

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Aenigmatite group</b> $D_2G_6[T_6O_{18}]O_2$								
Aenigmatite	46-1473	i	10.416	10.839	8.930	745.98	aP68	$Na_2Fe_{5+2}TiSi_6O_{20}$
Dorrite	45-1408		10.505	10.897	9.019	772.54	aP68	$Ca_2(Mg_2Fe_{4+3})(Al_4Si_2)O_{20}$
Hogtuviaite	46-1472	i	10.317	10.724	8.855	730.32	aP68	$(Ca,Na)_2(Fe,Ti,Mg,Mn,Sn)_6(Si,Be,Al)_6O_{20}$
Krinovite	20-1123	i	10.220	10.670	8.800	714.73	aP68	$NaMg_2CrSi_3O_{10}$
Rhönite	23-607		10.478	10.923	9.170	747.88	aP68	$Ca_2(Fe,Mg,Ti)_6(Si,Al)_6O_{20}$
Sapphirine-1A	44-1430	C	9.970	10.340	8.620	666.62	aP68	$(Al_6Mg_3)(Al_4Si_2)O_{20}$
Serendibite	29-343	i	9.513	10.001	8.622	668.24	aP68	$Ca_2(Mg,Al)_6(Si,Al,B)_6O_{20}$
Welshite	29-1407		10.280	10.690	8.838	729.61	aP68	$Ca_2Mg_4FeSbBe_2Si_4O_{20}$
Wilkinsonite	46-1337	i	10.355	10.812	8.906	741.09	aP68	$Na_2Fe_{4+2}Fe_2^{3+}Si_6O_{20}$
<b>Related structures</b>								
Sapphirine-2M	19-750		11.281	14.425	9.940	1317.01	mP136	$(Mg_4Al_4)(Al_4Si_2)O_{20}$
<b>Alluaudite group</b> $EE'GG'_1 \leftrightarrow 2(TX_4)_3$								
<b>Arsenate subgroup</b>								
Arseniopileite	20-224		11.310	13.060	6.860	1000.81	mP105.68	$(H_3O,Ca,Mg,Pb)_{8,42}(Mn,Fe,Mg)_{12}(As,H_4)O_{41}2$
Caryinite	12-295	i	11.480	13.170	6.870	1025.90	mP?	$(Ca,Na,Mn)_3(Mn,Mg)_2(AsO_4)_{3-z}(OH)_x$
Johillerite	35-522		11.870	12.755	6.770	940.55	mC80	$Na(Mg,Zn)_3Cu^{+2}(AsO_4)_3$
Odanielite	35-482		12.113	12.445	6.793	943.52	mC84	$NaZn_3H_2(AsO_4)_3$
<b>Phosphate subgroup</b>								
Alluaudite	14-245		11.076	12.616	6.425	890.26	mC76	$NaFe(Mn^{2+},Fe)_2(PO_4)_3$
Alluaudite	42-581	C	12.004	12.533	6.404	877.40	mC75.32	$NaMn^{2+}Fe_2(PO_4)_3$
Ferroalluaudite	39-377	★	11.002	12.527	6.415	875.22	mC76	$NaFe(Fe,Mn)_2(PO_4)_3$
Ferrowyllite	39-409	i	6.323	12.293	10.880	838.74	mP80	$Na_2Fe_2Al(PO_4)_3$
Hagendorffite	29-1191		10.933	12.594	6.515	888.37	mC76	$NaMn(Fe,Mn)_2(PO_4)_3$
Qingheite	41-588	C	11.856	12.411	6.421	860.09	mP80	$Na_3Mn_3Mg_2Al_2(PO_4)_6$
Qingheite	41-1418		11.856	12.411	6.421	860.09	mP80	$Na_3Mn_3Mg_2Al_2(PO_4)_6$
Rosemaryite	47-1874	i	11.977	12.388	6.320	853.61	mP76	$(Na,Ca,Mn)(Mn,Fe)(Fe,Fe,Mg)Al(PO_4)_3$
Varulite	6-487		11.000	12.570	6.460	884.75	mP76	$NaMn(Mn,Fe)_2(PO_4)_3$
<b>Related structures</b>								
Bob Fergusonite	40-509	★	12.773	12.486	11.038	1746.69	mP156	$Na_2Mn_5^{2+}Fe^{3+}Al(PO_4)_6$
<b>Alum group</b> $DG(SO_4)_2 \cdot 12H_2O$								
Loncreekite, syn	7-5	i	12.313	12.313	12.313	1866.77	cP208	$NH_4Fe(SO_4)_2 \cdot 12H_2O$
Potassiumalum, syn	7-17	★	12.157	12.157	12.157	1796.71	cP192	$KAl(SO_4)_2 \cdot 12H_2O$
Sodiumalum, syn	29-1167	★	12.214	12.214	12.214	1822.11	cP192	$NaAl(SO_4)_2 \cdot 12H_2O$
Tschermigite, syn	7-22	★	12.240	12.240	12.240	1833.77	cP208	$(NH_4)Al(SO_4)_2 \cdot 12H_2O$
<b>Alunite supergroup</b> $(D/L)G_3(TO_4)_2(OH)_6$								
<b>1R-arsenate subgroup</b>								
Arsenocrandallite	35-647	O	7.080	7.080	17.270	749.70	hR27	$CaAl_3[(As,P)O_4]_2[(As,P)O_3OH](OH)_6$
Arsenocrandallite, syn	48-1852	i	7.081	7.081	16.655	723.21	hR27	$CaAl_3(AsO_4)(AsO_3OH)(OH)_6$
Arsenoflorentite-(Ce)	42-1390		7.029	7.029	16.517	706.72	hR26.15	$CeAl_3(AsO_4)_2(OH)_6$
Arsenogoyazite	38-386	O	7.100	7.100	17.160	749.14	hR27	$SrAl_3(AsO_4)(AsO_3OH)(OH)_6$
Beudantite	19-689	i	7.320	7.320	17.020	789.79	hR26	$PbFe_3^{3+}(As,SiO_4)_2(OH)_6$
Dussertite	35-621	★	7.424	7.424	17.494	835.11	hR27	$BaFe_3(AsO_4)(AsO_3OH)(OH)_6$
Gallobeudantite	50-1594	i	7.184	7.184	17.077	763.26	hR26	$PbGa_3[(AsO_4)(SO_4)_2](OH)_6$
Hidalgoite	19-1359	★	7.071	7.071	16.975	734.94	hR26	$PbAl_3(AsO_4)(SO_4)(OH)_6$
Kemmlitzite	22-1248		7.027	7.027	16.510	706.02	hR26	$SrAl_3(AsO_4)(SO_4)(OH)_6$
Philipsbornite	35-540		7.174	7.174	17.180	765.73	hR27	$PbAl_3(AsO_4)(AsO_3OH)(OH)_6$
Philipsbornite, syn	48-1853	i	7.127	7.127	17.062	750.54	hR27	$PbAl_3(AsO_4)(AsO_3OH)(OH)_6$
Segnitite	45-1392	i	7.359	7.359	17.113	802.59	hR27	$PbFe_3(AsO_4)(AsO_3OH)(OH)_6$
Weilerite	35-648		7.110	7.110	17.380	760.89	hR28	$BaAl_3(AsO_3OH)_2(OH)_6$
Weilerite, S-rich	19-1419		7.050	7.050	17.160	738.63	hR26	$BaAl_3(AsO_4)(SO_4)(OH)_6$
<b>1R-phosphate subgroup</b>								
Benauite	50-1557		7.280	7.280	16.850	773.38	hR36	$SrFe_3(PO_4)_2(SO_4)_2(OH,H_2O)_6$
Corkite	17-471	O	7.220	7.220	16.660	752.11	hR26	$PbFe_3^{3+}(PO_4)(SO_4)(OH)_6$
Crandallite, Sr-rich	42-1420		7.003	7.003	16.667	707.87	hR27	$(Ca,Sr)Al_3(PO_4)(PO_3OH)(OH)_6$
Crandallite-H	33-257	i	7.006	7.006	16.192	688.33	hR27	$CaAl_3(PO_4)(PO_3OH)(OH)_6$
Eylettersite	26-991		6.990	6.990	16.700	706.65	hR25.50	$Th_{1-x}Al_3(PO_4)_2(OH)_6$
Florentite-(Ce)	43-673		6.972	6.972	16.262	684.53	hR26	$CeAl_3(PO_4)_2(OH)_6$
Florentite-(Ce), syn	48-1848	★	6.965	6.965	16.227	681.73	hR26	$CeAl_3(PO_4)_2(OH)_6$
Florentite-(La)	38-347		6.987	6.987	16.248	686.93	hR26	$LaAl_3(PO_4)_2(OH)_6$
Florentite-(La), syn	47-1804	★	6.994	6.994	16.331	691.82	hR26	$LaAl_3(PO_4)_2(OH)_6$
Florentite-(Nd)	39-333	i	6.992	6.992	16.454	696.63	hR26	$NdAl_3(PO_4)_2(OH)_6$
Florentite-(Nd), syn	47-1805	★	6.972	6.972	16.116	678.43	hR26	$NdAl_3(PO_4)_2(OH)_6$
Goyazite	14-58		7.040	7.040	16.800	721.08	hR27	$SrFe_3(PO_4)(PO_3OH)(OH)_6$
Goyazite	34-152	★	7.022	7.022	16.597	708.69	hR27	$SrAl_3(PO_4)(PO_3OH)(OH)_6$
Hinsdalite	16-711	O	6.990	6.990	16.800	710.88	hR26	$PbAl_3(PO_4)(SO_4)(OH)_6$
Kintoreite	47-1878	i	7.325	7.325	16.900	785.29	hR26	$PbFe_3(PO_4)_2(OH,H_2O)_6$
Orpheite	29-756		7.016	7.016	16.730	713.13	hR23.40	$H_2Pb_{10}Al_{20}(PO_4)_{15}(SO_4)_5(OH)_{40} \cdot 11H_2O$
Plumbogummite	35-623	★	7.010	7.010	16.712	711.25	hR27	$PbAl_3(PO_4)(PO_3OH)(OH)_6$
Svanbergite	39-1361	★	6.975	6.975	16.597	699.34	hR26	$SrAl_3(PO_4)(SO_4)(OH)_6$
Waylandite	39-367	i	6.974	6.974	16.293	686.35	hR26	$(Bi,Ca)Al_3(PO_4)(SiO_4)_2(OH)_6$
Woodhouseite	37-469	★	6.979	6.979	16.214	684.00	hR26	$CaAl_3(PO_4)(SO_4)(OH)_6$
Zairite	29-226		7.015	7.015	16.365	697.43	hR26	$BiFe_3(PO_4)_2(OH)_6$
<b>1R-sulfate subgroup</b>								
Alunite	4-865		6.970	6.970	17.380	731.22	hR26	$KAl_3(SO_4)_2(OH)_6$
Alunite	14-136	i	6.982	6.982	17.320	731.20	hR26	$KAl_3(SO_4)_2(OH)_6$
Ammonioalunite, syn	42-1334	i	7.011	7.011	17.797	757.60	hR30.93	$NH_4Al_3(SO_4)_2(OH)_6$
Ammoniojarosite, syn	26-1014	i	7.327	7.327	17.500	813.62	hR30	$(NH_4)Fe_3^{3+}(SO_4)_2(OH)_6$
Argentojarosite, syn	41-1398	i	7.353	7.353	16.584	776.51	hR26	$AgFe_3(SO_4)_2(OH)_6$
Beaverite	47-1817		7.205	7.205	16.994	764.00	hR26	$Pb(Fe^{3+},Cu^{2+})_3(SO_4)_2(OH)_6$
Dorallcharite	47-1768	★	7.330	7.330	17.663	821.90	hR26	$TlFe_3(SO_4)_2(OH)_6$
Hydroniumjarosite, syn	31-650	i	7.356	7.356	17.009	797.04	hR29	$(H_3O)Fe_3(SO_4)_2(OH)_6$
Jarosite, OH-rich	36-427	★	7.324	7.324	17.005	789.91	hR26	$(K,H_3O)Fe_3(SO_4)_2(OH)_6$
Jarosite, syn	22-827	i	7.290	7.290	17.160	789.77	hR26	$KFe_3(SO_4)_2(OH)_6$
Natroalunite	41-1467	i	6.982	6.982	16.737	706.59	hR26	$NaAl_3(SO_4)_2(OH)_6$
Natrojarosite, syn	36-425	★	7.335	7.335	16.747	780.23	hR26	$NaFe_3(SO_4)_2(OH)_6$
Osarizawaite	15-178	i	7.050	7.050	17.250	742.50	hR26	$Pb(Al_2Cu)(SO_4)_2(OH)_6$
Osarizawaite, Fe-rich	45-1431		7.060	7.060	17.250	744.61	hR26	$Pb(Al,Cu,Fe)_3(SO_4)_2(OH)_6$
Schlossmacherite	33-973		6.998	6.998	16.670	706.99	hR29	$(H_3O,Ca)Al_3(SO_4,AsO_4)_2(OH)_6$

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>2R-sulfate subgroup</b>								
Huangite	47-1834	i	6.983	6.983	33.517	1415.40	hR51	CaAl <sub>6</sub> (SO <sub>4</sub> ) <sub>4</sub> (OH) <sub>12</sub>
Minamiite	34-143	C	6.981	6.981	33.490	1413.45	hR51.60	(Na,Ca) <sub>1-x</sub> Al <sub>3</sub> (SO <sub>4</sub> ) <sub>2</sub> (OH) <sub>6</sub>
Minamiite	34-179	★	6.983	6.983	33.501	1414.73	hR51.60	(Na,Ca) <sub>1-x</sub> Al <sub>3</sub> (SO <sub>4</sub> ) <sub>2</sub> (OH) <sub>6</sub>
Plumbojarosite	39-1353	★	7.310	7.310	33.686	1559.02	hR51	PbFe <sub>6</sub> (SO <sub>4</sub> ) <sub>4</sub> (OH) <sub>12</sub>
Walthierite	47-1833	i	6.992	6.992	34.443	1458.26	hR51	BaAl <sub>6</sub> (SO <sub>4</sub> ) <sub>4</sub> (OH) <sub>12</sub>
<b>Related structures</b>								
Crandallite-A	16-162		7.010	9.819	9.697	649.43	aP65	(Ca,Sr,Pb) <sub>2</sub> Al <sub>7</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH) <sub>16</sub> •3H <sub>2</sub> O
Gorceixite	41-1459	★	12.217	7.056	7.061	497.32	mC54	BaAl <sub>3</sub> (PO <sub>4</sub> )(PO <sub>3</sub> OH)(OH) <sub>6</sub>
<b>Amblygonite group GG'(PO<sub>4</sub>)X</b>								
Amblygonite	22-1138	i	5.148	7.215	5.060	158.37	aP16	LiAl(PO <sub>4</sub> )F
Montebrasite	12-448		5.178	7.123	5.053	159.96	aP18	LiAl(PO <sub>4</sub> )(OH)
Natromontebrasite	44-1429	★	5.266	7.174	5.042	162.35	aP18	NaAl(PO <sub>4</sub> )(OH)
Tavorite	41-1376	i	5.340	7.283	5.110	174.14	aP18	LiFe(PO <sub>4</sub> )(OH)
<b>Amphibole family D<sub>0&lt;=&gt;1</sub>(E&lt;=&gt;G)<sub>2</sub>G'<sub>3</sub>G''<sub>2</sub>[T<sub>4</sub>O<sub>11</sub>]<sub>2</sub>X<sub>2</sub></b>								
<b>1M-Ca subgroup</b>								
Actinolite	41-1366	i	9.830	18.067	5.284	907.87	mC82	Ca <sub>2</sub> (Mg,Fe <sup>+2</sup> ) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Edenite	23-1405	i	9.837	17.954	5.307	904.58	mC84	NaCa <sub>2</sub> Mg <sub>5</sub> AlSi <sub>7</sub> O <sub>22</sub> (OH) <sub>2</sub>
Edenite, Na-rich, syn	31-1282	i	9.907	18.024	5.267	909.79	mC84	(Ca,Na) <sub>2</sub> Mg <sub>5</sub> (Si,Al) <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferroactinolite	23-118	i	9.922	18.242	5.308	929.29	mC82	Ca <sub>2</sub> Fe <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferroactinolite	45-1342	i	9.753	18.009	5.326	909.24	mC82	(Ca,Na,K) <sub>2</sub> Fe <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferroedenite	44-1478		9.984	18.223	5.327	935.94	mC84	NaCa <sub>2</sub> Fe <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferrohornblende, Na-rich	29-1258	i	9.960	18.190	5.320	931.56	mC84	(Na,K)Ca <sub>2</sub> (Fe,Mg) <sub>5</sub> (Al,Si) <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferropargasite, syn	26-1372	i	9.950	18.140	5.330	927.93	mC84	NaCa <sub>2</sub> Fe <sub>4</sub> AlSi <sub>8</sub> Al <sub>2</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferrorichterite, syn	26-1373	i	9.982	18.223	5.298	936.18	mC84	Na <sub>2</sub> CaFe <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferrotschermakite	43-665	C	9.818	18.106	5.331	915.43	mC82	Ca <sub>2</sub> Fe <sub>3</sub> Al <sub>2</sub> (Si <sub>6</sub> Al <sub>2</sub> )O <sub>22</sub> (OH) <sub>2</sub>
Fluorocannilloite	49-1871	★	9.814	17.887	5.295	897.11	mC80	Ca <sub>3</sub> (Mg,Al)Si <sub>5</sub> Al <sub>2</sub> O <sub>22</sub> F <sub>2</sub>
Hastingsite, Cl-K-rich	20-378		9.907	18.023	5.278	909.87	mC80	(K,Na)Ca <sub>2</sub> (Fe,Mg) <sub>5</sub> (Si,Al) <sub>8</sub> O <sub>22</sub> Cl <sub>2</sub>
Hastingsite, Mg-rich	20-469		9.912	18.030	5.296	918.75	mC92	(Ca,Na) <sub>2</sub> (Fe <sub>2</sub> ,Mg) <sub>5</sub> (Si,Al) <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Joersmithite	22-531	i	9.880	17.870	5.227	888.56	mP84	Ca <sub>2</sub> Pb(Mg,Fe) <sub>5</sub> (Si,Be) <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Kaersutite	44-1450	★	9.810	18.055	5.316	909.31	mC84	NaCa <sub>2</sub> (Mg,Fe <sup>+2</sup> ) <sub>4</sub> Ti(Si <sub>6</sub> Al <sub>2</sub> )O <sub>22</sub> (OH) <sub>2</sub>
Magnesiohornblende	20-481	i	9.783	17.935	5.297	899.39	mC82.82	(Ca,Na) <sub>2.26</sub> (Mg,Fe,Al) <sub>5.15</sub> (Si,Al) <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Magnesiohornblende, Fe-rich	45-1371	i	9.850	18.072	5.307	912.72	mC82	Ca <sub>2</sub> (Mg,Fe <sup>+2</sup> ) <sub>4</sub> Al(Si <sub>7</sub> Al) <sub>2</sub> O <sub>22</sub> (OH,F) <sub>2</sub>
Magnesiosadanagaite	38-359	i	9.964	18.008	5.354	925.51	mC84	KCa <sub>2</sub> Mg <sub>5</sub> (Si <sub>7</sub> Al) <sub>2</sub> O <sub>22</sub> (OH) <sub>2</sub>
Pargasite, K-rich	47-1799	i	9.929	18.080	5.330	920.22	mC78	(Na,K)Ca <sub>2</sub> (Mg,Fe) <sub>4</sub> Al(Si <sub>6</sub> Al <sub>2</sub> )O <sub>23</sub>
Pargasite, syn	41-1430	i	9.899	17.945	5.279	903.20	mC84	NaCa <sub>2</sub> Mg <sub>4</sub> Al(Si <sub>6</sub> Al <sub>2</sub> )O <sub>22</sub> (OH) <sub>2</sub>
Tremolite	44-1402	i	9.829	18.035	5.274	904.18	mC82	Ca <sub>2</sub> Mg <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
<b>1M-Ca-Na subgroup</b>								
Fluorrichterite	50-1686	O	9.762	17.888	5.122	874.05	m?80	Na <sub>2</sub> Ca(Mg,Fe <sup>+2</sup> ) <sub>5</sub> (Si <sub>8</sub> O <sub>22</sub> (F,OH) <sub>2</sub>
Richterite, Ca-rich, syn	31-1284	i	9.895	17.985	5.259	906.50	mC83.50	Na <sub>0.75</sub> (Ca <sub>1.25</sub> Na <sub>0.75</sub> Mg <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Richterite, K-rich	31-1082		10.030	18.415	5.234	933.92	mC84	KNaCaMg <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Richterite, K-rich, syn	42-1481	C	10.055	17.997	5.275	922.67	mC84	Na(CaKMg <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Richterite, syn	25-808	C	9.907	17.979	5.269	909.63	mC84	Na <sub>2</sub> CaMg <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Taramite, K-rich	20-734		9.952	18.101	5.322	924.29	mC84	Na <sub>2</sub> CaFe <sub>5</sub> Al <sub>2</sub> Si <sub>6</sub> O <sub>22</sub> (OH) <sub>2</sub>
Winchite	20-1390		9.834	18.062	5.300	911.82	mC82	NaCa(Mg,Fe,Mn,Al) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Winchite, K-rich	35-460	i	9.944	17.951	5.271	911.30	mC82	(Na,K)CaMg <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
<b>1M-Fe-Mg subgroup</b>								
Clinoholmquistite	25-498	O	9.800	17.830	5.300	875.11	mC79	(Li,Na) <sub>2.5</sub> (Al,Mg,Fe) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (O,F,OH) <sub>2</sub>
Cummingtonite	17-727	i	9.583	18.091	5.315	899.25	mC82	(Mg,Mn,Fe) <sub>7</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Cummingtonite	42-545	★	9.553	18.314	5.335	913.33	mC82	(Fe <sub>0.6</sub> Mg <sub>0.4</sub> ) <sub>7</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Grunerite	44-1401	i	9.529	18.322	5.338	912.27	mC82	Fe <sub>7</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Manganocummingtonite	50-1641		9.582	18.114	5.316	889.09	m?82	Mn <sub>2</sub> (Mg,Fe,Mn) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Manganogrunerite	38-465	★	9.618	18.280	5.335	916.42	mC82	Mn <sub>3</sub> (Fe <sup>+2</sup> ,Mg) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Sodicferriclinoferroholmquistite	50-1618	i	9.472	17.844	5.276	872.35	mC84	NaLi <sub>2</sub> (Fe,Mg) <sub>3</sub> Fe <sub>2</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
<b>1M-Na subgroup</b>								
Arfvedsonite	14-633	i	9.940	18.170	5.340	934.16	mC83.20	(Na,K) <sub>2.6</sub> Fe <sub>4-2</sub> Fe <sup>+3</sup> (Si,Al) <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Eckermannite, syn	20-386		9.762	17.892	5.284	898.53	mC84	Na <sub>3</sub> Mg <sub>4</sub> AlSi <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferroglaucophane	27-714	i	9.599	17.874	5.302	884.06	mC82	Na <sub>2</sub> (Fe,Al,Mg) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferroglaucophane	31-1307	i	9.543	17.726	5.302	871.29	mC82	Na <sub>2</sub> (Al,Fe,Mg) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Fluorferroleakeite	49-1873	i	9.792	17.938	5.313	906.06	mC80	NaNa <sub>2</sub> (Fe,Li)Si <sub>8</sub> O <sub>22</sub> F <sub>2</sub>
Glaucophane	20-453	i	9.595	17.798	5.307	880.65	mC82	Na <sub>2</sub> Mg <sub>5</sub> Al <sub>2</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Kozulite	25-850	i	9.910	18.110	5.300	920.48	mC84	(Na,K) <sub>3</sub> (Mn,Mg,Fe,Al) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH,F) <sub>2</sub>
Leakeite	47-1819	i	9.808	17.850	5.289	897.59	mC84	Na <sub>3</sub> Mg <sub>2</sub> Fe <sub>2</sub> LiSi <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Magnesioarfvedsonite	23-495		9.799	17.833	5.273	893.36	mC80	(Na,K) <sub>3</sub> (Fe,Mg,Al) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (F,OH) <sub>2</sub>
Magnesioarfvedsonite	42-1369	i	9.906	17.953	5.287	911.12	mC84	Na <sub>3</sub> (Mg,Fe) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Magnesioriebeckite	20-656		9.801	17.988	5.235	891.55	mC82	(Na,Ca) <sub>2</sub> (Mg,Fe) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Magnesioriebeckite	29-1237	C	9.740	17.950	5.300	899.48	mC82	Na <sub>2</sub> Mg <sub>5</sub> Fe <sub>2</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Manganocummingtonite	23-603	i	9.799	17.994	5.289	905.30	mC82	(Na,Ca) <sub>2</sub> (Mg,Mn,Fe) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Riebeckite	19-1061	★	9.769	18.048	5.335	914.28	mC82	(Na,Ca) <sub>2</sub> (Fe,Mn) <sub>3</sub> Fe <sub>2</sub> (Si,Al) <sub>8</sub> O <sub>22</sub> (OH,F) <sub>2</sub>
Riebeckite	20-376	i	9.647	17.905	5.317	892.48	mC82	(Na,Ca) <sub>2</sub> (Fe,Mg,Al) <sub>5</sub> (Si,Al) <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ungarettiite	47-1867	i	9.890	18.040	5.290	913.34	mC80	Na <sub>3</sub> Mn <sub>5</sub> Si <sub>8</sub> O <sub>24</sub>
<b>2O group</b>								
Anthophyllite	42-544	i	18.679	18.004	5.282	1776.32	oP164	Mg <sub>5</sub> Fe <sup>+2</sup> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Anthophyllite	45-1343	i	18.524	17.975	5.280	1758.08	oP164	(Mg,Fe <sup>+2</sup> ) <sub>7</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Anthophyllite, syn	16-401	i	18.610	18.010	5.240	1756.27	oP164	Mg <sub>7</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Ferrogdrite	31-617	★	18.526	17.948	5.317	1767.93	oP164	Fe <sub>5</sub> Al <sub>2</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Gedrite	13-506	i	18.594	17.890	5.304	1764.36	oP164	(Fe,Mg,Al) <sub>7</sub> Al <sub>2</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Holmquistite	13-401	i	18.300	17.690	5.300	1715.75	oP164	Li <sub>2</sub> (Mg,Fe <sup>+2</sup> ) <sub>3</sub> Al <sub>2</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
<b>Analcime supergroup see Zeolite family</b>								
<b>Ancylite supergroup DD'(CO<sub>3</sub>)<sub>2</sub>(OH)•H<sub>2</sub>O</b>								
Ancylite-(Ce)	29-384	i	5.062	8.586	7.303	317.41	oP30	(Sr,Ca)(La,Ce)(CO <sub>3</sub> ) <sub>2</sub> (OH)•H <sub>2</sub> O
Ancylite-(La)	50-1687	i	5.072	8.589	7.276	316.97	oP30	Sr(La,Ce)(CO <sub>3</sub> ) <sub>2</sub> (OH)•H <sub>2</sub> O
Calcioancylite-(Nd)	42-1424		4.948	8.469	7.167	300.33	mP24.79	CaNd(CO <sub>3</sub> ) <sub>2</sub> (OH) <sub>3</sub> •H <sub>2</sub> O
Gysinite-(Nd)	45-1402	★	5.041	8.606	7.294	316.47	oP30	PbNd(CO <sub>3</sub> ) <sub>2</sub> (OH)•H <sub>2</sub> O

