142.
Uniaxial (+). e = 1.529 w = 1.523.
Biaxial (+). (P21) a = 1.6169, b = 1.6204, g = 1.6336, 2V = 54ø40'.

Uniaxial
Uniaxial (+). e = 1.782, w = 1.701.

Biaxial (-). a = 1.567, b = 1.579, g = 1.581, 2V = 47ø.
Biaxial. b = 2.01, g = 2.06, 2V = 55ø.

Biaxial (-). a = 1.709, b = 1.752, g = 1.787, 2V = 85ø.

Biaxial (+). a = 1.500, b = 1.585, g = 1.641, 2V = 80ø.

Biaxial (+). a = 1.698, b = 1.704, g = 1.720, 2V = 65.5ø.
Uniaxial (-). w = 1.747, e = 1.741.
Uniaxial (+). e = 1.640, w = 1.632.
Biaxial. a = 1.672, b = 1.76, g = 1.683.
Biaxial (-). a = 1.472, b = 1.503, g = 1.526, 2V = 80ø.

Isotropic. N = 2.70. Gray-white in reflected light. R ~21%.
Biaxial (-). a = 1.947, b = 1.961, g = 1.968, 2V = 65ø.
High temp.: Biaxial (-). a = 1.527, b = 1.532, g = 1.538, 2V = 77ø.
Anisotropic with low birefringence. N(average) = 1.500.
Biaxial. a' = 1.600, g' = 1.620.

Uniaxial (-). w = e = 1.70.

Biaxial (-). a = 1.755, b = 1.772, g = 1.774, 2V ¯ 0.
Biaxial (-) occasionally (+). a = 1.64-1.78, b = 1.65-1.80, g = 1.66-1.81, 2V large = (50-80ø).

Biaxial (-). a = 1.756, b = 1.780, g = 1.792, 2V = 72ø.

Isotropic. N = 1.47-1.49.
Biaxial (+). a = 1.760, b = 1.765, g = 1.775, 2V moderate.
Isotropic. N = 1.830.
Biaxial (-). a = 1.5261, b = 1.6710, g = 1.6717, 2V = 6ø.

Biaxial (+). a = 1.588, b = 1.592, g = 1.598, 2V ~70ø.
Biaxial. b = 1.535, g = 1.585.
Anisotropic
Biaxial (-). a = 1.502, b = 1.562, g = 1.585, 2V = 64ø.
Isotropic. N = 1.565.
Anisotropic and birefringent
Uniaxial (+). e = 1.592, w = 1.572.
Biaxial (+). a = 1.475, b = 1.478, g = 1.485 (Indices vary with water content), 2V = 31ø, 69ø.
Biaxial (-). a = 1.658, g = 1.714, 2V = 80-85ø.
Uniaxial (+). e = 1.722, w = 1.707.
Biaxial (-). a = 1.516, b = 1.598, g = 1.621 , 2V = 30ø.
Biaxial (+). a = 1.532, b = 1.555, g = 1.591, 2V large.

Biaxial (-). a = 1.578, b = 1.593, g = 1.598 (indices vary with % F), 2V ¯ 50ø.
Biaxial (-). a = 1.429, b = 1.528, g = 1.538, 2V = 33ø.
Biaxial (-). a = 1.597, b = 1.600, g = 1.615, 2V = 10-14ø.

Anisotropic. N(avg.) = 1.498.
Uniaxial (-). w = 1.647, e = 1.637.
Biaxial (+). a = 1.470, b = 1.487, g = 1.540, 2V = 60ø.
Uniaxial (-). w = 1.800, e = 1.750.
Uniaxial (+). e ¯ w = 1.518.
Isotropic. N = 1.479-1.493.
Biaxial (+). a = 1.85, g = 1.88 (on cleavage flakes), 2V = ?
Biaxial (+). a = 1.602, b = 1.613, g = 1.649, 2V = 54ø.
Vary markedly with wavelength and temperature

Biaxial (-). a = 1.625, b = 1.700, g = 1.735, 2V = 66ø.
Biaxial (-). a = 1.629-1.640, b = 1.633-1.644, g = 1.638-1.650, 2V = 73-86ø.

Biaxial (+). a = 1.543, b = 1.476-1.5480, g = 1.551, 2V = 76-86ø and 83ø (-).

Isotropic. N = 1.887.
Biaxial (+). a ~ b = 1.740, g = 1.760, 2V near 0ø.
Biaxial (+). a = 1.813, b = 1.820, g = 1.830, 2V large.

Biaxial (+). a = 2.13, b = 2.2, g = 2.40, 2V large.
Biaxial (+). a = 1.8771, b = 1.8826, g = 1.8937, 2V = 75ø24'.
Biaxial (+). a = 1.5698, b = 1.5754, g = 1.6136, 2V = 43ø41'.

Uniaxial (-). Fe:Mg = 1:1.1: w = 1.728, e = 1.531 (vary with ratio of Fe to Mg).
Biaxial (+) but also (-). a = 1.622, b = 1.658, g = 1.687, 2V = 84ø.

(synthetic): Biaxial. a = 1.631, g = 1.697.
Biaxial (-). a = 1.577, b = 1.585, g = 1.590, 2V = 78ø.
Biaxial (-). a = 1.518-10527, b = 1.522-1.532, g = 1.522-1.534, 2V = 18-54ø.
Uniaxial (-). w = 1.550, e = 1.495.
Anisotropic. n = 1.81-1.82.
Biaxial. a = 1.526, b = 1.602, g = 1.602, 2V = 3ø.
Biaxial (ñ). a = 1.596-1.694, b = 1.605-1.710, g = 1.615-1.722, 2V = 78-111ø.
Biaxial (-). a = 1.557, b = 1.566, g = 1.571, 2V = 61ø.

Biaxial (+). a = 1.726, b = 1.738, g = 1.789, 2V = 53ø.
Biaxial (-). a = 1.610, b = g = 1.650, 2V is small.

Uniaxial (+). e = 1.492-1.499, w = 1.487-1.491.
Biaxial (-). a = 1.478, b = 1.482, g = 1.482, 2V is small.
Anisotropic. n's = 1.528(min.), 1.536(max.).

Biaxial (-). a = 1.530, b = 1.681, g = 1.685, 2V = 18ø.
Perceptible reflection pleochroism. Strongly anisotropic.
Biaxial (+). a = 1.4935, b = 1.4947, g = 1.4973, 2V = 67ø.
Uniaxial (-). w = 1.513, e = 1.470.
Uniaxial (-). w = 1.578, e = 1.577.

Biaxial (+). b = 1.74-2.0, 2V = 0-50ø, 68-70ø.
Biaxial (-). a = 1.674-1.700, b = 1.679-1.709, g = 1.686-1.710, 2V = 0-50ø (data uncertain).

Uniaxial (-). w = 1.882, e = 1.785.
Isotropic. Reddish brown in reflected light.

Optically similar to cassiterite with a light grey reflectance and distinct anisotropy.

Biaxial. a' = 1.720, g' = 1.740, 2V ¯ 90ø.
Biaxial (+). a = 1.484, b = 1.498, g = 1.523, 2V = 70ø

Uniaxial (-). w = 2.01, e = 1.99.
Biaxial (-). a = 1.5505, b = 1.5570, g = 1.5590, 2V = 58ø. Uniaxial (-). w = 1.556, e = 1.550.
Biaxial (-). a = 1.563, b = 1.569, g = 1.573.
Biaxial. a = 1.664, b = 1.670, g = 1.675, 2V = 86ø.
Biaxial (-). n's ~2.
Biaxial (-). a = 1.990, b = 2.030, g = 2.035, 2V ~ 30ø.

Biaxial (-). a = 1.815, b = g = 1.898, 2V ~ 0ø.
Isotropic. N > 1.86.
Biaxial (-). a = 1.787, b = 1.810, g = 1.816, 2V = 53ø26'.
Isotropic to weakly birefringent. N(avg.) = 1.625.
Isotropic or weakly birefringent. N(mean) = 1.64.

Isotropic. N = 1.755.

Biaxial (-). a = 1.970, b = 1.992, g = 2.011, 2V = 88ø.
Biaxial (-). b = 1.538, g = 1.542, 2V = 52ø.
Biaxial. a = 1.737, g = 1.766.

Biaxial (-). a = 1.488, b = 1.534, g = 1.556, 2V = 70ø.
Uniaxial (-). w = 1.86, e = 1.83.

Biaxial (+). a = 2.13, b = 2.35, g = 2.40, 2V = 70-75ø.

Isotropic. N ¯ 1.9.
Biaxial (+), occasionally (-). a = 1.678, b = 1.703, g = 1.733, 2V = 70-80ø.
Biaxial (-). a = 1.831, b = 1.861, g = 1.880, 2V = 74ø56' (Calc.).
Biaxial (+). a = 2.14, b = 2.15, g = 2.18, 2V = 44ø.

Biaxial (+). a = 1.655, b = 1.664, g = 1.675, 2V = 84ø.
Biaxial (-). a = 1.462, b = 1.482, g = 1.495, 2V = 71ø.
Biaxial (+). a = 1.5736, b = 1.5759, g = 1.5877, 2V = 50ø49'.
Biaxial (+). a = 1.671-1.735, b = 1.672-1.741, g = 1.703-1.761, 2V = 25-60ø.
Biaxial (-). a = 1.654-1.661, b = 1.740-1.749, g = 1.743-1.756, 2V very small.

Biaxial (+). a = 1.759, b = 1.763, g = 1.783, 2V ~ 47ø.
Usually biaxial (-), sometimes uniaxial (-). w = 1.577-1.57, e = 1.553-1.555, 2V variable ranging up to 53ø.

Biaxial (-). a = 1.3239, b = 1.3245, g = 1.3247, 2V very large.

Biaxial (+). a = 1.799, b = 1.822, g = 1.855, 2V > 70ø.
Biaxial (+). a = 1.730, b = 1.758, g = 1.836, 2V = 67ø.
Uniaxial (+). e = 1.632, w = 1.629.
Biaxial (+). a = 1.720, b = 1.731, g = 1.753, 2V = 76ø.
Biaxial (-). a = 2.13, b = 2.19, g = 2.20, 2V = 30ø.
Biaxial (-). a = 1.808, g = 1.860, 2V = 54ø.
Biaxial (+). a = 1.652, b = 1.658, g = 1.670, 2V = 72ø.
Biaxial (-). a = 1.81, b = 1.87, g = 1.92, 2V large.
Biaxial (-). a = 1.624, b = 1.635, g = 1.654, 2V = 85ø.
Biaxial. One index = 1.680.
Biaxial (-). a = 1.5810, b = 1.5958, g = 1.6008, 2V = 68-72ø.

Strongly anisotropic; white-grey in reflected light
Biaxial (-). a = 2.11, b = 2.18, g = 2.22, 2V = 80ø.

Biaxial (+). a = 1.5695, b = 1.571, g = 1.5775, 2V = 41ø.
Uniaxial (-). w = 1.691, e = 1.641.

N(mean) = 2.2(Calc.)
Biaxial. a = 1.544, b = 1.586, g = 1.588, 2V small.
Uniaxial (+). e > 2.00, w = 1.944.
Uniaxial (-). w = 1.406, e = 1.391.
Biaxial (+). b = 1.672, g = 1.673, 2V = 60ø.
Uniaxial (-). w = 1.557, e = 1.529.
Biaxial. a = 1.77, g = 1.835.
Biaxial (-). a = 1.358, b = 1.479, g = 1.530, 2V = 62ø.

Biaxial (+). a = 1.554, b = 1.564, g = 1.595, 2V ~ 59ø.
Biaxial (+). a = 1.735, b = 1.737, g = 1.80, 2V = 10-15ø.

Isotropic. N = 2.85.
Biaxial (+). a = 1.6362, b = 1.6373, g = 1.6482, 2V = 37ø.
Isotropic
Biaxial (-). a = 1.797, b g and > 2.0
Biaxial (-). a = 1.4791, b = 1.4851, g = 1.4891, 2V = 78ø.

Biaxial (+). a = 1.458, b = 1.473, g = 1.501, 2V = 73ø44' (Calc.).
Biaxial (-). a = 1.885, b = 1.910, g = 1.913, 2V = 35ø.
Yellow in reflected light. Distinctly anisotropic.
Biaxial (-). a = 1.69, b = 1.69-170, g = 1.70, 2V = 40ø27'.

Biaxial (-). a = 1.525, b = 1.684, g = 1.686, 2V = 15ø.
Biaxial (+). a = 1.742-1.743, b = 1.754 (Calc.), g = 1.776-1.778, 2V = 29-30ø.
Uniaxial (?). N = 1.515-1.519.
Biaxial (?). b(?) = 1.55, g(?) = 1.57.
Biaxial. a = 1.603, b = 1.610, g = 1.617, 2V 190ø.
Uniaxial (+). e = 1.82, w = 1.72.
Uniaxial (+) with high birefringence
Biaxial (+). a = 1.727, b = 1.732, g = 1.789, 2V = 7-40ø.

Biaxial. b = 1.598.

Biaxial (+). a = 1.578-1.586, b = 1.579-1.588, g = 1.583-1.593, 2V = 22-60ø.

Biaxial (+). a = 1.95, b = 1.97, g = 1.99, 2V large.
Biaxial (-). a = 1.453-1.455, b = 1.490-1.492, g = 1.498-1.505, 2V = 30ø(Calc.).
Biaxial (-). a = 1.465, b = 1.485, g = 1.535, 2V = 64ø.
Uniaxial (+). e = 1.6850, 10691, w = 1.6751, 1.6813.
Uniaxial (-). w = 1.627, e = 1.607.
Biaxial (-). a = 1.490, b ¯ g = 1.502.

Uniaxial (-). w = 1.85 (variable).
Biaxial (-). a = 1.730, b = 1.825, g = 1.830, 2V ~ 30ø.

Biaxial (-). a = 1.533, b = 1.544, g = 1.548, 2V = 82ø.
Biaxial (-). 2V small.

Biaxial (+). a = 1.890, b = 1.90, g = 1.99, 2V moderate.
Uniaxial (-). w = 1.660, e = 1.640.
Biaxial. a = 1.602-1.624, b = g = 1.632-1.650.

Uniaxial (+). e = 1.804, w = 1.757.
Greyish white or slightly bluish in reflected light
Uniaxial (-). w = 1.690, e = 1.527.
Uniaxial (+). e = 1.484, w = 1.478.
Biaxial (+). a = 1.775, b = 1.786, g = 1.815, 2V moderate to large.
Uniaxial (-). w = 1.580, e = 1.485.
Reddish brown in reflected light. Weakly anisotropic.
Biaxial (-). a = 1.660, b = 1.690, g = 1.695, 2V > 45ø.
Biaxial (-). a = 1.659, b = 1.681, g = 1.694, 2V = 70ø.
Uniaxial (+). e = 1.529, w = 1.5235.
Biaxial (-). a = 1.687, b = 1.725, g = 1.748, 2V = 74ø.

Biaxial (-). a = 1.624, b = 1.636, g = 1.642, 2V moderately large.
Biaxial (-). a = 1.584-1.591, b = 1.603-1.605, g = 1.611-1.614, 2V = 73-81ø.
Uniaxial (-). w = 1.566-1.602, e = 1.562-1.594.
Biaxial (-). a = 1.541, b = ?, g = 1.560.
Biaxial (-). a = 1.5520, b = 1.5579, g = 1.561, 2V = 67ø56'.

Isotropic. N = 1.71.
Bright orange-yellow in reflected light. Weakly anisotropic.
Isotropic. N ¯ 1.92 (variable).
Pinkish grey in reflected light.
Biaxial (+). a = 1.782, b = 1.797, g = 1.850, 2V = 60ø.
Uniaxial (-). w = 1.957, e = 1.943.
Biaxial (+). a = 1.702, b = 1.703, g = 1.722, 2V = 25ø.
Uniaxial (-). w = 2.13, e = 1.97.
Biaxial (-). a = 1.465, b = 1.494, g = 1.495, 2V = 10ø.
Isotropic. N = 1.625.
Isotropic. N = 2.192.
Biaxial (+). a = 1.4748, b = 1.4820, g = 1.4885, 2V = 88ø.

Biaxial (+). a = 1.600, b = 1.650, g = 1.722, 2V = 84ø (Meas.).
Biaxial (-). a = 1.510, b = 1.521, g = 1.523, 2V = 45ø.
Biaxial. a = 1.76(Calc.), b = 1.800, g = 1.805, 2Va ¯ 37ø.