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Andalusite group GJ(TO<sub>4</sub>)X</b>								
<b>Arsenate subgroup</b>								
Adamite	39- 1354	★	8.309	8.527	6.058	429.18	oP36	Zn <sub>2</sub> (AsO <sub>4</sub> )(OH)
Adamite, Cu-rich	33- 512		8.500	8.500	5.970	431.33	oP36	(Zn,Cu) <sub>2</sub> (AsO <sub>4</sub> )(OH)
Eveite	22- 1166		8.570	8.770	6.270	471.25	oP36	Mn <sub>2</sub> * <sup>2</sup> (AsO <sub>4</sub> )(OH)
Olivenite	42- 1353	★	8.232	8.609	5.937	420.71	mP36	Cu <sub>2</sub> * <sup>2</sup> (AsO <sub>4</sub> )(OH)
<b>Phosphate subgroup</b>								
Libethenite	36- 404	★	8.063	8.398	5.887	398.67	oP36	Cu <sub>2</sub> * <sup>2</sup> (PO <sub>4</sub> )(OH)
<b>Silicate subgroup</b>								
Andalusite	39- 376	★	7.794	7.898	5.559	342.18	oP32	Al <sub>2</sub> (SiO <sub>4</sub> )O
Andalusite, Mn-rich	18- 36	i	7.898	7.967	5.601	352.43	oP32	(Al,Mn) <sub>2</sub> (SiO <sub>4</sub> )O
Kanonaite	42- 575	C	7.959	8.047	5.616	359.68	oP31.96	AlMn(SiO <sub>4</sub> )O
<b>Antlerite group (G/Q)<sub>3</sub>(TO<sub>4</sub>)(OH)<sub>4</sub></b>								
Antlerite, syn	7- 407	i	8.250	12.010	6.040	598.46	oP64	Cu <sub>3</sub> * <sup>2</sup> (SO <sub>4</sub> )(OH) <sub>4</sub>
Flinkite	12- 400		9.550	13.110	5.350	669.82	oP64	Mn <sub>3</sub> (AsO <sub>4</sub> )(OH) <sub>4</sub>
Szenicsite	50- 1622	i	8.499	12.526	6.067	645.88	oP64	Cu <sub>3</sub> MoO <sub>4</sub> (OH) <sub>4</sub>
<b>Apatite group (D/L)<sub>3</sub>(E/L')<sub>2</sub>(TO<sub>4</sub>)<sub>3</sub>X</b>								
<b>Arsenate subgroup</b>								
Ferromerite	14- 215		9.550	9.550	6.980	551.31	hP44	(Ca,Sr) <sub>5</sub> ((As,P)O <sub>4</sub> ) <sub>3</sub> (OH,F)
Finnemanite	14- 187		10.230	10.230	7.000	634.42	hP36	Pb <sub>5</sub> (As* <sup>3</sup> O <sub>3</sub> ) <sub>3</sub> Cl
Hedyphane	36- 396	i	10.140	10.140	7.185	639.78	hP42	Ca <sub>2</sub> Pb <sub>3</sub> (AsO <sub>4</sub> ) <sub>3</sub> Cl
Johnbaumite	33- 265		9.700	9.700	6.930	564.69	hP44	Ca <sub>5</sub> (AsO <sub>4</sub> ) <sub>3</sub> (OH)
Mimetite, P-rich	13- 124	O	10.165	10.165	7.354	658.07	hP42	Pb <sub>5</sub> ((As,P)O <sub>4</sub> ) <sub>3</sub> Cl
Mimetite, syn	19- 683	i	10.251	10.251	7.442	677.26	hP42	Pb <sub>5</sub> (AsO <sub>4</sub> ) <sub>3</sub> Cl
Morelandite	31- 132	i	10.169	10.169	7.315	655.09	hP42	Ba <sub>5</sub> (AsO <sub>4</sub> ) <sub>3</sub> Cl
Svabite	19- 215		9.800	9.800	6.970	579.72	hP44	Ca <sub>5</sub> (AsO <sub>4</sub> ) <sub>3</sub> (OH,Cl,F)
Turneureite	38- 383	i	9.810	9.810	6.868	572.40	hP42	Ca <sub>5</sub> (AsO <sub>4</sub> ) <sub>3</sub> Cl
<b>Phosphate subgroup</b>								
Alforsite, syn	35- 691		10.250	10.250	7.640	695.14	hP42	Ba <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> Cl
Belovite-(Ce)	31- 1350		9.680	9.680	7.200	584.27	hP44	Sr <sub>3</sub> (Ce,Na,Ca) <sub>2</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH)
Belovite-(La)	50- 1595	i	9.666	9.666	7.177	580.72	hP42	Sr <sub>3</sub> Na(La,Ce)(PO <sub>4</sub> ) <sub>3</sub> (F,OH)
Carbonatefluorapatite	31- 267		9.346	9.346	6.887	520.97	hP41.50	Ca <sub>10</sub> (PO <sub>4</sub> ) <sub>5</sub> CO <sub>3</sub> F <sub>1.5</sub> (OH) <sub>0.5</sub>
Carbonatehydroxylapatite, F-rich	21- 145	i	9.415	9.415	6.866	527.04	hP42	Ca <sub>10</sub> (PO <sub>4</sub> ) <sub>5</sub> CO <sub>3</sub> (OH)F
Carbonatehydroxylapatite, syn	19- 272		9.309	9.309	6.927	519.85	hP41	Ca <sub>10</sub> (PO <sub>4</sub> ) <sub>5</sub> (CO <sub>3</sub> ) <sub>3</sub> (OH) <sub>2</sub>
Chlorapatite, syn	33- 271	i	9.641	9.641	6.771	545.04	hP42	Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> Cl
Chlorellestadite	25- 167	i	9.510	9.510	6.897	540.20	hP42	Ca <sub>5</sub> (P,Si,S) <sub>3</sub> O <sub>12</sub> (Cl,OH,F)
Deloneite-(Ce)	50- 1599		9.510	9.510	7.010	549.05	hP42	NaCa <sub>2</sub> SrCe(PO <sub>4</sub> ) <sub>3</sub> F
Fluorapatite, syn	15- 876	★	9.368	9.368	6.884	523.25	hP42	Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> F
Fluorocaphite	50- 1603	i	9.490	9.490	6.991	545.26	hP42	Ca(Sr,Na,Ca)(Ca,Sr,Ce) <sub>3</sub> (PO <sub>4</sub> ) <sub>3</sub> F
Hydroxylapatite, Cl-rich	25- 166	i	9.490	9.490	6.851	534.34	hP44	Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH,Cl,F)
Hydroxylapatite, Pb-rich	47- 1758	O	9.466	9.466	6.875	533.74	hP49.62	(Ca,Pb) <sub>10</sub> (PO <sub>4</sub> ,CO <sub>3</sub> ) <sub>6</sub> (OH,F,Cl) <sub>2.56</sub> *1.5H <sub>2</sub> O
Hydroxylapatite, syn	9- 432	i	9.418	9.418	6.884	528.80	hP44	Ca <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH)
Pyromorphite, syn	19- 701	i	9.987	9.987	7.330	633.15	hP42	Pb <sub>3</sub> (PO <sub>4</sub> ) <sub>3</sub> Cl
Strontiumapatite, syn	33- 1348	★	9.766	9.766	7.276	600.98	hP44	Sr <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH)
<b>Silicate subgroup</b>								
Britholite-(Ce)	46- 1294		9.597	9.597	7.040	561.53	hP42	Ca <sub>4</sub> (Ce,La,Nd,Ca,Th) <sub>6</sub> (Si,P) <sub>6</sub> O <sub>26</sub>
Britholite-(Ce)	48- 1859	i	9.524	9.524	6.961	546.82	hP44	(Ca,Ln,Na,H <sub>3</sub> O) <sub>5</sub> (Si,P,Al) <sub>3</sub> O <sub>12</sub> (OH,F)
Britholite-(Ce), heated	17- 724		9.480	9.480	6.960	541.70	hP38	Ca <sub>3</sub> Ce <sub>2</sub> (Si,P)O <sub>4</sub> <sub>3</sub> F
Britholite-(Y)	31- 315		9.430	9.430	6.810	524.45	hP44	Ca <sub>2</sub> Y <sub>2</sub> Si <sub>3</sub> O <sub>12</sub> (OH)
Fluorellestadite	3- 708		9.561	9.561	6.920	547.83	hP42	Ca <sub>5</sub> (Si,P,S)O <sub>4</sub> <sub>3</sub> (F,OH,Cl)
Fluorellestadite, syn	45- 9	★	9.442	9.442	6.939	535.73	hP42	Ca <sub>10</sub> (SiO <sub>4</sub> ) <sub>3</sub> (SO <sub>4</sub> ) <sub>3</sub> F <sub>2</sub>
Hydroxyllestadite	25- 173	i	9.491	9.491	6.921	539.91	hP44	Ca <sub>10</sub> (SiO <sub>4</sub> ) <sub>3</sub> (SO <sub>4</sub> ) <sub>3</sub> (OH,F,Cl) <sub>2</sub>
Mattheddleite	41- 610	i	9.948	9.948	7.504	643.12	hP39.50	Pb <sub>10</sub> (SiO <sub>4</sub> ) <sub>3.5</sub> (SO <sub>4</sub> ) <sub>2</sub> Cl <sub>2</sub>
Tritomite-(Ce), heated	14- 174		9.350	9.350	6.880	520.89	hP42	(La,Nd)(Ce,Pr,Th) <sub>2</sub> Ca <sub>2</sub> (Si <sub>2</sub> B)O <sub>13</sub>
Tritomite-(Y), heated	14- 138		9.320	9.320	6.840	514.54	hP42	Y <sub>3</sub> (Ce,Pr,Th)Ca(Si <sub>2</sub> B)O <sub>13</sub>
Tritomite-(Y), heated	27- 1063		9.410	9.410	6.920	530.66	hP64	(Ca,Ln) <sub>4</sub> (AlSi <sub>3</sub> B <sub>2</sub> O <sub>16</sub> *2H <sub>2</sub> O
<b>Sulfate subgroup</b>								
Cesantite	35- 506	i	9.442	9.442	6.903	532.96	hP44	Ca <sub>2</sub> Na <sub>3</sub> (SO <sub>4</sub> ) <sub>3</sub> (OH)
Chlorellestadite, syn	41- 479	★	9.668	9.668	6.853	554.73	hP42	Ca <sub>10</sub> (SiO <sub>4</sub> ) <sub>3</sub> (SO <sub>4</sub> ) <sub>3</sub> Cl <sub>2</sub>
<b>Vanadate subgroup</b>								
Vanadinite	43- 1461	★	10.325	10.325	7.343	677.97	hP42	Pb <sub>5</sub> (VO <sub>4</sub> ) <sub>3</sub> Cl
<b>Related structures</b>								
Caracolite	25- 706		19.620	7.140	9.810	1190.14	mP84	Na <sub>3</sub> Pb <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> Cl
Clinomimetite	47- 1808	i	10.189	20.372	7.460	1342.64	mP84	Pb <sub>5</sub> (AsO <sub>4</sub> ) <sub>3</sub> Cl
Ganomalite	25- 150	i	9.821	9.821	10.133	846.41	hP57	Pb <sub>9</sub> Ca <sub>5</sub> Mn* <sup>2</sup> Si <sub>9</sub> O <sub>33</sub>
Ganomalite, Ca-rich, syn	45- 1361	★	9.875	9.875	10.176	859.37	hP57	Pb <sub>9</sub> Ca <sub>6</sub> ((Si <sub>2</sub> O <sub>7</sub> ) <sub>3</sub> (SiO <sub>4</sub> ) <sub>3</sub> )
Nasonite	14- 328		9.940	9.940	13.080	1119.21	hP78	Ca <sub>4</sub> Pb <sub>6</sub> Cl <sub>2</sub> Si <sub>6</sub> O <sub>21</sub>
Samuelsonite	29- 154		18.495	6.805	14.000	1624.94	mC138	(Ca,Ba) <sub>3</sub> Fe <sub>2</sub> Mn <sub>2</sub> Al <sub>2</sub> (PO <sub>4</sub> ) <sub>10</sub> (OH) <sub>2</sub>
Vitusite-(Ce)	33- 1232	i	5.342	18.680	14.062	1403.23	oP112	Na <sub>3</sub> (Ce,La,Nd)(PO <sub>4</sub> ) <sub>2</sub>
<b>Apophyllite supergroup DCa<sub>4</sub>[Si<sub>8</sub>O<sub>20</sub>]X•8H<sub>2</sub>O</b>								
Fluorapophyllite	19- 82	i	8.960	8.960	15.767	1265.80	tP116	KCa <sub>4</sub> Si <sub>8</sub> O <sub>20</sub> F•8H <sub>2</sub> O
Hydroxapophyllite	29- 994	i	8.978	8.978	15.830	1275.97	tP118	KCa <sub>4</sub> Si <sub>8</sub> O <sub>20</sub> (OH)•8H <sub>2</sub> O
Natroapophyllite	41- 1371	★	8.954	8.954	15.799	1266.67	oP116	NaCa <sub>4</sub> Si <sub>8</sub> O <sub>20</sub> F•8H <sub>2</sub> O
<b>Aragonite group (D/L)(RO)<sub>3</sub></b>								
<b>Carbonate subgroup</b>								
Aragonite	41- 1475	★	4.962	7.968	5.744	227.11	oP20	CaCO <sub>3</sub>
Carbocernaite	25- 175	O	6.410	7.279	5.198	242.53	oP20	(Ca,Sr,Ce)(CO <sub>3</sub> )
Cerussite, syn	47- 1734	★	5.178	8.515	6.146	270.98	oP20	PbCO <sub>3</sub>
Strontianite, Ca-rich	44- 1421	i	5.054	8.209	5.916	245.44	oP20	(Sr,Ca)CO <sub>3</sub>
Strontianite, syn	5- 418	★	5.107	8.414	6.029	259.07	oP20	SrCO <sub>3</sub>
Witherite, syn	5- 378	i	5.314	8.904	6.430	304.24	oP20	BaCO <sub>3</sub>
Witherite, syn	45- 1471	★	6.433	5.315	8.904	304.42	oP20	BaCO <sub>3</sub>
<b>Nitrate subgroup</b>								
Gwhibaite	50- 1566	i	7.075	7.647	5.779	312.66	oP36	(NH <sub>4</sub> ,K)NO <sub>3</sub>
Niter, syn	5- 377	i	5.414	9.164	6.431	319.07	oP20	KNO <sub>3</sub>

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Related structures</b>								
Alstonite	27- 32	i	17.382	17.403	6.123	1602.70	aP120	BaCa(CO <sub>3</sub> ) <sub>2</sub>
Barytocalcite	15- 285	i	8.134	5.229	6.547	267.67	mP20	BaCa(CO <sub>3</sub> ) <sub>2</sub>
Olekminksite	44- 1422		8.668	8.668	6.080	395.61	hP30	Sr(Ca,Sr,Ba)(CO <sub>3</sub> ) <sub>2</sub>
Paralstonite	33- 178	i	8.692	8.692	6.148	402.26	hP30	(Ba,Sr)Ca(CO <sub>3</sub> ) <sub>2</sub>
<b>Arcanite group EE'(TO<sub>4</sub>)</b>								
<b>Chromate subgroup</b>								
Tarapacaite, syn	15- 365	i	7.663	10.391	5.919	471.31	oP28	K <sub>2</sub> CrO <sub>4</sub>
<b>Sulfate subgroup</b>								
Arcanite, NH <sub>4</sub> -rich, syn	42- 589	i	7.645	10.170	5.850	454.84	oP39.60	(K,NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>
Arcanite, syn	5- 613	i	5.772	10.072	7.483	435.03	oP28	K <sub>2</sub> SO <sub>4</sub>
Mascagnite, syn	40- 660	i	7.782	10.639	5.993	496.18	oP60	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>
<b>Arsenosiderite group DE<sub>2</sub>G<sub>4</sub>(TO<sub>4</sub>)<sub>4</sub>(OH)<sub>6</sub>•2&lt;=&gt;10H<sub>2</sub>O</b>								
Arsenosiderite	26- 1002		17.760	19.530	11.300	3897.97	mC384	Ca <sub>3</sub> Fe <sup>+3</sup> (AsO <sub>4</sub> ) <sub>4</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
Kolfanite	35- 662	i	17.860	19.660	11.110	3879.66	mC336	Ca <sub>2</sub> Fe <sup>+3</sup> O <sub>2</sub> (AsO <sub>4</sub> ) <sub>3</sub> •2H <sub>2</sub> O
Melkovite	23- 384		17.460	18.480	10.930	3515.81	mC306	CaFe <sup>+3</sup> H <sub>6</sub> (MoO <sub>4</sub> ) <sub>4</sub> (PO <sub>4</sub> )•6H <sub>2</sub> O
Mitridatite	26- 1057		17.520	19.350	11.250	3793.55	mC384	Ca <sub>3</sub> Fe <sub>4</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
Robertsite	26- 1067		17.360	19.530	11.300	3810.17	mC384	Ca <sub>3</sub> Mn <sub>4</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
<b>Related structures</b>								
Betpakdalite	25- 148		11.220	19.250	17.730	3825.77	mC380	CaFe <sup>+3</sup> H <sub>8</sub> (Mo <sup>+6</sup> O <sub>4</sub> ) <sub>5</sub> (As <sup>+6</sup> O <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Betpakdalite	37- 434		19.440	11.096	15.250	2472.06	mC232	KCa <sub>2</sub> Fe <sup>+3</sup> As <sub>2</sub> <sup>+6</sup> Mo <sub>8</sub> <sup>+6</sup> O <sub>36</sub> (OH) <sub>2</sub> •20H <sub>2</sub> O
<b>Arthurite group (E/Q)Fe<sub>2</sub>(TO<sub>4</sub>)<sub>2</sub>(OH)<sub>2</sub>•4H<sub>2</sub>O</b>								
<b>Arsenate subgroup</b>								
Arthurite	36- 400	★	10.160	9.619	5.578	544.74	mP58	Cu <sup>+2</sup> Fe <sub>2</sub> <sup>+3</sup> (AsO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Ojuelaite	35- 516	i	10.247	9.665	5.569	549.93	mP58	ZnFe <sub>2</sub> <sup>+3</sup> (AsO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
<b>Phosphate subgroup</b>								
Earlshannonite	38- 364	i	9.910	9.669	5.455	521.46	mP62.54	MnFe <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Whitmoreite	26- 1138	i	10.000	9.730	5.471	531.16	mP58	FeFe <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
<b>Related structures</b>								
Bermanite	20- 712		5.425	19.210	5.425	529.90	mP58	Mn <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
<b>Astrophyllite supergroup DD'<sub>2</sub>G<sub>7</sub>G'<sub>2</sub>[T<sub>8</sub>O<sub>24</sub>]X<sub>6,7</sub></b>								
Astrophyllite	41- 1490	i	5.391	11.904	21.277	1324.74	aP110	K <sub>3</sub> Fe <sup>+2</sup> Ti <sub>2</sub> Si <sub>8</sub> O <sub>27</sub> (OH) <sub>4</sub>
Cesiumkupletskite	25- 221	O	11.740	12.009	5.410	656.19	aP51	Cs <sub>3</sub> (Mn,Fe <sup>+2</sup> ) <sub>7</sub> (Ti,Nb) <sub>2</sub> Si <sub>8</sub> O <sub>24</sub> (O,OH,F) <sub>7</sub>
Hydroastrophyllite	29- 991	i	11.860	11.980	5.420	679.94	aP64	(Ca,K)(H <sub>3</sub> O) <sub>2</sub> (Fe,Mn,Al) <sub>7</sub> Ti <sub>2</sub> (SiO <sub>4</sub> ) <sub>5</sub> (OH) <sub>10</sub> F
Kupletskite	50- 1713		5.376	11.917	11.725	661.44	aP51	(K,Na) <sub>3</sub> (Mn,Zn) <sub>7</sub> (Ti,Nb) <sub>2</sub> Si <sub>8</sub> O <sub>24</sub> (O,OH) <sub>7</sub>
Magnesiumastrophyllite	29- 1042		10.560	23.000	5.350	1271.01	mC118	Na <sub>2</sub> K <sub>2</sub> (Fe,Mn) <sub>5</sub> Mg <sub>2</sub> Ti <sub>2</sub> Si <sub>8</sub> O <sub>24</sub> (OH, O) <sub>7</sub>
Niobophyllite	17- 742	i	5.391	11.880	11.660	657.23	aP50	(K,Na) <sub>3</sub> (Fe,Mn) <sub>6</sub> (Nb,Ti) <sub>2</sub> (Si,Al) <sub>8</sub> (O,OH,F) <sub>31</sub>
Zircophyllite	25- 856							(K,Na,Ca) <sub>3</sub> (Mn,Fe) <sub>7</sub> (Zr,Nb) <sub>2</sub> Si <sub>8</sub> O <sub>27</sub> (OH,F) <sub>4</sub>
<b>Atacamite group (E/Q)<sub>2</sub>(OH)<sub>3</sub>Cl</b>								
Atacamite	25- 269	i	6.030	9.122	6.868	377.78	oP36	Cu <sub>2</sub> <sup>+2</sup> Cl(OH) <sub>3</sub>
Hibbingite	46- 1452		6.310	9.200	7.100	412.17	oP36	Fe <sub>2</sub> <sup>+2</sup> Cl(OH) <sub>3</sub>
Kempite	25- 1158	i	6.490	9.520	7.120	439.91	oP36	Mn <sub>2</sub> <sup>+2</sup> (OH) <sub>3</sub> Cl
<b>Related structures</b>								
Botallackite	8- 88		5.715	6.124	5.632	196.89	mP18	Cu <sub>2</sub> <sup>+2</sup> Cl(OH) <sub>3</sub>
Clinoatacamite	50- 1559	i	6.157	6.814	9.104	376.54	mP36	Cu <sub>2</sub> Cl(OH) <sub>3</sub>
Paratacamite, Ni-rich	50- 1560	i	6.839	6.839	13.911	563.47	hR18	(Cu,Ni) <sub>2</sub> Cl(OH) <sub>3</sub>
Paratacamite, Zn-rich	50- 1558	i	6.832	6.832	14.042	567.62	hR18	(Cu,Zn) <sub>2</sub> Cl(OH) <sub>3</sub>
<b>Atelestite supergroup L<sub>2</sub>O(OH)(TO<sub>4</sub>)</b>								
Atelestite	15- 735		10.880	7.420	6.980	538.29	mP30	Bi <sub>8</sub> (As <sub>3</sub> O <sub>4</sub> ) <sub>5</sub> (OH) <sub>5</sub>
Hechtsbergite	50- 1623	i	6.971	7.535	10.881	546.57	mP40	Bi <sub>2</sub> O(OH)(VO <sub>4</sub> )
Smrkovecrite	49- 1822	i	6.954	7.494	10.869	541.67	mP40	Bi <sub>2</sub> (PO <sub>4</sub> )O(OH)
<b>Aubertite group (E/Q)E'(SO<sub>4</sub>)<sub>2</sub>X•14H<sub>2</sub>O</b>								
Aubertite	33- 447	i	6.288	13.239	6.284	516.74	aP55	Cu <sup>+2</sup> Al(SO <sub>4</sub> ) <sub>2</sub> Cl•14H <sub>2</sub> O
Magnesaubertite	45- 1403	i	6.310	13.200	6.290	517.82	aP52.03	(Mg,Cu <sup>+2</sup> )Al(SO <sub>4</sub> ) <sub>2</sub> Cl•14H <sub>2</sub> O
Svyazhinite	37- 443		6.217	13.306	6.255	511.34	aP55	(Mg,Mn)(Al,Fe)(SO <sub>4</sub> ) <sub>2</sub> F•14H <sub>2</sub> O
<b>Autunite supergroup (E/G/Q)<sub>2</sub>v[(UO<sub>2</sub>)<sub>2</sub>(TO<sub>4</sub>)<sub>2</sub>]•mH<sub>2</sub>O; m≈10,v=1,2</b>								
<b>Q1a2c-arsenate group</b>								
Heinrichite, syn	50- 1562	★	6.999	6.999	20.685	1013.28	tI94	Ba(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Uranospinite, syn	29- 390		7.170	7.170	20.610	1059.54	tP94	Ca(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Zeunerite	17- 150		7.180	7.180	20.790	1071.77	tP106	Cu(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •12H <sub>2</sub> O
Zeunerite, syn	4- 90		7.180	7.180	21.000	1082.60	tI130	Cu(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •16H <sub>2</sub> O
<b>Q1a2c-phosphate group</b>								
Autunite	41- 1353	★	7.009	7.009	20.736	1018.59	tI94	Ca(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Saleeite	8- 313	O	7.010	7.010	19.840	974.94	tP94	Mg(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Saleeite, Fe-rich	50- 1585		6.982	6.982	19.660	958.39	tP58	(Mg,Fe)(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •4H <sub>2</sub> O
Saleeite, syn	29- 874		7.047	7.047	19.652	975.92	tP88	Mg(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •9H <sub>2</sub> O
Torbernite, syn	8- 360	O	7.060	7.060	20.540	1023.79	tI100	Cu(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •11H <sub>2</sub> O
Uranocircite-20A	18- 199	O	7.010	7.010	20.460	1005.41	tI94	Ba(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Uranocircite-20A, syn	50- 1561	i	7.002	7.002	20.580	1009.00	t?94	Ba(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
<b>Q1a3c-arsenate group</b>								
Arsenuranspathite	31- 586		7.160	7.160	30.370	1556.94	tP154	HAL(UO <sub>2</sub> ) <sub>4</sub> (AsO <sub>4</sub> ) <sub>4</sub> •40H <sub>2</sub> O
<b>Q1a3c-phosphate group</b>								
Uranospathite	31- 587		7.000	7.000	30.020	1470.98	tP154	HAL(UO <sub>2</sub> ) <sub>4</sub> (PO <sub>4</sub> ) <sub>4</sub> •40H <sub>2</sub> O
<b>Q2a2c-arsenate group</b>								
Kahlerite, syn	17- 145		14.300	14.300	21.970	4492.65	tP424	Fe(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •12H <sub>2</sub> O
Novacekite-20A	8- 286		7.160	7.160	20.190	1035.05	tP94	Mg(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Novacekite-20A, syn	17- 148		7.100	7.100	20.010	1008.70	tP94	Mg(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Novacekite-22A, syn	17- 147		14.300	14.300	22.000	4498.78	tP424	Mg(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •12H <sub>2</sub> O
<b>Related structures</b>								
Sabugalite	39- 313	i	19.426	9.843	9.850	1872.54	mC164	Al(UO <sub>2</sub> ) <sub>4</sub> (PO <sub>4</sub> ) <sub>3</sub> (PO <sub>3</sub> OH)•16H <sub>2</sub> O
Threadgoldite	33- 39		20.250	9.850	19.750	3667.79	mC344	Al(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH)•8H <sub>2</sub> O

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Axinite group</b> $E_2GaAl_2[B(Si_4O_{14})O](OH)$								
Ferroaxinite	27- 76		8.957	9.218	7.163	571.29	aP54	$Ca_2(Fe,Mn)Al_2B(Si_2O_7)_2O(OH)$
Magnesoaxinite	29- 344	i	8.933	9.155	7.121	562.44	aP54	$Ca_2MgAl_2B(Si_2O_7)_2O(OH)$
Manganaxinite	27- 84	i	8.978	9.190	7.161	570.40	aP54	$Ca_2(Mn,Fe)Al_2B(Si_2O_7)_2O(OH)$
Tinzenite	6- 444		8.970	9.200	7.162	570.82	aP54	$(Ca,Mn,Fe)_3Al_2B(Si_2O_7)_2O(OH)$
<b>Barite group</b> $(D/L/Q)(TX_4)$								
Anglesite, syn	36- 1461	★	6.957	8.476	5.398	318.35	oP24	$PbSO_4$
Avogadrite, syn	16- 378		8.664	5.480	7.028	333.68	oP24	$KBF_4$
Barberite	47- 1762	★	9.061	5.673	7.267	373.56	oP40	$NH_4BF_4$
Barite, Pb-rich	46- 1415	★	8.795	5.451	7.117	341.20	oP24	$(Ba,Pb)SO_4$
Barite, Sr-rich, syn	39- 1469	i	7.079	8.733	5.442	336.43	oP24	$Ba_{0.75}Sr_{0.25}SO_4$
Barite, syn	24- 1035	★	7.156	8.881	5.454	346.65	oP24	$BaSO_4$
Celestine, Ba-rich, syn	39- 1467	★	6.936	8.477	5.395	317.18	oP24	$Ba_{0.25}Sr_{0.75}SO_4$
Celestine, Ba-rich, syn	39- 1468	★	7.006	8.604	5.421	326.80	oP24	$Ba_{0.50}Sr_{0.50}SO_4$
Celestine, syn	5- 593	★	8.359	5.352	6.866	307.17	oP24	$SrSO_4$
Chalcocyanite, syn	15- 775	O	6.698	8.396	4.829	271.57	oP24	$Cu_2SO_4$
Hashemite	35- 642	★	9.112	5.541	7.343	370.75	oP24	$BaCrO_4$
Itoite	12- 641	O	8.470	5.380	6.940	316.25	oP24	$Pb(S,Ge)(O,OH)_4$
Kerstenite, syn	15- 682		8.480	5.500	7.040	328.35	oP24	$PbSeO_4$
Unnamed mineral, syn	21- 909		4.851	8.998	6.475	282.63	oP24	$FeAsO_4$
Zinkosite, syn	8- 491	i	8.588	6.740	4.770	276.10	oP24	$ZnSO_4$
<b>Related structures</b>								
Olsacherite	22- 1135	i	8.420	10.960	7.000	645.98	oP48	$Pb_2(SO_4)(SeO_4)$
<b>Bastnäsite supergroup</b> $DD'(CO_3)_2X_{1,2} \cdot mH_2O$ ; $m \neq 0$								
<b>1H group</b>								
Bastnäsite-(Ce)	11- 340	i	7.129	7.129	9.774	430.19	hP36	$CeCO_3F$
Bastnäsite-(La)	41- 595	O	7.117	7.117	9.669	424.11	hP36	$La(CO_3)F$
Bastnäsite-(Y)	25- 1009	O	6.570	6.570	9.480	354.38	hP36	$YCO_3F$
Hydroxylbastnäsite-(Ce), syn	32- 189	★	7.238	7.238	9.960	451.89	hP42	$CeCO_3OH$
Hydroxylbastnäsite-(Nd)	38- 400	i	7.191	7.191	9.921	444.29	hP42	$NdCO_3(OH)$
Hydroxylbastnäsite-(Nd)	42- 1362		7.020	7.020	9.540	407.15	hP42	$Nd(CO_3)(OH)$
Thorbastnäsite	18- 1362		6.990	6.990	9.710	410.87	hP63	$Th(Ca,Ce)(CO_3)_2F_2 \cdot 3H_2O$
<b>6H group</b>								
Synchysite-(Ce)	18- 284	i	7.100	7.100	54.720	2388.88	hP198	$CaCe(CO_3)_2F$
Synchysite-(Ce)	44- 1438	i	7.126	7.126	55.080	2422.23	hP198	$CaCe(CO_3)_2F$
Synchysite-(Nd)	35- 589	i	6.984	6.984	54.270	2292.45	hP198	$CaNd(CO_3)_2F$
Synchysite-(Y)	29- 393	i	7.060	7.060	54.720	2362.03	hP198	$CaY(CO_3)_2F$
Synchysite-(Y)	44- 1431	i	12.051	6.957	18.418	1507.08	mC132	$CaY(CO_3)_2F$
<b>Related structures</b>								
Cordylite-(Ce)	27- 34	i	5.098	5.098	23.050	518.80	hP34	$BaCe_2(CO_3)_3F_2$
Huanghoite-(Ce)	15- 286		5.100	5.100	19.600	441.50	hP33	$BaCe(CO_3)_3F$
Parisite-(Ce)	42- 1332	i	7.143	7.143	28.110	1242.09	hP102	$CaCe_2F_2(CO_3)_3$
Parisite-(Ce)	47- 1832	i	7.110	7.110	83.834	3670.41	hR102	$Ca(Ce,La)_2F_2(CO_3)_3$
<b>Becquerelite supergroup</b> $D_{2v}[(UO_2)_6O_4(OH)_6] \cdot 8H_2O$ ; $v=1,2$								
Agrinerite	25- 630	i	14.040	24.070	14.130	4775.13	oP432	$(K_2,Ca,Sr)(UO_2)_3O_4 \cdot 4H_2O$
Becquerelite, syn	29- 389	i	13.820	12.390	14.940	2558.17	oP236	$Ca(UO_2)_6O_4(OH)_6 \cdot 8H_2O$
Billietite, syn	29- 208	i	14.220	12.030	15.020	2569.42	oP236	$Ba(UO_2)_6O_4(OH)_6 \cdot 8H_2O$
Clarkeite	50- 1586	★	3.954	3.954	17.660	239.11	hR10	$Na[(UO_2)O](OH) \cdot (H_2O)$
Compreignacite	17- 167	i	7.160	12.140	14.880	1293.41	oP120	$K_2(UO_2)_6O_4(OH)_6 \cdot 8H_2O$
Compreignacite, syn	33- 1049	i	7.162	12.190	14.847	1296.21	oP120	$K_2(UO_2)_6O_4(OH)_6 \cdot 8H_2O$
Masuyite	50- 1569	O						$Pb_3U_3O_{31} \cdot 10H_2O$
Richetite	38- 370		20.810	12.060	16.300	3570.24	aP270	$PbU_4O_{13} \cdot 4H_2O$
Unnamed mineral	13- 150	i	14.060	24.120	14.160	4802.04	oP496	$(Ca,Sr)_2U_7O_{23} \cdot 10H_2O$
Wölsendorffite, syn	29- 786	i	13.960	11.920	6.900	1148.18	oP96	$PbU_2O_7 \cdot 2H_2O$
<b>Benitoite group</b> $D_{2v}G[Si_3O_9]$								
Bazirite, syn	29- 214	i	6.755	6.755	9.980	394.38	hP28	$BaZrSi_3O_9$
Benitoite	38- 464	★	6.641	6.641	9.758	372.68	hP28	$BaTiSi_3O_9$
Pabstite, syn	18- 196		6.724	6.724	9.854	385.83	hP28	$BaSnSi_3O_9$
Pabstite, syn	43- 633	★	6.733	6.733	9.851	386.75	hP28	$BaSnSi_3O_9$
Wadeite, syn	35- 31	i	6.931	6.931	10.210	424.76	hP30	$K_2ZrSi_3O_9$
Wadeite, syn	43- 231	★	6.931	6.931	10.197	424.21	hP30	$K_2ZrSi_3O_9$
<b>Berthierite group</b> $(E/L)L'L'S_4$								
Berthierite, syn	24- 509	i	11.383	14.127	3.755	603.83	oP28	$FeSb_2S_4$
Clerite	50- 1597		11.470	14.360	3.810	627.54	oP28	$Mn(Sb,As)_2S_4$
Galenobismutite, syn	20- 571	i	11.840	14.553	4.081	703.10	oP28	$PbBi_2S_4$
Garavellite	33- 641	O	11.439	14.093	3.754	605.18	oP28	$FeSbBiS_4$
<b>Beryl supergroup</b> $G_2[T_{3+n}T'_{6-n}O_{18}]$ ; $n=0,1$								
<b>1H group</b>								
Bazzite, syn	20- 165		9.552	9.552	9.165	724.19	hP58	$Be_2Sc_2Si_6O_{18}$
Beryl	9- 430	i	9.215	9.215	9.192	675.98	hP58	$Be_3Al_2Si_6O_{18}$
Beryl, Fe-rich	47- 1826	i	9.284	9.284	9.179	685.17	hP58	$Be_3(Al,Fe)_2Si_6O_{18}$
Indialite, syn	48- 1600	i	9.772	9.772	9.371	774.97	hP58	$Mg_2Al_4Si_5O_{18}$
<b>20 group</b>								
Cordierite	12- 303	i	9.739	17.080	9.345	1554.47	oC116	$Mg_2Al_4Si_5O_{18}$
Cordierite, Fe-rich	9- 472	i	17.030	9.670	9.350	1539.76	oC116	$(Mg,Fe)_2Al_4Si_5O_{18}$
Cordierite, syn	13- 294	i	9.721	17.062	9.339	1548.96	oC116	$Mg_2Al_4Si_5O_{18}$
Sekaniinite	31- 616	i	17.186	9.827	9.298	1570.31	oC116	$Fe_2Al_4Si_5O_{18}$
Sekaniinite, syn	31- 615	i	17.234	9.824	9.298	1574.21	oC116	$Fe_2Al_4Si_5O_{18}$
<b>Bjarebyite group</b> $BaG_2G'_2(PO_4)_3(OH)_3$								
Bjarebyite	29- 171	i	9.103	12.204	4.959	541.74	mP52	$BaMn_2^{2+}Al_2(PO_4)_3(OH)_3$
Kulanite	29- 170	i	9.032	12.119	4.936	531.45	aP52	$Ba(Fe^{2+},Mn,Mg)_2Al_2(PO_4)_3(OH)_3$
Penikisite	29- 169	i	8.999	12.069	4.921	525.48	aP52	$Ba(Mg,Fe^{2+})_2Al_2(PO_4)_3(OH)_3$
Perloffite	29- 184	i	9.223	12.422	4.995	562.88	mP52	$BaMn_2Fe_2(PO_4)_3(OH)_3$

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Blödite group</b> $\text{Na}_2\text{G}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$								
Blödite	19-1215	i	11.128	8.246	5.543	499.62	mP50	$\text{Na}_2\text{Mg}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$
Changoite, syn	19-1263	★	11.080	8.256	5.534	498.23	mP50	$\text{Na}_2\text{Zn}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$
Nickelblödite	29-1253	i	10.870	8.070	5.460	470.60	mP50	$\text{Na}_2\text{Ni}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$
Nickelblödite, Mg-rich	29-1238	i	11.090	8.216	5.537	495.82	mP50	$\text{Na}_2(\text{Ni,Mg})(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$
Nickelblödite, syn	19-1220	★	11.045	8.193	5.535	492.48	mP50	$\text{Na}_2\text{Ni}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$
<b>Boracite supergroup</b> $\text{G}_3[\text{B}_7\text{O}_{13}]\text{Cl}$								
<b>1R group</b>								
Congolite	25-2	i	8.623	8.623	21.054	1355.60	hR48	$\text{Fe}_3\text{B}_7\text{O}_{13}\text{Cl}$
Trembathite	47-1829	i	8.574	8.574	20.990	1336.32	hR48	$(\text{Mg,Fe})_3\text{B}_7\text{O}_{13}\text{Cl}$
<b>2O group</b>								
Boracite	5-710		8.540	8.540	12.100	882.47	oP96	$\text{Mg}_3\text{B}_7\text{O}_{13}\text{Cl}$
Boracite	49-1806	i	8.557	8.553	12.090	884.84	oP96	$\text{Mg}_3\text{B}_7\text{O}_{13}\text{Cl}$
Chambersite	14-638	i	8.680	8.680	12.260	923.70	oP96	$\text{Mn}_3\text{B}_7\text{O}_{13}\text{Cl}$
Ericaite	29-697	i	8.580	8.650	12.170	903.22	oP96	$\text{Fe}_3\text{B}_7\text{O}_{13}\text{Cl}$
<b>Bournonite group</b> $\text{CuPbLX}_3$								
Bournonite	12-94	i	8.168	8.712	7.811	555.83	oP24	$\text{CuPbSbS}_3$
Seligmannite	11-92		8.134	8.710	7.634	540.85	oP24	$\text{CuPbAsS}_3$
Seligmannite, syn	25-292	i	8.054	8.714	7.614	534.37	oP24	$\text{CuPbAsS}_3$
Soucekite	33-197	i	8.153	8.498	8.080	559.82	oP23.84	$\text{CuPbBi(S,Se)}_3$
<b>Brackebuschite group</b> $(\text{D/L})_2\text{G}(\text{TO}_4)(\text{T}'\text{O}_4)(\text{OH})$								
Arsenbrackebuschite	29-1428	i	7.764	6.045	9.022	391.20	mP32	$\text{Pb}_2(\text{Fe}^{+2},\text{Zn})(\text{AsO}_4)(\text{AsO}_3\text{OH})(\text{OH})$
Arsentsumebite	25-456		8.850	5.920	7.840	379.21	mP30	$\text{Pb}_2\text{Cu}(\text{SO}_4)(\text{AsO}_4)(\text{OH})$
Bearthite	45-1483		7.231	5.734	8.263	316.37	mP30	$\text{Ca}_2\text{Al}(\text{PO}_4)_2(\text{OH})$
Brackebuschite	6-284		8.880	6.155	7.681	391.93	mP32	$\text{Pb}_2(\text{Mn}^{+2},\text{Fe}^{+2})(\text{VO}_4)(\text{VO}_3\text{OH})(\text{OH})$
Feinglosite	50-1570		8.973	5.995	7.776	387.29	mP32	$\text{Pb}_2(\text{Zn,Fe})(\text{As,S})\text{O}_4)_2 \cdot \text{H}_2\text{O}$
Gamagarite	41-1413	i	9.121	6.142	7.838	404.55	mP30	$\text{Ba}_2\text{Fe}(\text{VO}_4)_2(\text{OH})$
Goedkenite	29-383		8.450	5.740	7.260	322.41	mP30	$(\text{Sr,Ca})_2\text{Al}(\text{PO}_4)_2(\text{OH})$
Tsumebite	29-568	i	8.690	5.780	7.860	366.38	mP30	$\text{CuPb}_2(\text{PO}_4)(\text{SO}_4)(\text{OH})$
<b>Bradleyite group</b> $\text{Na}_3\text{G}(\text{PO}_4)(\text{CO}_3)$								
Bonshtedtite	35-678	i	8.921	6.631	5.151	304.70	mP26	$\text{Na}_3\text{Fe}^{+3}(\text{PO}_4)(\text{CO}_3)$
Bradleyite	22-478	i	8.850	6.630	5.160	302.76	mP26	$\text{Na}_3\text{Mg}(\text{PO}_4)(\text{CO}_3)$
Crawfordite	47-1853		9.187	6.707	5.279	325.28	mP26	$\text{Na}_3\text{Sr}(\text{PO}_4)(\text{CO}_3)$
Sidorenkite	33-1266	i	8.979	6.729	5.150	311.16	mP26	$\text{Na}_3\text{Mn}(\text{PO}_4)(\text{CO}_3)$
<b>Braunite supergroup</b> $\text{DMn}_{6,14}\text{SiO}_{12,24}$								
<b>1Q group</b>								
Abswurbachite, syn	41-576	★	9.406	9.406	18.546	1640.82	tI160	$\text{Cu}^{+2}\text{Mn}_6^{+3}\text{SiO}_{12}$
Braunite-1Q	41-1367	★	9.421	9.421	18.685	1658.29	tI160	$\text{Mn}^{+2}\text{Mn}_6^{+3}\text{SiO}_{12}$
Neltnerite	35-666		9.464	9.464	18.854	1688.70	tI160	$\text{CaMn}_6^{+3}\text{SiO}_{12}$
<b>2Q group</b>								
Braunite-2Q	41-1368	★	9.424	9.424	37.780	3355.52	tI320	$\text{CaMn}_{14}^{+3}\text{SiO}_{24}$
<b>Brucite group</b> $\text{GX}_2$								
<b>Chalcogenide subgroup</b>								
Berndtite-2T, syn	23-677	★	3.649	3.649	5.899	68.01	hP3	$\text{SnS}_2$
Kitkaite	18-896	i	3.715	3.715	5.134	61.36	hP3	$\text{NiSeTe}$
Melonite	8-4		3.843	3.843	5.265	67.34	hP3	$\text{NiTe}_2$
Melonite, Pd-rich	24-797		3.909	3.909	5.272	69.76	hP3	$(\text{Ni,Pd})(\text{Te,Bi})_2$
Merenskyite, syn	29-970		4.034	4.034	5.132	72.32	hP3	$\text{PdTe}_2$
Moncheite	15-392	O	4.049	4.049	5.288	75.08	hP3	$(\text{Pt,Pd})(\text{Te,Bi})_2$
Moncheite, syn	18-977		4.026	4.026	5.221	73.28	hP3	$\text{PtTe}_2$
Shuangfengite	50-1555		3.930	3.930	5.386	72.04	hP3	$\text{IrTe}_2$
Sudovikovite	50-1574		3.730	3.730	5.024	60.53	hP3	$\text{PtSe}_2$
<b>Hydroxide subgroup</b>								
Brucite, syn	7-239	i	3.147	3.147	4.769	40.90	hP5	$\text{Mg}(\text{OH})_2$
Brucite, syn	44-1482	★	3.144	3.144	4.777	40.90	hP5	$\text{Mg}(\text{OH})_2$
Portlandite, syn	4-733	i	3.593	3.593	4.909	54.88	hP5	$\text{Ca}(\text{OH})_2$
Portlandite, syn	44-1481	★	3.590	3.590	4.916	54.87	hP5	$\text{Ca}(\text{OH})_2$
Pyrochroite, syn	18-787		3.315	3.315	4.740	45.11	hP5	$\text{Mn}(\text{OH})_2$
Theophrastite, syn	14-117	★	3.126	3.126	4.605	38.97	hP5	$\text{Ni}(\text{OH})_2$
<b>Related structures</b>								
Amakinite	15-125		6.931	6.931	14.530	604.49	hR20	$(\text{Fe}^{+2},\text{Mg})(\text{OH})_2$
Berndtite-4H	21-1231		3.645	3.645	11.802	135.79	hP6	$\text{SnS}_2$
Chloromagnesite, syn	3-854		3.596	3.596	17.590	196.99	hR3	$\text{MgCl}_2$
Chloromagnesite, syn	25-1156	C	3.632	3.632	17.795	203.29	hR3	$\text{MgCl}_2$
Gibbsite, syn	33-18	i	8.655	5.072	9.716	425.17	mP56	$\text{Al}(\text{OH})_3$
<b>Burbankite group</b> $\text{D}_3\text{D}'_3(\text{CO}_3)_5$								
Burbankite	46-1307	i	10.490	10.490	6.420	611.81	hP51.80	$(\text{Ca,Na})_3(\text{Sr,Ba,Ce})_3(\text{CO}_3)_5$
Burbankite, syn	26-1374	i	10.477	10.477	6.456	613.72	hP52	$(\text{Na}_2\text{Ca})(\text{Sr}_2\text{Ca})(\text{CO}_3)_5$
Calciooburbankite	48-1900	i	10.447	10.447	6.318	597.16	hP52	$\text{Na}_3(\text{Ca,Ln,Sr})_3(\text{CO}_3)_5$
Khanneshite	35-700		10.650	10.650	6.580	646.33	hP52	$(\text{Na,Ca})_3(\text{Ba,Sr,Ln,Ca})_3(\text{CO}_3)_5$
<b>Related structures</b>								
Petersenite-(Ce)	46-1471	i	20.840	6.374	10.578	1211.56	mP104	$\text{Na}_4(\text{Ce,La})_2(\text{CO}_3)_5$
Remondite-(Ce)	46-1268	i	10.444	6.313	10.445	597.25	mP52.20	$\text{Na}_3(\text{Ce,La,Ca,Na,Sr})_3(\text{CO}_3)_5$
<b>Calcite supergroup</b> $(\text{D,E})\text{E}'(\text{RO}_3)_2$								
<b>Calcite group</b>								
Calcite	47-1743	C	4.990	4.990	17.061	367.85	hR10	$\text{CaCO}_3$
Calcite, Mg-rich	43-697	★	4.943	4.943	16.852	356.53	hR10	$(\text{Ca,Mg})\text{CO}_3$
Calcite, Mn-rich	2-714	O	4.850	4.850	16.600	338.16	hR10	$(\text{Ca,Mn})\text{CO}_3$
Calcite, syn	5-586	★	4.989	4.989	17.062	367.78	hR10	$\text{CaCO}_3$
Gaspeite, Mg-rich	23-437		4.621	4.621	14.930	276.10	hR10	$(\text{Ni,Mg})\text{CO}_3$
Gaspeite, syn	12-771	i	4.609	4.609	14.737	271.11	hR10	$\text{NiCO}_3$
Magnesite, Fe-rich	36-383		4.642	4.642	15.055	280.95	hR10	$(\text{Mg,Fe})\text{CO}_3$
Magnesite, syn	8-479	i	4.633	4.633	15.015	279.14	hR10	$\text{MgCO}_3$
Nitratine	36-1474	★	5.071	5.071	16.824	374.67	hR10	$\text{NaNO}_3$
Otavite, syn	42-1342	★	4.930	4.930	16.306	343.19	hR10	$\text{CdCO}_3$

**Classification**  
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Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Rhodochrosite, syn</b>	44- 1472	★	4.790	4.790	15.694	311.86	hR10	MnCO <sub>3</sub>
<b>Siderite</b>	29- 696	★	4.694	4.694	15.386	293.53	hR10	FeCO <sub>3</sub>
<b>Smithsonite</b>	8- 449	★	4.653	4.653	15.028	281.81	hR10	ZnCO <sub>3</sub>
<b>Spherochalcite, syn</b>	11- 692	i	4.659	4.659	14.957	281.16	hR10	CoCO <sub>3</sub>
<b>Dolomite group</b>								
<b>Ankerite</b>	41- 586	★	4.829	4.829	16.152	326.15	hR10	Ca(Fe <sup>+2</sup> ,Mg)(CO <sub>3</sub> ) <sub>2</sub>
<b>Dolomite</b>	36- 426	★	4.809	4.809	16.020	320.88	hR10	CaMg(CO <sub>3</sub> ) <sub>2</sub>
<b>Kutnohorite</b>	11- 345	O	4.874	4.874	16.420	337.81	hR10	Ca(Mn,Mg)(CO <sub>3</sub> ) <sub>2</sub>
<b>Kutnohorite, Ca-rich</b>	19- 234	i	4.915	4.915	16.640	348.12	hR10	Ca(Mn,Ca)(CO <sub>3</sub> ) <sub>2</sub>
<b>Kutnohorite, Mg-rich</b>	43- 695	★	4.852	4.852	16.217	330.60	hR10	Ca(Mn,Mg)(CO <sub>3</sub> ) <sub>2</sub>
<b>Minrecordite</b>	35- 667	★	4.818	4.818	16.029	322.28	hR10	CaZn(CO <sub>3</sub> ) <sub>2</sub>
<b>Nordenskiöldine</b>	36- 394	i	4.857	4.857	16.066	328.23	hR10	CaSn <sup>+4</sup> (BO <sub>3</sub> ) <sub>2</sub>
<b>Norsethite</b>	12- 530	i	5.020	5.020	16.750	365.56	hR10	BaMg(CO <sub>3</sub> ) <sub>2</sub>
<b>Oligonite</b>	27- 248	i	4.724	4.724	15.475	299.08	hR10	Fe(Mn,Zn)(CO <sub>3</sub> ) <sub>2</sub>
<b>Tusionite</b>	35- 727	i	4.787	4.787	15.300	303.63	hR10	MnSn(BO <sub>3</sub> ) <sub>2</sub>
<b>Related structures</b>								
<b>Benstonite</b>	14- 637	i	18.280	18.280	8.670	2509.01	hR65	Ca <sub>7</sub> Ba <sub>6</sub> (CO <sub>3</sub> ) <sub>13</sub>
<b>Bütschliite, syn</b>	25- 626	i	5.379	5.379	18.122	454.09	hR11	K <sub>2</sub> Ca(CO <sub>3</sub> ) <sub>2</sub>
<b>Daqingshanite-(Ce)</b>	47- 1814	i	10.060	10.060	9.230	808.96	hR21	Sr <sub>3</sub> (Ce,La)(PO <sub>4</sub> )(CO <sub>3</sub> ) <sub>3</sub>
<b>Eitelite, syn</b>	24- 1227	★	4.942	4.942	16.396	346.84	hR11	N <sub>2</sub> Mg(CO <sub>3</sub> ) <sub>2</sub>
<b>Fairchildite, syn</b>	21- 1287	★	5.294	5.294	13.355	324.15	hP22	K <sub>2</sub> Ca(CO <sub>3</sub> ) <sub>2</sub>
<b>Huntite</b>	14- 409	i	9.505	9.505	7.821	611.92	hR20	Mg <sub>3</sub> Ca(CO <sub>3</sub> ) <sub>4</sub>
<b>Natrofairchildite</b>	25- 804	O	5.291	5.291	13.218	320.46	hP22	N <sub>2</sub> Ca(CO <sub>3</sub> ) <sub>2</sub>
<b>Nyerereite</b>	33- 1221	O	5.044	8.809	12.743	566.20	oC44	N <sub>2</sub> Ca(CO <sub>3</sub> ) <sub>2</sub>
<b>Sergeevite</b>	41- 1403	O	19.930	19.930	7.836	2695.50	hR95	Ca <sub>2</sub> Mg <sub>11</sub> (CO <sub>3</sub> ) <sub>9</sub> (HCO <sub>3</sub> ) <sub>4</sub> (OH) <sub>4</sub> •6H <sub>2</sub> O
<b>Calomel group HgX</b>								
<b>Calomel, Br-rich</b>	42- 621		4.527	4.527	11.030	226.09	tI8	Hg <sub>2</sub> (Cl,Br) <sub>2</sub>
<b>Calomel, syn</b>	26- 312	★	4.480	4.480	10.906	218.90	tI8	HgCl
<b>Kuzminite</b>	40- 514	i	4.597	4.597	11.034	233.18	tI8	Hg <sub>2</sub> <sup>+1</sup> (Br,Cl) <sub>2</sub>
<b>Kuzminite, syn</b>	8- 468	i	4.667	4.667	11.138	242.60	tI8	Hg <sub>2</sub> Br <sub>2</sub>
<b>Moschelite</b>	46- 1292		4.920	4.920	11.600	280.79	tI8	HgI
<b>Moschelite, syn</b>	6- 245	★	4.933	4.933	11.633	283.08	tI8	HgI
<b>Cancrinite supergroup see Zeolite family</b>								
<b>Carminite group (E/L)<sub>1,2</sub>G<sub>4</sub>T<sub>0,2</sub>(T'O<sub>4</sub>)<sub>4</sub>(OH)<sub>4</sub></b>								
<b>Bertossite</b>	41- 1450	i	11.481	15.713	7.227	1303.76	oI140	CaAl <sub>4</sub> Li <sub>2</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>4</sub>
<b>Carminite</b>	39- 1355	★	16.590	7.579	12.292	1545.64	oC136	PbFe <sub>2-3</sub> (AsO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub>
<b>Palermoite</b>	18- 950	i	11.556	15.849	7.315	1339.75	oI140	(Sr,Ca)Al <sub>4</sub> (Li,Na) <sub>2</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>4</sub>
<b>Carnotite supergroup D<sub>2v</sub>[(UO<sub>2</sub>)<sub>2</sub>V<sub>2</sub>O<sub>8</sub>]•0^8H<sub>2</sub>O; v=1,2</b>								
<b>2M group</b>								
<b>Carnotite</b>	8- 317		10.470	8.410	6.910	591.13	mP44	K <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> •xH <sub>2</sub> O
<b>Margaritasite</b>	25- 1218	C	10.510	8.450	7.320	624.65	mP36	Cs <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub>
<b>Margaritasite</b>	35- 578	i	10.514	8.425	7.252	617.47	mP40	(Cs,K,H <sub>3</sub> O)(UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> •H <sub>2</sub> O
<b>3M group</b>								
<b>Metavanuralite</b>	23- 770	i	10.460	8.440	10.430	869.24	aP86	Al(UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> (OH)•8H <sub>2</sub> O
<b>Sengierite</b>	8- 398		10.620	8.100	10.110	845.30	mP80	Cu <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
<b>5O group</b>								
<b>Curienite</b>	22- 402	i	10.400	8.450	16.340	1435.96	oP128	Pb(UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> •5H <sub>2</sub> O
<b>Francevillite, syn</b>	21- 381	i	10.410	8.510	16.760	1484.75	oP128	Ba(UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> •5H <sub>2</sub> O
<b>Fritzscheite, syn</b>	23- 1249	i	10.590	8.250	15.540	1357.69	oP116	Mn(UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> •4H <sub>2</sub> O
<b>Metatyuyamunite</b>	43- 1457	i	10.612	8.375	16.811	1494.09	oP120	Ca(UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> •xH <sub>2</sub> O
<b>6O group</b>								
<b>Tyuyamunite</b>	6- 17		10.360	20.400	8.360	1766.84	oP164	Ca(UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> •8H <sub>2</sub> O
<b>Vanuralite</b>	19- 1417		10.490	8.370	20.300	1782.37	mP139.20	(H <sub>3</sub> O) <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> •3.6H <sub>2</sub> O
<b>Related structures</b>								
<b>Strelkinite</b>	27- 822		10.640	8.360	32.720	2910.46	oP288	Na <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> •6H <sub>2</sub> O
<b>Vanuralite</b>	23- 769	i	10.550	8.440	24.520	2127.35	mC208	Al(UO <sub>2</sub> ) <sub>2</sub> V <sub>2</sub> O <sub>8</sub> (OH)•11H <sub>2</sub> O
<b>Carpholite group E<sub>1-x</sub>G<sub>2</sub>G'<sub>4</sub>[Si<sub>2</sub>O<sub>6</sub>]<sub>2</sub>X<sub>4</sub>X'<sub>4</sub></b>								
<b>Balipholite</b>	33- 787		13.610	20.200	5.147	1415.02	oC156	BaMgLi <sub>1.5</sub> Al <sub>3.5</sub> Si <sub>4</sub> (OH) <sub>2</sub> (F,OH) <sub>8</sub>
<b>Carpholite</b>	19- 273	i	13.830	20.310	5.130	1440.95	oC152	Mn <sup>+2</sup> Al <sub>2</sub> Si <sub>2</sub> O <sub>6</sub> (OH) <sub>4</sub>
<b>Ferrocapholite</b>	33- 655	i	13.763	20.162	5.115	1419.36	oC152	(Fe <sup>+2</sup> ,Mg)Al <sub>2</sub> Si <sub>2</sub> O <sub>6</sub> (OH) <sub>4</sub>
<b>Magnesiocapholite, syn</b>	35- 489	★	13.708	20.081	5.108	1406.15	oC152	MgAl <sub>2</sub> Si <sub>2</sub> O <sub>6</sub> (OH) <sub>4</sub>
<b>Chalcanthite group (G/Q)(SO<sub>4</sub>)•5H<sub>2</sub>O</b>								
<b>Chalcanthite, syn</b>	11- 646	★	7.155	10.710	5.955	362.55	aP42	Cu <sup>+2</sup> SO <sub>4</sub> •5H <sub>2</sub> O
<b>Jokokuite</b>	31- 836	i	6.370	10.770	6.130	380.94	aP42	Mn <sup>+2</sup> SO <sub>4</sub> •5H <sub>2</sub> O
<b>Pentahydrate, syn</b>	25- 532	i	6.335	10.550	6.075	367.67	aP42	MgSO <sub>4</sub> •5H <sub>2</sub> O
<b>Siderotil</b>	22- 357	i	6.250	10.630	6.060	365.86	aP42	FeSO <sub>4</sub> •5H <sub>2</sub> O
<b>Chalcoalumite group (G/Q)Al<sub>4</sub>(RO<sub>3</sub>)<sub>2x</sub>(TO<sub>4</sub>)<sub>1-x</sub>(OH)<sub>12</sub>•3H<sub>2</sub>O</b>								
<b>Chalcoalumite</b>	8- 142		17.300	8.956	10.220	1575.09	mP172	Cu <sup>+2</sup> Al <sub>4</sub> SO <sub>4</sub> (OH) <sub>12</sub> •3H <sub>2</sub> O
<b>Chalcoalumite</b>	25- 1430	i	17.090	8.920	10.220	1550.71	mP172	Cu <sup>+2</sup> Al <sub>4</sub> SO <sub>4</sub> (OH) <sub>12</sub> •3H <sub>2</sub> O
<b>Mbobomkulite</b>	35- 696	i	10.171	8.865	17.145	1539.11	mP184	(Ni,Cu)Al <sub>4</sub> (NO <sub>3</sub> ) <sub>2</sub> (SO <sub>4</sub> )(OH) <sub>12</sub> •3H <sub>2</sub> O
<b>Nickelalumite</b>	35- 698	i	10.175	8.860	17.174	1539.90	mP172	(Ni,Cu)Al <sub>4</sub> (SO <sub>4</sub> )(NO <sub>3</sub> ) <sub>2</sub> (OH) <sub>12</sub> •3H <sub>2</sub> O
<b>Chalcophanite supergroup GMn<sub>3</sub>O<sub>7</sub>•3H<sub>2</sub>O</b>								
<b>1A group</b>								
<b>Aurorite</b>	19- 88		7.530	7.530	8.200	341.42	aP40	(Mn <sup>+2</sup> ,Ag,Ca)Mn <sub>3</sub> <sup>+4</sup> O <sub>7</sub> •3H <sub>2</sub> O
<b>Jianshuiite</b>	47- 1821	★	7.534	7.525	8.204	341.96	aP40	(Mg,Mn <sup>+2</sup> )Mn <sub>3</sub> <sup>+4</sup> O <sub>7</sub> •3H <sub>2</sub> O
<b>3R group</b>								
<b>Chalcophanite</b>	15- 807		7.567	7.567	20.872	1035.00	hR40	ZnMn <sub>3</sub> O <sub>7</sub> •3H <sub>2</sub> O
<b>Ernieckelite</b>	46- 1476	i	7.514	7.514	20.517	1003.20	hR40	Ni <sup>+2</sup> Mn <sub>3</sub> <sup>+4</sup> O <sub>7</sub> •3H <sub>2</sub> O
<b>Chalcopyrite supergroup see Diamond supergroup</b>								
<b>Chevkinite group D<sub>4</sub>G<sub>0,1</sub>G'<sub>4</sub>[Si<sub>2</sub>O<sub>7</sub>]<sub>2</sub>O<sub>8</sub></b>								
<b>Chevkinite-(Ce), heated</b>	42- 1394	i	13.395	5.745	11.086	838.42	mC70	Ce <sub>4</sub> Fe <sub>3</sub> Ti <sub>2</sub> (Si <sub>2</sub> O <sub>7</sub> ) <sub>2</sub> O <sub>8</sub>
<b>Perrierite-(Ce)</b>	19- 302	O	13.610	5.680	11.730	831.58	mC68	Ce <sub>2</sub> Ti <sub>2</sub> (Si <sub>2</sub> O <sub>7</sub> ) <sub>2</sub> O <sub>4</sub>
<b>Strontiochevkinite</b>	38- 443	i	13.560	5.700	11.100	844.06	mP70	Sr <sub>4</sub> FeTi <sub>4</sub> (Si <sub>2</sub> O <sub>7</sub> ) <sub>2</sub> O <sub>8</sub>