Isotropic. N = 1.84-1.93.
Biaxial (-). a = 1.565-1.625, b = 1.605-1.696, g = 1.605-1.696, 2V = 0.25ø.
Uniaxial (-). w = 1.525, e = 1.480.
Biaxial (-). a = 1.496, b = 1.539, g = 1.557, 2V = 62.7ø.
Biaxial. b(?) = 1.69, g(?) = 1.73.
Biaxial (+). a = 1.495, b = 1.507, g = 1.528, 2V = 79ø24'.
Biaxial. Indices > 2.42.
Uniaxial (-). w = 2.15, e = ?

Mean index ranges from ~2.12 to ~2.30 due to variable water content.
Biaxial. a = 1.93, b = 1.97, g = 2.01.
Isotropic. N > 2.0.
Isotropic. N = 2.09.
Biaxial (+). a = 2.388, b = 2.403, g = 2.428, 2V = 80ø.
Biaxial (-). a = 1.651, b = 1.659, g = 1.661, 2V = 35-52ø.

Biaxial (+). a = 1.692, b = 1.695, g = 1.710, 2V ~35ø.
Nearly isotropic. N = 2.16.
Biaxial (+). a ~ 2.05, b = ?, g ~ 2.20, 2V = 80ø.
Biaxial (-). a = 1.483, b = 1.486, g = 1.487, 2V = 71ø.
Biaxial (+). a = 1.694, b = 1.698, g = 1.715, 2V = 46.4ø.
Biaxial (+). a = 1.510, b = 1.520, g = 1.543, 2V = 71ø (Minnesota); a = 1.5468, b = 1.5533, g = 1.5820, 2V = 53ø (New Zealar
Biaxial (-) or (+). a = 1.638, 1.646, b = 1.645, g = 1.651, 1.661 (somewhat uncertain), 2V moderate for (-), 2V = 80ø for (+).
Purple-raspberry or greyish lilac to gold and yellow.
Biaxial (+). a = 1.462, b = 1.466, g = 1.469, 2V = 78-80ø.

a' and g' = 2.01-2.06
Isotropic. N ~2.04-2.09.
Biaxial to uniaxial (+). N = 1.50-1.51.
Biaxial (-). a = 1.669, b = 1.6955, g = 1.7005, 2V = large.

Biaxial. a = 1.554, b = 1.577, g = 1.618.

Biaxial (-). a = 1.520, b = 1.568, g = 1.591, 2V = 68ø (Khibina).
Biaxial. a = 1.47, b = 1.48, g = 1.49, 2V large.
Biaxial (+). a = 1.658-1.6622, b = 1.662-1.6670, g = 1.668-1.6730, 2V = 82.5ø.
Biaxial (-). a = 1.4466, b = 1.4687, g = 1.4717, 2V = 39ø58' (Calc.).
Biaxial (-). a = 1.590, b = 1.651, g = 1.657, 2V ¯ 30ø.

Biaxial (+). a = 1.682, b = 1.695, g = 1.720, 2V = 66ø (Calc.).

Biaxial (-). a = 1.775, b = 1.798, g = 1.800, 2V = 25ø.
Biaxial (+). a = 1.775, b = 1.800, g = 1.846, 2V moderately large.
Biaxial (+). a = 1.523, b = 1.530, g = 1.582, 2V = 42ø.

Biaxial (+). a = 3.141, b = 3.166, g = 3.280, 2V = 52ø.
Biaxial (+). a = 1.4716, b = 1.4730, g = 1.4786, 2V = 51ø11'.
Biaxial (-). a = 1.522, b = 1.531(Calc.), g = 1.536, 2V ~ 70ø.
Biaxial. b = 1.73, g - a = 0.05.

Biaxial (+). a = 2.28, b = 2.36, g = 2.48, 2V large (Li).
Biaxial (-). a = 1.49, b = ?, g = 1.56, 2V small.

Uniaxial (+). e = 1.647, w = 1.646.
Biaxial (-). a = 1.567, g = 1.585, 2V large.
Biaxial (+). a = 1.709-1.707, b = 1.711, g = 1.724-1.729, 2V = 23ø.
N = 2.26 (Li) metamict. N = 2.30 (Na), 2.23.
Uniaxial (-). w = 1.567, e = 1.566.
Biaxial (+). a = 1.531, b = 1.546, g = 1.562, 2V large.

Biaxial (+). a = 1.602, b = 1.609, g = 1.621-1.623, 2V = 71ø, 75ø (Calc.) .
Biaxial (+). a = 1.712, b = 1.716, g = 1.725, 2V = 30ø (variable).

Biaxial (-). a = 1.525, b = 1.590, g = 1.593, 2V = 26-28ø.
Biaxial (+). a = 1.510, b = 1.512, g = 1.523, 2V = 65ø.

Biaxial (-). a = 1.598, b = 1.605, g = 1.608, 2V = 63-65ø.

n(avg.) = 1.635.
Winchell and Winov K A, Mineralogy of Rare Elements, v. II, p. 297-300, Israel Program for Scientific Translations, 1966.
Uniaxial (-). w = 1.732, e = 1.728; also slightly biaxial with 2V up to 44ø.
Biaxial (-). a = 1.728, b = 1.771, g = 1.800, 2V ¯ 77ø.
Uniaxial (+). e = 1.695, w = 1.680.
Isotropic. N = 2.253.
Uniaxial (+). e = 1.733, w = 1.719.
Biaxial. a = 2.5831, b = 2.5843, g = 2.7004.
Biaxial (-). a = 1.96, b = 2.01, g = 2.04, 2V = 75ø (syn.).
Uniaxial (+). e = 1.580-1.60, w = 1.559-1.59.
Biaxial (-). a = 1.7755, b = 1.7985, g = 1.8205, 2V = 86-96ø.
Uniaxial (-). w = 1.540, e = 1.510.

Biaxial (+). a = 1.539, b = 1.546, g = 1.551, 2V = 86ø.
Biaxial (-). a = 1.607, b = 1.610, g = 1.616, 2V = 65ø.
Biaxial (+). a = 1.530, b = 1.531, g = 1.534.
Uniaxial (-). w = 1.735, e = 1.655.
Uniaxial (-). w = 1.595, e = 1.445.

Biaxial. b' = 1.570-1.582, g' = 1.626-1.631.
Biaxial (-). a = 1.540, g = 1.548, 2V ¯ 66ø.
Biaxial (+). a = 1.587, b = 1.590 (Calc.), g = 1.597.
Isotropic. N = 2.37 (Li), N = 2.23 (Na).

Biaxial (-). a = 1.611, b = 1.635, g = 1.643, 2V = 58ø.

Biaxial (-), nearly uniaxial. a = 1.82, b = g = 1.85.
Biaxial (-). a = 1.448, b = 1.489, g = 1.493, 2V = 34ø.

Isotropic to weakly anisotropic with uniaxial positive interference figures. N = 1.633.
Biaxial (-). a = 1.640-1.695, b = 1.651-1.708, g = 1653-1.710, 2V = 34-60ø.
Biaxial (+), sometimes (-). a = 1.593-1.604, b = 1.6651.674, g = 1.741-1.731, 2V large.

Mean index varies from 1.86 to 1.91.
Biaxial (-). a = 1.561, b = 1.565, g = 1.570, 2V = 86ø.

Uniaxial (+). e = 1.635, w = 1.575.

Isotropic. N = 1.513.

Biaxial (-). a = 1.95, b = 2.08, g = 2.11, 2V = 38ø.
Uniaxial (+). e = 1.663, w = 1.662.

Biaxial (-). a = 1.595, b = 1.654, g = 1.670, 2V = 54ø.

Uniaxial (-). w = 1.57-1.58 (variable).
Anisotropic
Biaxial (+). a = 2.01, b = 2.05, g = 2.09, 2V = 83ø.
Uniaxial (-). w = 1.65835, e = 1.48645 (l = 588.99 at 20øC).

Uniaxial (+). e = 1.639, w = 1.603.
Biaxial (+). a = 1.425, b = 1.428, g = 1.432, 2V = 72ø.
Biaxial (+). a = 1.468, b = 1.484, g = 1.515, 2V = 80ø.
Uniaxial (-). w = 1.816-1.827, e = 1.856-1.863, a = 1.770, b = 1.816, g = 1.856-1.863.
Isotropic. N = 1.872.
Biaxial (-). a = 1.818, b = 1.866, g = 1.909, 2V ~ 85ø.

Biaxial (-). a = 1.569, b = 1.657, g = 1.686, 2V = 54ø.
Biaxial (-). a = 1.559, b = 1.653, g = 1.680, 2V = 55ø.
Uniaxial (+). e = 2.656, w = 1.973.
Biaxial. a = 1.666, b = 1.690, g = 1.690, 2V = 2ø.
Uniaxial (+). e = 2.30-2.36, w = 2.19-2.27.
Biaxial (-). a = 1.589, b = 1.645, g = 1.659, 2V = 52ø.
Biaxial (-). a = 1.496, b = 1.504, g = 1.506, 2V = 52ø.
Biaxial (-). a = 1.534, b = 1.538, g = 1.543, 2V = 58ø (?).
Biaxial (+). a = 1.485, b = 1.494, g = 1.505, 2V very large.
Uniaxial (-). w = 1.507-1.528, e = 1.495-1.503.

Uniaxial (-). n's ~ 1.76.
Biaxial (-). a = 1.743, b = 1.754, g = 1.764, 2V very large.
Uniaxial (+). e = 1.711, w = 1.598.

Biaxial (-). a = 1.5069, b = 1.5459, g = 1.5693, 2V = 75ø.
Biaxial (-). a = 1.569, b = 1.679, g = 1.708, 2V = 52ø (Calc.).
Biaxial (+). a = 1.731, b = 1.735, g = 1.740, 2V = 7ø.
Biaxial (+). a = 1.616, b = ?, g = 1.677, 2V = 55-60ø.
Uniaxial to slightly biaxial (-). a (e) = 1.6155, b = 1.627, g (w) = 1.6785, 2V = 0-36ø.
Uniaxial (-). w = 1.603-1.628, e = 1.598-1.619.
Uniaxial (-). w = 1.521, e = 1.517.
Biaxial (-). a = 1.982, b = 2.095, g = 2.19, 2V = 80ø.
Biaxial (+). a = 1.411, b = 1.416, g = 1.422, 2V = 77ø.

Anisotropic with low birefringence

Biaxial (+). a = 2.070, 2.05, b = 2.070, 2.05, g = 2.080, 2.06, 2V moderate.
Biaxial (+). a = 1.4665, b = 1.4753, g = 1.4937, 2V = 70ø03'.
Biaxial (-). a = 1.750-1.78, b = 1.901-2.06, g = 1.92-2.08, 2V = small, 43-60ø.
Isotropic. N = 1.362.
Biaxial (+). a = 1.62, b = 1.63, g = 1.64, 2V = 67ø.
Uniaxial (-). n's between 1.54 and 1.56.

Biaxial (+). a = 1.776, b = 1.780, g = 1.805, 2V = 41ø.
Biaxial (-). a = 1.6055, b = g = 1.6325, 2V near 0ø.
Biaxial. n1 = 1.663, n2 = 1.684.
Biaxial. a = 1.64-1.65, b = ?, g = 1.67-1.68.
Uniaxial (+). e = 2.0972, w = 2.006.

Uniaxial (+). e = 1.624, w = 1.596.

Biaxial (+). a = 1.542, b = 1.544, g = 1.551, 2V = 52ø.
Biaxial (-). a = 1.589, b = 1.614, g = 1.626, 2V = 61ø.
Biaxial (-). a = 1.598-1.604, b = 1.735, g = 1.740-1.748, 2V ¯ 5ø.
Biaxial (+). a = 1.595, b = 1.60, g = 1.638, 2V = 58ø.

Biaxial. a = 1.610-1.606, g = 1.641-1.579.
Biaxial (+). a = 1.6215, b = 1.6237, g = 1.6308, 2V ¯ 50ø.
Biaxial (+). a = 1.579-1.587, b = 1.583-1.593, g = 1.588-1.600, 2V = 83-92ø.
Isotropic. N > 2.

Exhibits anomalous birefringence
Uniaxial (+). e = 1.81-1.82, w = 1.806-1.81.

Biaxial. a' = 1.89, b' = 1.95, g = 2.02.
Isotropic. N(mean) = 1.60.
Biaxial (-). a = 1.8036, b = 2.0765, g = 2.0786, 2V = 9ø0' (Calc.).
Biaxial. n's ¯ 1.67-2.05, 2V small.
Uniaxial (-). e = 1.564, w = 1.570.
Biaxial (+). a = 1.880, b = 1.928, g = 2.029, 2V = 72ø.
Biaxial (+). a = ?, b = 1.726, g = 1.758, 2V = 75ø.
Uniaxial (-). w = 1.470-1.494, e = 1.470-1.494.

Biaxial (-). a = 1.516, b = 1.539, g = 1.546, 2V = 56ø.

Biaxial (+) with 2V = 61ø at 430 mm to 46ø at 620 mm

Biaxial (-). a = 1.724, b = 1.733, g = 1.739, 2V large.
Biaxial (-). a = 1.712, b = 1.732, g = 1.732, 2V ~ 0ø.
Biaxial (+). a = 1.483, b = 1.530, g = 1.576, 2V large.
Biaxal (?). n's ~ 2.72
Uniaxial (-). w = 1.618, e = 1.552.

Biaxial (-). a = 1.775, b = 1.840, g = 1.855, 2V ¯ 22ø.

Biaxial (+). a = 1.732, b = 1.737, g = 1.744, 2V ¯ 83ø.

Uniaxial (+). w = 2.476, e = 2.485.
Uniaxial (-). w = 1.653, e = 1.642.

Uniaxial (-). w = 1.492, e = 1.475.
Biaxial (+). a = 1.550, b = 1.553, g = 1.559, 2V = 28-30ø.

Biaxial. a' = 1.520, g = 1.558.
Biaxial (-). a = 1.871, b = 1.909, g = 1.927, 2V = 67ø.
Biaxial. a = 1.779, b = 1.780, g = 1.816, 2V = 17.4-19ø.

Uniaxial (+). e = 1.879, w = 1.783.
Biaxial (-). a = 1.643, b = 1.691, g = 1.704, 2V = 11-12ø.
Biaxial (-). n's ~ 2.2-2.6, 2V = 65-75ø.
Biaxial (+). a = 1.456, b = 1.460, g = 1.480, 2V = 47ø.
Biaxial (-). a = 1.967-1.973, b ¯ 2.02, g ¯ 2.05, 2V moderate.
Biaxial (+). a = 1.596, b = 1.600, g = 1.618, 2V = 50ø (Calc.) (Norwegian material).
Biaxial (-). a = 1.63-1.645, b = 1.65-1.68, g = 1.66-1.685, 2V = 40-45ø.
Uniaxial (-). w = 1.3486, e = 1.3424.
Biaxial (+). a = 1.544, b = ?, g = 1.549, 2V = 78ø.
Uniaxial (-). w = 1.560, e = 1.507.
Uniaxial (-). w = 1.667, e = 1.664.
Isotropic. N = 2.07.
Biaxial. a = 1.705-1.730, b = 1.708-1.734, g = 1.712-1.740, 2V = 45-68ø.
Uniaxial (-). e = 1.560, w = 1.540.
Uniaxial (+). w = 1.59, e - very weak.
Biaxial (-). a = 1.682, b = 1.690, g = 1.697, 2V ¯ 83ø.
Biaxial (+). 2V moderately large.
Biaxial (-). a = 2.16, b = 2.24, g = 2.25, 2V ~ 70ø.
Isotropic. N = 2.04.

Biaxial (+). a = 1.592-1.615, b = 1.602-1.627, g = 1.621-1.646, 2V = 71-85ø.

Uniaxial (+). e = 1.84-1.88, w = 1.81-1.85.
Uniaxial (-). w = 1.778, e = 1.772.
Isotropic. N = 2.08.

Biaxial (+). a = 1.746, b = 1.748, g = 1.756, 2V ¯ 70ø.
Biaxial (-). a = 1.575-1.585, b = 1.597, g = 1.598-1.635.

Biaxial (-). a = 1.583, b = 1.608, g = 1.633, 2V = 79ø.
Isotropic. N = 1.443.
Isotropic. N = 1.440.
Biaxial (+). a = 1.623, b = 1.631, g = 1.657, 2V small.
Transparent in transmitted light with n's > 2.0. Grey with a bluish tint in reflected light.
Uniaxial (+). e = 3.256, w = 2.905.

Biaxial. a = 1.595, g = 1.607.
Optically negative, weakly biaxial with indices e = 1.645 and w = 1.751.
Uniaxial (-). w = 1.782, e = 1.780.

Isotropic. N > 2.11.