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Childrenite group</b> $E_{1,2}G(TO_4)(OH)_2 \cdot H_2O$								
Childrenite	47- 1859	i	10.390	13.390	6.920	962.72	oC112	(Fe,Mn)AlPO <sub>4</sub> (OH) <sub>2</sub> •H <sub>2</sub> O
Eosphorite	36- 402	★	10.436	13.495	6.923	974.95	oC112	Mn <sup>+2</sup> AlPO <sub>4</sub> (OH) <sub>2</sub> •H <sub>2</sub> O
Ogdensburgite	38- 482	O	11.354	14.877	6.558	1107.73	oC120	Ca <sub>2</sub> Fe(AsO <sub>4</sub> )(OH) <sub>2</sub> •H <sub>2</sub> O
<b>Chlorite family</b> $G_4^6[T_4O_{10}]X_8$								
<b>Di/dioctahedral supergroup</b>								
Donbassite-2M <sub>1a</sub>	45- 1375	C	5.174	8.956	14.260	654.62	mC68.66	Al <sub>4.33</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
<b>Di/trioctahedral supergroup</b>								
Franklinfurnaceite	41- 1412		5.483	9.390	14.510	741.42	mC74	Ca <sub>2</sub> FeMn <sub>4</sub> Zn <sub>2</sub> Si <sub>2</sub> O <sub>10</sub> (OH) <sub>8</sub>
<b>Tri/dioctahedral supergroup</b>								
Cookeite-2M <sub>1</sub>	45- 1377	i	5.161	8.938	28.410	1300.76	mC140	(Al <sub>4</sub> Li)(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
Cookeite-1a	45- 1376	i	5.158	8.927	28.351	1296.25	mC140	(Al <sub>4</sub> Li)(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
Cookeite-1a, B-rich	45- 1476		5.160	8.890	14.150	644.56	mC70	LiAl <sub>4</sub> (Si <sub>3</sub> Al,B)O <sub>10</sub> (OH) <sub>8</sub>
Sudoite-1M <sub>1b</sub>	19- 751		5.237	9.070	14.285	673.47	mC70	Mg <sub>2</sub> Al <sub>3</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
<b>Tri/trioctahedral supergroup</b>								
Baileychlore-1M <sub>1b</sub>	42- 1335	i	5.344	9.249	14.392	706.01	mC71.26	(Zn <sub>5</sub> Al)(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
Chamosite-1M <sub>1b</sub>	21- 1227		5.370	9.286	14.158	700.28	mC72	(Fe,Al,Mg) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Chamosite-1M <sub>1b</sub>	46- 1324	i	5.394	9.342	14.180	714.54	mC72	(Fe,Al,Mg) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Chamosite-1O <sub>1b</sub>	13- 29		5.396	9.344	14.169	714.40	oC72	(Fe,Al,Mg,Mn) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1b</sub>	12- 242	i	5.308	9.208	14.281	692.42	mC72	(Mg,Al) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1b</sub>	24- 506	C	5.340	9.270	14.360	704.99	aP72	(Mg <sub>5</sub> Al)(Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1b</sub>	46- 1322	i	5.317	9.227	14.324	697.03	aP36	Mg <sub>5</sub> Al(Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1b</sub>	46- 1323	i	5.347	9.263	14.250	700.23	mC72	(Mg,Al,Fe) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1b</sub> , Cr-rich	7- 160		5.336	9.242	14.186	694.15	mC72	(Mg,Cr) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1b</sub> , Fe-rich	7- 78		5.307	9.192	14.069	680.95	mC72	(Mg,Fe,Al) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1b</sub> , Fe-rich	29- 701	i	5.360	9.280	14.200	700.83	mC72	(Mg,Fe) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1b</sub> , Mn-rich	45- 1321	i	5.370	9.300	14.340	710.82	mC72	Mg <sub>3</sub> Mn <sub>2</sub> AlSi <sub>3</sub> AlO <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1a</sub> , Fe-rich	16- 362		5.320	9.290	14.200	696.57	mC72	(Mg,Fe,Al) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-1M <sub>1b</sub> , Fe-rich	16- 351		5.320	9.290	14.350	703.93	mC72	(Mg,Fe,Al) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Clinochlore-2A, Cr-rich	20- 671		5.335	9.240	28.735	1416.50	aP72	(Mg,Cr) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Gonyerite-2O	10- 378		5.470	9.460	28.800	1490.29	oP144	(Mn,Mg,Fe) <sub>6</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Nimite-1M <sub>1b</sub>	22- 712	i	5.320	9.214	14.302	695.69	mC72	(Ni,Mg,Al) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>8</sub>
Nimite-1M <sub>1a</sub>	38- 424	i	5.346	9.268	28.649	1408.58	mC144	(Ni <sub>5</sub> Al)(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
Pennantite-1M <sub>1b</sub>	42- 594	i	5.470	9.470	14.290	734.23	mC72	Mn <sub>5</sub> <sup>+2</sup> Al(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
Pennantite-1M <sub>1a</sub>	46- 1325	i	5.401	9.365	14.398	722.51	mC72	(Mn <sub>5</sub> <sup>+2</sup> Al)(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
Vermiculite-2M	16- 613	i	5.240	9.170	28.600	1369.83	mC?	Mg <sub>x</sub> (Mg,Fe) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
<b>Chlorophoenicite group</b> $G_3T_2(AsO_4)X_{6,7}$								
Chlorophoenicite	25- 1159		22.973	3.287	7.310	530.13	mC48	(Mn,Zn) <sub>5</sub> (AsO <sub>4</sub> )(OH) <sub>7</sub>
Magnesiumchlorophoenicite	34- 190	i	23.020	3.303	7.346	536.32	mC44	(Mg,Mn) <sub>3</sub> Zn <sub>2</sub> (AsO <sub>4</sub> )(OH,OH) <sub>6</sub>
Magnesiumchlorophoenicite	38- 1438		22.990	3.236	7.299	520.65	mC44	(Mg,Mn) <sub>3</sub> Zn <sub>2</sub> (AsO <sub>4</sub> )(OH,OH) <sub>6</sub>
Unnamed mineral	35- 555	O	21.800	3.080	7.270	488.14	oI44	(Mn,Zn) <sub>3</sub> Zn <sub>2</sub> AsO <sub>4</sub> (OH,OH) <sub>6</sub>
<b>Related structures</b>								
Jarosewichite	41- 580	i	6.560	25.200	10.000	1653.12	oC168	Mn <sub>4</sub> (AsO <sub>4</sub> )(OH) <sub>6</sub>
<b>Cobaltomenite group</b> $(G/Q)SeO_3 \cdot 2H_2O$								
Ahlfeldite, syn	49- 136	★	6.446	8.753	7.527	419.40	mP44	Ni(SeO <sub>3</sub> )•2H <sub>2</sub> O
Clinochalcofenite	38- 479		8.177	8.611	6.290	439.33	mP44	Cu <sup>+2</sup> Se <sup>+4</sup> O <sub>3</sub> •2H <sub>2</sub> O
Cobaltomenite, syn	25- 125	i	7.640	8.825	6.515	434.32	mP44	CoSeO <sub>3</sub> •2H <sub>2</sub> O
<b>Columbite supergroup</b> $GG'_{1+n}O_{4+2n}; n=0,1$								
<b>M2a4b2c group</b>								
Fergusonite-β-(Ce), syn	33- 332	★	5.540	11.409	5.163	325.30	mC24	CeNbO <sub>4</sub>
Fergusonite-β-(Nd), syn	32- 680	i	5.149	11.290	5.475	317.26	mC24	NdNbO <sub>4</sub>
Fergusonite-β-(Y), syn	23- 1486	★	5.292	10.940	5.069	292.52	mC24	YNbO <sub>4</sub>
<b>M4a4b2c group</b>								
Ferrowodginite	47- 1792	i	9.415	11.442	5.103	549.67	mC48	Fe <sup>+2</sup> Sn <sup>+4</sup> Ta <sub>2</sub> O <sub>8</sub>
Titanowodginite	47- 1793	i	9.466	11.431	5.126	554.66	mC48	MnTiTa <sub>2</sub> O <sub>8</sub>
Wodginite	29- 901		9.522	11.468	5.104	557.20	mC48	(Ta,Mn,Sn)O <sub>2</sub>
<b>O2a2b2c group</b>								
Ixiolite	15- 733	i	5.731	4.742	5.152	140.01	oP12	(Ta,Fe,Sn,Nb,Mn)O <sub>2</sub>
Samaraskite-(Y), heated	39- 361		5.663	4.957	5.233	146.55	mP9	YNb <sub>2</sub> O <sub>6</sub>
Scrutinyite	45- 1416	i	4.971	5.956	5.438	161.00	oP12	PbO <sub>2</sub>
Srilankite	35- 584		4.708	5.553	5.019	131.21	oP12	(Ti,Zr)O <sub>2</sub>
Srilankite, syn	46- 1265	i	4.701	5.501	4.991	129.07	oP12	Ti <sub>2</sub> ZrO <sub>6</sub>
<b>O2a4b2c group</b>								
Alumotantite	47- 1796	i	4.470	11.280	4.758	239.90	oP24	AlTaO <sub>4</sub>
Bismutocolumbite	45- 1372	i	4.992	11.731	5.677	332.45	oP24	Bi(Nb,Ta)O <sub>4</sub>
Bismutotantalite, syn	16- 909	i	4.957	11.763	5.633	328.46	oP24	BiTaO <sub>4</sub>
Cervantite, syn	11- 694	i	5.436	4.810	11.760	307.49	oP24	Sb <sup>+3</sup> Sb <sup>+5</sup> O <sub>4</sub>
Pucherite	12- 293	i	5.326	5.056	12.000	323.14	oP24	BiVO <sub>4</sub>
Stibiocolumbite, syn	16- 907	i	4.929	11.797	5.559	323.24	oP24	SbNbO <sub>4</sub>
Stibiotantalite, syn	16- 908	★	4.911	11.814	5.535	321.13	oP24	SbTaO <sub>4</sub>
<b>O2a6b2c group</b>								
Euxenite-(Y), heated	5- 603		5.520	14.570	5.166	415.48	oP36	(Y,Ce)(Nb,Ti) <sub>2</sub> O <sub>6</sub>
Euxenite-(Y), syn	14- 643		5.590	14.650	5.190	425.03	oP36	YNbTiO <sub>6</sub>
Ferrocolumbite	33- 659	★	5.746	14.308	5.075	417.23	oP36	(Fe,Mn)(Nb,Ta) <sub>2</sub> O <sub>6</sub>
Fersmite, syn	39- 1392	★	5.748	14.987	5.226	450.20	oP36	CaNb <sub>2</sub> O <sub>6</sub>
Kobeite-(Y)	11- 259		5.753	14.758	4.985	423.24	oP40	YTi <sub>2</sub> (O,OH) <sub>6</sub>
Magnocolumbite, syn	33- 875	★	5.700	14.193	5.032	407.09	oP36	MgNb <sub>2</sub> O <sub>6</sub>
Manganocolumbite, Fe-rich	45- 1360	★	14.246	5.726	5.093	415.41	oP36	(Mn,Fe)Nb <sub>2</sub> O <sub>6</sub>
Manganocolumbite, syn	33- 899	★	5.767	14.434	5.085	423.28	oP36	MnNb <sub>2</sub> O <sub>6</sub>
Manganotantalite, syn	33- 909	★	5.770	14.454	5.097	425.09	oP36	Mn <sup>+2</sup> Ta <sub>2</sub> O <sub>6</sub>
Samaraskite-(Y)	2- 717		5.498	14.340	5.120	403.67	oP36	YNb <sub>2</sub> O <sub>6</sub>
Tanteuxenite-(Y), heated	31- 1434	O						(U,Fe,V)(Ti,Sn) <sub>2</sub> O <sub>6</sub>



**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>O3a4b1c group</b>								
Aeschnite-(Ce), syn	15- 864	★	7.538	10.958	5.396	445.72	oP36	CeTiNbO <sub>6</sub>
Aeschnite-(Y)	47- 1786	i	7.412	10.810	5.126	410.71	oP36	YTbO <sub>6</sub>
Aeschnite-(Y), syn	20- 1401	i	5.180	10.980	7.410	421.45	oP36	YTbNbO <sub>6</sub>
Kobeite-(Y)	44- 1449	i	5.174	10.760	7.590	422.55	oP40	YTi <sub>2</sub> O <sub>5</sub> (OH)
Niobaeschnite-(Ce)	29- 311	i	5.396	11.085	7.585	453.69	oP36	(Ce,Ca,Nd,Ln)(Nb,Ti) <sub>2</sub> O <sub>6</sub>
Rynersonite	29- 356	i	7.505	11.063	5.370	445.86	oP36	Ca(Ta,Nb) <sub>2</sub> O <sub>6</sub>
Rynersonite, syn	39- 1430	★	11.068	7.503	5.373	446.20	oP36	CaTa <sub>2</sub> O <sub>6</sub>
Tantaloeschnite-(Y), heated	26- 1	i	5.340	10.970	7.380	432.32	oP36	(Y,Ce,Ca)(Ta,Ti,Ta,Nb) <sub>2</sub> O <sub>6</sub>
Vigezzite	34- 1316	i	7.559	11.028	5.360	446.81	oP36	(Ca,Ce)(Nb,Ta,Ti) <sub>2</sub> O <sub>6</sub>
Ytropyrochlore-(Y)	18- 765	O	5.299	10.986	7.497	436.44	oP36	(Y,Ce,Nd,Th)(Nb,Ti,Ta) <sub>2</sub> O <sub>6</sub>
<b>Related structures</b>								
Calciotantite, syn	15- 679		6.220	6.220	12.250	410.44	hP32	CaTa <sub>4</sub> O <sub>11</sub>
Fergusonite-(Y), heated	9- 443		7.740	7.740	11.340	679.35	tP48	(Y,Er)(Nb,Ta,Ti) <sub>4</sub> O <sub>4</sub>
Formanite-(Y), heated	26- 1478		7.732	7.732	11.490	686.92	tP48	YTaO <sub>4</sub>
Koragoite	50- 1568		24.730	5.056	5.760	700.30	mP56	(Mn,Fe <sub>3</sub> )(Nb,Ta,Ti) <sub>3</sub> (Nb,Mn) <sub>2</sub> (W,Ta) <sub>2</sub> O <sub>20</sub>
Lithiotantite	35- 718		7.444	5.044	15.255	547.23	mP48	Li(Ta,Nb) <sub>3</sub> O <sub>8</sub>
Qitianlingite	41- 1415		23.706	5.723	5.045	684.45	oP60	Fe <sub>2</sub> Nb <sub>2</sub> WO <sub>10</sub>
<b>Combeite group (D,E)<sub>3,6</sub>G<sub>2,1</sub>[Si<sub>6</sub>X<sub>18</sub>]•0,2H<sub>2</sub>O</b>								
Combeite	25- 800	i	10.429	10.429	13.146	1238.25	hR33	Na <sub>4</sub> (Ca,Al,Fe <sub>3</sub> )Si <sub>6</sub> O <sub>16</sub> (OH,F) <sub>2</sub>
Kazakovite	44- 1405	i	10.003	10.003	12.944	1121.66	hR32	Na <sub>6</sub> MnTiSi <sub>6</sub> O <sub>18</sub>
Lovozerite	28- 1201		10.180	10.180	13.100	1175.70	hR28	Na <sub>3</sub> ZrSi <sub>6</sub> (O,OH) <sub>18</sub>
Tisinalite	33- 607	O	10.140	10.140	13.080	1164.70	hR38	Ni <sub>6</sub> H <sub>3</sub> (Mn,Ca,Fe)TiSi <sub>6</sub> (O,OH) <sub>18</sub> •2H <sub>2</sub> O
Zirsinalite	27- 670	i	10.290	10.290	13.110	1202.16	hR32	Na <sub>6</sub> CaZrSi <sub>6</sub> O <sub>18</sub>
<b>Related structures</b>								
Imandrite	39- 403		7.426	10.546	10.331	809.07	oP65	Na <sub>12</sub> Ca <sub>3</sub> Fe <sub>2</sub> (Si <sub>6</sub> O <sub>18</sub> ) <sub>2</sub>
Koashvite	27- 669	i	7.356	20.950	10.194	1570.98	oP140	Na <sub>6</sub> (Ca,Mn)(Ti,Fe)Si <sub>6</sub> O <sub>18</sub> •H <sub>2</sub> O
Petarasite	33- 1310	i	10.791	14.505	6.626	953.19	mP76	Na <sub>5</sub> Zr <sub>2</sub> Si <sub>6</sub> O <sub>18</sub> (Cl,OH)•2H <sub>2</sub> O
Traskite	18- 171		17.880	17.880	12.300	3405.42	hP273	Ba <sub>9</sub> Fe <sub>2</sub> Ti <sub>2</sub> Si <sub>12</sub> O <sub>36</sub> (OH) <sub>6</sub> •6H <sub>2</sub> O
<b>Copiapite group G<sub>2/v</sub>G'<sub>4</sub>(SO<sub>4</sub>)<sub>6</sub>(OH)<sub>2</sub>•mH<sub>2</sub>O; m≈20, v=2,3</b>								
Aluminocopiapite	20- 659		7.300	18.800	7.310	967.14	aP99	(Mg,Al)(Fe <sup>+3</sup> ,Al) <sub>4</sub> (SO <sub>4</sub> ) <sub>6</sub> (OH) <sub>2</sub> •20H <sub>2</sub> O
Calciocopiapite	27- 77	O	7.350	18.210	7.100	907.41	aP96	CaFe <sub>4+3</sub> (SO <sub>4</sub> ) <sub>6</sub> (OH) <sub>2</sub> •19H <sub>2</sub> O
Copiapite	35- 583	i	7.337	18.760	7.379	978.92	aP99	FeFe <sub>4</sub> (SO <sub>4</sub> ) <sub>6</sub> (OH) <sub>2</sub> •20H <sub>2</sub> O
Cuprocopiapite	19- 394		7.340	18.190	7.280	934.89	aP99	Cu <sup>+2</sup> Fe <sub>4+3</sub> (SO <sub>4</sub> ) <sub>6</sub> (OH) <sub>2</sub> •20H <sub>2</sub> O
Ferriccopiapite	29- 714		7.394	18.360	7.324	955.05	aP98.67	Fe <sub>4,67</sub> (SO <sub>4</sub> ) <sub>6</sub> (OH) <sub>2</sub> •20H <sub>2</sub> O
Magnesiocopiapite	42- 599	i	7.351	18.805	7.394	985.79	aP99	MgFe <sub>4+3</sub> (SO <sub>4</sub> ) <sub>6</sub> (OH) <sub>2</sub> •20H <sub>2</sub> O
Zincocopiapite	33- 1472		7.330	18.720	7.350	973.05	aP93	ZnFe <sub>4</sub> (SO <sub>4</sub> ) <sub>6</sub> (OH) <sub>2</sub> •18H <sub>2</sub> O
Zincocopiapite	45- 1323		7.360	18.400	7.280	945.80	aP93	ZnFe <sub>4</sub> (SO <sub>4</sub> ) <sub>6</sub> (OH) <sub>2</sub> •18H <sub>2</sub> O
<b>Corundum supergroup GG'O<sub>3</sub></b>								
<b>Corundum group</b>								
Corundum, syn	10- 173		4.758	4.758	12.991	254.70	hR10	Al <sub>2</sub> O <sub>3</sub>
Corundum, syn	46- 1212	★	4.759	4.759	12.993	254.81	hR10	Al <sub>2</sub> O <sub>3</sub>
Eskolaite, syn	38- 1479	★	4.959	4.959	13.594	289.49	hR10	Cr <sub>2</sub> O <sub>3</sub>
Hematite, syn	33- 664	★	5.036	5.036	13.749	301.93	hR10	Fe <sub>2</sub> O <sub>3</sub>
Karelianite, syn	34- 187	★	4.954	4.954	14.008	297.73	hR10	V <sub>2</sub> O <sub>3</sub>
<b>Ilmenite group</b>								
Brizziite	47- 1843		5.301	5.301	15.932	387.72	hR10	NaSbO <sub>3</sub>
Ecandrewsite, syn	26- 1500	★	5.079	5.079	13.927	311.10	hR10	ZnTiO <sub>3</sub>
Geikielite, syn	6- 494	i	5.054	5.054	13.898	307.44	hR10	MgTiO <sub>3</sub>
Ilmenite, syn	29- 733	★	5.088	5.088	14.093	316.01	hR10	Fe <sup>+2</sup> TiO <sub>3</sub>
Melanostibite	20- 699		5.228	5.228	14.334	339.28	hR10	Mn(Sb <sup>+5</sup> ,Fe <sup>+3</sup> )O <sub>3</sub>
Pyrophanite, syn	29- 902	★	5.140	5.140	14.290	326.90	hR10	MnTiO <sub>3</sub>
<b>Covellite group Cu<sub>5</sub>(T,R)X<sub>6</sub></b>								
Covellite, syn	6- 464	★	3.792	3.792	16.344	203.53	hP12	CuS
Idaite, syn	13- 161	O	3.900	3.900	16.950	223.27	hP12	Cu <sub>5</sub> FeS <sub>6</sub>
Klockmannite	6- 427		3.940	3.940	17.250	231.91	hP12	CuSe
Klockmannite, syn	34- 171	C	3.939	3.939	17.250	231.79	hP12	CuSe
<b>Related structures</b>								
Geerite	33- 491		3.863	3.863	46.100	595.77	hR13	Cu <sub>6</sub> S <sub>5</sub>
Nukundamite	34- 1409	i	3.782	3.782	11.187	138.58	hP8	(Cu,Fe) <sub>4</sub> S <sub>4</sub>
Nukundamite, syn	16- 159	i	3.777	3.777	11.180	138.12	hP8	Cu <sub>3,38</sub> Fe <sub>0,62</sub> S <sub>4</sub>
Spionkopite	36- 380	i	22.962	22.962	41.429	18917.10	hP1206	Cu <sub>39</sub> S <sub>28</sub>
Yarrowite	36- 379		3.800	3.800	67.269	841.23	hP51	Cu <sub>9</sub> S <sub>8</sub>
<b>Crichtonite group DGG'<sub>6</sub>G''<sub>6</sub>G'''<sub>6</sub>T<sub>2</sub>X<sub>38</sub></b>								
Crichtonite	22- 1121		10.370	10.370	20.870	1943.62	hR60.00	SrTi <sub>21</sub> O <sub>38</sub>
Davidite-(Ce)	47- 1753		10.370	10.370	20.870	1943.62	hR60	(Ce,La)(Ti,Fe) <sub>21</sub> O <sub>38</sub>
Davidite-(Ce), heated	8- 291	O	10.280	10.280	20.810	1904.53	hR60	CeTi <sub>21</sub> O <sub>38</sub>
Davidite-(La)	44- 1453		10.410	10.410	21.000	1970.84	hR60	LaFe <sub>4</sub> Ti <sub>6</sub> O <sub>19</sub>
Davidite-(La), heated	13- 505		10.370	10.370	20.870	1943.62	hR60	LaTi <sub>21</sub> O <sub>38</sub>
Davidite-(La), heated	42- 576	C	10.375	10.375	20.909	1949.13	hR60	LaFe <sub>4</sub> Ti <sub>6</sub> O <sub>19</sub>
Dessauite	50- 1649		10.385	10.385	20.921	1954.01	hR60	(Sr,Pb)(Y,U)(Ti,Fe) <sub>20</sub> O <sub>38</sub>
Landauite	18- 672	O	10.366	10.366	20.770	1932.81	hR60	NaMn <sup>+2</sup> Zn <sub>2</sub> (Ti,Fe <sup>+3</sup> ) <sub>6</sub> Ti <sub>12</sub> O <sub>38</sub>
Lindsleyite	46- 1296		10.370	10.370	20.630	1921.27	hR60	(Ba,K)(Ti,Cr,Fe,Mg) <sub>21</sub> O <sub>38</sub>
Lindsleyite, syn	46- 1467	i	10.399	10.399	20.618	1930.90	hR60	Ba(Ti <sub>12</sub> Cr <sub>4</sub> Fe <sub>2</sub> ZrMg <sub>2</sub> )O <sub>38</sub>
Loveringite	30- 263	C	10.337	10.337	20.676	1913.31	hR60	(Ca,Ce)(Ti,Fe <sup>+3</sup> ,Cr,Mg) <sub>21</sub> O <sub>38</sub>
Loveringite	42- 1368	i	10.385	10.385	20.702	1933.55	hR60	CaTi <sub>21</sub> O <sub>38</sub>
Mathiasite	46- 1297	i	10.363	10.363	20.644	1920.09	hR60	(K,Ba)(Ti,Cr,Fe,Mg) <sub>21</sub> O <sub>38</sub>
Mathiasite, syn	46- 1468	i	10.368	10.368	20.611	1918.76	hR59	K(Ti <sub>13</sub> Cr <sub>4</sub> FeZrMg)O <sub>38</sub>
Senaite	46- 1305	i	10.418	10.418	20.928	1967.10	hR60.28	Pb(Ti,Fe,Zn,Mn,Y,Nb) <sub>21</sub> O <sub>38</sub>
Senaite, Zn-Y-rich	47- 1863	i	10.448	10.448	21.036	1988.66	hR60	(Pb,Na,Ba)(Ti,Fe,Y,Zn,Mn,Nb) <sub>21</sub> O <sub>38</sub>
<b>Cryptomelane supergroup D<sub>0,1</sub>[G<sub>n</sub>O<sub>2n</sub>X<sub>0,1</sub>]•0,3H<sub>2</sub>O; n≈8</b>								
<b>1Q group</b>								
Paramontroseite	25- 1003		4.905	9.422	2.916	134.76	oP12	VO <sub>2</sub>
Ramsdellite	39- 375	C	9.270	2.866	4.533	120.43	oP12	MnO <sub>2</sub>
Ramsdellite	42- 1316	★	9.531	2.864	4.700	128.29	oP12	MnO <sub>2</sub>
Ramsdellite	43- 1455	★	9.266	2.861	4.513	119.62	oP12	MnO <sub>2</sub>
Ramsdellite, syn	44- 142	★	9.372	2.851	4.471	119.44	oP12	MnO <sub>2</sub>

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>2M group</b>								
Akaganeite-M	42-1315	i	10.603	3.035	10.512	338.27	mC35	Fe <sup>3+</sup> (O,OH) <sub>16</sub> Cl <sub>1.3</sub>
Coronadite-M	41-596	i	9.912	2.863	9.802	278.12	mC25	PbMn <sub>8</sub> O <sub>16</sub>
Cryptomelane-M	44-1386	★	9.942	2.866	9.709	276.62	mC25	K <sub>2-x</sub> Mn <sub>8</sub> O <sub>16</sub>
Hollandite	38-476	i	10.008	2.871	9.723	279.33	mC25	BaMn <sub>8</sub> O <sub>16</sub>
Manjiroite-M, syn	42-1347	i	9.910	2.860	9.620	272.62	mC25.90	Na <sub>2-x</sub> Mn <sub>8</sub> O <sub>16</sub>
Todorokite	38-475	i	9.757	2.842	9.568	264.65	mP28.18	NaMn <sub>6</sub> O <sub>12</sub> •3H <sub>2</sub> O
<b>2Q group</b>								
Akaganeite-Q, syn	34-1266		10.535	10.535	3.030	336.29	tI32	Fe <sup>3+</sup> O(OH)
Ankangite	45-1393	i	10.139	10.139	2.961	304.39	tI25	Ba(Ti,V <sup>+3</sup> ) <sub>8</sub> O <sub>16</sub>
Coronadite-Q, syn	42-1349	i	9.887	9.887	2.842	277.81	tI25.32	Pb <sub>2-x</sub> Mn <sub>8</sub> O <sub>16</sub>
Cryptomelane-Q, syn	42-1348	i	9.766	9.766	2.842	271.06	tI25	K <sub>2-x</sub> Mn <sub>8</sub> O <sub>16</sub>
Manjiroite-Q	21-1153		9.916	9.916	2.864	281.61	tI?	(Na,K)Mn <sub>8</sub> O <sub>16</sub> •xH <sub>2</sub> O
Priderite	6-296		10.112	10.112	2.968	303.49	tI25	(K,Ba)(Ti,Fe) <sub>8</sub> O <sub>16</sub>
Unnamed mineral	49-1839	i	9.857	9.857	2.859	277.78	tI?	K <sub>2</sub> Ba <sub>20</sub> Sr <sub>7</sub> Al <sub>2</sub> Fe <sub>26</sub> Mn <sub>318</sub> O <sub>557</sub>
Vernadite	15-604		9.866	9.866	2.844	276.83	tI36	Mn(OH) <sub>4</sub>
<b>4M group</b>								
Hollandite, Fe-rich	12-514	i	10.020	5.760	9.890	570.77	mP50	BaFeMn <sub>7</sub> O <sub>16</sub>
<b>8Q group</b>								
Mannardite	42-615	i	14.333	14.333	5.899	1211.82	tI112	(BaH <sub>2</sub> O)/Ti <sub>6</sub> V <sub>2</sub> O <sub>16</sub>
Redledgeite	39-352	i	14.300	14.300	5.894	1205.26	tI100	BaTi <sub>6</sub> Cr <sub>2</sub> O <sub>16</sub>
<b>Related structures</b>								
Unnamed mineral	47-1782		10.127	10.127	14.810	1518.86	tI125	Ba(Ti,V) <sub>8</sub> (O,OH) <sub>16</sub>
Woodruffite	16-338		8.420	8.420	9.280	657.92	tP62	(Zn,Mn) <sub>2</sub> Mn <sub>5</sub> O <sub>12</sub> •4H <sub>2</sub> O
Woodruffite	47-1825		8.494	8.494	9.658	696.81	tP68	ZnMn <sub>3</sub> O <sub>7</sub> •2H <sub>2</sub> O
<b>Cubanite supergroup</b> TF <sub>2</sub> S <sub>3</sub>								
Argentopyrite	38-459	i	6.639	11.463	6.452	491.02	oP24	AgFe <sub>2</sub> S <sub>3</sub>
Cubanite	47-1749	★	6.234	11.125	6.471	448.78	oP24	CuFe <sub>2</sub> S <sub>3</sub>
Sternbergite	38-460	i	6.645	11.546	12.744	977.76	oC48	AgFe <sub>2</sub> S <sub>3</sub>
<b>Cylindrite subfamily</b> (G/L) <sub>8,9</sub> Sb <sub>2</sub> S <sub>13,14</sub>								
Cylindrite-H	39-1365		11.710	3.670	6.320	271.30	aP12	FePb <sub>3</sub> Sn <sub>4</sub> Sb <sub>2</sub> S <sub>14</sub>
Cylindrite-Q	27-246		11.730	5.790	5.810	393.36	aP18	FePb <sub>3</sub> Sn <sub>4</sub> Sb <sub>2</sub> S <sub>14</sub>
Franckeite	15-25		46.900	5.820	17.300	4706.43	aP192	Pb <sub>5</sub> Sn <sub>3</sub> Sb <sub>2</sub> S <sub>14</sub>
Franckeite	43-1480	i	5.850	5.830	17.340	589.80	mP24	Pb <sub>5</sub> Sn <sub>3</sub> Sb <sub>2</sub> S <sub>14</sub>
Incaite-H	27-277		17.250	3.660	6.350	400.91	aP18	Pb <sub>4</sub> FeSn <sub>4</sub> Sb <sub>2</sub> S <sub>13</sub>
Incaite-Q	39-1362		17.290	5.790	5.830	583.64	aP12	Pb <sub>4</sub> Sn <sub>4</sub> FeSb <sub>2</sub> S <sub>13</sub>
Incaite-Q	46-1423		5.820	5.780	17.260	580.61	aP24	Pb <sub>4</sub> FeSn <sub>4</sub> Sb <sub>2</sub> S <sub>13</sub>
Potosiite-H	46-1422		6.190	3.690	17.210	392.74	aP18.75	Pb <sub>5</sub> FeSb <sub>2</sub> Sn <sub>2</sub> S <sub>14</sub>
Potosiite-Q	42-616		5.915	5.938	17.239	605.08	aP25	Pb <sub>6</sub> Sn <sub>2</sub> FeSb <sub>2</sub> S <sub>14</sub>
<b>Delafossite group</b> G(E,G')X <sub>2</sub>								
Caswellsilverite, syn	10-292	O	3.541	3.541	19.350	210.12	hR4	CrNaS <sub>2</sub>
Delafossite, syn	39-246	★	3.035	3.035	17.162	136.88	hR4	Cu <sup>+</sup> Fe <sup>+3</sup> O <sub>2</sub>
Mcconnellite, syn	39-247	★	2.976	2.976	17.102	131.18	hR4	Cu <sup>+</sup> Cr <sup>+3</sup> O <sub>2</sub>
<b>Derbylite group</b> (D/L) <sub>7</sub> LO <sub>13</sub> (OH)								
Derbylite	35-599	i	7.156	14.354	4.980	494.81	mP46	Fe <sub>4</sub> Ti <sub>3</sub> SbO <sub>13</sub> (OH)
Tomichite	34-1401	i	7.119	14.176	4.992	486.51	mP46	(V,Fe) <sub>4</sub> Ti <sub>3</sub> AsO <sub>13</sub> (OH)
<b>Descloizite group</b> (D/L)(G/Q)(TO <sub>4</sub> )(OH)								
<b>Arsenate subgroup</b>								
Adelite	24-208		5.850	8.895	7.525	391.57	oP36	CaMgAsO <sub>4</sub> (OH)
Arsendescloizite	35-668		6.075	9.358	7.634	433.99	oP36	PbZnAsO <sub>4</sub> (OH)
Austinite	37-445	★	7.507	9.039	5.930	402.37	oP36	CaZnAsO <sub>4</sub> (OH)
Cobaltaustinitite	45-1410		7.498	9.006	5.920	399.76	oP36	CaCo(AsO <sub>4</sub> )(OH)
Conichalcite	37-448	i	7.400	9.234	5.834	398.68	oP36	CaCuAsO <sub>4</sub> (OH)
Duffite	42-1444	i	7.778	9.207	6.000	429.67	oP36	PbCuAsO <sub>4</sub> (OH)
Gabrielsonite	20-583		7.860	5.980	6.620	405.16	oP36	PbFeAsO <sub>4</sub> (OH)
Nickelaustinitite	41-1425	i	7.455	8.955	5.916	394.95	oP36	CaNi(AsO <sub>4</sub> )(OH)
<b>Silicate subgroup</b>								
Mozartite	46-1432	i	5.837	7.229	8.690	366.68	oP36	CaMn <sup>+3</sup> (OH)SiO <sub>4</sub>
Vuagnatite	29-289	★	7.054	8.541	5.684	342.44	oP36	CaAlSiO <sub>4</sub> (OH)
<b>Vanadate subgroup</b>								
Cechite	35-530	i	7.607	9.441	6.096	437.80	oP36	Pb(Fe <sup>+2</sup> ,Mn)VO <sub>4</sub> (OH)
Descloizite	12-537		7.602	9.460	6.060	435.80	oP36	(Zn,Cu)PbVO <sub>4</sub> (OH)
Descloizite, Cu-rich	41-1369	★	7.619	6.032	9.400	432.00	oP36	Pb(Zn,Cu)VO <sub>4</sub> (OH)
Duhamelite	35-500	i	7.490	9.660	5.870	424.71	oP57	Cu <sub>4</sub> <sup>+2</sup> Pb <sub>2</sub> Bi(VO <sub>4</sub> ) <sub>4</sub> (OH) <sub>3</sub> •8H <sub>2</sub> O
Mottramite	43-1463	★	7.693	9.267	6.040	430.60	oP36	PbCu <sup>+2</sup> (VO <sub>4</sub> )(OH)
Mottramite, Ca-rich	45-1465		7.520	9.610	5.910	427.10	oP36	(Pb,Ca)Cu(VO <sub>4</sub> )(OH)
Pyrobelonite	20-588		7.620	6.170	9.470	445.24	oP36	PbMn(VO <sub>4</sub> )(OH)
Tangeite	31-265		7.450	9.260	5.910	407.71	oP36	CaCuVO <sub>4</sub> (OH)
<b>Diamond supergroup</b> T or (T,T'/L) <sub>6</sub> <sup>12</sup> X <sub>8</sub> or (T,T'/L) <sub>6</sub> <sup>12</sup> T' <sub>8</sub>								
<b>2C-chalcogenide group</b>								
Coloradoite, syn	32-665	★	6.460	6.460	6.460	269.64	cF8	HgTe
Creerarite	47-1846		5.860	5.860	5.860	201.23	cF8	(Pt,Pb)Bi <sub>3</sub> (S,Se) <sub>4</sub>
Hawleyite	10-454		5.818	5.818	5.818	196.93	cF8	CdS
Isocubanite, syn	27-166		5.283	5.283	5.283	147.45	cF7.98	CuFe <sub>2</sub> S <sub>3</sub>
Metacinnabar, Se-rich	22-729		5.903	5.903	5.903	205.69	cF8	Hg(S,Se)
Metacinnabar, syn	6-261	★	5.852	5.852	5.852	200.38	cF8	HgS
Mgriite, syn	40-1250	i	5.515	5.515	5.515	167.74	cF8	CuAsSe <sub>2</sub>
Mgriite, syn	40-1251	i	5.530	5.530	5.530	169.11	cF8	Cu <sub>3</sub> AsSe <sub>4</sub>
Moissanite-3C, syn	29-1129	i	4.359	4.359	4.359	82.82	cF8	SiC
Sphalerite, Hg-rich	22-731		5.455	5.455	5.455	162.32	cF8	(Zn,Hg)S
Sphalerite, syn	5-566	i	5.406	5.406	5.406	157.99	cF8	ZnS
Stilleite, syn	37-1463	★	5.669	5.669	5.669	182.17	cF8	ZnSe
Tiemannite, syn	8-469	★	6.085	6.085	6.085	225.31	cF8	HgSe
<b>2C-diamond group</b>								
Diamond	6-675	★	3.567	3.567	3.567	45.37	cF8	C
Silicon, syn	27-1402	★	5.431	5.431	5.431	160.18	cF8	Si

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>2C-halide group</b>								
Marshallite, syn	6- 246	★	6.051	6.051	6.051	221.55	cF8	CuI
Miersite	2- 499		6.504	6.504	6.504	275.13	cF8	(Ag,Cu)I
Nantokite, syn	6- 344	★	5.416	5.416	5.416	158.87	cF8	CuCl
<b>2C-ordered group</b>								
Sakuraiite	40- 510		5.456	5.456	5.456	162.44	cP7.96	(Cu,Zn,Fe,In,Sn)S
Sulvanite	11- 104		5.393	5.393	5.393	156.85	cP8	Cu <sub>3</sub> VS <sub>4</sub>
<b>Q2a2c I42d group</b>								
Chalcopyrite	37- 471	★	5.289	5.289	10.423	291.60	tI16	CuFeS <sub>2</sub>
Gallite, syn	25- 279	i	5.351	5.351	10.484	300.16	tI16	CuGaS <sub>2</sub>
Roquesite, syn	27- 159	i	5.523	5.523	11.141	339.84	tI16	CuInS <sub>2</sub>
<b>Q2a2c I42m group</b>								
Briartite, syn	26- 527	i	5.330	5.330	10.528	299.09	tI16	Cu <sub>2</sub> FeGeS <sub>4</sub>
Briartite, syn	42- 565	C	5.325	5.325	10.510	298.02	tI16	Cu <sub>2</sub> FeGeS <sub>4</sub>
Cernyite	29- 537		5.487	5.487	10.845	326.51	tI16	Cu <sub>2</sub> CdSnS <sub>4</sub>
Famatinitite, syn	35- 581	★	5.385	5.385	10.748	311.72	tI16	Cu <sub>3</sub> SbS <sub>4</sub>
Ferrokösterite, Zn-rich, syn	31- 463	C	5.427	5.427	10.871	320.18	tI16	Cu <sub>4</sub> FeZnSn <sub>2</sub> S <sub>8</sub>
Hocartite	21- 1337	O	5.740	5.740	10.960	361.11	tI16	Ag <sub>2</sub> FeSnS <sub>4</sub>
Kösterite, Fe-rich	45- 688	i	5.446	5.446	10.800	320.36	tI16	Cu <sub>2</sub> (Zn,Fe)SnS <sub>4</sub>
Kösterite, syn	26- 575	i	5.427	5.427	10.848	319.50	tI16	Cu <sub>2</sub> ZnSnS <sub>4</sub>
Kuramite	29- 570		5.542	5.542	10.908	335.03	tI15.96	(Cu,Hg) <sub>5.5</sub> Sn <sub>2</sub> S <sub>8</sub>
Kuramite	30- 494	C	5.542	5.542	10.908	335.03	tI15.92	(Cu,Hg) <sub>5.5</sub> Sn <sub>2</sub> S <sub>8</sub>
Kuramite	33- 501	O	5.445	5.445	10.750	318.72	tI16	Cu <sub>3</sub> SnS <sub>4</sub>
Luzonite	10- 450		5.290	5.290	10.465	292.85	tI16	Cu <sub>3</sub> AsS <sub>4</sub>
Luzonite, Sb-rich	25- 285	C	5.330	5.330	10.570	300.28	tI16	Cu <sub>3</sub> (As,Sb)S <sub>4</sub>
Permingeatite	25- 263	i	5.630	5.630	11.230	355.96	tI16	Cu <sub>3</sub> SbSe <sub>4</sub>
Pirquitasite	35- 544		5.786	5.786	10.829	362.53	tI16	Ag <sub>2</sub> ZnSnS <sub>4</sub>
Stannite	44- 1476	★	5.450	5.450	10.739	318.99	tI16	Cu <sub>2</sub> FeSnS <sub>4</sub>
Velikite	50- 1661		5.560	5.560	10.905	337.11	tI16	Cu <sub>2</sub> HgSnS <sub>4</sub>
<b>Q2a3c group</b>								
Bukovite, syn	33- 497	i	3.966	3.966	13.713	215.69	tI10	Cu <sub>3</sub> FeTi <sub>2</sub> Se <sub>4</sub>
Muruskite	33- 1005	O	3.880	3.880	13.100	197.21	tI10	K <sub>2</sub> Cu <sub>3</sub> FeS <sub>4</sub>
Thalcusite, syn	29- 580		3.882	3.882	13.250	199.68	tI10	Cu <sub>3</sub> Tl <sub>2</sub> FeS <sub>4</sub>
<b>Q3a1c group</b>								
Chatkalite	35- 683	O	7.610	7.610	5.373	311.16	tP17	Cu <sub>6</sub> Fe <sup>+2</sup> Sn <sub>2</sub> S <sub>8</sub>
Hauchecornite	6- 457		7.290	7.290	5.400	286.98	tP19	Ni <sub>9</sub> BiSbS <sub>8</sub>
Mawsonite	30- 486	C	7.603	7.603	5.358	309.72	tP17	Cu <sub>6</sub> <sup>+1</sup> Fe <sup>+3</sup> Sn <sub>2</sub> S <sub>8</sub>
Tucekite	29- 927		7.174	7.174	5.402	278.02	tP19	Ni <sub>9</sub> Sb <sub>2</sub> S <sub>8</sub>
<b>Q3a2c group</b>								
Rhodostannite, syn	29- 558	i	7.301	7.301	10.338	551.06	tI28	Cu <sub>2</sub> FeSn <sub>3</sub> S <sub>8</sub>
Toyohaite	44- 1440		7.464	7.464	10.800	601.68	tI28	Ag <sub>2</sub> FeSn <sub>3</sub> S <sub>8</sub>
<b>Q4a2c group</b>								
Arsenohauchecornite	45- 1461	i	10.277	10.277	10.816	1142.35	tI76	Ni <sub>18</sub> Bi <sub>3</sub> AsS <sub>16</sub>
Mawsonite	29- 557	i	10.745	10.745	10.711	1236.64	tI68	Cu <sub>6</sub> <sup>+1</sup> Fe <sup>+3</sup> Sn <sub>2</sub> S <sub>8</sub>
Routhierite	29- 1338	i	9.977	9.977	11.290	1123.81	tI64	Cu <sub>2</sub> TlHgAsS <sub>4</sub>
Stalderite	49- 1837		9.855	9.855	10.937	1062.21	tI48	Cu <sub>2</sub> Tl <sub>2</sub> (Zn,Fe,Hg) <sub>2</sub> As <sub>2</sub> S <sub>6</sub>
<b>Q6a2c group</b>								
Bismutohauchecornite	45- 1328	i	14.650	14.650	10.760	2309.34	tP152	Bi <sub>2</sub> Ni <sub>9</sub> S <sub>8</sub>
Tellurohauchecornite	34- 566	i	14.640	14.640	10.870	2329.76	tP152	Ni <sub>9</sub> (Bi,Te) <sub>2</sub> S <sub>8</sub>
<b>Related structures</b>								
Arsenosulvanite, syn	35- 1017	i	10.528	10.528	10.528	1166.91	cP64	Cu <sub>3</sub> (As,V)S <sub>4</sub>
Eskebornite	41- 1464	i	5.518	5.518	11.048	336.39	tP16	CuFeSe <sub>2</sub>
Haycockite	25- 289		10.710	10.710	31.560	3620.06	oP204	Cu <sub>4</sub> (Fe,Ni) <sub>5</sub> S <sub>8</sub>
Lautite	39- 393	i	11.360	5.460	3.760	233.22	oP12	CuAsS
Mooihoekite, syn	25- 286		10.579	10.579	5.371	601.10	tP34	Cu <sub>9</sub> Fe <sub>9</sub> S <sub>16</sub>
Polhemusite	31- 870		8.710	8.710	14.740	1118.24	tP49.20	(Zn,Hg)S
Putoranite	41- 1404		5.300	5.300	5.300	148.88	cP12	CuFeS <sub>2</sub>
Sinnerite, syn	25- 264		9.071	9.834	9.076	722.12	aP38	Cu <sub>2</sub> As <sub>2</sub> S <sub>9</sub>
Stannoidite	22- 237	i	10.760	5.400	16.090	934.89	oI50	Cu <sub>8</sub> (Fe,Zn) <sub>3</sub> Sn <sub>2</sub> S <sub>12</sub>
Talnakhite	25- 287		10.591	10.591	10.591	1187.98	cI66	Cu <sub>9</sub> (Fe,Ni) <sub>3</sub> S <sub>16</sub>
<b>Diaspore group GO(OH)</b>								
Bracewellite	25- 1497	i	4.492	9.860	2.974	131.72	oP16	Cr <sup>+3</sup> O(OH)
Diaspore	5- 355	i	4.396	9.426	2.844	117.85	oP16	AlO(OH)
Goethite	29- 713	i	4.608	9.956	3.022	138.62	oP16	Fe <sup>+3</sup> O(OH)
Groutite	12- 733		4.565	10.695	2.852	139.24	oP16	Mn <sup>+3</sup> O(OH)
Groutite	24- 713	C	4.560	10.700	2.870	140.03	oP16	Mn <sup>+3</sup> O(OH)
Groutite, Sb-rich	20- 108		4.568	10.581	2.885	139.44	oP16.60	(Mn,Sb)O(OH)
Montroseite	11- 152	i	4.820	9.480	2.930	133.88	oP16	VO(OH)
<b>Dickinsonite group DD'<sub>4</sub>EE'<sub>4</sub>E''<sub>10</sub>Al(PO<sub>4</sub>)<sub>12</sub>X<sub>2</sub></b>								
Arrojadite	34- 149	★	16.537	10.056	24.750	3963.24	mC340	KNa <sub>4</sub> CaMn <sub>4</sub> <sup>+2</sup> Fe <sub>10</sub> <sup>+2</sup> Al(PO <sub>4</sub> ) <sub>12</sub> (OH,F) <sub>2</sub>
Dickinsonite	43- 1466	C	24.940	10.131	16.722	4069.46	mC340	KNa <sub>4</sub> CaMn <sub>14</sub> Al(PO <sub>4</sub> ) <sub>12</sub> (OH) <sub>2</sub>
Sigismundite	50- 1556	i	16.394	9.932	24.437	3829.00	mC336	Na <sub>3</sub> Ba(Ca,Sr)(Fe,Mg) <sub>14</sub> Al(PO <sub>4</sub> ) <sub>12</sub> (OH) <sub>2</sub>
<b>Djerfisherite group (D/L)<sub>6</sub>(Q/E)<sub>25</sub>S<sub>26</sub>Cl</b>								
Djerfisherite	18- 1007	i	10.340	10.340	10.340	1105.51	cP30.70	K <sub>6</sub> (Cu,Fe) <sub>25</sub> S <sub>26</sub> Cl
Djerfisherite	25- 635		10.410	10.410	10.410	1128.11	cP58	K <sub>6</sub> (Cu,Fe) <sub>25</sub> S <sub>26</sub> Cl
Owensite	49- 1862	i	10.373	10.373	10.373	1116.13	cP58	(Ba,Pb) <sub>6</sub> (Cu,Fe,Ni) <sub>25</sub> S <sub>27</sub>
Thalfenisite	33- 1401	O	10.238	10.238	10.238	1073.11	cP58	Tl <sub>6</sub> (Fe,Ni,Cu) <sub>25</sub> S <sub>26</sub> Cl
<b>Domeykite-β group (Q/X)<sub>3</sub>(D/L)</b>								
Domeykite-β	14- 454		7.160	7.160	7.330	325.43	hP24	Cu <sub>3</sub> As
Fluocerite-(Ce), syn	38- 452	i	7.129	7.129	7.287	320.75	hP24	CeF <sub>3</sub>
Fluocerite-(La), syn	32- 483	★	7.187	7.187	7.350	328.80	hP24	LaF <sub>3</sub>
<b>Dufrenoyte group E<sub>2/ν</sub>G<sub>12</sub>(PO<sub>4</sub>)<sub>8</sub>X<sub>12</sub>•4H<sub>2</sub>O</b>								
Burangaitite	29- 1190	i	25.090	5.048	13.450	1591.31	mC180	(Na,Ca) <sub>2</sub> (Fe <sup>+2</sup> ,Mg) <sub>2</sub> Al <sub>10</sub> (PO <sub>4</sub> ) <sub>8</sub> (OH,O) <sub>12</sub> •4H <sub>2</sub> O
Dufrenoyte	8- 155		24.730	5.163	13.990	1761.14	mC144	Fe <sub>5</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH) <sub>5</sub> •2H <sub>2</sub> O
Dufrenoyte	22- 1143	i	25.840	5.126	13.780	1701.72	mC178	CaFe <sub>12</sub> (PO <sub>4</sub> ) <sub>8</sub> (OH) <sub>12</sub> •4H <sub>2</sub> O
Natrodufrenoyte	35- 570	i	25.830	5.150	13.772	1704.19	mC180	Na(Fe,Al) <sub>6</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>6</sub> •2H <sub>2</sub> O

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Dumortierite group</b> $EE^1_2Al_4(SiO_4)_3(BO_3)OX_2$								
Dumortierite	7- 71	i	11.770	20.210	4.710	1120.38	oP116	$(Al,Fe)_7BO_3(SiO_4)_3O_3$
Holtite	25- 1209	i	11.905	20.355	4.690	1136.51	oP116	$(Ta,Sb)Al_6(SiO_4)_3BO_3(O,OH)_3$
Magnesioidumortierite	47- 1876	i	11.910	20.400	4.730	1149.22	oP124	$(Mg,Ti)(Al,Mg)_2Al_4(SiO_4)_3(BO_3)(O)(OH)_2$
<b>Dundasite group</b> $D_2Al_4(CO_3)_4(OH)_8 \cdot 2,3H_2O$								
Dresserite	20- 617	i	9.270	16.830	5.630	878.36	oP94	$Ba_2Al_4(CO_3)_4(OH)_8 \cdot 3H_2O$
Dundasite	21- 936	i	9.050	16.350	5.610	830.10	oP94	$Pb_2Al_4(CO_3)_4(OH)_8 \cdot 3H_2O$
Strontiodresserite	29- 1295	i	9.140	15.910	5.594	813.46	oP88	$(Sr,Ca)Al_2(CO_3)_2(OH)_4 \cdot H_2O$
<b>Related structures</b>								
Alumohydrocalcite	42- 592	i	6.498	14.457	5.678	525.29	aP56	$CaAl_2(CO_3)_2(OH)_4 \cdot 3H_2O$
Hydrodresserite	29- 145	i	9.790	10.420	5.620	511.40	aP56	$BaAl_2(CO_3)_2(OH)_4 \cdot 3H_2O$
Montroyalite	40- 470							$Sr_4Al_8(CO_3)_8(OH)_8F_{126} \cdot 11H_2O$
Paraalumohydrocalcite	30- 222							$CaAl_2(CO_3)_2(OH)_4 \cdot 6H_2O$
<b>Ekaniite group</b> $D(E/Q)_2E^1_{0,1}[Si_8O_{20}]$								
Cuprorivaite, syn	12- 512	i	7.300	7.300	15.120	805.74	tP64	$CaCu^{+2}Si_4O_{10}$
Effenbergite	47- 1779	★	7.442	7.442	16.133	893.50	tP64	$BaCuSi_4O_{10}$
Effenbergite, syn	12- 510		7.440	7.440	16.110	891.75	tP64	$BaCuSi_4O_{10}$
Ekaniite	35- 532		7.483	7.483	14.893	833.94	tP62	$ThCa_2Si_8O_{20}$
Gillespite	37- 472	★	7.522	7.522	16.082	909.93	tP64	$BaFe^{+2}Si_4O_{10}$
Iraqite-(La)	29- 995	i	7.610	7.610	14.720	852.47	tP63	$KCa_4La_2Si_{16}O_{40}$
Steaeyite	25- 677		7.580	7.580	14.770	848.63	tP64	$K(Na,Ca)_2ThSi_8O_{20}$
Steaeyite	39- 408	i	7.583	7.583	14.763	848.90	tP63.45	$KNa_2ThSi_8O_{20}$
Turkestanite	50- 1685	i	7.592	7.592	14.824	854.43	tP68.50	$K_{0.85}(Ca,Na)_2ThSi_8O_{20} \cdot 0.8H_2O$
Wesselite	49- 1813	i	7.366	7.366	15.574	845.01	tP64	$CuSrSi_4O_{10}$
<b>Epidote supergroup</b> $(D/L)_2G_3(SiO_4)[Si_2O_7]X_2$								
Allanite-(Ce)	25- 169	★	8.932	5.770	10.158	475.66	mP42	$Ca_2Ce_3(SiO_4)(Si_2O_7)(O,OH)_2$
Allanite-(La)	45- 1352	i	8.905	5.699	10.131	466.09	mP43.76	$(Ca,La,Ce)_2(Al,Fe^{+3})_2(Fe^{+2},Mg)(SiO_4)_3(OH)$
Androsite-(La)	49- 1826	i	8.896	5.706	10.083	468.00	mP44	$(Mn,Ca)(La,Ln)AlMn_2(SiO_4)(Si_2O_7)(O)(OH)$
Clinozoisite	44- 1400	★	8.882	5.604	10.149	456.22	mP44	$Ca_2Al_3(SiO_4)(Si_2O_7)(O)(OH)$
Dissakisite-(Ce)	47- 1788	i	8.920	5.700	10.140	468.39	mP44	$Ca(Ce,La)MgAl_2Si_3O_{12}(OH)$
Dollaseite-(Ce)	41- 1469	i	8.934	5.721	10.176	473.99	mP44	$CaMg_2AlCe(SiO_4)(Si_2O_7)F(OH)$
Epidote	45- 1446	i	8.898	5.635	10.162	460.31	mP46	$Pb_2(Al,Fe)_3(Si_2O_7)(SiO_4)(OH)_2$
Hancockite	17- 212		9.030	5.620	10.290	469.75	mP42	$Pb_2Al_3(SiO_4)(Si_2O_7)(O,OH)_2$
Khristovite-(Ce)	46- 1426		8.903	5.748	10.103	474.46	mP46	$Ce(Ca,Ln)Ln(Mg,Fe)AlMnSi_3O_{11}(OH)(F,O)$
Mukhimite	22- 1066	i	8.900	5.610	10.150	457.41	mP42	$Ca_2Al_2V(SiO_4)(Si_2O_7)(O,OH)_2$
Piemontite	19- 897	i	8.900	5.680	10.160	463.96	mP42	$Ca_2Al_2Mn(SiO_4)(Si_2O_7)(O,OH)_2$
Piemontite	29- 288	i	8.843	5.665	10.150	459.89	mP42	$Ca_2Al_2Mn(SiO_4)(Si_2O_7)(O,OH)_2$
Strontioepimontite	46- 1345	i	8.862	5.682	10.191	466.21	mP44	$CaSr(Al,Mn,Fe)_3Si_3O_{11}(O)(OH)$
Zoisite, syn	13- 562	i	16.150	5.581	10.060	906.74	oP84	$Ca_2Al_3(SiO_4)(Si_2O_7)(O,OH)_2$
<b>Epsomite group</b> $G(SO_4) \cdot 7H_2O$								
Epsomite, syn	36- 419	★	11.869	11.984	6.847	973.90	oP108	$MgSO_4 \cdot 7H_2O$
Goslarite, syn	9- 395	i	11.779	12.050	6.822	968.29	oP108	$ZnSO_4 \cdot 7H_2O$
Morenosite, syn	1- 403		11.860	12.080	6.810	975.66	oP108	$NiSO_4 \cdot 7H_2O$
<b>Ettringite supergroup</b> $Ca_6G_2[(RX_3)_{2-2n}(TX_4)_{2+n}(OH)_{12}] \cdot 24,26H_2O; n=0,1$								
<b>1H group</b>								
Jouravskite	18- 668		11.060	11.060	10.500	1112.32	hP122	$Ca_3Mn(CO_3)(SO_4)(OH)_6 \cdot 12H_2O$
Thaumasite	46- 1360	★	11.064	11.064	10.454	1108.25	hP122	$Ca_3Si(OH)_6CO_3[SO_4] \cdot 12H_2O$
<b>2H group</b>								
Bentorite	33- 248		11.210	11.210	21.480	2337.63	hP250	$Ca_6Cr_2(SO_4)_3(OH)_{12} \cdot 26H_2O$
Charlesite	35- 606	i	11.160	11.160	21.210	2287.70	hP258	$Ca_6(Al,Si)_2(SO_4)_2(B(OH)_4)(OH,O)_{12} \cdot 26H_2O$
Ettringite, syn	41- 1451	★	11.224	11.224	21.408	2335.62	hP250	$Ca_6Al_2(SO_4)_3(OH)_{12} \cdot 26H_2O$
Sturmanite	35- 637	i	11.160	11.160	21.790	2350.26	hP258	$Ca_6Fe_2(SO_4)_2[B(OH)_4](OH)_{12} \cdot 26H_2O$
<b>Fairfieldite group</b> $(D/L)(D'/Q)(G/Q')(TO_4)_2 \cdot 2H_2O$								
<b>Arsenate subgroup</b>								
Gaitite	33- 598	i	5.900	7.610	5.570	199.08	aP19	$Ca_2Zn(AsO_4)_2 \cdot 2H_2O$
Parabrandtite	40- 1457	i	5.890	7.031	5.640	202.49	aP19	$Ca_2Mn^{+2}(AsO_4)_2 \cdot 2H_2O$
Roselite-β	17- 166		5.880	7.670	5.580	199.51	aP19	$Ca_2Co(AsO_4)_2 \cdot 2H_2O$
Talmessite	38- 451		5.874	6.943	5.537	196.76	aP19	$Ca_2Mg(AsO_4)_2 \cdot 2H_2O$
<b>Phosphate subgroup</b>								
Cassidyite	20- 228		5.710	6.730	5.410	187.68	aP19	$Ca_2Ni(PO_4)_2 \cdot 2H_2O$
Collinsite	26- 1063	i	5.734	6.780	5.441	185.66	aP19	$Ca_2Mg(PO_4)_2 \cdot 2H_2O$
Collinsite, Fe-rich	35- 635	★	5.735	6.787	5.462	186.56	aP19	$Ca_2(Mg,Fe^{+2})(PO_4)_2 \cdot 2H_2O$
Collinsite, Zn-rich	27- 83		5.712	6.830	5.393	190.52	aP19	$Ca_2(Mg,Zn)(PO_4)_2 \cdot 2H_2O$
Fairfieldite	10- 390		5.780	6.570	5.480	192.20	aP19	$Ca_2(Mn^{+2},Fe^{+2})(PO_4)_2 \cdot 2H_2O$
Messelite	10- 389	O	5.950	6.520	5.450	196.32	aP19	$Ca_2(Fe^{+2},Mn^{+2})(PO_4)_2 \cdot 2H_2O$
<b>Related structures</b>								
Xanthoxenite	30- 258		6.700	8.850	6.540	362.72	aP39	$Ca_4Fe_2(PO_4)_4(OH)_2 \cdot 3H_2O$
<b>Feldspar family</b> $D_{2x/y,3}[T_xT'_{4-x}O_8]_2; x = 1 \leftrightarrow 2$								
<b>40 group</b>								
Banalsite	38- 401	i	8.497	9.983	16.756	1421.34	oI108	$Na_2BaAl_4(SiO_4)_4$
Stronalsite	40- 1451	i	8.415	9.901	16.729	1393.81	oI108	$Na_2SrAl_4(SiO_4)_4$
<b>Orthoclase supergroup</b>								
Anorthoclase, disordered	9- 478	i	8.287	12.972	7.156	689.47	aP26	$(Na,K)(Si_3Al)O_8$
Buddingtonite, syn	45- 1428	★	8.828	13.079	7.203	746.75	mC68	$NH_4AlSi_3O_8$
Celsian, syn	38- 1450	★	8.641	13.047	7.203	735.55	mC52	$BaAl_2Si_2O_8$
Microcline, intermediate	19- 932	i	8.560	12.970	7.210	718.74	aP26	$KAlSi_3O_8$
Microcline, ordered	19- 926	★	8.581	12.961	7.223	721.76	aP26	$KAlSi_3O_8$
Orthoclase	31- 966	★	8.556	12.980	7.205	719.12	mC52	$KAlSi_3O_8$
Orthoclase, Ba-rich	19- 2	i	8.552	13.040	7.200	723.50	mC52	$(K,Ba,Na)(Si,Al)_4O_8$
Orthoclase, Ba-rich	19- 3		8.616	13.059	7.199	729.88	mC52	$(K,Ba)(Si,Al)_4O_8$
Sanidine	19- 1227	★	8.427	13.000	7.168	705.19	mC52	$(K,Na)(Si_3Al)O_8$
Sanidine, K-rich, disordered, syn	10- 357		8.335	12.970	7.159	694.41	mC52	$(Na,K)(Si_3Al)O_8$
Sanidine, disordered	25- 618	★	8.604	13.035	7.175	723.26	mC52	$K(Si_3Al)O_8$

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Paracelsian supergroup</b>								
Danburite	29- 304	i	8.041	8.760	7.737	544.99	oP52	CaB <sub>2</sub> (SiO <sub>4</sub> ) <sub>2</sub>
Hurlbutite	6- 213		8.290	8.800	7.810	569.76	oP52	CaBe <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub>
Hurlbutite	34-1441	C	8.306	8.790	7.804	569.74	mP52	CaBe <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub>
Paracelsian	10- 352	i	9.076	9.583	8.578	746.07	mP52	BaAl <sub>2</sub> Si <sub>2</sub> O <sub>8</sub>
Slawsonite	37- 462	★	8.895	9.359	8.333	693.70	mP52	SrAl <sub>2</sub> Si <sub>2</sub> O <sub>8</sub>
Svyatoslavite	46-1266		8.232	8.606	4.852	343.74	oP26	CaAl <sub>2</sub> Si <sub>2</sub> O <sub>8</sub>
<b>Plagioclase supergroup</b>								
Albite, Ca-rich, disordered, syn	9- 456		8.163	12.875	7.107	668.04	aP26	(Na,Ca)(Si,Al) <sub>4</sub> O <sub>8</sub>
Albite, Ca-rich, ordered	41-1480	i	8.161	12.858	7.112	666.83	aP26	(Na,Ca)Al(Si,Al) <sub>3</sub> O <sub>8</sub>
Albite, disordered	10- 393	★	8.165	12.872	7.111	667.79	aP26	Na(Si <sub>3</sub> Al)O <sub>8</sub>
Albite, ordered	9- 466	★	8.144	12.787	7.160	664.84	aP26	NaAlSi <sub>3</sub> O <sub>8</sub>
Albite, ordered	19-1184	i	8.138	12.790	7.161	664.59	aP26	NaAlSi <sub>3</sub> O <sub>8</sub>
Anorthite, Na-rich, disordered	41-1481	i	8.181	12.874	7.097	670.22	aP52	(Ca,Na)(Si,Al) <sub>4</sub> O <sub>8</sub>
Anorthite, Na-rich, intermediate	18-1202	i	8.176	12.865	7.102	669.11	aP26	(Ca,Na)(Si,Al) <sub>4</sub> O <sub>8</sub>
Anorthite, Na-rich, ordered	9- 465		8.165	12.859	7.097	667.64	aP26	(Ca,Na)(Al,Si) <sub>2</sub> Si <sub>2</sub> O <sub>8</sub>
Anorthite, Na-rich, ordered	20- 528	C	8.178	12.870	14.187	1339.53	aP104	(Ca,Na)(Al,Si) <sub>2</sub> Si <sub>2</sub> O <sub>8</sub>
Anorthite, ordered	41-1486	★	8.176	12.872	14.183	1338.75	aP104	CaAl <sub>2</sub> Si <sub>2</sub> O <sub>8</sub>
Reedmergerite	18-1201	★	7.833	12.360	6.803	587.82	aP26	NaBSi <sub>3</sub> O <sub>8</sub>
<b>Fillowite group D<sub>2</sub>D'G<sub>7</sub>(PO<sub>4</sub>)<sub>6</sub></b>								
Chladniite	47-1763	i	14.994	14.994	42.600	8294.21	hR240	Na <sub>2</sub> CaMg <sub>7</sub> (PO <sub>4</sub> ) <sub>6</sub>
Fillowite	18- 516		15.282	15.282	43.507	8799.34	hR240	Na <sub>2</sub> Ca(Mn <sup>+2</sup> ,Fe <sup>+2</sup> ) <sub>7</sub> (PO <sub>4</sub> ) <sub>6</sub>
Galileite	50-1612		14.980	14.980	41.660	8096.06	hR240	NaFe <sub>4</sub> (PO <sub>4</sub> ) <sub>3</sub>
Johnsomervilleite	33-1224		15.000	15.000	42.750	8330.08	hR240	Na <sub>2</sub> Ca(Mg,Fe <sup>+2</sup> ,Mn) <sub>7</sub> (PO <sub>4</sub> ) <sub>6</sub>
<b>Fleischerite group (D/L)<sub>3</sub>G(SO<sub>4</sub>)<sub>2</sub>(OH)<sub>6</sub>•3H<sub>2</sub>O</b>								
Despujolsite	20- 226		8.560	8.560	10.760	682.80	hP70	Ca <sub>3</sub> Mn <sup>+4</sup> (SO <sub>4</sub> ) <sub>2</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
Fleischerite, syn	29- 771	i	8.867	8.867	10.875	740.48	hP70	Pb <sub>3</sub> Ge <sup>+4</sup> (SO <sub>4</sub> ) <sub>2</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
Schaurteite	19- 225	i	8.525	8.525	10.803	679.93	hP70	Ca <sub>3</sub> Ge(SO <sub>4</sub> ) <sub>2</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
<b>Fluorite group EX<sub>2</sub> or ET<sub>2</sub></b>								
<b>Halide subgroup</b>								
Fluorite, Y-rich	31- 293	i	5.500	5.500	5.500	166.38	cF12	(Ca,Y)F <sub>2</sub>
Fluorite, syn	35- 816	★	5.463	5.463	5.463	163.04	cF12	CaF <sub>2</sub>
Frankdicksonite, syn	4- 452	★	6.200	6.200	6.200	238.34	cF12	BaF <sub>2</sub>
<b>Metallic subgroup</b>								
Damiaoite	50-1616	O	6.364	6.364	6.364	257.75	cF12	In <sub>2</sub> Pt
<b>Oxide subgroup</b>								
Cerianite-(Ce), syn	34- 394	★	5.411	5.411	5.411	158.46	cF12	CeO <sub>2</sub>
Cerianite-(Ce), syn	43-1002	C	5.411	5.411	5.411	158.46	cF12	CeO <sub>2</sub>
Tazheranite	22- 540	i	5.108	5.108	5.108	133.28	cF12	(Zr,Ca,Ti)O <sub>2</sub>
Thorianite, syn	42-1462	★	5.597	5.597	5.597	175.33	cF12	ThO <sub>2</sub>
Uraninite-C	41-1422	★	5.467	5.467	5.467	163.40	cF12	UO <sub>2</sub>
<b>Related structures</b>								
Parwellite	29- 346	i	10.048	19.418	9.735	1889.59	mC160	(Mn,Mg,Ca) <sub>5</sub> SbAsSiO <sub>12</sub>
Uraninite-O	47-1879	i	3.802	3.702	5.403	76.05	oI6.40	UO <sub>2.2</sub>
Uraninite-Q, syn	15- 4		5.448	5.448	5.394	160.10	tP12	U <sub>3</sub> O <sub>7</sub>
<b>Fornacite group (D/L)<sub>2</sub>G(TO<sub>4</sub>)(T'O<sub>4</sub>)(OH)</b>								
Fornacite	15- 200	i	8.022	5.906	17.564	779.96	mP60	Pb <sub>2</sub> Cu(CrO <sub>4</sub> )(AsO <sub>4</sub> )(OH)
Molybdoformacite	35- 593	i	8.100	5.946	17.650	802.93	mP60	Pb <sub>2</sub> Cu(MoO <sub>4</sub> )(AsO <sub>4</sub> )(OH)
Törnebohmite-(Ce)	14- 257		7.383	5.673	16.937	657.54	mP60	Ce <sub>2</sub> Al(SiO <sub>4</sub> ) <sub>2</sub> (OH)
Törnebohmite-(Ce)	34- 160	C	7.383	5.673	16.937	657.54	mP60	Ce <sub>2</sub> Al(SiO <sub>4</sub> ) <sub>2</sub> (OH)
Törnebohmite-(La), syn	37- 62	i	7.401	5.702	17.072	666.09	mP60	La <sub>2</sub> Al(SiO <sub>4</sub> ) <sub>2</sub> (OH)
Unnamed mineral	47-1764	i	8.050	5.910	17.670	791.46	mP60	Pb <sub>2</sub> Cu(Mo,As,Cr) <sub>2</sub> O <sub>4</sub> PO <sub>4</sub> OH
<b>Related structures</b>								
Vauquelinite	13- 302		13.680	5.830	9.530	758.24	mP60	Pb <sub>2</sub> Cu(CrO <sub>4</sub> )(PO <sub>4</sub> )(OH)
<b>Franconite group D<sub>2</sub>vNb<sub>4</sub>O<sub>11</sub>•8,9H<sub>2</sub>O</b>								
Franconite	38- 357	i	22.220	12.857	6.359	1815.27	mP176	Na <sub>2</sub> Nb <sub>4</sub> O <sub>11</sub> •9H <sub>2</sub> O
Hochelagaite	36- 418		19.882	12.831	6.438	1639.81	mP160	CaNb <sub>4</sub> O <sub>11</sub> •8H <sub>2</sub> O
Ternovite	50-1576	i	20.656	13.062	6.338	1709.11	mP184	(Mg,Ca)Nb <sub>4</sub> O <sub>11</sub> •10H <sub>2</sub> O
<b>Freieslebenite supergroup AgLL'S<sub>3</sub></b>								
Freieslebenite	10- 468		7.540	12.820	5.890	568.91	mP24	AgPbSbS <sub>3</sub>
Laffittite	35- 566	★	7.752	11.329	6.662	529.52	mC24	AgHgAsS <sub>3</sub>
Marrite	21-1338	i	7.291	12.680	5.998	554.39	mP24	AgPbAsS <sub>3</sub>
<b>Gadolinite group (D/L)<sub>2</sub>G<sub>0,1</sub>T<sub>2</sub>(T'O<sub>4</sub>)<sub>2</sub>X<sub>2</sub>•0,1H<sub>2</sub>O</b>								
Bakerite	36- 428	i	9.533	7.569	4.794	345.90	mP37	Ca <sub>4</sub> B <sub>4</sub> (BO <sub>4</sub> )(SiO <sub>4</sub> ) <sub>3</sub> (OH) <sub>3</sub> •H <sub>2</sub> O
Bergslagite	35- 650	i	4.882	7.809	10.127	386.06	mP36	CaBeAsO <sub>4</sub> OH
Datolite	36- 429	★	9.633	7.610	4.835	354.44	mP36	CaBSiO <sub>4</sub> (OH)
Drugmanite	33- 732	i	11.100	7.976	4.644	411.13	mP36	Pb <sub>2</sub> (Fe,Al)(PO <sub>4</sub> ) <sub>2</sub> (OH)•H <sub>2</sub> O
Gadolinite-(Ce), heated	29-1409		4.820	7.580	10.010	365.71	mP34	(Ce,Ln,Y) <sub>2</sub> FeBe <sub>2</sub> Si <sub>2</sub> O <sub>10</sub>
Gadolinite-(Y), syn	26-1134	i	9.920	7.484	4.747	352.44	mP34	Be <sub>2</sub> Fe <sup>+3</sup> Y <sub>2</sub> Si <sub>2</sub> O <sub>10</sub>
Herderite	6- 338	O	4.810	7.700	9.820	363.70	mP36	CaBePO <sub>4</sub> (OH,F)
Hingganite-(Ce)	40-1452		10.004	7.690	4.789	368.42	mP36	Ce <sub>2</sub> Be <sub>2</sub> Si <sub>2</sub> O <sub>8</sub> (OH) <sub>2</sub>
Hingganite-(Y), syn	26- 812	i	9.861	7.605	4.720	353.96	mP36	BeYSiO <sub>4</sub> (OH)
Hingganite-(Yb)	35- 705		9.888	7.607	4.740	356.52	mP36	(Yb,Y)BeSiO <sub>4</sub> (OH)
Homilite	36- 430	i	9.787	7.614	4.780	356.18	mP34	Ca <sub>2</sub> (Fe,Mn)B <sub>2</sub> Si <sub>2</sub> O <sub>10</sub>
Hydroxyherderite	34- 147	i	9.802	7.671	4.813	361.89	mP36	CaBePO <sub>4</sub> (OH)
Minasgeraisite-(Y)	39- 344	i	9.833	7.562	4.702	349.62	mP34	Be <sub>2</sub> CaY <sub>2</sub> Si <sub>2</sub> O <sub>10</sub>
<b>Gainesite group D<sub>2</sub>Zr<sub>2</sub>T(PO<sub>4</sub>)<sub>4</sub>•0&lt;=&gt;2H<sub>2</sub>O</b>								
Gainesite	35- 604	O	6.567	6.567	17.119	738.27	tI50	Na <sub>2</sub> Zr <sub>2</sub> Be(PO <sub>4</sub> ) <sub>4</sub>
Gainesite	35- 724	C	6.567	6.567	17.119	738.27	tI50	Na <sub>2</sub> Zr <sub>2</sub> Be(PO <sub>4</sub> ) <sub>4</sub>
Mccrillisite	47-1845	i	6.573	6.573	17.280	746.57	tI59	NaCsZr <sub>2</sub> (Be,Li)(PO <sub>4</sub> ) <sub>4</sub> •1.5H <sub>2</sub> O
Selwynite	47-1860	i	6.570	6.570	17.142	739.93	tI62	NaKZr <sub>2</sub> (Be,Al)(PO <sub>4</sub> ) <sub>4</sub> •2H <sub>2</sub> O