Biaxial (-). a = 1.675, b = 1.723, g = 1.765, 2V = 78.
Biaxial (+ or -). a = 1.578-1.670, b = 1.580-1.685, g = 1.586-1.685. Variable depending on composition.
Biaxial. a = 1.569, g = 1.570, 2V ~ 42ø.
Biaxial (-). a = 1.756, b = 1.874, g = 1.896, 2V = 50ø.
Biaxial (+). a = 1.651, b = 1.654, g = 1.660, 2V = 53ø.
Biaxial (+). a = 1.764, b = 1.767, g = 1.792, 2V = 25ø.
Biaxial (-). a = 1.662, b = 1.667, g = 1.669, 2V large.
Biaxial (-). a = 1.610, b = 1.627, g = 1.633, 2V = 55-61ø.
Biaxial (+). a = 1.629, b = 1.641, g = 1.662, 2V = 73ø.
Not determined
Biaxial (-). a = 1.642-1.644, b = 1.647-1.675, g = 1.699-1.704, 2V = 82-88ø (Meas.).
Biaxial (+). a = 1.557, b = 1.561, g = 1.567, 2V = 80ø.
Biaxial. a = 1.478 (variable), b = 1.480, g = 1.481, 2V = 32-48ø.

Biaxial (-). a = 1.6665, b = 1.6862, g = 1.6945, 2V = 65-66ø.
Biaxial (+). a = 1.670-1.715, b = 1.674-1.725, g = 1.690-1.734, 2V = 14-90ø.
Biaxial (-). a = 1.643-1.648, b = 1.655-1.662, g = 1.655-1.663, 2V ¯ 6-32ø.
Uniaxial (-). w = 1.588-1.635, e = 1.560-1.590.

Biaxial (-). a = 1.747, b = 1.779, g = 1.84, 2V moderately large.

Biaxial (+). a = 1.646, b = 1.668, g = 1.705, 2V = 78.
Biaxial (-). a = 1.681, b = 1.728, g = 1.769, 2V = 83ø.
Opaque. Isotropic.

Biaxial (-). a = 1.558, b = 1.576, g = 1.593, 2V ¯ 40ø.
Biaxial (+). a = 1.580, b = 1.599, g = 1.605.
Biaxial (+). a = 1.593-1.599, b = ?, g = 1.597-1.604, 2V = 54-64ø.
Uniaxial (+ and -). e and w ~ 1.73-1.75.

Biaxial (+). a = 1.5863, b = 1.5920, g = 1.6140, 2V = 55ø.
Biaxial (+). a = 1.632, b = 1.642, g = 1.657, 2V = 80ø.

Uniaxial (-) to slightly biaxial. w = 1.388, e = 1.385.

Anisotropic; n's between 1.78 and 1.79.
Uniaxial (+). e = w = 1.598.
Uniaxial. w = 1.690, e' = 1.684.
Biaxial (-). a < 1.790, b = 1.798, g = 1.802, 2V = 10-15ø.
Uniaxial (-). w = 1.755, e = 1.731.
Biaxial (+ or -). a = 1.730-1.800, b = 1.795-1.831, g = 1.771-1.846, 2V variable from 0-10ø and up to ~ 90ø.
Uniaxial (+). e = 1.746-1.758, w = 1.724-1.738.
Biaxial (+). a = 1.572-1.576, b = 1.579-1.584, g = 1.589-1.600, 2V = 0-90ø. Fluctuations due to degree of hydration.

Biaxial (+). a = 1.496, b = 1.531, g = 1.579, 2V = 78ø.

Uniaxial (+). e = 1.548, w = 1.539.
Isotropic
Biaxial (+ or -). a = 1.522-1.558, b = 1.524-1.574, g = 1.527-1.578, 2V= 65-104ø.
Uniaxial (-). w = 1.773, e = 1.576.
Uniaxial (-). w = 1.93, w-e weak.
Biaxial (-). a = 1.765, b = 1.81, g = 1.82, 2V ~ 33ø.

Biaxial (+). a = 1.81, b = 1.815, g = 1.85, 2V small.

Uniaxial (-). w = 1.7653-1.7760, e = 1.7573-1.7677.

Biaxial (+). a = 2.199, b = 2.217, g = 2.260, 2V = 67ø12' (Calc.).

Uniaxial (+). e = 2.62, w = 1.40.
Biaxial (-). a = 1.512, b = 1.515, g = 1.517, 2V = 50ø.

Trigonal: Uniaxial (+). e = 1.631, w = 1.622.
Biaxial (+). a = 1.737, b = 1.747, g = 1.768, 2V = 69ø.

Biaxial (-). a = 1.461, b = 1.478, g = 1.485, 2V = 64ø22'.

Uniaxial (-). w = 1.484, e = 1.487.

Biaxial (+). a = 2.29, b = 2.36, g = 2.66, 2V = 57ø.
Biaxial (-)

Biaxial (+). a = 1.659, b = 1.670, g = 1.674, 2V = 59.8ø.
Biaxial (+). a = 1.3376, b = 1.3377, g = 1.3387, 2V = 43ø.
Isotropic. N = 1.3395.
Isotropic. N = 1.369.

Uniaxial (-), weakly biaxial. w = 1.672, e = 1.644.

Uniaxial (-). w = 2.041, e = 1.926.
Biaxial (+). a = 1.656, b = 1.671, g = 1.688, 2V = 87ø.

Isotropic. N = 2.849.

Biaxial (+). a = 1.558, b = 1.575, g = 1.620, 2V = 63ø.
Not given
Optically similar to pavonite. Pleochroism weak. Anisotropy strong.
Not given
Uniaxial (-). w = 1.633, e = 1.590.
Biaxial (-). a = 1.654-1.655, b = g = 1.664-1.667, 2V very small or zero.
Isotropic

Mean index = 2.15
Biaxial (+). a = 1.676, b = 1.680, g = 1.693, 2V = 60ø.
Biaxial (-). a , b, g > 2, 2V = 66ø.
Biaxial (-). a = 2.05-2.06, b = 2.07-2.11, g = 2.12-2.15, 2V large.
Biaxial (+). a = 1.591, b = 1.596, g = 1.602, 2V = 76ø.
Uniaxial (-). w = 2.06, e = 2.05.
Biaxial (+). a = 1.4936, b = 1.4864, g = 1.5020, 2V = 46ø32'.

Biaxial (-). a = 1.640, b = 1.664, g = 1.675, 2V = 67ø.
Biaxial (+). a = 1.588-1.591, b = 1.617-1.620, g = 1.654-1.655, 2V = 82ø.

Uniaxial (-). w = 1.611-1.617, e = 1.603-1.606.
Uniaxial (-). w = 1.803, e = 1.769.
Biaxial (+). a = 1.494, b = 1.496, g = 1.499, 2V = 70ø.

Biaxial (-). a = 1.575, b = 1.590, g = 1.601, 2V ¯ 72ø.
Isotropic. N = 1.753-1.771.

Biaxial (-). a = 1.6303, b = 1.6332, g = 1.6360, 2V = 88ø.
Biaxial (+). a = 1.655, b = 1.672, g = 1.686, 2V = 85ø.

Uniaxial (-). w = 1.708, e = 1.609.
Uniaxial (-). w = 1.580, e = 1.575.
Biaxial (-). a = 1.388, b = 1.479, g = 1.486, 2V ~ 27ø.

Biaxial (-). a = 1.622-1.626, b = 1.649-1.658, g = 1.666-1.670, 2V = 72-75ø.
Uniaxial (-). w = 1.91, e = ?.

Biaxial (-). a = 1.660, b = 1.684, g = 1.690, 2V = 48ø.

Isotropic. Metamict; N ~ 2.3.
Biaxial (-). a = 1.660, b = 1.684, g = 1.690, 2V = 48ø.
Uniaxial (-). e ~ 1.520, w ~ 1.519.
Biaxial (-). a = 1.462-1.466, b = 1.537-1.542, g = 1.589-1.596, 2V = 76ø46'.
Biaxial. a = 1.840, g = 1.870.
Biaxial (-). a = 1.546, b = 1.572, g = 1.576, 2V = 42ø.

Biaxial. b = 1.532, 2V = 83ø.
Biaxial (-). a = 1.783, b = 1.834, g = 1.866, 2V medium to large.
Isotropic. N = 1.610-1.650.

Biaxial (+). a' = 1.835, g' = 1.910.
Biaxial (+). a = 1.567, b = 1.568, g = 1.576.
Uniaxial (+). e = 2.00, w = 1.89.
Biaxial (+). a = b = 2.45, g = 2.51, 2V ~ 0ø.
Biaxial (-). a = 1.77 b = 1.85, g = 1.89.

Uniaxial (-). w = 1.569, e = 1.547.
Biaxial (-). a = 2.185, b = 2.265, g = 2.35, 2V ~90ø.
Uniaxial (+). e = 1.682, w = 1.656.
Biaxial (-). a = 1.586, b = 1.651, g = 1.660, 2V = 39ø.
Biaxial (-). a = 1.760-1.762, b = 1.767-1.768, g = 1.768-1.770, 2V moderate.
Uniaxial (-). w = 1.98, e = 1.85.
Biaxial (+). a = 1.62, b = 1.64, g = 1.67, 2V small.
Isotropic. N = 2.4175.

Biaxial (+). a = 1.702, b = 1.722, g = 1.750, 2V = 84ø.
Biaxial (+). a = 1.648-1.658, b = 1.655-1.662, g = 1.662-1.671, 2V large.
Biaxial (+). a = 1.560-1.564, b = 1.561-1.566, g = 1.566-1.570, 2V = 50-80ø.
Biaxial (-). a = 1.825, b = 1.842, g = 1.857, 2V = 86ø.

Biaxial (+). b = 1.6654.
Biaxial (+). a = 1.664-1.695, b = 1.672-1.701, g = 1.695-1.721, 2V = 50-60ø.
Uniaxial (+). e = 1.723, w = 1.667.
Biaxial (-). a = 1.549, b = 1.569, g = 1.571, 2V = 40ø.
Uniaxial (+). e = ?, w = 1.96.

Biaxial (+). a = 1.715, b = 1.820, g = 1.880, 2V = 85ø.
Uniaxial (-). w = 1.679, e = 1.501.

Shows distinct anisotropy in reflected light.
Biaxial (-). a = 1.551-1.561, b = 1.646, g = 1.652, 2V = 0-20ø.
Biaxial (-). a = 1.677, b = 1.684, g = 1.692, 2V = 88ø.
Biaxial (+). a = 1.454, b = 1.461, g = 1.471, 2V = 65ø.
Biaxial (+). n's between 1.488 amd 1.500.
Uniaxial (+). n's >1.80.

Biaxial (+). a = 1.545, b = 1.553, g = 1.566, 2V = 77ø.
Uniaxial (-). w = 1.634, e = 1.611.
Biaxial (-). a = 1.518, b = ?, g = 1.601, 2V = 30-40ø.
Uniaxial (+). n's > 2.0.
Anisotropic. Mean index = 1.87, 2V = 33ø.

Biaxial (+). a = 1.820-1.842, b = 1.830-1.850, g = 1.875-1.925, 2V small.

Biaxial (-). a = 2.04, b = 2.08, g = 2.10, 2V large.
Uniaxial (-). w = 1.977, e = 1.967.
Biaxial. a = 2.08, b = 2.11.
Biaxial (+). a = 1.85, b = 1.87, g = 1.89, 2V large.
Biaxial (-). a = 1.686, b = 1.722, g = 1.723, 2V = 13ø.
Biaxial (-). a = 1.602, b = 1.716, g = 1.750, 2V large.
Biaxial (-). a = 1.634, b = 1.673, g = 1.685, 2V = 45ø.

Uniaxial (-). w = 1.87, e = 1.85.

Biaxial. Mean index = 1.63.
Biaxial (+). a = 1.508, b = 1.510, g = 1.516.

Isotropic. N = 1.716-1.725.
Biaxial (+). a = 1.584, b = 1.586, g = 1.600, 2V ~ 35ø.
Biaxial (+). a = 1.515, b = 1.530, g = 1.580, 2V = 60ø.
Biaxial (-). a = 1.696, b = 1.745, g = 1.765.
Uniaxial (-). w = 2.32, e = 2.25.
Biaxial (-). a = 1.612-1.638, b = 1.625-1.652, g = 1.630-1.654, 2V ¯ 80ø.
Whitish grey in reflected light in air.
Biaxial (+ or -). a ~ 1.654, b ~ 1.666, g ~ 1.670, 2V large.
Biaxial (-). a = 1.5405, b = 1.5528, g = 1.5569, 2V = 54ø.
Biaxial (-). a = 1.566, b = 1.606, g' = 1.606, 2V = 9ø.
Isotropic. N = 2.49.
Biaxial (+). a = 1.556, b = 1.560, g = 1.580, 2V = 62ø.
Uniaxial (+). e = 1.5458, 1.5443; w = 1.5445, 1.5430.
Uniaxial (-). w = 1.6052, e = 1.4502.
Uniaxial (-). w = 1.580, e = 1.568. Somtimes slightly biaxial with 2V = 10-15ø.
Uniaxial (-). w = 1.577, e = 1.574. Listed as being biaxial with a small 2V.
Uniaxial (-). q = 1.640-1.655, e = 1.615-1.620.

Isotropic. N = 1.376.
Biaxial (+). a = 1.563, b = 1.569, g = 1.577, 2V = 76-89ø.
Biaxial (-). a = 1.990, b = 1.993, g = 1.994, 2V = 66ø.
Biaxial (-). a = 2.20, b = g = 2.36, 2V = 0-10ø.

Biaxial (-). a = 1.962, b = 2.09, g = 2.10-2.12, 2V small.

Biaxial (+). a = 3.081, b = 3.089, g = 3.120, 2V = 54ø.
Anisotropic; n's ¯ 1.537.

Biaxial (-). a = 1.570, b = ?, g = 1.572, 2V small.
Biaxial (-). a = 1.638-1.639, b = 1.660-1.664, g = 1.667-1.671, 2V = 50ø.
Biaxial (-). a = 1.595, b = 1.625, g = 1.627, 2V = 28ø.
Biaxial (+). a = 1.536-1.542, b = 1.541-1.544, g = 1.542-1.548, 2V = 30-32ø.
Biaxial (-). a = 1.740, b = 1.768, g = 1.787, 2V = 74ø.
Biaxial (-). a = 1.485-1.505, b = 1.497-1.515, g = 1.497-1.519, 2V = 44ø.
Biaxial (-). a = 1.610, b = 1.650, g = 1.682, 2V = 60ø.
Biaxial (-). a = 1.430-1.440, b = 1.452-1.462, g = 1.457-1.469, 2V = 50ø.

Biaxial (+). a = 1.646, b = 1.685, g = 1.745, 2V = 75ø.
Uniaxial (+). e = 1.4740, w = 1.4711.
Biaxial (-). a = 1.667, b = 1.674, g = 1.679, 2V = 56-59ø.

Biaxial (-). a = 1.678, b = 1.706, g = 1.721, 2V = 74ø.
Isotropic. N = 1.502.
Biaxial (+ and -). a = 1.622-1.629, b = 1.658-1.663, g = 1.681-1.701, 2V large.
Biaxial (+). a = 1.715, b = 1.75, g = 1.80, 2V = 62ø.

Biaxial (-). a = 1.762, b = 1.770, g = 1.774, 2V = 40ø.

Biaxial (-). a = 1.795, b = 1.815, g = 1.825, 2V = 77ø.
Uniaxial (-). w = 1.491, e = 1.470.

Biaxial (+). a = 1.580, b = 1.605, g = 1.644, 2V large.
Biaxial (+). a = 1.695, b = 1.698, g = 1.733, 2V = 29ø.
Biaxial (+). a = 1.651, b = 1.655, g = 1.671, 2V = 50ø.
Uniaxial (+). e = 1.589, w = 1.527.
Uniaxial (+). e = 1.594-1.633, w = 1.591-1.623.
Biaxial (+). a = 1.545, b = 1.546, g = 1.551, 2V ~ 30ø.
Biaxial. n's between 1.492 and 1.496.
Isotropic. N = 2.05.
Isotropic (metamict). N = 2.06-2.24.
Isotropic. N ~ 1.445-1.485.
Biaxial (+). a = 1.700, b = 1.715, g = 1.732, 2V = 65ø.