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Garnet group E<sub>3</sub>G<sub>2</sub>[TX<sub>4</sub>X'<sub>4</sub>]<sub>3</sub></b>								
<b>Aluminate subgroup</b>								
Kimzeyite	13- 130	i	12.460	12.460	12.460	1934.43	cI160	Ca <sub>3</sub> (Zr,Fe,Ti) <sub>2</sub> (Al,Si,Fe)O <sub>4</sub> <sub>3</sub>
<b>Arsenate subgroup</b>								
Berzeliite	19- 165	i	12.340	12.340	12.340	1879.26	cI160	(Ca,Na) <sub>3</sub> (Mg,Mn <sup>+2</sup> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>3</sub>
Manganberzeliite, syn	20- 1089	i	12.520	12.520	12.520	1962.52	cI160	NaCa <sub>2</sub> Mn <sub>2</sub> (AsO <sub>4</sub> ) <sub>3</sub>
<b>Halide subgroup</b>								
Cryolithionite	22- 416	i	12.125	12.125	12.125	1782.74	cI160	Li <sub>3</sub> Na <sub>3</sub> Al <sub>2</sub> F <sub>12</sub>
<b>Hydroxide subgroup</b>								
Hibschite	45- 1447	★	12.288	12.288	12.288	1855.20	cI202	Ca <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>1.25</sub> (OH) <sub>7</sub>
Katoite, Si-rich	38- 368	i	12.358	12.358	12.358	1887.32	cI213.52	Ca <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> )(OH) <sub>8</sub>
Katoite, syn	24- 217	★	12.573	12.573	12.573	1987.40	cI232	Ca <sub>3</sub> Al <sub>2</sub> (OH) <sub>12</sub>
<b>Phosphate subgroup</b>								
Griphite	41- 582		12.166	12.166	12.166	1800.71	cP167	Na <sub>4</sub> Ca <sub>6</sub> Mn <sub>19</sub> Li <sub>2</sub> Al <sub>8</sub> (PO <sub>4</sub> ) <sub>24</sub> (F,OH) <sub>8</sub>
<b>Silicate subgroup</b>								
Almandine	9- 427		11.530	11.530	11.530	1532.81	cI160	Fe <sub>3</sub> <sup>+2</sup> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Almandine, Mn-rich	33- 658	★	11.563	11.563	11.563	1546.01	cI160	(Fe <sup>+2</sup> ,Mn) <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Andradite, OH-rich	30- 253		12.063	12.063	12.063	1755.36	cI?	Ca <sub>3</sub> Fe <sub>2</sub> <sup>+3</sup> (SiO <sub>4</sub> ) <sub>3-x</sub> (OH) <sub>4-x</sub>
Andradite, syn	10- 288	★	12.059	12.059	12.059	1753.61	cI160	Ca <sub>3</sub> Fe <sub>2</sub> <sup>+3</sup> (SiO <sub>4</sub> ) <sub>3</sub>
Calderite, Ca-rich	10- 367		11.819	11.819	11.819	1650.98	cI160	(Mn <sup>+2</sup> ,Ca) <sub>3</sub> (Fe <sup>+3</sup> ,Al) <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Goldmanite	16- 714	i	12.026	12.026	12.026	1739.26	cI160	Ca <sub>3</sub> (V,Fe <sup>+3</sup> ,Al) <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Grossular	39- 368	★	11.849	11.849	11.849	1663.71	cI160	Ca <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Grossular, OH-rich	3- 801	i	12.140	12.140	12.140	1789.19	cI160	Ca <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> CO <sub>3</sub> OH) <sub>3</sub>
Grossular, OH-rich	31- 250		12.000	12.000	12.000	1728.00	cI184	Ca <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub>
Grossular, OH-rich	42- 570	C	12.040	12.040	12.040	1745.34	cI184	Ca <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub>
Knorringtonite, syn	35- 536	i	11.596	11.596	11.596	1559.28	cI160	Mg <sub>3</sub> Cr <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Morimotoite	47- 1877	★	12.162	12.162	12.162	1798.93	cI160	Ca <sub>3</sub> TiFeSi <sub>3</sub> O <sub>12</sub>
Pyrope, syn	15- 742	★	11.455	11.455	11.455	1503.09	cI160	Mg <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Schorlomite	33- 285	★	12.128	12.128	12.128	1783.89	cI160	Ca <sub>3</sub> (Fe,Ti) <sub>2</sub> [(Si,Ti)O <sub>4</sub> ] <sub>3</sub>
Spessartine, V-rich	47- 1815	i	11.690	11.690	11.690	1597.51	cI160	(Mn,Ca) <sub>3</sub> (Al,V) <sub>2</sub> Si <sub>3</sub> O <sub>12</sub>
Spessartine, syn	10- 354		11.630	11.630	11.630	1573.04	cI160	Mn <sub>3</sub> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Uvarovite, syn	11- 696	i	11.999	11.999	11.999	1727.57	cI160	Ca <sub>3</sub> Cr <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
<b>Vanadate subgroup</b>								
Palenzonaite	41- 608	i	12.534	12.534	12.534	1969.11	cI160	(Ca <sub>2</sub> Na)Mn <sub>2</sub> <sup>+2</sup> (VO <sub>4</sub> ) <sub>3</sub>
<b>Zincate subgroup</b>								
Yafsoanite	35- 661		12.621	12.621	12.621	2010.39	cI160	Ca <sub>3</sub> Te <sub>2</sub> Zn <sub>3</sub> O <sub>12</sub>
<b>Related structures</b>								
Almandine, syn	41- 1423		11.470	11.470	11.470	1509.00	cP160	Fe <sub>3</sub> <sup>+2</sup> Al <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Henritermierite	22- 150		12.390	12.390	11.910	1828.33	tI184	Ca <sub>3</sub> (Mn,Al) <sub>2</sub> (SiO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub>
Majorite	25- 843		11.524	11.524	11.524	1530.42	tI160	Mg <sub>3</sub> Fe <sub>2</sub> (SiO <sub>4</sub> ) <sub>3</sub>
<b>Germanite group see Tetrahedrite family</b>								
<b>Gold supergroup DD'<sub>3</sub></b>								
<b>1C-disordered group</b>								
Aluminium, syn	4- 787	★	4.049	4.049	4.049	66.40	cF4	Al
Bilibinskite	29- 544		4.095	4.095	4.095	68.67	cF4	Au <sub>3</sub> Cu <sub>2</sub> PbTe <sub>2</sub>
Copper, syn	4- 836	★	3.615	3.615	3.615	47.24	cF4	Cu
Eugenite, syn	4- 781		4.114	4.114	4.114	69.63	cF3.96	Au <sub>5</sub> Hg
Gold, Ag-Hg-rich	42- 1421		4.080	4.080	4.080	67.93	cF3.96	Ag <sub>0.36</sub> Au <sub>0.52</sub> Hg <sub>0.09</sub> Cu <sub>0.02</sub>
Gold, syn	4- 784	★	4.079	4.079	4.079	67.85	cF4	Au
Iridium, osmian	41- 600	i	3.822	3.822	3.822	55.83	cF4	(Ir,Os)
Iridium, osmian	41- 602		3.833	3.833	3.833	56.31	cF4	(Ir,Os,Ru)
Iridium, syn	6- 598	i	3.839	3.839	3.839	56.60	cF4	Ir
Lead, syn	4- 686	★	4.951	4.951	4.951	121.33	cF4	Pb
Nickel, syn	4- 850	★	3.524	3.524	3.524	43.76	cF4	Ni
Palladium, syn	46- 1043	★	3.890	3.890	3.890	58.87	cF4	Pd
Platinum, Fe-rich	29- 718		3.816	3.816	3.816	55.57	cF3.80	(Pt,Fe)
Platinum, Fe-rich, syn	29- 717		3.877	3.877	3.877	58.28	cF4	(Pt,Fe)
Platinum, syn	4- 802	★	3.923	3.923	3.923	60.38	cF4	Pt
Rhodium, Pt-rich	27- 504	i	3.856	3.856	3.856	57.33	cF4	(Rh,Pt)
Rhodium, syn	5- 685	★	3.803	3.803	3.803	55.01	cF4	Rh
Silver, Hg-rich	43- 1465	O	4.169	4.169	4.169	72.46	cF4	(Ag,Hg)
Silver-3C, syn	4- 783	i	4.086	4.086	4.086	68.23	cF4	Ag
Taenite, syn	47- 1417		3.598	3.598	3.598	46.56	cF4	(Fe,Ni)
<b>1C-ordered group</b>								
Atokite	29- 967		3.991	3.991	3.991	63.57	cP3.96	(Pd,Pt) <sub>3</sub> Sn
Auricupride, syn	35- 1357	★	3.749	3.749	3.749	52.70	cP4	AuCu <sub>3</sub>
Awaruite	38- 419		3.545	3.545	3.545	44.55	cP4	FeNi <sub>3</sub>
Bogdanovite	34- 1302		4.088	4.088	4.088	68.30	cP3.99	Au <sub>3</sub> Cu
Chengdeite	49- 1824		3.787	3.787	3.787	54.31	cP4	FeIr <sub>3</sub>
Isoferroplatinum, syn	29- 716		3.866	3.866	3.866	57.78	cP4	Pt <sub>3</sub> Fe
Rustenburtite	29- 968		3.988	3.988	3.988	63.43	cP3.99	(Pt,Pd) <sub>3</sub> Sn
Yixunite	50- 1615	O	3.988	3.988	3.988	63.43	cP4	InPt <sub>3</sub>
Zvyagintsevite	50- 1631	C	4.035	4.035	4.035	65.69	cP4	PbPd <sub>3</sub>
Zvyagintsevite, syn	20- 827		4.024	4.024	4.024	65.16	cP4	Pd <sub>3</sub> Pb
<b>Related structures</b>								
Auricupride	25- 301	O	3.880	42.680	3.840	635.90	oP44	(Cu,Pd) <sub>3</sub> Au <sub>2</sub>
Bezsmeritnovite	41- 579	i	24.215	4.025	16.245	1583.33	oP96	Au <sub>4</sub> Cu(Te,Pb)
Unnamed mineral	18- 877	O	7.171	7.171	7.171	368.76	cP31.80	(Fe,Ni)
<b>Gypsum group E(TX<sub>4</sub>)•2H<sub>2</sub>O</b>								
Brushite	11- 293		5.837	15.192	6.265	497.31	mC52	CaPO <sub>3</sub> (OH)•2H <sub>2</sub> O
Brushite, syn	9- 77	★	6.363	15.190	5.815	493.93	mC52	CaPO <sub>3</sub> (OH)•2H <sub>2</sub> O
Churchite-(Nd)	39- 1385	O	6.190	15.140	5.610	476.10	mC48	NdPO <sub>4</sub> •2H <sub>2</sub> O
Churchite-(Y)	8- 167		5.610	15.140	6.190	476.10	mC48	YPO <sub>4</sub> •2H <sub>2</sub> O
Gypsum	21- 816	★	6.286	15.213	5.678	495.65	mC48	CaSO <sub>4</sub> •2H <sub>2</sub> O
Gypsum, syn	33- 311	★	6.285	15.208	5.678	495.37	mC48	CaSO <sub>4</sub> •2H <sub>2</sub> O
Pharmacolite	25- 138	O	5.959	15.313	6.357	527.13	mC52	CaAsO <sub>3</sub> (OH)•2H <sub>2</sub> O

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Related structures</b>								
Ardealite	41- 585	i	5.726	30.950	6.265	986.70	mC96	Ca(SO <sub>4</sub> )(PO <sub>3</sub> OH)•4H <sub>2</sub> O
<b>Halite group (G/L)X or (G/L)G'</b>								
<b>Carbide subgroup</b>								
Khamrabaevite, syn	32- 1383	★	4.327	4.327	4.327	81.04	cF8	TiC
Tantalcarbide, syn	35- 801	★	4.455	4.455	4.455	88.40	cF8	TaC
<b>Chalcogenide subgroup</b>								
Alabandite, syn	6- 518	★	5.224	5.224	5.224	142.56	cF8	Mn•S
Altaite, syn	38- 1435	★	6.459	6.459	6.459	269.46	cF8	PbTe
Borovskite	26- 1426		5.795	5.795	5.795	194.61	cF8	Pd <sub>3</sub> SbTe <sub>4</sub>
Clausthalite, syn	6- 354	i	6.124	6.124	6.124	229.67	cF8	PbSe
Galena, syn	5- 592	i	5.936	5.936	5.936	209.18	cF8	PbS
Niningerite, syn	35- 730	i	5.200	5.200	5.200	140.61	cF8	MgS
Oldhamite, syn	8- 464	i	5.695	5.695	5.695	184.69	cF8	CaS
<b>Halide subgroup</b>								
Bromargyrite	6- 438	★	5.774	5.774	5.774	192.55	cF8	AgBr
Carobbiite, syn	36- 1458	★	5.348	5.348	5.348	152.92	cF8	KF
Chlorargyrite, Br-rich	14- 255		5.626	5.626	5.626	178.07	cF8	Ag(Cl,Br)
Chlorargyrite, syn	31- 1238	★	5.549	5.549	5.549	170.87	cF8	AgCl
Graiceite	45- 1460	i	4.027	4.027	4.027	65.32	cF8	LiF
Graiceite, syn	4- 857	★	4.027	4.027	4.027	65.30	cF8	LiF
Halite, K-rich, syn	26- 918	C	5.771	5.771	5.771	192.22	cF8	K <sub>0.2</sub> Na <sub>0.8</sub> Cl
Halite, K-rich, syn	26- 919	C	5.902	5.902	5.902	205.57	cF8	K <sub>0.1</sub> Na <sub>0.6</sub> Cl
Halite, syn	5- 628	★	5.640	5.640	5.640	179.43	cF8	NaCl
Sylvite, syn	41- 1476	★	6.292	6.292	6.292	249.06	cF8	KCl
Villiamite, syn	36- 1455	★	4.633	4.633	4.633	99.46	cF8	NaF
<b>Nitride subgroup</b>								
Carlsbergite, syn	11- 65		4.140	4.140	4.140	70.96	cF8	CrN
Osbornite, syn	38- 1420	★	4.242	4.242	4.242	76.32	cF8	TiN
<b>Oxide subgroup</b>								
Bunsenite, syn	47- 1049	★	4.177	4.177	4.177	72.88	cF8	NiO
Lime, syn	37- 1497	★	4.811	4.811	4.811	111.33	cF8	CaO
Manganosite, syn	7- 230	i	4.445	4.445	4.445	87.82	cF8	Mn•O
Monteponite, syn	5- 640	★	4.695	4.695	4.695	103.51	cF8	CdO
Periclase, syn	45- 946	★	4.211	4.211	4.211	74.68	cF8	MgO
Wüstite	46- 1312		4.293	4.293	4.293	79.12	cF8	FeO
Wüstite, syn	6- 615	i	4.307	4.307	4.307	79.90	cF8	FeO
<b>Halotrichite group GG'<sub>2</sub>(SO<sub>4</sub>)<sub>4</sub>•22H<sub>2</sub>O</b>								
Apjohnite	29- 886	i	6.198	24.347	21.266	3157.58	mP356	Mn•Al <sub>2</sub> (SO <sub>4</sub> ) <sub>4</sub> •22H <sub>2</sub> O
Bilinite	25- 1153		6.208	24.333	21.255	3159.02	mP356	Fe•Fe <sub>2</sub> •3(SO <sub>4</sub> ) <sub>4</sub> •22H <sub>2</sub> O
Dietrichite	25- 1173		6.240	24.434	21.379	3209.10	mP356	ZnAl <sub>2</sub> (SO <sub>4</sub> ) <sub>4</sub> •22H <sub>2</sub> O
Halotrichite	39- 1387	i	6.195	24.262	21.262	3144.45	mP356	Fe•Al <sub>2</sub> (SO <sub>4</sub> ) <sub>4</sub> •22H <sub>2</sub> O
Pickeringite	46- 1454	i	20.852	24.586	6.193	3166.86	mP356	MgAl <sub>2</sub> (SO <sub>4</sub> ) <sub>4</sub> •22H <sub>2</sub> O
Wupatkiite	48- 1884	★	6.189	24.230	21.200	3127.61	mP356	(Co,Mg,Ni)Al <sub>2</sub> (SO <sub>4</sub> ) <sub>4</sub> •22H <sub>2</sub> O
<b>Hexahydrate group G(SO<sub>4</sub>)•6H<sub>2</sub>O</b>								
Bianchite	12- 16	i	10.096	7.201	24.492	1762.08	mC192	(Zn,Fe•2)SO <sub>4</sub> •6H <sub>2</sub> O
Chvaleticeite	42- 614		10.050	7.240	24.300	1750.91	mC192	(Mn•2,Mg)SO <sub>4</sub> •6H <sub>2</sub> O
Ferrohexahydrate	15- 393		10.080	7.280	24.590	1785.25	mC192	Fe•SO <sub>4</sub> •6H <sub>2</sub> O
Hexahydrate, syn	24- 719	★	24.442	7.216	10.119	1766.12	mC192	MgSO <sub>4</sub> •6H <sub>2</sub> O
Moorhouseite	16- 304	i	10.040	7.234	24.300	1746.23	mC192	CoSO <sub>4</sub> •6H <sub>2</sub> O
Nickelhexahydrate, syn	33- 955	★	24.188	7.241	9.895	1714.43	mC192	NiSO <sub>4</sub> •6H <sub>2</sub> O
<b>Hilairite group D<sub>2,4,5</sub>GG'[Si<sub>3</sub>O<sub>9</sub>]<sub>2</sub>•6H<sub>2</sub>O</b>								
Calciohilairite	41- 1456	i	20.900	20.900	16.050	6071.53	hR184	CaZrSi <sub>3</sub> O <sub>9</sub> •3H <sub>2</sub> O
Hilairite	26- 975	i	10.556	10.556	15.851	1529.63	hR48	Na <sub>2</sub> ZrSi <sub>3</sub> O <sub>9</sub> •3H <sub>2</sub> O
Pyatenkoite-(Y)	50- 1600		10.696	10.696	15.728	1558.29	hR49	Na <sub>5</sub> (Y,Dy,Gd)Ti <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> •6H <sub>2</sub> O
Sazykinaite-(Y)	50- 1688	i	10.831	10.831	15.852	1610.44	hR49	Na <sub>5</sub> YZrSi <sub>6</sub> O <sub>18</sub> •6H <sub>2</sub> O
<b>Hilgardite supergroup D<sub>2</sub>[B<sub>5</sub>O<sub>8</sub>X<sub>3</sub>]</b>								
Hilgardite-1A, Sr-rich	29- 313	i	6.297	6.464	6.565	205.72	aP20	Ca <sub>2</sub> B <sub>5</sub> O <sub>8</sub> Cl(OH) <sub>2</sub>
Hilgardite-3A	11- 403	i	6.317	6.485	17.501	618.61	aP60	Ca <sub>2</sub> B <sub>5</sub> O <sub>8</sub> (OH) <sub>2</sub> Cl
Hilgardite-4M	11- 404	i	6.314	11.331	11.439	818.39	mC80	Ca <sub>2</sub> B <sub>5</sub> O <sub>8</sub> (OH) <sub>2</sub> Cl
Tyretskite-1A	26- 2	O	6.440	6.450	6.410	203.25	aP21	Ca <sub>2</sub> B <sub>5</sub> O <sub>8</sub> (OH) <sub>3</sub>
Tyretskite-1A, Sr-rich	18- 671	O	6.440	6.450	6.410	203.20	aP21	(Ca,Sr) <sub>2</sub> B <sub>5</sub> O <sub>8</sub> (OH) <sub>3</sub>
<b>Högbomite supergroup G<sub>7,10,11</sub>JTO<sub>12,17,19</sub></b>								
<b>5H group</b>								
Batiferrite	50- 1718	i	5.908	5.908	23.390	707.04	hP64	Ba(Fe <sub>10</sub> Ti <sub>2</sub> )O <sub>19</sub>
Diaoyudaoite	45- 1451		5.602	5.602	22.626	614.93	hP58	NaAl <sub>11</sub> O <sub>17</sub>
Diaoyudaoite, syn	21- 1096	i	5.593	5.593	22.610	612.52	hP58	NaAl <sub>11</sub> O <sub>17</sub>
Hawthorneite	46- 1365	C	5.871	5.871	23.060	688.36	hP64	BaCr <sub>7</sub> Ti <sub>3</sub> Fe <sub>4</sub> MgO <sub>19</sub>
Hawthorneite, syn	46- 1469		5.862	5.862	22.910	681.78	hP64	Ba(Ti <sub>3</sub> Cr <sub>4</sub> Fe <sub>2</sub> Mg <sub>3</sub> )O <sub>19</sub>
Hibonite-5H, Fe-rich	38- 469	★	5.603	5.603	22.380	608.55	hP64	Ca(Al,Fe) <sub>12</sub> O <sub>19</sub>
Hibonite-5H, syn	38- 470	i	5.558	5.558	21.905	586.00	hP64	CaAl <sub>12</sub> O <sub>19</sub>
Högbomite-5H	16- 336	O	5.718	5.718	23.020	651.81	hP68.10	(Mg,Fe•2) <sub>2</sub> (Al,Ti) <sub>5</sub> O <sub>10</sub>
Magnetoplumbite-5H, Mn-rich	43- 666		5.940	5.940	23.550	719.61	hP64	Pb(Fe•3,Mn•3) <sub>12</sub> O <sub>19</sub>
Magnetoplumbite-5H, syn	41- 1373	★	5.894	5.894	23.090	694.78	hP64	PbFe <sub>12</sub> O <sub>19</sub>
Nezilovite	50- 1591	i	5.854	5.854	22.882	679.09	hP64	PbZn <sub>2</sub> Fe <sub>8</sub> (Mn,Ti) <sub>2</sub> O <sub>19</sub>
Plumboferrite	48- 1894	★	5.931	5.931	23.551	717.46	hP62.66	(Mg,Mn) <sub>0.33</sub> Pb <sub>2</sub> Fe <sub>10.67</sub> O <sub>18.33</sub>
Yimengite	37- 480		5.857	5.857	22.940	681.52	hP64	K(Cr,Ti,Fe,Mg) <sub>12</sub> O <sub>19</sub>
Yimengite, syn	46- 1470	i	5.882	5.882	23.081	691.57	hP64	K(Ti <sub>3</sub> Cr <sub>7</sub> Fe <sub>2</sub> Mg <sub>2</sub> )O <sub>19</sub>
<b>9R group</b>								
Musgravite-9R	34- 191	i	5.675	5.675	41.096	1146.20	hR42	Be(Mg,Fe) <sub>2</sub> Al <sub>6</sub> O <sub>12</sub>
Pehrmanite-9R	35- 503		5.700	5.700	41.160	1158.13	hR42	BeFe <sub>2</sub> Al <sub>6</sub> O <sub>12</sub>
<b>Related structures</b>								
Högbomite-18R	16- 167		5.738	5.738	83.360	2376.89	hR81	(Fe,Mg) <sub>1.8</sub> (Al,Ti) <sub>3.7</sub> (O,OH) <sub>8</sub>
Nigerite-12R	38- 436	i	5.715	5.715	55.464	1568.82	hR54.67	ZnAl <sub>12</sub> Sn <sub>2</sub> O <sub>22</sub> (OH) <sub>2</sub>
Nigerite-3T	26- 1391	i	5.699	5.699	13.806	388.33	hP41	ZnAl <sub>12</sub> Sn <sub>2</sub> O <sub>22</sub> (OH) <sub>2</sub>
Pengzhizhongite-3T	44- 136	i	5.692	5.692	13.782	386.70	hP42	(Mg,Zn,Fe,Al) <sub>4</sub> (Sn,Fe) <sub>2</sub> Al <sub>10</sub> O <sub>22</sub> (OH) <sub>2</sub>
Taaffeite-4H	35- 701	i	5.684	5.684	18.332	512.92	hP56	BeMg <sub>3</sub> Al <sub>3</sub> O <sub>16</sub>

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Humite subfamily</b> $G_{2n+1}(SiO_4)_nX_2$ ; $n=1\wedge 4$								
<b>1n group</b>								
Norbergite, syn	11- 686	★	10.271	8.727	4.709	422.09	oP40	$Mg_3SiO_4F_2$
<b>2n group</b>								
Alleghanyite	22- 726	O	10.467	4.855	8.281	397.46	mP38	$Mn^{5+2}(SiO_4)_2(OH)_2$
Alleghanyite	25-1184	C	10.720	4.850	8.275	407.67	mP38	$Mn^{5+2}(SiO_4)_2(OH)_2$
Alleghanyite, Mg-rich	39-1348	C	8.083	10.574	4.815	389.72	mP38	$Mg_2Mn_3^{+2}(SiO_4)_2(OH)_2$
Alleghanyite, Mg-rich	43- 683	i	10.613	4.827	8.116	393.94	mP38	$(Mn^{+2},Mg)_5(SiO_4)_2(OH)_2$
Chondrodite	12- 527	i	10.255	4.730	7.867	360.81	mP34	$(Mg,Fe^{+2})_5(SiO_4)_2(OH)_2$
Chondrodite, Ti-rich	33- 865	C	7.905	10.318	4.727	363.88	mP37.96	$(Mg_{3.99}Fe_{0.57}Ti_{0.42})(SiO_4)_2(OH, O)_2$
Chondrodite, syn	14- 10	i	10.270	4.750	7.800	359.34	mP34	$Mg_5F_2(SiO_4)_2$
Reinhardbraunsite, F-rich	37- 414	i	11.458	5.052	8.840	484.09	mP38	$Ca_5(SiO_4)_2(OH, F)_2$
Reinhardbraunsite, syn	29- 380	i	11.465	5.077	8.915	491.64	mP38	$Ca_5(SiO_4)_2(OH)_2$
<b>3n group</b>								
Humite, syn	12- 755	i	10.243	20.720	4.735	1004.93	oP96	$Mg_7F_2(SiO_4)_3$
Manganhumite	29- 866	i	10.492	21.302	4.809	1074.81	oP104	$(Mn^{+2},Mg)_7(SiO_4)_3(OH)_2$
<b>4n group</b>								
Clinohumite, Ti-rich	33- 867	C	13.699	4.745	10.283	656.13	mP66	$(Mg,Fe,Ti)_9(SiO_4)_4(OH, O)_2$
Clinohumite, syn	14- 9	i	13.680	4.760	10.230	653.91	mP62	$Mg_9F_2(SiO_4)_4$
Sonolite	22- 725	i	14.301	4.870	10.656	728.59	mP66	$Mn_9Si_4O_{16}(OH)_2$
Sonolite, Zn-rich	22- 728	i	13.940	4.790	10.510	689.28	mP66	$(Mn, Zn)_9Si_4O_{16}(OH)_2$
<b>Related structures</b>								
Jerrygibbsite	38- 352	i	4.850	10.700	28.170	1461.88	oP132	$Mn_9^{+2}(SiO_4)_4(OH)_2$
Leucophoenicite	22-1168	i	10.842	4.826	11.324	575.09	mP52	$Mn_7^{+2}(SiO_4)_3(OH)_2$
Ribbeite	40- 491	i	4.799	10.742	15.700	809.35	oP76	$Mn_5(SiO_4)_2(OH)_2$
<b>Hureaulite group</b> $G_5(TO_4)_2(T'X_4)_2 \cdot 4H_2O$								
Hureaulite	34- 146	★	17.618	9.117	9.482	1513.03	mC156	$Mn_5^{+2}(PO_4)_2[PO_3(OH)]_2 \cdot 4H_2O$
Irhtemite	25- 158	i	16.730	9.480	10.840	1705.48	mC156	$Ca_4MgH_2(AsO_4)_4 \cdot 4H_2O$
Sainfeldite	16- 615	i	18.640	9.810	10.120	1836.73	mC132	$Ca_5(AsO_4)_2(AsO_3OH) \cdot 4H_2O$
Villyaelenite	41-1455	i	18.015	9.261	9.770	1620.35	mC156	$Mn_5(AsO_4)_2(AsO_3OH)_2 \cdot 4H_2O$
Villyaelenite, Ca-rich	37- 444	i	18.550	9.500	9.990	1747.59	mC156	$(Mn, Ca)_5(AsO_4)_2(AsO_3OH)_2 \cdot 4H_2O$
<b>Hydrotalcite family</b> $(G/Q)_6G'_2[RO_3, TO_4, (OH)_2](OH)_{16} \cdot 4\wedge 4.5H_2O$								
<b>2H supergroup</b>								
Carbohydrite	29- 926	i	9.140	9.140	10.340	748.07	hP80	$Ni_{14}Al_9(SO_4)_6(OH)_{43} \cdot 7H_2O$
Hydrohonesite	36- 382	O	3.090	3.090	10.800	89.30	hP10.96	$Ni_6Fe_2^{+2}(SO_4)(OH)_{16} \cdot 7H_2O$
Koenenite	43-1490	O	3.052	3.052	10.880	87.77	hP7.30	$Na_4Mg_9Al_4Cl_{12}(OH)_{22}$
<b>3H supergroup</b>								
Brugnatellite	14- 365	i	5.480	5.480	16.000	416.11	hP49	$Mg_6Fe^{+3}CO_3(OH)_{13} \cdot 4H_2O$
Chlormagaluminite	38- 446	i	5.290	5.290	15.460	374.67	hP38	$(Mg, Fe)_4Al_2(OH)_{12}(Cl_2, CO_3) \cdot 2H_2O$
Manasseite	14- 525	i	6.120	6.120	15.324	497.06	hP56	$Mg_6Al_2CO_3(OH)_{16} \cdot 4H_2O$
Sjögrenite	14- 281	i	3.092	3.092	15.565	128.87	hP14	$Mg_6Fe_2CO_3(OH)_{16} \cdot 4H_2O$
Sjögrenite	24-1091	C	3.113	3.113	15.610	131.01	hP14	$Mg_6Fe_2CO_3(OH)_{16} \cdot 4H_2O$
<b>7R supergroup</b>								
Comblainite	33- 429	i	3.038	3.038	22.790	182.16	hR7.89	$(Ni_{6.10}Co_{2.90})(OH)_{18.27}(CO_3)_{1.315} \cdot 6.7H_2O$
Desautelsite	33- 869	i	3.114	3.114	23.390	196.43	hR7	$Mg_6Mn_2^{+3}(CO_3)(OH)_{16} \cdot 4H_2O$
Desautelsite, syn	44-1446	i	3.110	3.110	23.107	193.58	hR7	$Mg_6Mn_2^{+3}(OH)_{16}CO_3 \cdot 4H_2O$
Honesite	42- 573	i	3.083	3.083	26.710	219.86	hR7.13	$Ni_6Fe_2^{+2}(SO_4)(OH)_{16} \cdot 4H_2O$
Iowaite	20- 500	i	3.119	3.119	24.250	204.30	hR?	$Mg_4Fe(OH)_8OCl \cdot xH_2O$
Meixnerite	38- 478	★	3.046	3.046	22.930	184.28	hR7	$Mg_6Al_2(OH)_{18} \cdot 4H_2O$
Meixnerite	50-1684	★	3.041	3.041	22.670	181.56	hR7.15	$[Mg_5Al_3(OH)_{16}](OH)_3(H_2O)_4$
Takovite	15- 87	i	3.025	3.025	22.595	179.06	hR7	$Ni_6Al_2(OH)_{16}(CO_3, OH) \cdot 4H_2O$
Wermlandite	25- 153	i	9.260	9.260	22.520	1672.33	hP192	$Ca_4Mg_{14}(Al, Fe)CO_3(OH)_{42} \cdot 29H_2O$
Woodwardite	29- 529	i	2.999	2.999	26.720	208.12	hR9.50	$Cu_6Al_2(SO_4)(OH)_{16} \cdot 4H_2O$
<b>9R supergroup</b>								
Glaucoerinite	39- 338	i	3.070	3.070	32.650	266.50	hR9.31	$(Zn, Cu)_3Al_3(OH)_{16}(SO_4)_{1.5} \cdot 9H_2O$
Glaucoerinite	39- 726	i	3.066	3.066	32.800	267.02	hR7.33	$Cu_4Al_2(SO_4)(OH)_{12} \cdot 3H_2O$
Koenenite	43- 684	i	4.072	4.072	32.640	468.70	hR12.17	$Na_4Mg_9Al_4Cl_{12}(OH)_{22}$
Motukoreaitite	41-1380	i	9.172	9.172	33.510	2441.37	hR92	$NaMg_6Al_3(SO_4)_2(OH)_{18} \cdot 12H_2O$
Mountkeithite	41- 578	i	9.153	9.153	33.600	2437.79	hR111	$Mg_{11}Fe_3(CO_3)_{1.5}(SO_4)_2(OH)_{24} \cdot 11H_2O$
<b>11R group</b>								
Coalingite	26-1217	i	3.120	3.120	37.400	315.29	hR11.67	$Mg_{10}Fe_2^{+3}CO_3(OH)_{24} \cdot 2H_2O$
Coalingite	34- 182	C	3.120	3.120	37.400	315.29	hR11.67	$Mg_{10}Fe_2^{+3}(OH)_{24}(CO_3) \cdot 2H_2O$
<b>14R supergroup</b>								
Hydrotalcite	41-1428	O	6.151	6.151	46.500	1523.61	hR56	$Mg_6Al_2(CO_3)(OH)_{16} \cdot 4H_2O$
Pyroaurite	25- 521	i	6.219	6.219	46.825	1568.17	hR56	$Mg_6Fe_2CO_3(OH)_{16} \cdot 4H_2O$
Reevesite	26-1286	i	6.164	6.164	45.540	1498.47	hP168	$Ni_6Fe_2CO_3(OH)_{16} \cdot 4H_2O$
Stichtite	45-1475	i	6.180	6.180	46.834	1549.06	hR56	$Mg_6Cr_2CO_3(OH)_{16} \cdot 4H_2O$
Unnamed mineral	18-1422	O	6.490	6.490	46.450	1694.36	hR72	$Mg_4Ni(OH)_9$
<b>Iron supergroup EE'</b>								
<b>1C-disordered group</b>								
Chromium, syn	6- 694	★	2.884	2.884	2.884	23.99	cI2	Cr
Iron, syn	6- 696	★	2.866	2.866	2.866	23.55	cI2	Fe
Kamacite	37- 474	★	2.868	2.868	2.868	23.59	cI2	(Fe, Ni)
Suessite	35- 519	i	2.841	2.841	2.841	22.93	cI2	Fe <sub>3</sub> Si
<b>1C-ordered group</b>								
Chromferide	41-1466	i	2.859	2.859	2.859	23.37	cP1.70	(Fe, Cr)
Iron, Rh-rich	25-1408	i	2.985	2.985	2.985	26.60	cP2	(Fe, Rh)
Salammoniac, syn	7- 7	i	3.876	3.876	3.876	58.21	cP6	NH <sub>4</sub> Cl
Wairauite, syn	44-1433	C	2.857	2.857	2.857	23.32	cP2	CoFe
Zhanghengite, syn	2-1231	i	2.948	2.948	2.948	25.62	cP2	CuZn
<b>Related structures</b>								
Indium, syn	5- 642	★	3.252	3.252	4.946	52.30	tI2	In
<b>Jahnsite group</b> $EGG'_2G''_2(PO_4)_4(OH)_2 \cdot 8H_2O$								
Jahnsite-(CaMnFe)	30- 266	i	15.010	7.150	9.870	987.38	mP108	$(Ca, Mn)Mn(Mg, Fe, Mn)_2Fe_2(PO_4)_4(OH)_2 \cdot 8H_2O$
Jahnsite-(CaMnMg)	26-1062	i	14.940	7.140	9.930	994.35	mP108	$CaMg_2MnFe_2(PO_4)_4(OH)_2 \cdot 8H_2O$
Jahnsite-(CaMnMg)	30- 265	C	14.940	7.140	9.930	994.29	mP108	$CaMnMg_2Fe_2(PO_4)_4(OH)_2 \cdot 8H_2O$
Jahnsite-(CaMnMn)	46-1356	i	14.844	7.152	9.966	997.90	mP108	$CaMn^{+2}Mn_2^{+2}Fe_2^{+3}(PO_4)_4(OH)_2 \cdot 8H_2O$
Rittmannite	46-1320	i	15.010	6.890	10.160	968.49	mP108	$(Mn, Ca)Mn(Fe, Mn, Mg)_2(Al, Fe)_2(OH)_2(PO_4)_4 \cdot 8H_2O$

Mineral Group Classification



**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
Whiteite-(CaFeMg)	30- 254		14.850	6.920	10.130	961.74	mP108	CaFeMg <sub>2</sub> Al <sub>2</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
Whiteite-(MnFeMg)	43- 1467	i	14.990	6.960	10.140	971.49	mP108	MnFeMg <sub>2</sub> Al <sub>2</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
<b>Related structures</b>								
Keckite	33- 289		15.020	7.190	19.740	1996.80	mP152	(Ca,Mg)(Mn,Zn) <sub>2</sub> Fe <sub>3</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>3</sub> •2H <sub>2</sub> O
<b>Jarlite group E<sub>14</sub>G<sub>2</sub>G'<sub>2</sub>G''<sub>14</sub>F<sub>64</sub>X<sub>4</sub></b>								
Calcjarlite	29- 1195	O	16.190	9.868	7.157	1128.71	mC92	Na(Ca,Sr) <sub>3</sub> Al <sub>3</sub> (F,OH) <sub>16</sub>
Jarlite	5- 594	i	16.173	10.815	7.273	1242.88	mC102	Na <sub>2</sub> (Sr,Na) <sub>14</sub> Al <sub>12</sub> (Mg) <sub>2</sub> F <sub>64</sub> (OH,H <sub>2</sub> O) <sub>4</sub>
Jarlite, Ca-rich	5- 595		15.804	10.823	7.310	1223.93	mC102	Na <sub>2</sub> (Sr,Ca,Na) <sub>14</sub> Al <sub>12</sub> (Mg) <sub>2</sub> F <sub>64</sub> (OH,H <sub>2</sub> O) <sub>4</sub>
Jorgensenite	50- 1572	i	16.046	10.971	7.281	1254.97	mC102	Na <sub>4</sub> (Sr,Ba) <sub>14</sub> Al <sub>12</sub> F <sub>64</sub> (OH,F) <sub>4</sub>
<b>Joaquinite supergroup D<sub>2</sub>D'<sub>2</sub>E<sub>2</sub>G<sub>2</sub>[Si<sub>4</sub>O<sub>12</sub>]<sub>2</sub>X<sub>3,4</sub>•0,1H<sub>2</sub>O</b>								
<b>1M group</b>								
Joaquinite-(Ce)	36- 385		10.516	9.686	11.833	1127.70	mC94	Ba <sub>2</sub> NaCe <sub>2</sub> FeTi <sub>2</sub> Si <sub>8</sub> O <sub>26</sub> OH•H <sub>2</sub> O
Strontiojoaquinite	36- 384	i	10.516	9.764	11.870	1150.44	mP90	Sr <sub>2</sub> Ba <sub>2</sub> (Na,Fe) <sub>2</sub> Ti <sub>2</sub> Si <sub>8</sub> O <sub>24</sub> (O,OH) <sub>2</sub> •H <sub>2</sub> O
<b>2O group</b>								
Barioorthojoaquinite	36- 386	i	10.477	9.599	22.590	2271.85	oC180	Ba <sub>4</sub> Fe <sub>2</sub> Ti <sub>2</sub> Si <sub>8</sub> O <sub>26</sub> •H <sub>2</sub> O
Byelorussite-(Ce)	46- 1335	i	10.517	9.662	22.296	2265.61	oP184	NaMn <sup>2+</sup> Ba <sub>2</sub> Ce <sub>2</sub> Ti <sub>2</sub> Si <sub>8</sub> O <sub>26</sub> (F,OH)•H <sub>2</sub> O
Orthojoaquinite-(Ce)	26- 1034		10.480	9.660	22.260	2253.53	oC172	Ba <sub>2</sub> NaCe <sub>2</sub> FeTi <sub>2</sub> Si <sub>8</sub> O <sub>26</sub> (OH)
Unnamed mineral	29- 1173		9.777	10.517	22.392	2302.45	oP188	Na(Ba,Sr) <sub>4</sub> FeTi <sub>2</sub> Si <sub>8</sub> O <sub>25</sub> (OH) <sub>3</sub>
<b>Kaolin-serpentine family G<sub>2,3</sub>[T<sub>2</sub>O<sub>5</sub>](OH)<sub>4</sub>•0,2H<sub>2</sub>O</b>								
<b>Di octahedral supergroup</b>								
Dickite-2M <sub>1</sub>	10- 446	i	5.149	8.949	14.419	659.73	mC68	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Halloysite-10A	9- 451	i	5.122	5.122	10.030	227.88	hP23	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub> •2H <sub>2</sub> O
Halloysite-10A	29- 1489	★	5.118	5.118	10.030	227.53	hP23	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub> •2H <sub>2</sub> O
Halloysite-7A	9- 453		5.125	5.125	7.300	166.05	hP17	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Halloysite-7A	29- 1487	★	5.133	5.133	7.160	163.38	hP17	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Hisingerite	26- 1140	O	5.400	9.030	14.990	723.25	mP92	Fe <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub> •2H <sub>2</sub> O
Kaolinite-1A	14- 164	i	5.155	8.959	7.407	330.43	aP17	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Kaolinite-1Md	29- 1488		5.160	8.930	7.390	329.68	mC34	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Nacrite-2M <sub>2</sub>	16- 606	i	8.909	5.146	15.697	658.95	mC68	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Odinite-1	48- 1857		5.373	9.326	7.363	357.99	mC35	(Fe,Mg,Al) <sub>2,5</sub> (Si,Al) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Odinite-1O	48- 1858		5.366	9.334	7.161	358.67	oP35	(Fe,Mg,Al) <sub>2,5</sub> (Si,Al) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
<b>Tri octahedral supergroup</b>								
Amesite, Fe-rich	37- 429	i	5.385	9.291	14.124	706.63	aP?	(Mg,Fe,Al) <sub>3-x</sub> [SiAlO <sub>5</sub> ](OH) <sub>4-2x</sub>
Berthierine-1H	31- 618		5.415	5.415	7.114	180.65	hP18	(Fe <sup>2+</sup> ,Fe <sup>3+</sup> ,Al) <sub>3</sub> (Si,Al) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Berthierine-1M	7- 315		5.410	9.330	7.280	355.76	mC36	(Fe <sup>2+</sup> ,Fe <sup>3+</sup> ,Al) <sub>3</sub> (Si,Al) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Brindleyite-1M	31- 892	O	5.286	9.133	7.310	342.20	mC32	(Ni <sub>2</sub> ,Al)(Al,Si) <sub>3</sub> O <sub>5</sub> (OH) <sub>4</sub>
Brindleyite-1T	42- 1311		5.277	5.277	7.090	170.98	hP18	(Ni <sub>2</sub> Al)(AlSi) <sub>3</sub> O <sub>5</sub> (OH) <sub>4</sub>
Caryopillite-1M	38- 422		5.692	9.858	7.518	408.23	mC36	Mn <sub>3</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Caryopillite-1T	41- 1446	O	5.692	5.692	7.275	204.12	hP18	Mn <sub>3</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Chrysotile	25- 645	O	5.320	9.200	14.640	715.33	mC?	Mg <sub>3</sub> (Si <sub>2-x</sub> O <sub>5</sub> )(OH) <sub>4-4x</sub>
Cronstedtite-1M	17- 470	i	5.490	9.510	7.320	370.00	mC36	Fe <sub>3</sub> (Si,Fe) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Fraipontite	33- 1466		5.330	9.260	14.570	717.77	mC72	(Zn <sub>2</sub> Al)Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Fraipontite-1O	34- 782	O	5.325	9.258	7.075	348.79	oC36	(Zn,Al,Cu) <sub>3</sub> (Si,Al) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Fraipontite-2M <sub>1</sub>	14- 366		5.340	9.210	14.120	693.36	mC72	(Zn,Al) <sub>3</sub> (Si,Al) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Greenalite-1M	39- 348	i	5.598	9.696	7.439	391.44	mC36	Fe <sub>3</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Kellyite-2H	29- 885		5.438	5.438	14.040	359.56	hP36	(Mn,Al) <sub>3</sub> (Si,Al) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Lizardite-1M	50- 1606	i	5.319	9.204	14.708	714.83	mC72	(Mg,Fe) <sub>3</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Lizardite-1T	50- 1625	i	5.327	5.327	7.260	178.45	hP18	(Mg,Al) <sub>3</sub> (Si,Fe) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Lizardite-6T <sub>1</sub>	9- 444		5.328	5.328	43.780	1076.34	hP108	Mg <sub>3</sub> (Si,Fe) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Lizardite-6T <sub>1</sub> , Al-rich	13- 4	O	5.318	5.318	42.500	1040.88	hP108	(Mg,Al) <sub>3</sub> (Si,Al) <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Manandonite	45- 1464	i	5.057	8.765	13.769	610.31	oC72	Li <sub>2</sub> Al <sub>4</sub> (Si <sub>2</sub> AlB) <sub>10</sub> (OH) <sub>8</sub>
Nepouite-2O	25- 524		5.310	9.190	14.500	707.58	oC72	(Ni,Mg) <sub>3</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Pecoraite-2M <sub>cl</sub>	49- 1859		5.270	9.170	14.740	711.87	mC72	Ni <sub>3</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
<b>Khibinskite group K<sub>2</sub>E[T<sub>2</sub>O<sub>7</sub>]</b>								
Khibinskite	26- 928		9.610	5.550	14.100	673.02	mP48	K <sub>2</sub> ZrSi <sub>2</sub> O <sub>7</sub>
Khibinskite, syn	24- 710	C	9.540	14.260	5.600	681.78	mP48	K <sub>2</sub> ZrSi <sub>2</sub> O <sub>7</sub>
Pyrocoprite	50- 1565	i	9.409	5.431	12.533	620.12	mP48	(K,Na) <sub>2</sub> Mg[P <sub>2</sub> O <sub>7</sub> ]
Pyrophosphite	50- 1563	i	9.742	5.653	12.955	691.19	mP48	K <sub>2</sub> CaP <sub>2</sub> O <sub>7</sub>
<b>Kieserite group (G/Q)(SO<sub>4</sub>)•H<sub>2</sub>O</b>								
Dwornikite, syn	21- 974	★	7.398	7.591	6.831	341.81	mC36	NiSO <sub>4</sub> •H <sub>2</sub> O
Gunningite, syn	33- 1476	★	7.508	7.587	6.936	354.33	mC36	ZnSO <sub>4</sub> •H <sub>2</sub> O
Kieserite, syn	33- 882	★	7.511	7.611	6.921	355.09	mC36	MgSO <sub>4</sub> •H <sub>2</sub> O
Poitevinite	15- 120		7.480	7.424	7.053	355.83	mC36	(Cu,Fe)SO <sub>4</sub> •H <sub>2</sub> O
Szmikite, syn	33- 906	★	7.766	7.666	7.120	381.47	mC36	MnSO <sub>4</sub> •H <sub>2</sub> O
Szomolnokite, syn	45- 1365	★	7.081	7.549	7.775	364.86	mC36	FeSO <sub>4</sub> •H <sub>2</sub> O
<b>Langbeinite group D<sub>2</sub>G<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub></b>								
Efremovite	42- 1432	i	9.980	9.980	9.980	994.01	cP108	(NH <sub>4</sub> ) <sub>2</sub> Mg <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>
Langbeinite, syn	19- 974	i	9.921	9.921	9.921	976.52	cP76	K <sub>2</sub> Mg <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>
Manganolangbeinite, syn	20- 909	★	10.114	10.114	10.114	1034.59	cP76	K <sub>2</sub> Mn <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>
<b>Lanthanite group D<sub>2</sub>(CO<sub>3</sub>)<sub>3</sub>•8H<sub>2</sub>O</b>								
Lanthanite-(Ce)	38- 377	i	9.482	16.938	8.965	1439.83	oP152	Ce <sub>2</sub> (CO <sub>3</sub> ) <sub>3</sub> •8H <sub>2</sub> O
Lanthanite-(La)	30- 678	i	9.470	16.902	8.929	1429.19	oP152	(La,Nd) <sub>2</sub> (CO <sub>3</sub> ) <sub>3</sub> •8H <sub>2</sub> O
Lanthanite-(Nd)	42- 593	★	9.476	16.940	8.942	1435.40	oP152	Nd <sub>2</sub> (CO <sub>3</sub> ) <sub>3</sub> •8H <sub>2</sub> O
<b>Latiumite supergroup D<sub>7,8</sub>(G/L)<sub>4</sub>(RO<sub>3</sub>,TO<sub>4</sub>)<sub>2</sub>(SiO<sub>4</sub>)<sub>2</sub>[Si<sub>2</sub>O<sub>7</sub>]<sub>2</sub>•0,1H<sub>2</sub>O</b>								
Latiumite	8- 174		12.120	5.130	10.800	638.63	mP50	(Ca,K) <sub>4</sub> (Si,Al) <sub>5</sub> O <sub>11</sub> (SO <sub>4</sub> ,CO <sub>3</sub> )
Latiumite	25- 1202	C	12.060	5.080	10.810	636.62	mP50	(Ca,K) <sub>4</sub> (Si,Al) <sub>5</sub> O <sub>11</sub> (SO <sub>4</sub> ,CO <sub>3</sub> )
Queite	33- 782	i	11.358	5.263	12.628	717.27	mP50	Pb <sub>4</sub> Zn <sub>2</sub> (SO <sub>4</sub> )(SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )
Tuscanite	29- 1035	i	24.040	5.110	10.890	1279.59	mP104	K(Ca,Na) <sub>6</sub> (Si,Al) <sub>10</sub> O <sub>22</sub> (SO <sub>4</sub> ,CO <sub>3</sub> ,OH) <sub>2</sub> •H <sub>2</sub> O
<b>Lavendulan group D(D'/L)Q<sub>5</sub>(TO<sub>4</sub>)<sub>4</sub>Cl•5H<sub>2</sub>O</b>								
Lavendulan	31- 1280		9.815	40.394	9.990	3960.71	oP344	NaCaCu <sub>5-2</sub> (AsO <sub>4</sub> ) <sub>4</sub> Cl•5H <sub>2</sub> O
Sampleite	11- 349		9.700	38.400	9.650	3594.43	oP344	NaCaCu <sub>5</sub> (PO <sub>4</sub> ) <sub>4</sub> Cl•5H <sub>2</sub> O
Zdenekite	47- 1873	i	10.066	10.066	39.390	3991.17	tP344	NaPbCu <sub>5</sub> (AsO <sub>4</sub> ) <sub>4</sub> Cl•5H <sub>2</sub> O

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Lazulite group</b> (G/Q)G <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub>								
Barbosolite	33- 668	i	7.313	7.489	7.520	355.99	mP34	Fe <sup>2+</sup> Fe <sup>2+</sup> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub>
Hentschelite	40- 501	i	6.984	7.786	7.266	349.89	mP34	Cu <sup>2+</sup> Fe <sup>2+</sup> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub>
Lazulite	34- 136	i	7.153	7.278	7.233	324.31	mP34	MgAl <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub>
Lazulite, Fe-Sr-rich	46-1380	i	7.220	7.345	7.119	328.58	mP34	(Mg,Fe,Sr)Al <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub>
Scorzalite	35- 632	★	7.157	7.302	7.248	326.06	mP34	(Fe,Mg)Al <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub>
<b>Lillianite subfamily</b> G <sub>2n</sub> L <sub>p</sub> L' <sub>2q</sub> S <sub>n+p+3q</sub> ; n=0^12.5, p=0^30, q=0^20.5								
Andorite	45-1423	i	13.024	19.177	17.138	4280.41	oP176	AgPbSb <sub>3</sub> S <sub>6</sub>
Boulangerite	18- 688	i	21.560	23.510	8.090	4027.99	mP160	Pb <sub>5</sub> Sb <sub>4</sub> S <sub>11</sub>
Boulangerite	40- 504	i	21.547	23.475	8.090	4020.24	mP159.36	Pb <sub>5</sub> Sb <sub>4</sub> S <sub>11</sub>
Boulangerite, syn	42- 562	C	21.240	23.510	4.036	2015.39	oP80	Pb <sub>5</sub> S <sub>11</sub> Sb <sub>4</sub>
Bursaitite	25- 431	O	4.118	13.376	20.508	1129.63	oC44	Pb <sub>5</sub> Bi <sub>4</sub> S <sub>11</sub>
Cosalite	42-1409	★	19.100	23.890	4.059	1851.96	oP72	Pb <sub>2</sub> Bi <sub>2</sub> S <sub>5</sub>
Cupropavonite	42- 552	i	13.445	4.023	33.060	1784.85	mC76	PbAgCu <sub>2</sub> Bi <sub>5</sub> S <sub>10</sub>
Eclarite	35- 627	i	54.760	4.030	22.750	5020.53	oP197.60	(Cu,Fe)Pb <sub>9</sub> Bi <sub>12</sub> S <sub>28</sub>
Eskimoite	33-1187	i	30.194	4.100	13.459	1663.32	mC68	Ag <sub>7</sub> Pb <sub>10</sub> Bi <sub>15</sub> S <sub>36</sub>
Fizelyite	23- 753	i	13.167	19.246	8.700	2204.69	oP86	(Pb,Ag) <sub>8</sub> Sb <sub>11</sub> S <sub>24</sub>
Giessenite	38- 445	i	34.340	38.050	4.060	5304.86	mP204	CuPb <sub>13</sub> Bi <sub>9</sub> S <sub>28</sub>
Gustavite	24- 143	i	27.100	19.450	8.210	4327.45	oC172	Bi <sub>1</sub> Pb <sub>5</sub> Ag <sub>3</sub> S <sub>24</sub>
Heyrovskyite	47-1789	i	13.697	31.069	4.128	1756.68	oC68	Pb <sub>10</sub> AgBi <sub>5</sub> S <sub>18</sub>
Heyrovskyite, syn	25- 432	i	13.695	31.358	4.135	1775.77	oC68	Pb <sub>10</sub> AgBi <sub>5</sub> S <sub>18</sub>
Izoklakeite	36- 415	i	33.880	38.020	4.070	5242.64	oP211	(Cu,Fe) <sub>2</sub> Pb <sub>27</sub> (Sb,Bi) <sub>19</sub> S <sub>57</sub>
Izoklakeite	41- 592	i	34.070	37.980	4.072	5269.08	oP200	Cu <sub>2</sub> Pb <sub>27</sub> (Sb,Bi) <sub>19</sub> S <sub>57</sub>
Kobellite	8- 122	i	22.620	34.080	4.020	3098.98	oP120	Pb <sub>5</sub> (Bi,Sb) <sub>8</sub> S <sub>17</sub>
Lillianite, syn	29- 763	i	13.522	20.608	4.112	1145.86	oC44	Pb <sub>5</sub> Bi <sub>2</sub> S <sub>6</sub>
Makovickyite	47-1752	i	13.350	4.040	14.790	786.04	mC32	Ag <sub>1.5</sub> Bi <sub>5.5</sub> S <sub>9</sub>
Mummeite	46-1456	i	13.470	4.060	21.630	1181.39	mC48.88	(Bi,Ag,Pb,Cu) <sub>11</sub> S <sub>13</sub>
Nordströmite	35- 466	i	17.970	4.110	17.620	1297.69	mP50	CuPb <sub>2</sub> Bi <sub>7</sub> S <sub>10</sub> Se <sub>4</sub>
Ourayite	33-1188	i	13.457	44.042	4.100	2429.96	oC100	Ag <sub>25</sub> Pb <sub>30</sub> Bi <sub>41</sub> S <sub>104</sub>
Pavonite	50-1645	i	13.340	4.036	16.420	881.63	mC36	AgBi <sub>3</sub> S <sub>5</sub>
Pavonite, syn	42- 539	i	13.305	4.042	16.417	880.71	mC36	AgBi <sub>3</sub> S <sub>5</sub>
Pavonite, syn	42- 559	C	13.305	4.042	16.417	880.71	mC36	AgBi <sub>3</sub> S <sub>5</sub>
Ramdohrite	42-1415	i	18.960	13.290	8.600	2144.43	mP84.04	Ag <sub>4</sub> Pb <sub>6</sub> Bi <sub>3</sub> Sb <sub>8</sub> S <sub>24</sub>
Rayite	35- 594	i	13.600	11.960	24.490	3866.13	mC156	Pb <sub>5</sub> (Ag,Tl) <sub>2</sub> Sb <sub>8</sub> S <sub>21</sub>
Roshchinitite	42-1422	i	12.900	19.040	4.236	1040.43	oP44.04	AgPbSb <sub>3</sub> S <sub>6</sub>
Schirmerite	25- 760	i	13.448	44.390	4.022	2400.96	oC99.97	AgPb <sub>2</sub> Bi <sub>3</sub> S <sub>7</sub>
Semseyite	22-1130	i	13.640	11.960	24.460	3838.18	mC152	Pb <sub>9</sub> Sb <sub>8</sub> S <sub>21</sub>
Tintinaite	20- 565	i	22.234	34.158	4.049	3075.09	oP120	Pb <sub>5</sub> Sb <sub>8</sub> S <sub>17</sub>
Treasurite	33-1189	i	26.538	4.092	13.349	1447.92	mC60	Ag <sub>7</sub> Pb <sub>6</sub> Bi <sub>15</sub> S <sub>32</sub>
Uchuchacuaite	38- 369	i	12.670	19.320	4.380	1072.16	oP43.90	AgMnPb <sub>3</sub> Sb <sub>5</sub> S <sub>12</sub>
Unnamed mineral	22- 650	O	39.600	4.100	14.280	2318.50	mC93	Pb <sub>3</sub> Bi <sub>6</sub> S <sub>17</sub>
Unnamed mineral	23-1155	O						Pb-Bi-Cu-Ag-S
Unnamed mineral	41-1396	i	8.811	13.060	7.106	817.70	oP31	(Cu,Ag)Pb <sub>6</sub> Bi <sub>3</sub> S <sub>17</sub>
Unnamed mineral, syn	42-1403	i	13.440	19.850	4.110	1096.48	oP44	Pb <sub>2</sub> Bi <sub>3</sub> S <sub>6</sub>
Vikingite	43- 690	i	13.603	25.248	4.112	1405.64	mP27.79	Ag <sub>5</sub> Pb <sub>8</sub> Bi <sub>13</sub> S <sub>33</sub>
Wittite	42-1445	i	4.190	4.080	15.560	260.80	mP9.69	Pb <sub>2.3</sub> Bi <sub>2.7</sub> Se <sub>1.3</sub> S <sub>5.1</sub>
Wittite	42-1446	i	4.160	4.080	15.660	261.92	mP9.69	Pb <sub>2.3</sub> Bi <sub>2.7</sub> Se <sub>1.3</sub> S <sub>5.1</sub>
Wittite	43-1485	O	7.210	4.080	15.500	450.65	mC17.10	Pb <sub>23</sub> Bi <sub>27</sub> Se <sub>13</sub> S <sub>51</sub>
Wittite, Ag-rich	25- 460	i	17.983	4.100	17.593	1293.71	mP51.60	(Pb,Ag) <sub>5</sub> Bi <sub>6</sub> S <sub>14</sub>
<b>Lindackerite group</b> D <sub>5</sub> (TO <sub>3</sub> OH) <sub>2</sub> (TO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O								
Chudobaite	12- 643	i	7.690	11.370	6.590	514.33	aP57	(Mg,Zn) <sub>5</sub> H <sub>2</sub> (AsO <sub>4</sub> ) <sub>4</sub> •10H <sub>2</sub> O
Geigerite	45-1347	i	7.949	10.649	6.770	557.84	aP57	Mn <sub>5</sub> (AsO <sub>3</sub> OH) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Lindackerite	48-1871	i	8.035	10.368	6.453	525.90	aP57	(Cu,Co) <sub>5</sub> (AsO <sub>4</sub> ) <sub>2</sub> (AsO <sub>3</sub> ) <sub>2</sub> (OH) <sub>2</sub> •10H <sub>2</sub> O
<b>Litharge group</b> (L/T)X or TT'								
Litharge, syn	5- 561	i	3.973	3.973	5.022	79.26	tP4	PbO
Mackinawite	15- 37	i	3.676	3.676	5.032	68.00	tP4	FeS
Romarchite, syn	6- 395	i	3.802	3.802	4.836	69.91	tP4	SnO
<b>Ludwigite group</b> G <sub>2</sub> G'(BO <sub>3</sub> ) <sub>2</sub>								
Azoprite	25- 523	O	9.279	12.232	3.001	340.62	oP36	Mg <sub>2</sub> (Fe,Ti,Mg)(BO <sub>3</sub> ) <sub>2</sub>
Bonaccordite	29- 930	i	9.213	12.229	3.001	338.11	oP36	Ni <sub>2</sub> Fe <sup>3+</sup> (BO <sub>3</sub> ) <sub>2</sub>
Fredrikssonite	38- 412	i	9.182	12.551	2.956	340.63	oP36.04	Mg <sub>2</sub> Mn(BO <sub>3</sub> ) <sub>2</sub>
Ludwigite	46-1290	i	9.242	12.280	3.018	342.52	oP36	(Mg,Cr) <sub>2</sub> (Fe,Al)(BO <sub>3</sub> ) <sub>2</sub>
Vonsenite	25- 395	★	9.452	12.287	3.072	356.77	oP36	Fe <sub>2</sub> Fe(BO <sub>3</sub> ) <sub>2</sub>
<b>Related structures</b>								
Blatterite	45-1435	i	37.693	12.620	6.254	2974.99	oP320	(Mn <sup>2+</sup> ,Mg) <sub>2</sub> (Mn <sup>3+</sup> ,Sb <sup>3+</sup> ,Fe <sup>3+</sup> )(BO <sub>3</sub> ) <sub>2</sub>
Chestermanite	45-1415	i	18.535	12.273	6.043	1374.66	oP144	Mg <sub>2</sub> (Fe <sup>3+</sup> ,Mg,Al,Sb <sup>5+</sup> )(BO <sub>3</sub> ) <sub>2</sub>
Hulsite	17- 511	i	10.684	3.099	5.438	179.58	mP18	(Fe,Mg) <sub>2</sub> (Fe,Sn)(BO <sub>3</sub> ) <sub>2</sub>
Magnesiophulsite	41-1374	i	10.700	3.060	5.450	177.87	mP18	Mg <sub>2</sub> Fe(BO <sub>3</sub> ) <sub>2</sub>
Orthopinakiolite	13- 397	i	18.450	12.700	6.070	1422.29	oP144	(Mg,Mn) <sub>2</sub> Mn(BO <sub>3</sub> ) <sub>2</sub>
Orthopinakiolite	33- 656	C	18.357	12.591	6.068	1402.51	oP144	(Mg,Mn) <sub>2</sub> Mn(BO <sub>3</sub> ) <sub>2</sub>
Pinakiolite	36- 413	i	21.745	5.994	5.334	691.88	mC88	(Mg,Mn) <sub>2</sub> Mn(BO <sub>3</sub> ) <sub>2</sub>
Takeuchiite	33- 864	i	27.610	12.583	6.039	2098.05	oP216	Mg <sub>2</sub> Mn(BO <sub>3</sub> ) <sub>2</sub>
Warwickite	12- 171	i	9.236	9.444	3.001	261.76	oP28	(Mg,Ti) <sub>2</sub> (BO <sub>3</sub> ) <sub>2</sub>
Warwickite	19- 775	i	9.200	9.450	3.130	272.12	oP28	(Mg,Ti) <sub>2</sub> (BO <sub>3</sub> ) <sub>2</sub>
<b>Macdonaldite supergroup</b> D <sub>5</sub> ^8[Si <sub>16</sub> O <sub>36</sub> X <sub>2</sub> ]•10,11H <sub>2</sub> O								
Macdonaldite	18- 163	i	14.060	23.520	13.080	4325.44	oC364	BaCa <sub>4</sub> Si <sub>16</sub> O <sub>36</sub> (OH) <sub>2</sub> •10H <sub>2</sub> O
Monteregianite-(Y)	31-1087	i	9.512	23.956	9.617	2186.57	mP184	(Na,K) <sub>2</sub> Y <sub>2</sub> Si <sub>16</sub> O <sub>38</sub> •10H <sub>2</sub> O
Rhodesite	22-1253	i	9.512	23.956	9.617	2186.47	mP194	(Ca,K,Na) <sub>8</sub> Si <sub>16</sub> O <sub>40</sub> •11H <sub>2</sub> O
<b>Marcasite supergroup</b> GXX' or GTT'								
<b>2M group</b>								
Arsenopyrite	42-1320	i	5.741	5.668	5.770	174.19	mP12	FeAsS
Clinosafflorite, syn	14- 412	i	5.916	5.872	5.960	185.45	mP12	CoAs <sub>2</sub>
Iridarsenite, syn	14- 411	i	6.060	6.071	6.158	208.13	mP12	IrAs <sub>2</sub>
Osarsite	25- 595	i	5.933	5.916	6.009	195.07	mP12	(Os,Ru)AsS
Ruarsite, syn	27- 568	i	5.945	5.920	6.025	195.31	mP12	RuAsS