Uniaxial (-). w = 1.646, e ~ 1.572.
Sahama n Wambeke L, Am. Min. 56:1366-1384 (1971). Van WamThbeke L, Am. Min. 59:2(08 1974).
Biaxial (-). a = 1.468, b = 1.507, g = 1.529, 2V = 73.5ø.
Biaxial. n's ~ 2.14.
Biaxial (-). a = 1.6085, b = 1.6375, g = 1.6500, 2V = 65ø.
Uniaxial (+). e = 1.652, w = 1.631.
Biaxial. a = 2.29, b = 2.31, g = 2.33, 2V = 86ø.
Uniaxial (-). w = 1.532, e = 1.478.
Biaxial (+). a = 1.636-1.640, b = 1.644-1.650, g = 1.654-1.660, 2V ¯ 86ø.
Biaxial. n's < 1.55.

Biaxial (+). a = 1.540, b = 1.544, g = 1.559, 2V = 54-55ø.
Isotropic. N ¯ 1.48.

Biaxial (-). a = 1.827, b = 1.869, g = 1.879, 2V =134ø.
Biaxial (-). a = 1.522, b = 1.530, g = 1.531, 2V = 32ø.
Biaxial (-). a = 1.619, b = 1.627, g = 1.629, 2V = 48ø.
Biaxial (+). a = 1.541, b = 1.560, g = 1.567, 2V = 84ø.
Biaxial (+). a = 2.255, b = 2.305, g = 2.414, 2V = 68ø.

Isotropic (metamict); N = 2.05-2.19.

Isotropic to weakly anisotropic. N = 2.0.

Uniaxial (-). Mean index = 1.660.

Biaxial (+). a = 1.562, b = 1.572, g = 1.585, 2V = 83ø.
Biaxial (-). a = 1.653, b = 1.677, g = 1.691, 1.721, 2V small.
Biaxial
Uniaxial (-). w = 1.800, e = 1.743.
Biaxial (+). a = 1.478, b = 1.479, g = 1.482, 2V ¯ 50ø.

Biaxial (+). a = 1.791-1.806, b = 1.808-1.827, g = 1.997-2.005, 2V small, 28ø.
Uniaxial (+). e = 1.610, w = 1.556.
Biaxial (-). a = 1.790, b = 1.805, g = 1.820, 2V ~ 85ø.
Uniaxial. w, e ~ 2.09-2.15.
Biaxial (-). a = 1.680, b = 1.685, g = 1.702, 2V = 10-12ø.

Biaxial (+). a = 1.727, g = 1.738.

Biaxial (-). a = 1.681, b = 1.688, g = 1.695.
Biaxial (-). a = 1.640, g = 1.653, 2V = 60ø.
Biaxial (-). a = 1.614, b = 1.630, g = 1.635, 2V = 58ø.

Biaxial (-). a = 1.694, b = 1.710, g = 1.722, 2V = 82ø.
Biaxial (-). a = 1.641, b = 1.659, g = 1.662, 2V = 42ø.
Biaxial. a = 1.468, g = 1.498.
Biaxial (-). a = 1.691, b = 1.700, g = 1.707, 2V moderate to large.

Biaxial (-). a = 1.700, b = 1.713, g = 1.718.
Biaxial. a = 1.690, g = 1.710.

Biaxial (-). a = 1.628, b = 1.682(Calc.), g = 1.723, 2V = 80ø.
Biaxial (+). a = 2.26, b = 2.30-2.40, g = 2.43.

Isotropic. N = 1.550.

Biaxial (+). a = 1.688, b = 1.691, g = 1.696, 2V = 50ø.
Biaxial (+). a = 1.301, b = 1.3012(Calc.), g = 1.3068, 2V = 11ø25'.

Biaxial (-). a = 1.873, b = 1.886, g = 1.914-1.939, 2V = 0-7ø.
Biaxial (+). a = 2.07, b = 2.08(Calc.), g = 2.19, 2V = 20-25ø.
Uniaxial (+). e = 1.570, w = 1.532.
Biaxial (-). a = 1.98, b = 2.04, g = 2.10, 2V large.
Uniaxial (+) to slightly biaxial with a small 2V. e = 1.676, w = 1.671.
Medium grey in reflected light.
Uniaxial (-). w = 2.2949, e = 2.2847.

Biaxial (+). a = 1.505, b = 1.512, g = 1.524, 2V = 77ø.
Uniaxial (+). e = 1.776, w = 1.747.

Biaxial (+). a = 1.783, b = 1.801, g = 1.834, 2V large.
Uniaxial (+). e = 1.776, w = 1.747.
Uniaxial (+). e = 1.701, w = 1.694.
Biaxial. a' = 1.618, g' = 1.642, 2V large.
Biaxial (+). a = 1.473-1.490, b = 1.490-1.496, g = 1.506-1.511, 2V very large.
Uniaxial (-). w = 1.570, e = 1.534.
Uniaxial (-). w = 1.612-1.618, e = 1.607-1.611.
Uniaxial (-). w = 1.609, e = 1.603.
Uniaxial (-). w = 1.6357, e = 1.6328.
Uniaxial (+). e = 1.536, w = 1.5345.
Uniaxial (-). w = 1.655, e = 1.650.
Isotropic. N = 1.434
Biaxial (+). a = 1.610, b = 1.610, g = 1.611, 2V = 40-45ø.

Isotropic. N = 2.05-2.19.
Biaxial (+). a = 2.14, g = 2.24.
Biaxial (+). a = 1.635, b = 1.651, g = 1.670, 2V = 82ø.
Biaxial. b = 1.594, g = 1.598.
Biaxial (-). a = 1.863, b = 1.885, g = 1.890, 2V = 50ø.
Biaxial (-). b = g = 1.624, 2V ~ 15-20ø.
Biaxial (-). a = 1.750-1.785, b = 1.910-1.952, g = 1.945-2.002, 2V = 52ø.
Uniaxial (+). e = 1.876, w = 1.859.

Uniaxial (+). e = 1.515, w = 1.510.
Biaxial (-). a = 1.72, b = 1.78, g = 1.79, 2V = 35ø.
Isotropic. N = 1.475.

Biaxial (+). a = 1.560, b = 1.566, g = 1.586, 2V = 25ø.
Uniaxial (+). e = 1.512, w = 1.510.

Biaxial (+). a = 1.82, b < 1.86, g ~ 1.99.
Biaxial. n's > 1.90.

Uniaxial (-). w = 1.775, e = 1.765.
Biaxial (+). n's ~ 2.37-2.42.
Given as uniaxial (-). w = 1.654-1.64, e = 1.625-1.629.

Biaxial (-). a = 1.860, b = 1.880, g = 1.893, 2V moderate.

Biaxial. a = 1.59, b = 1.60, g = 1.62.

Biaxial (-). a = 1.543-1.549, b = 1.564-1.567, g = 1.570-1.575, 2V = 65ø.

Biaxial n's > 2.0.
Isotropic (metamict) with N = 1.78.
Biaxial (+) usually metamict. a = 1.77-1.78, g = 1.78-1.82.

Uniaxial (+). e = 1.492, w = 1.472.

Isotropic. N = 1.790.
Biaxial (+). a = 1.573, b = 1.592, g = 1.599, 2V = 59ø.
Uniaxial (+). e = 1.60, w = 1.618.
Biaxial (+). a = 1.713, b = 1.730, g = 1.748, 2V = 88ø.
Isotropic. N =1.923.
Uniaxial (+). e = 1.449, w = 1.447.

Biaxial (+). a = 2.016, b = 2.040, g = 2.130, 2V = 46-62ø.
Uniaxial (+). e = 1.945, w = 1.910.
Biaxial (-). a = 1.537, b = 1.611, g = 1.613, 2V small.

Biaxial (-). a = 1.620, b = 1.633, g = 1.640, 2V = 72ø.

Biaxial (-). a = 1.733, b = 1.757, g = 1.761, 2V = 55ø.
Uniaxial (-). w = 1.83, e = 1.61.

Biaxial (-). a = 1.610, b = 1.63 (est.), g = 1.639, 2V = 65ø.
Uniaxial (+). e = 2.02, w = 1.81.
Biaxial (-). a = 1.445, b = 1.516, g = 1.522, 2V = 34ø.
Biaxial (-). a = 1.448, b = 1.454, g = 1.456, 2V moderate.
Biaxial (-). a = 2.08, g = 2.12.
Biaxial (-). a = 1.671, b = 1.681, g = 1.690, 2V = 75ø.

Uniaxial (-). w = 1.669, e = 1.658.
Uniaxial (-). w = 2.31, e = 1.95.

Isotropic. N = 1.742-1.745.

Biaxial (-). a = 1.578, b = 1.597, g = 1.606, 2V = 67ø.
Isotropic. N = 1.593.
Biaxial (+). a = 2.17, b = 2.17, g = 2.18, 2V very large.
Biaxial (+). a = 1.703, b = 1.713, g = 1.722, 2V large.

Anisotropic. n's > 2.01.
Biaxial (-). a = 1.665, b = 1.657, g = 1.678, 2V ~ 50-60ø.

Isotropic. N = 2.085.
Biaxial (+). a = 1.568, b = 1.568, g = 1.587, 2V ¯ 0ø.

Biaxial (-). a = 1.560, b = g = 1.635, 2V small.
Uniaxial (-). w = 1.621, e = 1.619.
Biaxial (-). a = 1.775, b = 1.803, g = 1.812, 2V = 55ø.
Biaxial (+). a = 1.517, b = 1.524(Calc.), g = 1.577, 2V = 42ø.
Light grey in reflected light.
Biaxial (-). a = 2.44, b = 2.47, g = 2.48, 2V = 70ø.
Biaxial. a = 1.520-1.521, g = 1.522-1.525.
Biaxial (-). a = 1.720, b = 1.736, g = 1.738, 2V = 30ø.
Uniaxial (+). e = 1.507, w = 1.491.

Biaxial (-). a = 1.515, b = 1.535, g = 1.536, 2V = 7ø.
Biaxial (-). a = 1.685, b = 1.723, g = 1.736, 2V = 61ø.

Biaxial (-). a = 1.540, b = 1.554, g = 1.562, 2V = 60ø.
Biaxial (-). a = 1.592-1.610, b = 1.614-1.641, g = 1.614-1.641, 2V = 0-20ø.
Biaxial (-). a = 1.606-1.661, b = 1.622-1.667, g = 1.627-1.670, 2V = 0-50ø.
Biaxial (-). a = 1.69, b = 1.83, g = 1.83.
Biaxial (-). a = 1.365, b = 1.630, g = 1.595.
Uniaxial (-). w = 1.476-1.494, e = 1.474-1.480.
reported as uniaxial (-). w = 1.494, e = 1.489, but probably biaxial.

Biaxial (+). a = 1.669, b = 1.673, g = 1.692, 2V = 45-50ø.
Biaxial (-). a = 2.260, b = 2.393, g = 2.398, 2V small to moderate.

Biaxial (+). a = 1.582, b = 1.602, g = 1.629, 2V = 82ø.
Isotropic. N = 1.821-1.855.
Biaxial (-). a = 1.497-1.506, b = 1.499-1.508, 2V = 50ø.
Biaxial (-). a = 1.646, b = 1.664, g = 1.664, 2V = 0ø.
Biaxial (-). a = 1.495, b = 1.498, g = 1.502.
Uniaxial (+). n's near 1.625.
Biaxial (+). a = 1.534, b = 1.543, g = 1.558, 2V = 73ø.
Biaxial (+). a = 1.560, b = 1.569, g = 1.584, 2V = 79ø.
Biaxial (-). a = 1.619, b = 1.653, g = 1.660, 2V = 53ø.

Biaxial (-). a = 1.447-1.463, b = 1.475-1.480, g = 1.470-1.485, 2V small to moderate.
Biaxial (+). a = 1.660, b = 1.662, g = 1.670, 2V = 5ø.
Uniaxial (+). e = 1.765, w = 1.704.
Biaxial (+). a = 1.484, b = 1.501, g = 1.550, 2V = 65ø.
Uniaxial (+). e = 1.6512, w = 1.6397.
Biaxial (+). a = 1.920, b = 1.960, g = 2.20, 2V = 48.5ø.
Biaxial (+). a = 1.695-1.709, b = 1.699-1.714, g = 1.719-1.736, 2V small to moderate.
Biaxial (-). a = 1.590-1.602, b = 1.618-1.636, g = 1.623-1.639, 2V = 30ø.
Biaxial (-). a = 1.82, b and g > 2.0.

Nearly isotropic. n's ~ 1.674.

Uniaxial (-). w = 2.155, e = 1.975.
Uniaxial (-). w = 1.601, e = 1.480.
Isotropic. N = 1.63-1.66.
Biaxial (+). a = 1.784, b = 1.785, g = 1.790, 2V = 40-50ø.
Isotropic. N = 1.734-1.75.

Biaxial (-). a = 1.665-1.696, b = 1.675-1.709, g = 1.698-1.729, 2V = 90ø.

Not determined

Biaxial (-). a = 1.576, b = 1.582, g = 1.584, 2V ~ 10ø.

Uniaxial (+). e = 1.672, w = 1.664.
Biaxial (+). a = 1.622-1.623, b = 1.628-1.630, g = 1.681-1.684, 2V ¯ 62ø.
Biaxial (-). a = 1.720, b = 1.798, g = 1.805, 2V = 35ø.
Biaxial. a' = 1.570, b' = 1.576, g' = 1.630.

Biaxial. n's ~ 1.9.
Biaxial (+). a = 1.521, b = 1.523, g = 1.530, 2V = 58ø.
Uniaxial (-). w = 1.549, e = 1.536.

Biaxial (-). a = 1.745, b = 1.805, g = 1.840, 2V = 70ø.

Biaxial (-). a = 1.735, b = 1.742, g = 1.745.

Biaxial (+). a = 1.590, b = 1.602, g = 1.638, 2V ¯ 58ø.
Biaxial (-). a = 1.571, b = 1.575, g = 1.578, 2V ~ 15ø.

Isotropic. N = 1.5443.
Biaxial (+). a = 1.882, b = ?, g = 1.915, 2V ¯ 80ø.

Biaxial. N(avg.) = 1.555.
Biaxial (-). a = 1.480, b = 1.486, g = 1.490, 2V = 35ø.
Biaxial (+). a = 1.532, b = 1.545, g = 1.572, 2V = 70ø.
Biaxial (+). a = 1.55, b = 1.59, g = 1.63, 2V = 87ø.

Biaxial (-). a = 1.788, b = 1.81, g = 1.830, 2V ~ 50ø.
Uniaxial (-). w = 1.481, e = 1.461.
Biaxial (-). a = 1.504-1.555, b = 1.522-1.572, g = 1.539-1.579, 2V = 45-90ø.
Biaxial (+). a = 1.713, b = 1.721, g = 1.734, 2V = 90ø.
Uniaxial (-). w = 1.6691, e = 1.6568.
Uniaxial (?). N(avg.) = 1.653.
Biaxial (+). a = 1.505, b = 1.508, g = 1.512, 2V = 82ø.
Biaxial (+). a = 1.678, b = 1.68, g = 1.683, 2V = 52ø.
Biaxial (+). a = 1.952, b = 1.960, g = 1.977, 2V = 35-57ø.
Biaxial (-). a = 1.67-1.71, b = 1.68-1.73, g = 1.69-1.73, 2V ~ 10-80ø.

Biaxial (-). 2V small. Birefringence approximately 0.006.

Uniaxial (+). e = 1.638, w = 1.630.

Isotropic. N = 1.496-1.505.

Biaxial (-). a ¯ 1.49, b = 1.50, g = 1.52, 2V small.
Biaxial (+). a = 1.716-1.726, b = 1.723-1.730, g = 1.741-1.751, 2V = 52-62ø.

Uniaxial (-). w = 1.958, e = 1.948.

Biaxial (+). a = 1.579, b = 1.588, g = 1.604, 2V = 63-77ø.
Uniaxial (-). w = 1.605, e = 1.573.

Biaxial. 2V large.
Biaxial (+). b ¯ 1.65, g - a ¯ 0.01, 2V ¯ 80ø.
Biaxial (-). a = 1.455, b = 1.503, g = 1.549, 2V = 85ø.
Biaxial (+). a = 1.72, b = 1.80, g = 1.98, 2V ~ 70ø.
Isotropic. N = 1.728-1.747.

Uniaxial (-). w = 1.733, e = 1.714.
Uniaxial (-)
Biaxial (+). a = 2.105, b = 2.32, g = 2.65, 2V = 88ø(Calc.).
Biaxial (+). a = 1.614, b = 1.617, g = 1.636, 2V = 46ø.

Biaxial (-). a < 2.0, b > 2.01, g > 2.01, 2V medium.
Biaxial with mean index = 1.686
Biaxial (-). a = 1.585, b = 1.608(Calc.), g = 1.615, 2V = 58ø.

Uniaxial (-). w = 1.765, e = 1.800.

Biaxial (+). a = 1.843, b = 1.848, g = 1.945, 2V small.
Isotropic. N = 1.83.
Biaxial (-). a = 1.591-1.592, b = 1.611-1.612, g = 1.619-1.621, 2V = 67-75ø.
Uniaxial (+). e = 1.481, w = 1.479.

Uniaxial (-). w = 2.34, e = 2.14.

Biaxial. a = 1.86, b = 1.89, g = 1.91, 2V large.
Biaxial (+). a = 1.496, b = 1.498, g = 1.504, 2V = 35ø.
Biaxial (-). a = 1.77, b = 2.18, g = 2.35-2.4, 2V medium.
Biaxial (-). a = 1.426, b = 1.453, g = 1.456, 2V = 38ø.
Biaxial (+). a = 1.498, b = 1.503, g = 1.510, 2V = 83ø.

Biaxial. a = 2.185, b = 2.219, g = 2.266, 2V = 89ø.

Uniaxial (-). w = 1.807, e = 1.79.
Nearly isotropic with N(avg.) = 1.713.
Isotropic. N = 1.340.
Uniaxial (-). w = 1.609, e = 1.596.
Biaxial (+). a = 1.630, b = 1.636, g = 1.664, 2V = 35ø.
Biaxial. a = 1.605, b = 1.61, g = 1.612, 2V ¯ 60ø.

Biaxial (+). a = 1.725, b = 1.738, g = 1.760, 2V = 65ø.
Uniaxial (+). e = 1.689, w = 1.671.
Biaxial (+). a = 1.639, b = 1.643, g = 1.646, 2V = 80ø.
Biaxial (-). a = 1.715, g = 1.730, 2V = 0ø to small.

Biaxial (-). a = 1.720, b = 1.741, g = 1.746, 2V = 52ø.

Biaxial (-). a = 1.559, b = 1.643, g = 1.655, 2V = 40ø.
Biaxial (+). a = 1.769, b = 1.770, g = 1.785, 2V = 30ø20'.

Biaxial (-). a = 1.622-1.642, b = 1.642-1.660, g = 1.646-1.666, 2V = 49ø.
Uniaxial (-). w = 1.599, e = 1.597.
Biaxial. a = 1.743-1.746, b = 1.756-1.759, g = 1.758-1.761, 2V = 49-55ø.
Biaxial (+). a = 1.715, b = 1.725, g = 1.738, 2V = 80ø.

Biaxial (-). a = 1.574, b = 1.582, g = 1.582, 2V small.
Biaxial (+). a = 1.563, b = 1.571, g = 1.596, 2V = 60ø.
Biaxial. a = 1.519, g = 1.521.
Biaxial (-). a = 1.701, b = 1.720, g = 1.734, 2V = 65ø.

Biaxial (-). a = 1.583-1.586, b = 1.596-1.598, g = 1.605, 2V large.
Isotropic. N = 1.6132.
Uniaxial (-). w = 1.765, e = 1.603.
Biaxial (+). a = 2.17-2.20, b = 2.22, g = 2.30-2.32, 2V large (~73ø, Calc.).
Biaxial (+). a = 1.898, g = 1.915, 2V = 25ø.

Uniaxial (-). w = 1.474, e = 1.436.
Biaxial (+). a ~ 1.494, b ~ 1.561, g ~ 1.692, 2V large.
Biaxial (+). a = 1.607-1.643, b = 1.619-1.653, g = 1.639-1.675, 2V = 65-84ø.
Biaxial (-). Mean index = 1.81.
Biaxial (-). a = 1.445, b = 1.485, g = 1.490, 2V = 15ø.

Biaxial (-). a = 1.637-1.652, b = 1.645-1.658, g = 1.649-1.663, 2V = 75ø.
Biaxial (-). a = 1.595, b = 1.601, g = 1.604, 2V = 70ø.
Biaxial (-). a = 3.078, b = 3.176, g = 3.188, 2V = 37ø24'.
Biaxial (+). a = 1.898, b = 1.900, g = 1.922, 2V = 25ø.
Biaxial. a = 1.520-1.542, b = 1.524-1.545, g = 1.526-1.547, 2V = 101-132ø.
Biaxial (+). a = 1.963, b = 1.963, g = 1.966, 2V small.
Biaxial (-). a = 1.660, b = 1.720, g = 1.728, 2V = 40ø.
Biaxial (+). a = 1.520-1.523, b = 1.534-1.535, g = 1.569-1.571, 2V = 60-66ø.
Biaxial (-). a = 1.535, b = 1.553, g = 1.557, 2V = 24ø.
Uniaxial (-). w = 2.09, e = 1.94.
Biaxial (+). a = 1.499, b = 1.502, g = 1.521, 2V = 45ø.
Biaxial (-). a = 1.501, b = 1.594, g = 1.595, 2V = 17ø.
Isotropic. N = 1.675-1.734.
Uniaxial (-). w = 2.26, e = 2.10.
Uniaxial (-). w = 1.63, e = 1.59.
Biaxial (+). a = 1.523, b = 1.527, g = 1.545, 2V moderate.

Biaxial (+). a = 1.600, b = 1.605, g = 1.613, 2V moderate.

Uniaxial (-). w = 1.511-1.531, e = 1.495-1.529.
Biaxial (-). a = 1.70, b = 1.95, g = 2.04, 2V = 52ø.
Isotropic. N = 1.825-1.830.
Uniaxial (+). w = 1.542, e = 1.543.

Uniaxial (+). w = 1.760, e = 1.870.
Uniaxial (-). w = 1.654, e = 1.650.
Biaxial (-). a = 1.601, b = 1.622, g = 1.631, 2V = 70ø.
Biaxial (-). a = 1.635-1.650, b = 1.736, g = 1.740-1.750, 2V = 40ø(Calc.).
Uniaxial (+). e = 2.85, w = 2.61.
Biaxial (-). a = 1.685, b = 1.91, g = 1.93, 2V = 58ø.
Uniaxial (+). e = 1.31052, w = 1.309607.

Biaxial (-). a = 1.753, b = 1.824, g = 1.830, 2V = 31ø.

Biaxial (-). a ~ 1.455, b ~ 1.538, g ~ 1.545, 2V ~ 45ø.

Biaxial (-). a = 1.511, b = 1.519, g = 1.521, 2V moderate.
Uniaxial (+). e = 1.695, w = 1.689.
Biaxial (-). a = 1.579, b = 1.602, g = 1.618, 2V = 37ø.
Biaxial (+). a = 1.573, b = 1.576, g = 1.579, 2V = 90ø.

Biaxial (-). a = 1.727, b = 1.870, g = 1.883, 2V = 20-30ø.
Biaxial (+). a = 1.605, b = 1.608, g = 1.612, 2V = 75ø.

Anisotropic
Opaque. Weakly anisotropic.
Greyish white. Distinctly anisotropic. R(600 nm) = 29.8%(min.), 32.9%(max.).
Biaxial (-). a = 1.482, b = 1.512, g = 1.530, 2V = 77ø.
Biaxial (+). a = 1.488, b = 1.491, g = 1.505, 2V = 37ø.
Uniaxial (-). w = 1.539, e = 1.534.

Biaxial (-). a = 1.6178, b = 1.6384, g = 1.6519, 2V = 77ø.

Biaxial (+). a = 1.726, b = 1.737, g = 1.766, 2V = 82ø.

Biaxial (-). a = 1.492-1.495, b = 1.505-1.51, g = 1.516-1.520, 2V = 70-84ø.
Uniaxial (+). e = 2.22, w = 2.21.
Uniaxial (-). w = 1.543, e = 1.533.
Uniaxial (-). w = 1.502, e = 1.447.
Biaxial. a = 2.25-2.30, g = 2.40-2.50, 2V large.

Uniaxial (-). w = 1.590, e = 1.585.

Biaxial (+). a = 1.634, g' = 1.642.

Biaxial (-). a = 1.764, b = 1.889, g = 1.936.

Biaxial (+). a = 1.590, b = 1.594, g = 1.614, 2V = 51ø.

Mean index = 1.84-1.85.

Isotropic. N = 2.3.
Biaxial (+). a = 1.640, b = 1.645, g = 1.652, 2V = 67ø.

Uniaxial (-). n's ~ 2.0.
Biaxial (+). a = 1.672, b = 1.693, g = 1.710, 2V = 80ø.

Biaxial (+). a = 1.640, b = 1.658, g = 1.670, 2V large.

Uniaxial (-). w = 1.607, e = 1.602.
Biaxial (-). a = 1.960, b = 1.995, g = 2.020, 2V = 75ø.

Distinct birefringence.
Biaxial (+). a = 1.770, b = 1.828, g = 1.910(Calc.), 2V = 80ø.
Biaxial with variable sign. a = 1.429, b = 1.433, g = 1.436, 2V ¯ 90ø.
Biaxial (-). a = 1.780, b = 1.795, g = 1.805, 2V = 78ø(Calc.).
Uniaxial (-). w = 1.820, e = 1.715.

Uniaxial (+). e = 1.728, w = 1.715.
Uniaxial (-). w = 1.837, e = 1.833.
Biaxial (-). a = 1.625, b = 1.641, g = 1.643, 2V = 40ø.
Biaxial (-). a = 1.552, b = 1.564, g = 1.571, 2V = 74ø(Calc.).

Uniaxial (sometimes biaxial). w = 1.653, e = 1.640.
Biaxial (-). a = 1.772, b = 1.783, g = 1.789, 2V = 72ø.
Biaxial (-). a = 1.683, b = 1.715, g = 1.724, 2V large.
Biaxial (+). a = 1.792, b = 1.794, g = 1.821, 2V = 30ø.
Biaxial (-). a = 1.605, b = 1.626, g = 1.633, 2V = 62ø.
Biaxial (+). a = 1.729, b = 1.802, g = 1.852, 2V = 72ø.
Isotropic. N = 2.262-2.315.
Biaxial (+). a = 1.748-1.754, b = 1.760-1.767, g = 1.762-1.823, 2V = 40ø.
Biaxial (+). a = 1.747, b = 1.765, g = 1.78, 2V = large.
Biaxial (+). a = 1.712, b = 1.717, g = 1.726, 2V = 70ø.

Biaxial (+ or -). a = 1.572-1.577, b = 1.592-1.597, g = 1.612-1.616, 2V ¯ 90ø.
Biaxial (+). a = 1.703-1.716, b = 1.711-1.728, g = 1.732-1.745, 2V = 68-70ø.
Biaxial (+). a = 1.715, b = 1.743, g = 1.783, 2V = 80ø.
Uniaxial (-). w = 1.687, e = 1.684.
Anomalously biaxial with 2V ¯ 10ø, a ¯ b = 1.655.
Biaxial (+). a = 1.748, b = 1.763, g = 1.84, 2V = 53ø.
Biaxial (-). a = 1.498, b = 1.510, g = 1.517, 2V = 70-80ø.
Biaxial (-). a = 1.600, b = 1.644, g = 1.644, 2V small.
Biaxial (+). a = 1.641, b = 1.660, g = 1.682, 2V = 76-78ø.

Uniaxial (-). w = 1.556, e = 1.540.

Biaxial (-). a = 1.776, b = 1.814, g = 1.836, 2V = 50-70ø.
Uniaxial (+). e = 1.645, w = 1.556.
Biaxial (-?). b = 1.658, g = 1.664, 2V ~ 60ø.
Biaxial. a = 1.656, b = 1.664, g = 1.672, 2V = 86ø.

Biaxial (-). a = 1.459, b = 1.473, g = 1.483, 2V = 80ø.
Biaxial (+). a = 1.581, b = 1.582(Calc.), g = 1.625, 2V = 15ø.
Biaxial (-). a = 1.670-1.689, b = 1.690-1.741, g = 1.700-1.772, 2V = 66-82ø.
Uniaxial (+). w = 1.577, e = 1.584.
Uniaxial (-). w = 1.634, e = 1.632.
Biaxial (-). a = 1.494, b = 1.505, g = 1.516, 2V ~ 90ø.
Biaxial (-). a = 1.662, b = 1.686, g = 1.692, 2V = 40ø.
Uniaxial (+). e ¯ w = 1.525.
Biaxial (+). a = 1.5081, b = 1.5255, g = 1.5500, 2V = 80ø38'.
Biaxial (-). a = 1.380, b = 1.482, g = 1.578, 2V = 81.5ø.

Uniaxial (-). w = 1.537, e = 1.533.
Isotropic. N = 1.93-1.99.
Uniaxial (-). w = 1.569, e = 1.549.
Uniaxial (-). w = 1.538-1.543, e = 1.532-1.537.

Nearly isotropic with N = 1.629. No interference figure observed.
Uniaxial (+). e = 1.69, w = 1.65.

Biaxial (-). a = 1.709(Calc.), b = 1.735, g = 1.744, 2V = 60ø.
Biaxial (-). a = 1.451, b = 1.470, g = 1.478, 2V = 46ø.
Anisotropic. N(max.), N(min.) = 1.664.
Biaxial (+). a = 1.715, b = 1.715, g = 1.728, 2V = 40-42ø.
Biaxial (+). a = 1.702, b = 1.730, g = 1.823.
Biaxial (-). a = 1.553-1.565, b = 1.559-1.569, g = 1.560-1.570, 2V = 24-50ø.

Biaxial (-). a = 1.96, b > 2.120, 2V large.
Biaxial (-). a = 1.589, b = 1.632, g = 1.634, 2V = 24ø.
Uniaxial (-). w = 1.67, e = 1.595.
Biaxial (-). a = 1.780, b = 1.977-1.982, g = 2.05-2.15. Biaxial (+). a = 1.76, b = 1.78, g > 1.85, 2V = 96-115ø.
Deeply coloured: Biaxial (-). a = 1.570, g = 1.594. Pale coloured: Biaxial. a = 1.553, g = 1.569.

Biaxial (+). a = 1.89-1.90, b = 1.90-1.91, g = 1.95-1.97, 2V = 43ø.
Biaxial (-). a = 1.95, b = 2.13, g = 2.21, 2V = 58ø.
Weakly birefringent with N = 1.632.
Biaxial (-). a = 1.92, b = 1.95, g = 1.95, 2V small.

Uniaxial (-). w = 1.648, e = 1.625.
Biaxial (-). a = ?, b = 1.692, g = 1.699.
Biaxial (-). 2V small, n in plane of plates = 1.81.
Cream to grey. Moderate to strong anisotropism.

Biaxial (-). a = 1.723, b = 1.758, g = 1.768.

Biaxial (-). a = 1.639, b = 1.646, g = 1.646, 2V = 16-30ø. Biaxiality due to strain or nonhexagonl polytypes.
Translucent reddish brown in transmitted light. In reflected light it is greyish white, anisotropic, and weakly birefringent.
Uniaxial (+). e = 1.707, w = 1.701.
Biaxial (-). a = 1.684, b = 1.695, g = 1.698, 2V = 54ø52'(Calc.).

Biaxial (+). a = 2.10, b = 2.20, g = 2.31, 2V = 88ø.

Biaxial (+). a > 2.27, b = 2.74, g = ?, 2V small.
Biaxial (-). a = 1.454, b = 1.472, g = 1.488, 2V = 80ø.
Biaxial. a = 1.96, b = 1.98, 2V = 50ø.

Biaxial. a = 1.80, g = 1.87.

Uniaxial (-). w = 1.623-1.620, e = 1.610-1.609.

Biaxial (-). a = 1.665, b = 1.715, g = 1.715, 2V = 6-16ø.
Biaxial (+). a = 2.110, b = 2.112, g = 2.165, 2V = 20ø.

Biaxial (-). a = 1.787, b = 1.800, g = 1.805, 2V large.
Biaxial (+). a = 1.520, b = 1.533, g = 1.584, 2V = 55ø.
Biaxial (+). a = 1.647, g = 1.650, 2V = 60ø.
Biaxial (-). a = 1.635, g = 1.642, 2V = 26ø.
Isotropic. N >2; 2.23(Calc.).
Biaxial (-). a = 1.584, b = 1.612, g = 1.626, 2V = 70ø.
Isotropic. N = 1.94.
Mean index ~ 1.514.
Biaxial (-). a = 1.575, b = 1.581, g = 1.583, 2V = 62ø.
Uniaxial (+). e and w > 1.80.
Biaxial (-). a = 1.638, b = 1.665, g = 1.676, 2V = 68ø.
Biaxial (-). a = 1.619, b = 1.633, g = 1.635, 2V = 23ø.
Biaxial (-). a = 1.693, b = 1.738, g = 1.740.

Uniaxial (-). w = 1.727, e = ?.
Biaxial (-). a = 1.618, b = 1.654, g = 1.655, 2V = 0-5ø.
Biaxial (+). a = 1.501, b = 1.519, g = 1.755.
Biaxial (-). b ¯ 1.95, 2V ¯ 70ø.
Uniaxial (-). Indices > 1.80.
Biaxial. a = 1.598, g = 1.614.

Triclinic: Biaxial (-). a = 2.16, b = 2.18, g = 2.18, 2V small to medium. Hexagonal: Uniaxial (+). e = 2.21, w = 2.19.

Isotropic. N = 1.803.
Biaxial (-). a = 1.637, b = 1.643, g = 1.648, 2V = 83ø.

Biaxial (-). a = 2.52, b = 2.61, g = 2.67, 2V large.
Uniaxial (+). e = 1.55, w = 1.53.
Biaxial (+). a ¯ b = 1.439.
Biaxial (-). a = 1.524, b = 1.532, g = 1.536, 2V = 72ø.

Biaxial (-). a = 1.572, b = 1.590, g = 1.601, 2V = 60ø.

Biaxial (-). a = 1.810, b = 1.923, g = 1.933, 2V = 5-7ø.
Biaxial (-). a = 1.779, b = 1.786, g = 1.790, 2V = 78ø.

Biaxial. a' = 1.688, g' > 1.90.

Biaxial (+). a = 1.750, b = 1.766, g = 1.85, 2V = 48ø.

Biaxial. a = 1.645, b = 1.65, g = 1.656, 2V moderate.
Biaxial (+). a = 1.464, b = 1.468, g = 1.474, 2V = 74ø.

Biaxial (+). a = 1.632, b = 1.652, g = 1.693, 2V = 70ø.
Biaxial (+). a = 1.567, b = 1.581, g = 1.638, 2V = 49-62ø.
Biaxial (-). a = 1.667, b = 1.677, g = 1.678, 2V small.
Biaxial (-). a = 1.516, b = 1.538, g = 1.547, 2V = 62ø.
Biaxial. a = 1.766, g = 1.781.

Biaxial. a = 1.595, b = 1.598, g = 1.610, 2V = 48ø.
Biaxial (+). a = 1.652, b = 1.653, g = 1.673, 2V = 21ø.
Biaxial (+). a = 1.622, b = 1.638, g = 1.671, 2V = 74ø.

Biaxial (-). a = 1.527, b = 1.542, g = 1.549, 2V = 80-82ø.
Biaxial (-). a = 1.685, b = 1.717, g = 1.720, 2V = 34-36ø.
Uniaxial (+). w = 1.805. Birefringence weak.
Biaxial (+). a = 1.578, b = 1.663, g = 1.919.
Biaxial (+). a = 1.588, b = 1.650, g = 1.722, 2V large.
Biaxial (-). a = 1.574, b = 1.587, g = 1.599, 2V = 88ø.
Biaxial (+). a = 1.620, b = 1.639, g = 1.686, 2V = 65ø.
Biaxial (+). a = 1.715, b = 1.75, g = 1.80, 2V = 62ø.

Biaxial (+). a = 1.712, b = 1.725, g = 1.760, 2V = 61ø.
Biaxial (-). a = 1.544, b = 1.578, g = 1.601, 2V = 78ø42'.

Biaxial. 2V = 40-45ø.
Biaxial (-). a = 1.571, b = 1.613, g = 1.623, 2V = 51ø.

Biaxial (+). a = 1.703, b = 1.705, g = 1.723, 2V = 32ø.
Biaxial (-). a = 1.552, b = 1.5605, g = 1.5610, 2V = 24ø.

Biaxial (-). a = 1.656, b = 1.699, g = 1.731, 2V = 79ø.
Distinctly anisotropic

Biaxial (-). a = 1.635, b = 1.681, g = 1.698, 2V = 66ø.
Biaxial (-). a = 1.488, b = 1.508, g = 1.515, 2V = 63ø.

Uniaxial (-). w = 1.727, e = 1.535.
Isotropic

Biaxial (+). a = 1.522, b = 1.522, g = 1.543, 2V = 0-9ø.
Biaxial (-). a = 1.712-718, b = 1.721-723, g = 1.727-734, 2V = 82ø.
Opaque. Distinctly anisotropic.
Biaxial (+). a = 1.5625, b = 1.5668, g = 1.5718, 2V = 85ø.
Biaxial (+). a = 1.689-1.695, b = 1.698-1.702, g = 1.795-1.825, 2V ~ 20-44ø.
Biaxial (-). a = 1.546, b = 1.563, g = 1.580, 2V ¯ 89ø.

Biaxial (+). a < or = 1.89, b = 1.90, g = 1.95, 2V = 54ø.

Biaxial (-). a = 1.928, b = 2.007, g = 2.036, 2V ¯ 60ø.
Uniaxial(?) (-). w = 2.388, e = 2.373.
Biaxial (-). a = 1.720, b = 1.728, g = 1.735, 2V large.
Isotropic. N = 1.536.

Biaxial (-). a = 1.654, b = 1.713, g = 1.722, 2V = 70ø.
Uniaxial (+). e = 1.478, w = 1.460.
Biaxial (+). a = 1.465, b = 1.468, g = 1.507, 2V = 59ø30'.
Biaxial (-). a = 1.532, b = 1.594, g = 1.616, 2V = 60ø.
Biaxial (-). a = 1.52, b = 1.587, g = 1.613, 2V ~ 63ø.
Biaxial (-). a = 1.532, b = 1.590, g = 1.614, 2V = 61ø.

Biaxial (-). a = 1.568, b = 1.584, g = 1.585, 2V = 28ø.
Biaxial (+). a = 1.509, b = 1.52, g = 1.561, 2V = 64ø.
Biaxial (+). a = 1.707, b = 1.715, g = 1.730, 2V = 63ø.

Biaxial (-). a = 1.92, b = 1.95, g = 1.96, 2V = 80ø.
Biaxial (+) or (-). a = 1.600, b = 1.606, g = 1.614, 2V large.

Biaxial (+). a = 1.840, b = 1.847, g = 1.892, 2V moderate, variable.
Biaxial (-). a < 1.612, b = 1.658, g = 1.682, 2V = 50ø.
Biaxial (-). a = 1.502-1.514, b = 1.512-1.522, g = 1.514-1.525, 2V = 26-47ø.

Biaxial (-). a = 2.077, b = 2.116, g = 2.158, 2V large.

Biaxial (+). a = 1.792, b = 1.840, g = 1.888, 2V = 90ø.

Biaxial (-). a = 1.66, b = 1.715, g = 1.734, 2V = 33ø.
Uniaxial (-). e ¯ w = 1.576.
Biaxial (-). a = 1.590, b = 1.608, g = 1.611, 2V = 42ø.
Biaxial (+). a = 1.665, b = 1.674-1.675, g = 1.684-1.686, 2V = 76-87ø.
Biaxial (-). a = 1.820, b = 1.920, g = 1.955, 2V ¯ 30ø.
Biaxial (-). a = 1.6139, b = 1.6363, g = 1.6461, 2V = 69ø.
Isotropic. N ¯ 1.50.

Biaxial (-). a = 1.87, b = 2.00, g = 2.01, 2V ¯ 10ø.

Biaxial (-). a = 1.440, b = 1.454, g = 1.455, 2V = 29ø44'.
Biaxial (+). a = 1.675-1.702, b = 1.690-1.709, g = 1.735-1.740, 2V = 50ø.
Uniaxial (+). e = 1.520, w = 1.516.
Biaxial (-). a = 1.578, b = 1.587, g = 1.595, 2V = 86ø09'.
Biaxial (+). a = 1.87, b = 1.880, g = 1.98, 2V = 26.5ø.
Biaxial (+). a = 1.540, b = 1.553, g = 1.570, 2V = 80ø.

Biaxial (pseudo-uniaxial). a = 1.553, b = g = 1.594, 2V = 0ø.
Biaxial (+). a = 1.479, b = 1.482, g = 1.487, 2V near 90ø.
Biaxial (-). a = 1.638, b = 1.666, g = 1.682, 2V = 73ø.
Biaxial (-). a = 1.94, b = 2.20, g = 2.51, 2V = 83ø.
Biaxial (-). a = 1.525-1.548, b = 1.551-1.585, g = 1.554-1.587, 2V = 0-58ø.
Biaxial (-). a = 1.501, b = 1.516, g = 1.525, 2V = 75ø.
Mt. Vesuvius, Napoli, Campania, the geological survey of Belgium.
Biaxial (-). a = 1.570-1.571, b = 1.594-1.595, g = 1.596-1.598, 2V = ~ 40ø.
Biaxial. a = 1.751, b = 1.771, g = 1.782.
Biaxial (+). a = 1.707, b = 1.721, g = 1.739.
Biaxial (+). a = 1.645, b = 1.661, g = 1.688, 2V = 77ø.
Uniaxial (-). w = 1.496-1.505, e = 1.491-1.500.
Isotropic. N = 2.20.
Isotropic (metamict). N = 1.83.
Biaxial (-). a = 1.6220, b = 1.6332, g = 1.6380, 2V = 66ø18'.
Biaxial (-). a = 1.701, b = 1.743, g = 1.787, 2V ¯ 90ø.
Uniaxial (-). w = 1.637, e = 1.621.
Biaxial (-). a = 1.820, b = 1.854, g = 1.888, 2V = 80ø.
Biaxial (+). a = 1.497, b = 1.502, g = 1.539, 2V = 40ø.
Biaxial. a = ?, b = 1.61, g = 1.69.

Isotropic. N = 1.838.
Biaxial (-). a = 1.809, b = 1.838, g = 1.859, 2V = 80ø.
Biaxial (-). a = 1.930, b = 2.002, g = 2.020, 2V = 71ø.

Uniaxial (-). w = 1.530, e = 1.528.

Biaxial (-). a = 1.612, b = 1.652, g = 1.675, 2V ~ 72ø.
Uniaxial (-). w = 2.665, e = 2.535.
Biaxial (+). a = 1.669, b = 1.673, g = 1.67582, 2V ~ 65ø.

Biaxial (+). a = 1.550-1.553, b = 1.557-1.558, g = 1.566-1.567, 2V = 69-80ø.
Biaxial. n's > 1.9.
Biaxial (+). a = 1.510, b = 1.513, g = 1.527, 2V = 47ø.
Biaxial (-). a = 1.548, b = 1.574, g = ?, 2V = 56ø.

Biaxial (-). a = 1.541-1.5625, b = 1.565, g = 1.552-1.568, 2V = 37-61ø.
Biaxial. a = 1.569, b = 1.592, g = 1.620.

Biaxial (-). a = 1.670, b = 1.750, g = 1.778, 2V = 56ø.
Isotropic. N = 1.483.

Frondel C, USGS Bull. 1064 p. 177-1 Textbook of Mineralogy, 4th ed., p. 692, New81 York, Wiley, 932. Contrib. Min. Pet., 84
Biaxial (+). a = 1.714, b = 1.732, g = 1.805, 2V = 50ø.

Biaxial (-). a = 1.91, b = 2.01, g = 2.03, 2V = 38-40ø.
Biaxial. n's ~ 2.35.
Biaxial (+). a = 1.637, b = 1.648, g = 1.676, 2V = 64ø.
Biaxial (+). a = 1.797, b = 1.804, g = 1.815, 2V = 80ø.
Biaxial. a = 1.536, g = 1.550.
Biaxial (+). a = 1.513, b = 1.516, g = 1.518, 2V = 90ø.

Uniaxial (-). w = 1.561, e = 1.549.
Uniaxial (-). w = 1.490, e = 1.471.
Biaxial. a = 1.852, b = ?, g = 1.867, 2V = 40ø.
Biaxial (+). a = 1.650-1.653, b = 1.667-1.675, g = 1.688-1.697, 2V = 82ø.
Biaxial (+). a = 1.96, b = 2.055, g > 2.11.
Biaxial (+). a = 1.83-1.85, b = 1.83-1.85, g = 1.94-2.02, 2V = 20-45ø.
Biaxial. n's ~ 2.30, 2V ~ 45ø.
Biaxial (-). a = 1.752, b = 1.775, g = 1.796, 2V = 88ø(Calc.).
Biaxial (+). a = 1.603, b = 1.608, g = 1.616, 2V = 70ø.
Biaxial (-). a = 1.520-1.522, b = 1.54-1.541, g = 1.545-1.548, 2V moderate.
Uniaxial. n's ~ 1.77-1.855.

Uniaxial (-). w = 2.36, e = 2.31.
Biaxial (-). a = 1.67, b = 1.69, g = 1.72, 2V = 40-70ø.
Anisotropic. n's > 1.734.
Biaxial (+ or -). a = 1.518, b = 1.524, g = 1.530, 2V = 90ø.

Biaxial (-). a = 1.773, b = 1.795, g = 1.815.
Uniaxial (-). w = 1.593, e = 1.585.
Uniaxial (+). e = 2.21, w = 2.19.

Biaxial (-). a = 1.87, b = 2.00, g = 2.01, 2V = 35ø.
Biaxial (-). a = 2.28, b = 2.31, g = 2.34, 2V = 85ø.

Biaxial (-). a = 1.587, b = 1.602, g = 1.613, 2V ~ 80ø.
Biaxial (-). a = 1.660, b = 1.662, g = 1.664, 2V ~ 33-40ø.
Biaxial (+). a = 1.656, b = 1.660, g = 1.668.

Biaxial (+). a = 1.507, b = 1.529, g = 1.576, 2V = 67ø(Calc.).
Biaxial (+). a = 1.630, b = 1.644, g = 1.652, 2V = 72.53ø(Calc.).

Biaxial (-). a = 1.675, b = 1.690, g = 1.695, 2V = 56ø.
Biaxial (-). a = 1.668, g = 1.680.
Biaxial (-). a = 1.674, b = 1.686, g = 1.699, 2V = 90ø.
Uniaxial (-). w = 1.700, e = 1.509.
Biaxial (-). a = 1.658, b = 1.687(Calc.), g = 1.710, 2V = 81.5-83ø.
Biaxial (+). a = 1.669, b = 1.672, g = 1.677, 2V small.
Biaxial. a ~ 1.70, b ~ 1.74, g ~ 1.79.

Biaxial (+). a = 1.641, b = 1.649, g = 1.661, 2V ~ 60ø.
Biaxial (+). a = 2.33, b = ?, g = 2.40, 2V ~ 80ø.
Isotropic. N = 1.980.

Anisotropic. N(min.) = 1.472, N(max.) = 1.487.

Biaxial (-). a = 1.655, b = 1.875, g = 1.909, 2V ¯ 43ø.

Biaxial (-). a = 1.765, b = 1.784, g = 1.799, 2V ¯ 85ø.

Uniaxial (-). w = 1.3125, e = 1.3089.
Biaxial (+). a = 1.462, b = 1.465, g = 1.474.
Biaxial (+). a = 1.868, b = 1.892, g = 1.928, 2V = 80ø.
Biaxial (+). b = 1.6, g - a = 0.014, 2V = 25-30ø.
Uniaxial (-). w = 1.524, e = 1.510.
Biaxial (-). a = 1.715, b = 1.80, g = 1.87, 2V = 85ø.
Biaxial (+). a = 1.697, b = 1.700, g = 1.725, 2V = 36ø.
Biaxial (-). a = 1.78, b = g = 1.81 (?) with 2V = 28-43ø. Apparent biaxial character suggests lower symmetry.
Biaxial (-). a = 1.672, b = 1.678, g = 1.687, 2V = 75ø.
Biaxial (+). a = 1.716, b = 1.730, g = 1.746, 2V = 86ø.
Isotropic. N = 1.790.
Biaxial (+). a = 1.579, b = 1.589, g = 1.609, 2V = 65-70ø.

Biaxial (+). a = 1.707, b = 1.712, g = 1.723, 2V = 37ø.
Biaxial (+). a = 2.25, b = 2.25, g = 2.53, 2V small.

Isotropic. N = 1.572.

Biaxial (-). a = 1.92, b = 1.95, g = 1.96, 2V small.
Biaxial (+). a = 2.19, b = 2.25, g = 2.34, 2V large.
Anisotropic. Grey in reflected light.
Uniaxial (-). w = 1.669, e = 1.631.

Biaxial (+). a = 1.622-1.631, b = 1.624-1.649, g = 1.642-1.663, 2V = 30-68ø.
Biaxial (-). a = 1.564, g = 1.598, 2V = 50-60ø.
Biaxial (+). a = 1.672, b = 1.678, g = 1.712, 2V = 50ø.

Biaxial.
Biaxial (-). a = 1.630-1.638, b = 1.642-1.648, g = 1.644-1.650, 2V = 40-67ø.
Biaxial (-). a = 1.727, b = 1.771, g = 1.798, 2V = 78ø.
Uniaxial (-). w = 1.546-1.550, e = 1.540-1.541.
Biaxial (-). a = 1.676, b = 1.695, g = 1.698, 2V = 43ø.
Biaxial (-). a = 2.10, b = g = 2.42, 2V = 20-25ø.

Isotropic. N = 2.346.
Biaxial (+). a = 1.686, b = 1.691, g = 1.708, 2V = 60ø.
Biaxial (-). a = ?, b = 1.7825, g = 1.7975, 2V = 37-42ø.
Biaxial (+). a = 1.520, b = 1.523, g = 1.533, 2V = 52ø12'.

Biaxial (+). a = 2.51, b = 2.61, g = 2.71, 2V = 90ø.
Biaxial (-). a = 1.534, b = 1.569, g = 1.570, 2V = 29-31ø.
Biaxial (-). a = 1.785, b = 1.895, g = 1.915, 2V ~ 50ø.

Uniaxial (-). w = 2.145, e = 2.006.

Biaxial (-). a = 1.43, b = 1.46, g = 1.48, 2V = 86ø.
Biaxial (-). b = 1.576, g = 1.582, 2V ~ 60ø.

Isotropic. N = 1.643.
Uniaxial (-). w = 1.5062, e = 1.4990.
Biaxial. a = 1.515, g = 1.585.
Uniaxial (-). w = 1.504, e = 1.459.
Uniaxial (-). w = 2.155, e = 1.975.
Uniaxial (-). w = 1.6685, e = 1.6415.
Uniaxial (+). e = 1.716.
Biaxial (-). a = 1.596-1.607, b = g = 1.724-1.740.

Uniaxial (-). w = 1.66, e = 1.57.

Biaxial (+). a = 1.559, b = 1.562, g = 1.572.
Biaxial (+). a = 1.77, b = 1.78, g = 1.80, 2V = 71ø(Calc).
Uniaxial (-). w = 1.590-1.562.
Uniaxial (-). Often isotropic (metamict). n's ¯ 1.733-1.76.
Isotropic (?). N = 1.425.
Uniaxial. One index = 2.12.
Biaxial (+). a = 2.12, b = 2.17, g = 2.31, 2V = 67ø.

Biaxial (-). a = 1.73, b = 1.96, g = 1.98, 2V moderate.
Biaxial (+). a = 1.4713, b = 1.478, g = 1.4856, 2V = 85ø27'.
Uniaxial (-). w = 1.612, e = 1.593.
Uniaxial (-). w = 1.539, e = 1.511.

Biaxial (-). a = 1.720, b = 1.770, g = 1.800, 2V = 80-85ø.
Biaxial (+). a = 2.24, b = 2.27, g = 2.31, 2V nearly 90ø.
Biaxial (+). a = 1.762, b = 1.763, g = 1.766.
Biaxial (-). a = 1.449, b = 1.461, g = 1.463, 2V = 56ø.

Biaxial (+). a = 1.445, b = 1.460(Calc.), g = 1.491, 2V = 56ø.

Biaxial. b = 1.494.
Uniaxial. n's between ~ 1.559 and 1.592.

Biaxial (+). a = 1.706, b = 1.712, g = 1.724, 2V = 71ø.
Biaxial (+). a = 1.5065, b = 1.5074, g = 1.5085, 2V ¯ 90ø.
Biaxial (+). a = 1.653, b = 1.659, g = 1.676, 2V = 20-35ø.
Biaxial (-). a = 1.497, b = 1.512, g = 1.513, 2V small.
Uniaxial (-). n = 1.580.
Uniaxial (-). w = 1.607, e = 1.584. May be slightly biaxial with 2V = 0.20ø.
Biaxial (-). a = 1.610, b = 1.623, g = 1.623.
Biaxial (-). a = 1.591, b = 1.619, g = 1.67621, 2V = 0-5ø.
Isotropic. N = 1.618.

Biaxial. a = 1.611, b = 1.620, g = 1.645.
Uniaxial (-). w = 1.637, e = 1.609.
Biaxial (-). a = 1.70, b = 2.10, g ~ 2.23, 2V = 52ø(Calc.).
Uniaxial (-) to biaxial with a 2V from 0-22ø. w = 1.642, e = 1.608.
Uniaxial (-) to biaxial with 2V from 0-20ø. w = 1.644, e = 1.617.
Biaxial (+?). a = 1.648, b = 1.680, g = 1.716, 2V = 93ø.
Biaxial (-). a = 1.615, b = 1.635, g = 1.638, 2V = 27-37ø.
Uniaxial (-). w = 1.632, e = 1.595.
Biaxial (+). a = 1.840, b > 1.85, g > 1.85, 2V large.
Biaxial (+). a = 1.598, b = 1.604, g = 1.626, 2V = 59ø(Calc.).

Biaxial (+). a = 1.615543, b = 1.575, g = 1.634, 2V = 60ø.

Biaxial (+). a = 1.640, b = 1.658, g = 1.760, 2V = 47.7ø(Calc).
Biaxial (-). a = 1.602, b = 1.628, g = 1.632, 2V = 42ø.
a = 17.28, b = 7.03, c = 6.56, \b = 105.88
Biaxial (-). a = 1.68(Calc), b = 1.835, g = 1.865, 2V = 45ø.
Biaxial (-). a = 1.780, b = 1.850, g = 1.860, 2V ¯ 60ø.
Biaxial (-). a ¯ 1.67, b ¯ 1.68, g ¯ 1.69, 2V = 83ø.

Biaxial (+). a = 1.551, b = 1.558, g = 1.582, 2V = 55ø.
Biaxial (+). a = 1.550, b = 1.561, g = 1.577, 2V large.
Biaxial (+). a = 1.579, b = 1.603, g = 1.629, 2V = 85ø.
Uniaxial (-). w = 1.588-1.595, e = 1.573-1.581.
Biaxial. Mean index ~ 1.626.
Uniaxial (-). w = 1.650, e = 1.626.

Biaxial (-). a = 1.500, b = 1.535, g = 1.560, 2V = 78ø.
Isotropic with N > 2.

Biaxial (-). a = 1.514-1.529, b = 1.518-1.533, g = 1.521-1.539, 2V = 66-90ø.
Isotropic. N = 1.93-1.94, 1.98-2.02.
Biaxial (+). b = 1.521, g = 1.529.
Isotropic. N = 2.20.

Uniaxial (-). w = 1.532-1.551, e = 1.529-1.548.

Biaxial (+). a = 1.584, b = 1.598, g = 1.602, 2V moderate.

Biaxial (+). a = 1.740, b = 1.754, g = 1.786, 2V = 68ø.
Biaxial (-). a = 1.513, b = 1.536, g = 1.545, 2V medium large.
Uniaxial (-). w = 1.607, e = 1.604.
Biaxial (-). a = 1.501-1.498, b = 1.555, 1.554, g = 1.597, 1.594, 2V = 78ø(Calc.).

Biaxial (-). a = 1.592, b = ?, g = 1.623, 2V small.
Uniaxial (-). w = 1.750, e = 1.550.
Biaxial (+). a = 1.531, b = 1.534, g = 1.538, 2V large.
Biaxial (-). a = 1.396, b = 1.4103, g = 1.419(Calc.), 2V = 75ø56'.
Biaxial (+). a = 1.475, b = 1.480, g = 1.487, 2V large.
Biaxial (+). a = 1.587, b = 1.589, g = 1.594, 2V = 65ø.
Biaxial (-). a = 1.785, b = 1.85, g = 1.85, 2V = 5-10ø.
Uniaxial (-). w = 1.6438, e = 1.6097.
Uniaxial (+). w = 1.748-1.750, e > 1.81.
Biaxial (-). All indices > 2.11, 2V = 5-10ø.

Biaxial (+). a = 1.486, 1.480, g = 1.497, 1.486, 2V ¯ 75ø.
Uniaxial (+). w = 2.654, e = 2.697.
Isotropic. N = 1.97-1.98.

Biaxial (+). b and g > 2.0, 2V very large.
Biaxial. a = 2.05, g = 2.15.
Biaxial (-). a = 2.12, g = 2.14, 2V = 80ø.
Uniaxial (-). w = 1.815, e = 1.761.
Uniaxial (-). Mean index = 1.6.

Biaxial (+). a = 1.785, b = 1.787, g = 1.840, 2V ~ 12ø.

Biaxial (+). a = 1.600, 1.587, b = 1.614, g = 1.631, 1.640, 2V moderate to large.
Uniaxial (-). w = 1.80, e = 1.74.

Uniaxial (+). e = 1.590, w = 1.545.
Isotropic. N = 1.6081.

Biaxial (-). a = 1.580, b = g = 1.605, 2V = 0-3ø.
Biaxial (-). a = 1.57-1.60, b = 1.61, g = 1.62, 2V = 81ø30'.
Isotropic. N = 2.49.

Biaxial (+). a = 1.510, b = 1.513, g = 1.517, 2V = 87ø.

Biaxial (-). a = 1.572, b = 1.578, g = 1.582, 2V = 75ø.
Biaxial (-). a = 1.639-1.654, b = 1.646-1.664, g = 1.653-1.674, 2V = 72-82ø.
Biaxial (-). a = 1.48-1.57, b = 1.50-1.60, g = 1.50-1.60, 2V small.

Biaxial (-). a = 1.51, b = 1.530, g = 1.545, 2V = 80ø.
Biaxial (+). a = 2.37, b = 2.5, g = 2.65, 2V large.

Anisotropic. Birefringent. n's between 1.57 and 1.95.
Biaxial (-). a = 1.533, b = 1.545, g = 1.547, 2V ~ 50ø.
Biaxial (-). a = 1.470, b = 1.497, g = 1.497, 2V very small.
Uniaxial (-). w = 1.614, e = 1.605.
Biaxial (-). a = 1.462, b = 1.482, g = 1.490, 2V = 65ø.
Biaxial (+ or -). a = 1.472-1.483, b = 1.475-1.485, g = 1.477-1.487, 2V = 76-104ø.
Biaxial (-). a = 1.540, b = 1.552, g = 1.558, 2V = 70ø.
Uniaxial (+). e = 1.884, w = 1.880.
Biaxial (-). a = 1.47, b = 1.49, g = 1.49, 2V = 41ø54'.
Biaxial (-). a = 1.551, b = 1.563, g = 1.565, 2V = 43ø.

Biaxial (+). a = 1.662-1.643, b = 1.667-1.645, g = 1.681-1.651, 2V = 43-87ø.

Isotropic. N > 1.95.
Biaxial (-). a = 2.17, b = 2.26, g = 2.32, 2V ~ 73ø.
Uniaxial, but nearly isotropic with n ¯ 1.51.
Biaxial. All indices > 2.09.
Biaxial (-). a = 1.504, b = 1.510, g = 1.519.
Uniaxial (-). w = 1.52, e = 1.51.
Biaxial. n's > 1.780.
Biaxial (-). a = 1.588, b = 1.681, g = 1.690, 2V = 32ø.

Biaxial (-). a = 1.79, b = 1.85, g = 1.89, 2V = 80ø.
Uniaxial (+). w = 1.697, e = 1.704.
Biaxial (+). a = 1.723, b = 1.733, g = 1.755, 2V = 88ø.
Biaxial (+). a = 1.637, b = 1.641, g = 1.652.
Biaxial (-). a = 1.62(Calc.), b = 1.682, g = 1.688, 2V = 33ø.
Biaxial (-). a = 1.521, b = 1.542, g = 1.551, 2V = 65ø.
Biaxial (-). a = 1.692, b = 1.757, g = 1.800, 2V = 75ø.

Biaxial (-). a = 1.735-1.682, b = 1.765-1.770, g = 1.807-1.839, 2V = 50-75ø.

Biaxial (-). a = 1.552-1.574, b = 1.582-1.610, g = 1.587-1.616, 2V = 30-47ø.

Uniaxial (-). w = 1.739, e = 1.735.
Not determined.
Biaxial (-). Mean index = 1.80-1.81, 2V = 15-40ø.
Biaxial. n's > 1.8.
Isotropic. N = 1.504.
Biaxial (-). a = 1.508, b = 1.515, g = 1.520, 2V = 80ø.
Biaxial (-). a = 1.557, b = 1.5622, g = 1.563, 2V = 40ø.
Biaxial (+). a = 2.30, b = 2.35, g = 2.40, 2V large.
Biaxial (+). a = 1.750, b = 1.753, g = 1.780, 2V = 30ø.
Usually uniaxial (+), sometimes biaxial (+) with a 2V near 0ø. Synthetic material is biaxial (+), a = 1.642-1.680, b = 1.642-1.67

Biaxial (-). a = 1.377, b = 1.503, g = 1.583, 2V ~ 75ø.
Biaxial. N(min.) = 1.490, N(max.) = 1.505.
Biaxial (-). a = 1.585, b = 1.604, g = 1.612, 2V = 65ø.
Biaxial (+). a = 1.707, b = 1.710, g = 1.730, 2V = 30ø.
Biaxial (-). n's > 2.10.
Uniaxial with extremely low birefringence. n's = 1.577.
Uniaxial (-). w = 1.82, e = 1.78.
Isotropic. N = 1.930.
Uniaxial (+). e = 1.625-1.653, w = 1.604-1.609.
Biaxial (-). a = 1.494, b = 1.512, g = 1.524, 2V = 66.8ø.
Uniaxial (+). e = 1.9710, w = 1.9453.

Biaxial (-). a = 1.741, b ¯ g = 1.762, 2V = 8-12ø.
Isotropic. N = 1.755.
Uniaxial (-). w = 1.756, e = 1.680.
Biaxial (-). a = 1.410, b = 1.535, g = 1.543, 2V = 28ø.
Uniaxial (+). e = 1.590, w = 1.568.
Biaxial (+). a = 1.536, b = 1.538, g = 1.544, 2V = 32ø.
Isotropic
Biaxial (+). a = 1.649, b = 1.655, g = 1.714, 2V = 36ø48'.
Biaxial. a = 1.756, b = 1.775.
Uniaxial (-). w = 1.525, e = 1.459. Sometimes slightly biaxial.
Uniaxial (-). w = 1.832, e = 1.750.
Biaxial (+). a = 1.473-1.483, b = 1.476-1.486, g = 1.485-1.496, 2V = 58-64ø.
Biaxial (+). a = 1.594, b = 1.603, g = 1.615, 2V very large.
Biaxial (-). a = 1.405, b = 1.425, g = 1.440, 2V large.
Biaxial (+). a = 1.706, b = 1.710, g = 1.730, 2V = 45ø.
Biaxial (+). a = 1.671, b = 1.674, g = 1.684, 2V ~ 75ø.
Isotropic. N = 1.460-1.462.
Biaxial (-). a = 1.507, b = 1.517, g = 1.521, 2V = 49-64ø.
Strongly anisotropic and birefringent.
Biaxial (-). a = 1.537, b = 1.550, g = 1.556, 2V = 52-71ø.

Biaxial. a = 1.905, b = 2.02, g > 2.02.
Biaxial. n's > 2.0.

Biaxial (+). a = 1.571, g = 1.590.
Biaxial with mean index = 1.364.
Biaxial (+). Mean index = 1.535, 2V ¯ 70ø.

Uniaxial (-). w = 1.718, e = 1.700. (Biaxial with an extremely small 2V?).

Biaxial (+). a = 1.659, b = 1.686, g = 1.785, 2V = 46ø.
Uniaxial (-). w = 1.529-1.546, e = 1.526-1.542.
Biaxial (-). a = 1.662, g = 1.645.
Biaxial (+). a = 1.690-1.6908, b = 1.6927-1.700, g = 1.7194-1.736, 2V = 49ø, 36ø.
Biaxial (-). a = 1.417(Calc.), b = 1.503, g = 1.527, 2V = 53ø.

Biaxial (+). a = 1.514, b = 1.517, g = 1.533, 2V = 45ø.

Biaxial (-). a = 1.582, b = 1.604, g = 1.609, 2V = 54ø.

Biaxial (+). a = 1.490, b = 1.494, g = 1.501.

Biaxial (+). a = 1.745, b = 1.777, g = 1.84.
Biaxial. a = 1.532, g = 1.543.
Biaxial (+). a = 1.589, b = 1.617, g = 1.644, 2V = 87ø.
Biaxial (-). a = 1.513, b = 1.518(Calc.), g = 1.520, 2V = 60-70ø.

Biaxial. a = 1.469-1.470, g = 1.493-1.494.
Biaxial (+). a = 1.575, b = 1.578, g = 1.584, 2V = 76ø.
Uniaxial (+). e = 1.81, w = 1.80.

Biaxial. a = 1.637, g ¯ b = 1.647, 2V ¯15ø.
n's ~ 1.64-1.71

Isotropic. N = 2.26.

Biaxial (-). a = 1.724, b = 1.760, g = 1.772, 2V = 60ø.
Biaxial (-). a = 1.701, b = 1.714, g = 1.720, 2V = 56ø.

Biaxial (-). a = 1.584, b = 1.620, g = 1.621, 2V = 19ø(Calc.).
Biaxial (-). a = 1.332, b = 1.504, g = 1.504, 2V = 7ø.
Uniaxial (-). w = 1.5874, e = 1.3361.
Isotropic. N = 1.5714.
Biaxial (-). a = 1.465, b = 1.498, g = 1.504, 2V ¯ 50ø.
Biaxial (-). a = 1.34, b = 1.506, g = 1.506, 2V ¯ 5ø.
Biaxial (+). a = 1.500, b = 1.520, g = 1.554, 2V = 76ø.

Biaxial (+). a = 1.563-1.567, b = 1.567-1.579, g = 1.590-1.593, 2V = 44-50ø.
Uniaxial (-). w = 1.778, e = 1.660.

Biaxial (-). a = 1.619-1.621, b = 1.63-1.64, g = 1.642-1.655, 2V = 30ø.
Biaxial (+). a = 1.580, b = 1.583, g = 1.602, 2V = 24ø.

Uniaxial (-). w = 1.694, e = 1.519.
Isotropic. N = 1.5144.
Isotropic. N = 1.495.
Uniaxial. e = 1.620-1.625, w = 1.620-1.641. Sometimes slightly biaxial with 2V = 0-20ø.

Biaxial. a = 1.67, b ~ g = 1.78.
Biaxial (-). a = 1.5112, b = 1.533, g = 1.5345, 2V = 29ø.
Biaxial (+). a = 1.745, b = 1.753, g = 1.778, 2V ~ 60ø.
Biaxial. a = 2.24, g = 2.26.
Biaxial (+). a = 1.790, b = 1.798, g = 1.811, 2V = 81ø.
Uniaxial (-). w = 1.489, e = 1.486.
Biaxial (+). a = 1.765, b = 1.775, g = 1.800.
Biaxial. a = 1.649, b = 1.715.
Biaxial (+). a = 1.696, b = 1.730, g = 1.798, 2V = 73ø(Calc.).
Uniaxial (-). w = 1.753, e = 1.740.
Biaxial (-). a = 1.530, b = ?, g = 1.541 (variable), 2V large.
Isotropic. N = 2.137. Abundant internal reflections in reflected light; R ~ 13%.
Uniaxial (-). w = 1.623, e = 1.619.
Biaxial (-). a = 1.542, b = 1.546, g = 1.549, 2V = 82ø.
Biaxial (+), sometimes (-). a = 1.772-1.780, b = 1.810-1.820, g = 1.863-1.865, 2V ~ 90ø.

Biaxial (+). a = 1.725, b = 1.755, g = 1.815, 2V = 60ø (Big Chief); a = 1.765, b = 1.775, g = 1.835 (Hesnard).
Biaxial (-). a = 1.945, b = 1.966, g = 1.983, 2V = 80ø.
Biaxial (+). a ¯ b = 1.510, g = 1.512, 2V = 46ø(?).

Biaxial (+). a = 1.662-1.691, b = 1.670-1.700, g = 1.688-1.718, 2V = 58-83ø.
Biaxial (-). b ~ 2.20, g ~ 2.24.

Isotropic. N = 1.435-1.455.
Uniaxial (+). e > w > 1.95.
Uniaxial (+). e =1.875 w = 1.857.

Biaxial (-). a = 1.756, b = 1.777, g = 1.794, 2V = 68-83ø.
Uniaxial (+). e =1.691 w = 1.670.
Biaxial (-). a = 2.4, b = 2.81, g = 3.02, 2V = 76ø.
Isotropic (metamict). N = 2.328.

Biaxial (-). a = 1.518-1.529, b = 1.522-1.533, g = 1.522-1.539, 2V = 33-103ø.
Biaxial (+). a = 1.802, b = 1.840, g = 1.888, 2V ~ 50ø.

Uniaxial (+). e =1.731, w = 1.714.

Uniaxial (+). e =1.550, w = 1.546.
Uniaxial (+). e =1.543, w = 1.5406. May be anomalously biaxial with 2V = 5-15ø.

Biaxial (+). a = 1.920, b = 1.943, 2V = 20ø.

Biaxial (+). a = 1.709, b = 1.712, g = 1.716, 2V = 60-70ø.
Biaxial. a = 1.65, g = 1.72.
Biaxial (-). a = 1.624, b = 1.640, g = 1.650, 2V = 76ø(Calc.).
Biaxial (-). a = 1.568, b = 1.574, g = 1.580, 2V = 75ø.

Biaxial (-). a = 1.438, b = 1.547, g = 1.595, 2V = 62ø.
Biaxial (+). a = 1.602, b = 1.606, g = 1.613.

Uniaxial (-). w = 1.685, e = 1.674.
Biaxial (+). a = 1.411, b = 1.413, g = 1.420, 2V = 76ø.

Isotropic. N = 1.523.
Uniaxial (-). w = 1.8159, e = 1.7875.

Biaxial (-). a = 1.627, b = 1.642, g = 1.644, 2V ~ 20ø.

Uniaxial (-). w = 1.712; birefringence strong.

Biaxial (+). a = 1.590, b = 1.596, g = 1.616, 2V = 51ø.
Biaxial (-). a = 1.567, b = 1.576, g = 1.579, 2V = 51ø.

Biaxial (-). a = 1.607, b = 1.641, g = 1.672, 2V = 78ø.
Anisotropic (uniaxial ?). N > 2.0.
Biaxial (+). a = 1.598, b = 1.663, g = 1.737, 2V = 87ø.
Biaxial (-). a = 1.5702, b = 1.5824, g = 1.5869, 2V = 52.7ø.
Uniaxial. w = 1.550, e = 1.555.

Biaxial (-). a = 1.726, b = 1.771, g = 1.780, 2V = 50ø.

Biaxial (-). a = 1.564-1.580, b = 1.594-1.609, g = 1.600-1.609, 2V = 0-40ø.

Biaxial (+). a = 1.630, b = 1.636, g = 1.664, 2V = 35ø.
Biaxial (+). a = 1.614, b = 1.625, g = 1.637, 2V = nearly 90ø.
Biaxial (-). a' = 1.670, b' = 1.629, g' = 1.713, 2V = 88ø(Calc.), 84ø(Meas.).
Uniaxial (-). w = 2.155, e = 2.120.
Biaxial (-). a = 2.05, b = 2.15, g = 2.20, 2V medium to large.
Uniaxial (-). w = 1.672, e = 1.527.

Biaxial (-). a = 1.686, b = 1.710, g = 1.720, 2V ~ 55ø.

Biaxial (-). 2V < 10ø.

Biaxial. a = 1.700, b = 1.750, g = 1.770, 2V = 40ø.
Biaxial (+). a = 1.587, b = 1.588, g = 1.603, 2V = 25ø.
Biaxial (-). a = 1.650, b = 1.672, g = 1.677, 2V = 47ø.
Biaxial (-). a = 1.628, b = 1.660, g = 1.705, 2V large.
Uniaxial (+). w = 1.842, e = 1.848.

Biaxial (-). a = 1.588, b = 1.601, g = 1.610, 2V = 82ø.
Biaxial (+). a = 1.552, b = 1.559, g = 1.572, 2V = 72ø.
Biaxial (-). a = 1.618, b = 1.630, g = 1.632, 2V = 38-60ø.
Biaxial (+). a = 1.613, b = 1.618, g = 1.635, 2V = 20ø.
Uniaxial (+). w = 1.676, e = 1.757.

Biaxial (-). a = 1.680, b = 1.704, g = 1.712, 2V = 60ø.
Biaxial (-). g = 1.572, 2V = 0-8ø.
Biaxial (-). a = 1.85, g = 1.86, 2V ~ 11-26ø.
Biaxial (+). a = 1.547, b = 1.549, g = 1.559, 2V = 48ø.
Isotropic. N = 1.61-1.82.
Biaxial (+). a = b = 1.85, g = 1.88, 2V ¯ 27ø.
Biaxial (-). a = 1.775, b = 1.815, g = 1.825, 2V = 50.5ø.

Isotropic. N = 1.473.
Biaxial (-). a = 1.598, b = 1.624(Calc.), g = 1.643, 2V = 80ø.
Biaxial (+). n's > 1.9, 2V = 65ø.

Anisotropic. n's ~ 1.565-1.603.
Biaxial (+). a = 1.595-1.610, b = 1.605-1.615, g = 1.632-1.645, 2V = 50-63ø.
Uniaxial (-). N(mean) = 1.79.
Biaxial. N(mean) = 1.510.

Biaxial (+). a = 1.643, b = 1.645, g = 1.649, 2V = 47ø.
Biaxial (+). a = 1.684, b = 1.688, g = 1.705, 2V = 56ø(Meas.), 52ø(Calc.).
Biaxial (+). a = 1.637, b = 1.640, g = 1.662, 2V = 42ø.
Biaxial (-). a = 1.646, b = g = 1.661, 2V ¯ 0ø.

Biaxial (-). a = 1.533, b = 1.544, g = 1.547, 2V = 50ø.
Biaxial (-). a = 1.482, b = 1.492, g = 1.493, 2V = 45ø08'.

Biaxial (+). N(mean) = 1.841, 2V large.

Uniaxial (+). e = 1.577, w = 1.564.
Isotropic. N = 1.736.
Biaxial. n's > 2.4.
a = 1.483, g = 1.488 (?).
Biaxial (-). a = 1.793, b = 1.803, g = 1.808, 2V = 70-80ø.

Anisotropic with indices near 2.34.
Biaxial (-). a = 1.90-1.95, b = 2.01(Calc.), g = 2.02-2.06, 2V = 60ø.

Biaxial (+). a = 1.504, b = 1.510, g = 1.516, 2V = 83ø24'.
Biaxial (+). a = 1.596, b = 1.598, g = 1.632, 2V = 29ø.
Biaxial (+). a = 1.68, b = 1.69, g = 1.70, 2V = 80ø.
Uniaxial (+). e = 1.747, w = 1.666.

Optically resembles argentite
Isotropic. Metamict.

Biaxial (-). a = 1.583, b = 1.589, g = 1.594, 2V = 79.4ø.
Isotropic. N = 1.693.
Biaxial (+). a = 1.532, b = 1.542, g = 1.556, 2V = 80ø.
Uniaxial (+). e = 1.670, w = 1.654.
Isotropic (?). N = 1.790.
Biaxial (-). a = 1.729, b = 1.774, g = 1.775, 2V = 17ø.
Biaxial (-). a = 1.4984, b = 1.5042, g = 1.5085, 2V = 81ø.
Biaxial (-). a = 1.530-1.590, b = 1.557-1.637, g = 1.558-1.637, 2V = 0-15ø.
Biaxial (+). a = 2.38, b = 2.44, g = 2.65, 2V = 58ø.
Uniaxial (+). e = 2.1446, w = 2.1181.
Biaxial (-). a = 1.567, b = 1.569, g = 1.570, 2V = 68ø.
Biaxial (+). a = 1.508, b = 1.518, g = 1.530.
Biaxial (+). a = 1.672, b = 1.680, g = 1.700, 2V = 68ø.
Biaxial (-). a = 1.755, g = 1.790, 2V moderate.
Biaxial (-). a = 1.5994, b = 1.6167, g = 1.6198, 2V = 44.3ø.
Biaxial (-). a = 1.477, b = 1.485, g = 1.486, 2V = 38ø10'.
a = 1.692, b = 1.725, g = 1.738. (-)2V = 62ø.
Biaxial (-). a = 1.658-1.690, b = 1.699-1.724, g = 1.699-1.724, 2V = 0-25ø, 51ø.
Biaxial (-). a = 1.559(Calc), b = 1.616, g = 1.624, 2V = 40ø.
Biaxial (-). a = 1.690(Calc), b = 1.730, g = 1.749, 2V = 68ø.
Uniaxial to weakly biaxial (-). a (or e) = 2.10, g (or w) = 2.185, 2V < 18ø.
Biaxial (-). a = 1.475, b = 1.480, g = 1.483, 2V = 60ø.

Biaxial (+). a = 1.4607, b = 1.4629, g = 1.4755, 2V = 47ø54'.
Biaxial. a = 1.566(Calc), b = 1.571, g = 1.578, 2V ¯ 50ø.
Biaxial (+). a = 1.732-1.794, b = 1.750-1.807, g = 1.762-1.829, 2V = 64-85ø.

Biaxial (+). a = 1.682-1.722, b = 1.684-1.722, g = 1.705-1.751, 2V = 0-30ø.

Biaxial (-). a = 1.908, b = 2.05, g = 2.065, 2V = 32ø.
Anisotropic. Pleochroic from red to opaque black in transmitted light. n's > 2.0.

Uniaxial (+). e = 1.575, w = 1.565.

Biaxial (+). a = 1.5043, b = 1.5095, g = 1.5751, 2V = 31ø26'.
Uniaxial (+). e = 1.695, w = 1.583.

Biaxial (+). a = 1.697, b = 1.718, g = 1.741, 2V = 88.5ø(Calc.).

Anisotropic. n's >1.782.
Isotropic. Metamict.

a = 12.58-12.76, c = 5.11-5.20

Palache et al, Dan79). Am. Min. 42:286 (1957).

Volcano, Kamchatka, Russia.

NAMENDX,C,5
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Tlalo
Tlapa
Tobel
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Tolba
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Tosud
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Trech
Tremo

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Trogt
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Troll
Trona
Trusc
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Tsumc
Tsume
Tsumo
Tucek
Tugar
Tugtu
Tuhua
Tulam

Tundr
Tunel

Tungs
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Tuper
Turne
Turqu
Tusca
Tusio
Tvalc
Tveit
Twinn
Tychi

Tyret
Tyrol

Tyrre
Tyuya
Uchuc
Uklon
Ulexi
Ullma
Ulric
Ulv"s
Umang
Umbit
Umboz
Umoho
Ungem
Upali
Uralb
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Urea
Urici
Ushko
Usovi
Ussin
Uvani
Uvaro
Uvite
Uyten
Uzoni
Vaesi
Valen
Valle
Vanad
Vanal
Vande
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Vanme
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Varis
Varla
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Vashe
Vater
Vauqu
Vauxi
V„yry
Veatc
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Veeni
Velik
Verna
Verpl
Versi
Vertu
V,sig
Vesuv
Vesze
Vigez
Viita
Vikin
Villa
Villi
Villy
Vimsi
Vinci
Vinog
Viola
Virgi
Vis,i
Vishn
Vismi
Vitus
Vivia
Vladi
Vlaso
Vogli
Volbo
Volko
Volta
Volyn
Vonse
Vozhm
Vrbai

Vuagn
Vulca
Vuonn
Vuore
Vyach
Vysot
Vyunt
Wadei
Wadsl
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Walen
Walli
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Walst
Wardi
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Warik
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Wavel
Wayla
Weber
Wedde
Weeks
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Weibu
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Weili
Weiss
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Welin
Wells
Welog
Welsh
Wendw
Wenki
Werml
Weste
Wheat
Wherr

Whewe

White

Whitl
Whitm
Wicke
Wickm
Wicks
Widen
Widgi
Wight
Wilco
Wilhe
Wilkm
Wille
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Willh
Willy
Winch
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Wiser
Withe
Witti
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Wodgi
W”hle
Wolfe
Wolfr
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Wolla
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Wones
Woodh
Woodr
Wroew
Wulfe
Wurtz
W□sti
Wyart
Xanth
Xanth
Xanth

Xenot
Xiang
Xifen
Xilin
Xingz
Xitie
Xocom
Xonot

Yafso
Yagii
Yaros
Yarro
Yavap
Ye'el
Yeatm
Yecor
Yedli

Yftis
Yimen
Yixun
Yoder
Yofor
Yoshi
Yttro
Yttro

Yttro
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Yttro
Yugaw
Yukon
Yuksp
Yushk
Zaher
Zairi
Zakha
Zapat
Zarat
Zavar
Zektz
Zelle
Zeman
Zeoph
Zeune

Zhemc
Zhong
Ziesi
Zinal
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Zincs

Zinke
Zinnw
Zippe
Zirco
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Zirke
Zirsi
Zoisi
Zorit
Zoube
Zunyi
Zussm
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Zwies
Zykai