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>O5b group</b>								
Anduoite	33-1144		5.410	6.206	3.010	101.06	oP6	RuAs <sub>2</sub>
Löllingite, Ni-rich	25-249	i	5.160	5.930	3.050	93.33	oP6	(Fe,Ni,Co)As <sub>2</sub>
Löllingite, syn	11-699	★	5.300	5.983	2.882	91.39	oP6	FeAs <sub>2</sub>
Omeiite	29-954	O	5.409	6.167	3.021	100.77	oP6	OsAs <sub>2</sub>
Omeiite, syn	34-336	C	5.411	6.190	3.013	100.92	oP6	OsAs <sub>2</sub>
Safflorite, syn	11-140	★	5.233	5.951	2.957	92.09	oP6	CoFeAs <sub>4</sub>
Seinäjäokite	29-129		3.190	5.810	6.490	120.29	oP6	FeSb <sub>2</sub>
<b>O6b group</b>								
Alloclasite	25-246	i	4.641	5.606	3.415	88.85	oP6	(Co,Fe)AsS
Costibite	22-1082		3.603	4.868	5.838	102.40	oP6	CoSbS
Ferroselite	21-432	i	4.800	5.776	3.585	99.40	oP6	FeSe <sub>2</sub>
Frohbergite	14-419		5.290	6.270	3.860	128.03	oP6	FeTe <sub>2</sub>
Hastite	10-408	O	3.600	4.840	5.720	99.67	oP6	CoSe <sub>2</sub>
Kullerudite	18-886		4.890	5.960	3.670	106.96	oP6	NiSe <sub>2</sub>
Marcasite	37-475	★	4.443	5.424	3.386	81.61	oP6	FeS <sub>2</sub>
Mattagamite, syn	11-553		5.312	6.311	3.889	130.37	oP6	CoTe <sub>2</sub>
Nisbite, syn	25-1083		5.178	6.319	3.832	125.38	oP6	NiSb <sub>2</sub>
Rammelsbergite	33-126	C	4.758	5.795	3.545	97.76	oP6	NiAs <sub>2</sub>
Rammelsbergite, Co-rich	15-441		4.670	5.660	3.540	93.57	oP6	(Ni,Co)As <sub>2</sub>
Rammelsbergite, syn	11-14	★	4.759	5.797	3.539	97.63	oP6	NiAs <sub>2</sub>
<b>Related structures</b>								
Glaucodot	5-643		6.640	28.390	5.640	1063.19	oC72	(Co,Fe)AsS
Gudmundite	8-104		10.020	5.940	6.740	401.16	mP24	FeSbS
Paracostibite, syn	23-1062		5.768	5.949	11.666	400.31	oP24	CoSbS
Pararammelsbergite, syn	18-876	i	5.770	5.838	11.419	384.65	oP24	NiAs <sub>2</sub>
Viaeneite	49-1875		9.717	7.280	6.559	462.22	mP26.13	(Fe,Pb) <sub>1/2</sub> (S <sub>2</sub> ) <sub>11</sub> (S <sub>2</sub> O <sub>3</sub> )
<b>Matlockite group (G/L)XX' or (G/L)TT'</b>								
Bismoclockite, syn	6-249	i	3.891	3.891	7.369	111.57	tP6	BiOCl
Daubreeite	43-674	i	3.849	3.849	7.392	109.50	tP7.34	Bi(O,OH,Cl)
Matlockite, syn	26-311	★	4.110	4.110	7.233	122.20	tP6	PbClF
Rorisite, syn	24-185	★	3.891	3.891	6.823	103.30	tP6	CaClF
Zavaritskite, syn	22-114	i	3.747	3.747	6.226	87.41	tP6	BiOF
<b>Mckelveyite supergroup D<sub>3</sub>D'G<sub>2</sub>(CO<sub>3</sub>)<sub>6</sub>•3H<sub>2</sub>O</b>								
Donnayite-(Y)	29-1445	i	9.000	8.999	6.793	427.17	aP39	Sr <sub>3</sub> YNaCa(CO <sub>3</sub> ) <sub>6</sub> •3H <sub>2</sub> O
Mckelveyite-(Y)	18-901	i	9.174	9.174	19.154	1396.07	hP117	Ba <sub>3</sub> YNaCa(CO <sub>3</sub> ) <sub>6</sub> •3H <sub>2</sub> O
Weloganite	27-790	i	8.988	8.988	6.730	421.62	aP39	Sr <sub>3</sub> ZrNa <sub>2</sub> (CO <sub>3</sub> ) <sub>6</sub> •3H <sub>2</sub> O
<b>Melanterite group G(SO<sub>4</sub>)•7H<sub>2</sub>O</b>								
Bieberite, syn	16-487	i	14.040	6.495	10.925	961.08	mP108	CoSO <sub>4</sub> •7H <sub>2</sub> O
Mallardite	33-905	i	14.150	6.500	11.060	979.77	mP108	Mn <sub>2</sub> SO <sub>4</sub> •7H <sub>2</sub> O
Melanterite, syn	22-633	★	14.077	6.509	11.054	975.54	mP108	Fe <sup>2+</sup> SO <sub>4</sub> •7H <sub>2</sub> O
Zinmelanterite	49-1815		13.878	6.389	11.388	987.15	mP108	(Zn,Fe)SO <sub>4</sub> •7H <sub>2</sub> O
<b>Melilite group E<sub>2</sub>[TT'<sub>2</sub>O<sub>7</sub>]</b>								
Akermanite, syn	35-592	★	7.833	7.833	5.007	307.22	tP24	Ca <sub>2</sub> MgSi <sub>2</sub> O <sub>7</sub>
Gehlenite, syn	35-755	★	7.686	7.686	5.068	299.39	tP24	Ca <sub>2</sub> Al <sub>2</sub> SiO <sub>7</sub>
Gugiaite	15-199	★	7.430	7.430	5.024	277.35	tP24	Ca <sub>2</sub> BeSi <sub>2</sub> O <sub>7</sub>
Hardystonite, syn	35-745	★	7.825	7.825	5.015	307.09	tP24	Ca <sub>2</sub> ZnSi <sub>2</sub> O <sub>7</sub>
<b>Related structures</b>								
Jeffreyite	38-365	O	14.900	14.900	40.410	8971.42	oC768	Ca <sub>2</sub> BeSi <sub>2</sub> O <sub>7</sub>
Leucophanite	18-711		7.390	7.390	9.980	545.03	oP48	NaCaBeSi <sub>2</sub> O <sub>6</sub> F
Leucophanite	22-1362	C	7.401	7.420	9.939	545.80	oP48	NaCaBeSi <sub>2</sub> O <sub>6</sub> F
Meliphanite	23-349	C	10.516	10.516	9.887	1093.37	tI96	(Ca,Na) <sub>2</sub> Be(Si,Al) <sub>2</sub> (O,F) <sub>7</sub>
Meliphanite	31-304	O	10.569	10.569	9.877	1103.30	tI96	(Ca,Na) <sub>2</sub> Be(Si,Al) <sub>2</sub> (O,F) <sub>7</sub>
<b>Metaautunite supergroup (E,G)<sub>2</sub>/<sub>v</sub>[(UO<sub>2</sub>)<sub>2</sub>(TO<sub>4</sub>)<sub>2</sub>]•mH<sub>2</sub>O; m≈6, v=1,2</b>								
<b>1Q-arsenate subgroup</b>								
Metakahlerite	12-576							Fe <sup>2+</sup> (UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metakahlerite, syn	17-151		7.160	7.160	8.620	441.91	tP41	Fe <sup>2+</sup> (UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metanovacekrite	17-152	O	7.160	7.160	8.580	439.86	tP41	Mg(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metauranospinite-9A, syn	8-319		7.190	7.190	8.810	455.44	tP41	Ca(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Sodiumuranospinite	28-1165		7.150	7.150	8.730	446.30	tP39	Na(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •3.5H <sub>2</sub> O
Sodiumuranospinite	45-1433	i	7.156	7.156	8.705	445.77	tP54	Na(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Trögerite	8-326		7.160	7.160	8.800	451.14	tP55	UO <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •12H <sub>2</sub> O
<b>1Q-phosphate subgroup</b>								
Chernikovite, syn	8-296	i	7.020	7.020	9.043	445.64	tP42	H <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Chernikovite, syn	29-670		6.990	6.990	8.720	426.06	tP42	H <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metaankoleite	19-1008		6.993	6.993	8.891	434.79	tP35.90	(K <sub>1</sub> 7Ba <sub>0.2</sub> )(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Metaankoleite, syn	29-1061		6.990	6.990	8.890	434.37	tP36	K(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •3H <sub>2</sub> O
Metaautunite-9A	39-1351	★	6.988	6.988	8.459	413.07	tP26	Ca(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •3H <sub>2</sub> O
Metanatroautunite	29-1283	O	6.970	6.970	8.960	435.28	tP42	Na <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metanatroautunite, syn	29-1284	O	7.000	7.000	8.710	426.79	tP36	Na(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •3H <sub>2</sub> O
<b>2Q-arsenate subgroup</b>								
Abernathyite	16-386	i	7.176	7.176	18.126	933.40	tP72	K(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •3H <sub>2</sub> O
Metaheinrichite	24-128		7.070	7.070	17.740	886.73	tP82	Ba(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metakirchheimerite	12-586	O	7.170	7.170	17.360	892.46	tP82	Co(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metalodevite	25-1239		7.160	7.160	17.200	881.77	tP94	Zn(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •10H <sub>2</sub> O
Metauranospinite-17A	18-309		7.140	7.140	17.000	866.65	tP70	Ca(UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Metazeunerite	17-146		7.100	7.100	17.420	878.14	tP82	Cu <sup>2+</sup> (UO <sub>2</sub> ) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>2Q-phosphate subgroup</b>								
Metasaleite	41-1389		7.220	7.220	17.730	924.24	tP82	Mg(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metatorbernite	36-406	★	6.970	6.970	17.334	842.15	tP82	Cu <sup>2+</sup> (UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metauranocircite-17A	17-759		6.940	6.940	16.830	810.59	tP70	Ba(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Metauranocircite-18A	36-407	★	6.953	6.953	17.634	852.41	tP82	Ba(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Przevalskite, syn	29-787	O	7.240	7.240	18.220	955.05	t?46	Pb(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Uramphite, syn	42-384	i	7.020	7.020	18.080	890.99	tP88	(NH <sub>4</sub> )(UO <sub>2</sub> ) <sub>2</sub> PO <sub>4</sub> •3H <sub>2</sub> O

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Related structures</b>								
Bassetite	7- 288		6.980	17.070	7.010	835.20	mP82	Fe <sup>2+</sup> (UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Lehnerite	45- 1421		7.040	17.160	6.950	839.59	mP78.92	Mn <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Lehnerite, syn	46- 1372	i	7.040	17.160	6.950	839.59	mP82	Mn(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Metaautunite-8A	14- 73		6.551	7.053	8.164	377.21	oP23	Ca(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Metauranocircite-17A, syn	25- 1468	i	9.855	9.756	16.840	1619.00	mP140	Ba(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Metauranocircite-17A, syn	47- 1813	i	9.789	9.882	16.868	1631.72	mP140	Ba(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Ranunculite	33- 972		11.100	17.700	18.000	3536.46	mP392	Al(H <sub>3</sub> O)(UO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> )(OH) <sub>3</sub> •3H <sub>2</sub> O
Sincosite	39- 318		8.895	8.895	12.727	1006.97	tP120	Ca(VO <sub>2</sub> ) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> •5H <sub>2</sub> O
Triangulite	35- 577		10.390	10.560	10.600	774.22	aP60	Al <sub>3</sub> (UO <sub>2</sub> ) <sub>4</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>5</sub> •5H <sub>2</sub> O
<b>Mica family DG<sub>2,3</sub>[T<sub>4</sub>O<sub>10</sub>]XX'</b>								
<b>Di octahedral-1M group</b>								
Boromuscovite-1M	46- 1383	★	5.077	8.775	10.061	439.52	mC42	KAl <sub>2</sub> (Si <sub>3</sub> B)O <sub>10</sub> (OH,F) <sub>2</sub>
Celadonite-1M	17- 521	i	5.230	9.060	10.130	471.34	mC42	K(Mg,Fe,Al) <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Celadonite-1M, Al-rich	49- 1840	i	5.225	9.036	10.103	468.34	mC42	K(Al,Fe,Mg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Ferrocaldonite	50- 1580		5.270	9.106	10.125	478.10	mC42	KFe <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Glauconite-1M	9- 439	i	5.234	9.066	10.160	474.03	mC42	K(Fe,Al) <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Illite-1M	29- 1496		5.204	8.950	10.180	464.32	mC41.40	K <sub>0.7</sub> Al <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Muscovite-1M, Mg-rich	21- 993	i	5.208	9.006	10.071	463.68	mC42	KMgAlSi <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Muscovite-1M, syn	7- 25	i	5.208	8.995	10.275	471.51	mC42	KAl <sub>2</sub> Si <sub>3</sub> AlO <sub>10</sub> (OH) <sub>2</sub>
Paragonite-1M, syn	24- 1047	i	5.139	8.885	9.750	439.86	mC42	NaAl <sub>2</sub> (AlSi <sub>3</sub> )O <sub>10</sub> (OH) <sub>2</sub>
Roscoelite-1M	43- 686	i	5.282	9.109	10.172	480.95	mC42	KV <sub>2</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Tobelite-1M, K-rich	46- 1344	i	5.225	8.996	10.447	481.24	mC50	[(NH <sub>4</sub> ) <sub>2</sub> K](Si,Al) <sub>4</sub> Al <sub>2</sub> O <sub>10</sub> (OH) <sub>2</sub>
Tobelite-1M, syn	42- 1321	i	5.232	9.024	10.563	488.54	mC50	NH <sub>4</sub> Al <sub>2</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
<b>Di octahedral-2M supergroup</b>								
Boromuscovite-2M <sub>1</sub>	46- 1384	i	5.075	8.794	19.815	880.13	mC84	KAl <sub>2</sub> (Si <sub>3</sub> B)O <sub>10</sub> (OH,F) <sub>2</sub>
Chernykhite-2M <sub>1</sub>	25- 76	i	5.290	9.182	20.023	967.80	mC83.32	(Ba,Na) <sub>0.55</sub> (V,Al,Mg) <sub>2.28</sub> (Si,Al,V) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Chromphylite-2M <sub>1</sub>	49- 1853	O	5.320	9.070	20.500	984.45	mC84	KCr <sub>2</sub> AlSi <sub>3</sub> O <sub>10</sub> (OH,F) <sub>2</sub>
Illite-2M <sub>1</sub>	26- 911	i	5.190	9.000	20.160	937.83	mC84	(K,H <sub>3</sub> O)Al <sub>2</sub> Si <sub>3</sub> AlO <sub>10</sub> (OH) <sub>2</sub>
Illite-2M <sub>2</sub>	43- 685	i	9.017	5.210	20.437	944.33	mC84	KAl <sub>2</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Margarite-2M <sub>1</sub>	18- 276	i	5.118	8.799	19.159	859.31	mC84	CaAl <sub>2</sub> (Si <sub>2</sub> Al <sub>2</sub> )O <sub>10</sub> (OH) <sub>2</sub>
Muscovite-2M <sub>1</sub>	6- 263	i	5.190	9.030	20.050	934.90	mC84	KAl <sub>2</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH,F) <sub>2</sub>
Muscovite-2M <sub>1</sub> , V-Ba-rich	46- 1409	i	5.210	9.073	20.064	943.68	mC83	(K,Ba,Na) <sub>0.75</sub> (Al,Mg,Cr,V) <sub>2</sub> (Si,Al,V) <sub>4</sub> O <sub>10</sub> (OH,O) <sub>2</sub>
Muscovite-2M <sub>1</sub> , V-rich	19- 814	i	5.193	9.045	20.044	936.66	mC84	K(Al,V) <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Muscovite-2M <sub>2</sub>	34- 175	C	8.965	5.175	20.310	925.98	mC84	(K,Na)Al <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Muscovite-2M <sub>2</sub> , Ba-rich	10- 490		9.000	5.200	20.000	930.17	mC84	(Ba,K)Al <sub>2</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Muscovite-2M <sub>2</sub> , Ca-rich	25- 649		9.112	5.260	20.033	951.12	mC84	(K,Ca,Na)(Al,Mg,Fe) <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Muscovite-2M <sub>1</sub> , NH <sub>4</sub> -rich	46- 1311		5.160	8.990	20.060	926.87	mC84	(K,NH <sub>4</sub> ,Na)Al <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Nanpingite-2M <sub>1</sub>	44- 1428	★	5.296	8.907	21.297	999.97	mC84	CaAl <sub>2</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Nanpingite-2M <sub>1</sub>	46- 1298	i	5.362	8.860	21.410	1011.98	mC82	CaAl <sub>2.5</sub> Si <sub>3</sub> O <sub>10</sub> (OH,F) <sub>2</sub>
Nanpingite-2M <sub>2</sub>	49- 1872	i	9.087	5.230	21.519	1008.72	mC84	CaAl <sub>2</sub> (AlSi <sub>3</sub> )O <sub>10</sub> (OH) <sub>2</sub>
Paragonite-2M <sub>1</sub>	12- 165	i	5.147	8.937	19.415	890.40	mC84	NaAl <sub>2</sub> (AlSi <sub>3</sub> )O <sub>10</sub> (OH) <sub>2</sub>
Paragonite-2M <sub>1</sub> , K-deficient	27- 20		5.120	8.910	19.260	874.08	mC84	NaAl <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Paragonite-2M <sub>1</sub> , syn	42- 602	i	5.143	8.890	19.302	879.90	mC84	NaAl <sub>2</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
<b>Di octahedral-3T group</b>								
Muscovite-3T	7- 42	i	5.203	5.203	29.988	703.05	hP63	(K,Na)(Al,Mg,Fe) <sub>2</sub> (Si <sub>3.1</sub> Al <sub>0.9</sub> )O <sub>10</sub> (OH) <sub>2</sub>
<b>Tri octahedral-12O group</b>								
Polyolithionite-12O	15- 62	i	5.280	9.080	119.100	5709.94	oC528	K(Li,Al) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
<b>Tri octahedral-1M group</b>								
Annite-1M	42- 1413	i	5.346	9.255	10.237	498.48	mC43.86	KFe <sub>3</sub> *(Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Annite-1M, Al-rich	26- 909	i	5.369	9.297	10.268	504.65	mC44	K <sub>2</sub> (Fe <sub>5</sub> *Al)Si <sub>5</sub> Al <sub>2</sub> O <sub>20</sub> (OH) <sub>4</sub>
Annite-1M, Mn-rich	33- 1016	i	5.310	9.200	10.175	489.67	mC39	K <sub>2</sub> (Fe <sup>2+</sup> ,Mn,Mg) <sub>5</sub> Si <sub>5</sub> O <sub>20</sub> (F,OH) <sub>4</sub>
Annite-1M, syn	45- 1444	★	5.392	9.341	10.313	511.38	mC44	KFe <sub>3</sub> *(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Clintonite-1M	20- 321	i	5.204	9.026	9.812	453.31	mC44	Ca(Mg,Al,Fe) <sub>3</sub> (Al,Si) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Glauconite-1M, Cr-rich	45- 1337		5.256	9.088	10.148	475.93	mC?	K(Al,Cr,Mg) <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Hendricksite-1M	19- 544	i	5.370	9.320	10.300	509.15	mC44	K(Zn,Mn,Fe) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Kinoshitalite-1M	43- 687	i	5.327	9.233	10.165	492.22	mC44	BaMg <sub>2</sub> (Si <sub>2</sub> Al <sub>2</sub> )O <sub>10</sub> (OH) <sub>2</sub>
Masutomilite-1M	29- 822		5.253	9.085	10.107	474.79	mC40	K(Li,Mn) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> F <sub>2</sub>
Norrishite-1M	46- 1271	i	5.293	8.936	10.076	471.94	mC40	KMn <sub>2</sub> *LiSi <sub>4</sub> O <sub>12</sub>
Phlogopite-1M	10- 495	i	5.300	9.200	10.220	491.03	mC44	KMg <sub>3</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Phlogopite-1M, Fe-rich	42- 1437	i	5.344	9.252	10.228	497.74	mC43.16	K(Mg,Fe) <sub>3</sub> (Al,Fe)Si <sub>3</sub> O <sub>10</sub> (OH,F) <sub>2</sub>
Phlogopite-1M, syn	24- 867	i	5.313	9.200	10.309	496.41	mC44	KMg <sub>3</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Polyolithionite-1M	38- 425	i	5.212	9.005	10.129	467.43	mC40	K(Li,Al) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (F,OH) <sub>2</sub>
Polyolithionite-1M, Fe-rich	14- 565		5.250	9.180	10.020	474.52	mC40	K(Li,Al,Fe) <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (F,OH) <sub>2</sub>
Polyolithionite-1M, Fe-rich	42- 1399	★	5.265	9.146	10.094	477.53	mC42	K(AlFeLi)(Si <sub>3</sub> Al)O <sub>10</sub> (OH)F
Polyolithionite-1M, syn	21- 952	i	5.186	8.968	10.029	458.77	mC40	KLi <sub>2</sub> AlSi <sub>4</sub> O <sub>10</sub> F <sub>2</sub>
Preiswerkite-1M <sub>d</sub>	42- 605	i	5.227	9.049	9.804	456.35	mC44	Na(Mg <sub>2</sub> Al)(Si <sub>2</sub> Al <sub>2</sub> )O <sub>10</sub> (OH) <sub>2</sub>
Siderophyllite-1M	25- 1355		5.319	9.113	10.115	482.76	mC40	KFe <sub>3</sub> Al <sub>3</sub> Si <sub>2</sub> O <sub>10</sub> (F,OH) <sub>2</sub>
Siderophyllite-1M, Li-rich	42- 604		5.267	9.101	10.073	474.75	mC42	K(AlFeLi)(Si <sub>3</sub> Al)O <sub>10</sub> (OH)F
Tainiolite-1M, syn	31- 1045	i	5.227	9.057	10.133	472.62	mC39.20	K <sub>0.6</sub> (Mg,Li) <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> F <sub>2</sub>
Tetraferriannite-1M, syn	16- 169		5.430	9.404	10.341	519.87	mC44	KFe <sub>3</sub> (FeSi <sub>3</sub> )O <sub>10</sub> (OH) <sub>2</sub>
Wonesite	50- 1636	C	5.312	9.163	9.825	465.62	mC43	(Na,K)(Mg,Fe,Al) <sub>6</sub> (Si,Al) <sub>8</sub> O <sub>20</sub> (OH,F) <sub>4</sub>
<b>Tri octahedral-2M supergroup</b>								
Anandite-2M <sub>1</sub>	19- 78		5.468	9.489	19.963	1032.06	mC84	BaFe <sub>3</sub> *(Si,Fe) <sub>4</sub> (O,OH) <sub>10</sub> (OH)S
Anandite-2O	42- 606	i	5.465	9.494	19.853	1030.07	oC84.56	BaFe <sub>3</sub> *(Si <sub>3</sub> Fe)O <sub>10</sub> (OH)S
Bityite-2M <sub>1</sub>	42- 607	i	5.015	8.682	19.024	824.98	mC88	Ca(Al <sub>2</sub> Li)(Si <sub>2</sub> AlBe)O <sub>10</sub> (OH) <sub>2</sub>
Ephesite-2M <sub>1</sub> , syn	35- 423	★	5.124	8.872	19.282	873.17	mC88	Na(LiAl) <sub>2</sub> Al <sub>2</sub> Si <sub>2</sub> O <sub>10</sub> (OH) <sub>2</sub>
Phlogopite-2M <sub>1</sub>	10- 493	i	5.347	9.227	20.252	995.34	mC88	KMg <sub>3</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Phlogopite-2M <sub>1</sub>	42- 1339	C	5.329	9.234	20.098	985.08	mC88	KMg <sub>3</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Polyolithionite-2M <sub>1</sub>	24- 594		5.209	9.053	20.185	939.82	mC80	K(Li,Al) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (F,OH) <sub>2</sub>
Tainiolite-2M <sub>1</sub> , syn	12- 236		5.170	9.050	20.100	936.87	mC80	KLiMg <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> F <sub>2</sub>
Trilithionite-2M <sub>2</sub>	43- 692	i	9.016	5.206	20.292	938.83	mC80	KLi(Al,Li) <sub>2</sub> (Si <sub>3</sub> Al)O <sub>10</sub> F <sub>2</sub>
<b>Tri octahedral-3T group</b>								
Phlogopite-3T	10- 492	i	5.313	5.313	30.150	737.05	hP66	KMg <sub>3</sub> (Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub>
Polyolithionite-3T	10- 483	O	5.200	5.200	30.000	702.52	hP66	K(Li,Al) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Polyolithionite-3T	42- 612	i	5.203	5.203	29.771	697.96	hP60	K(Li,Al) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub>
<b>Tri octahedral-4M group</b>								
Biotite-4M <sub>3</sub> , Ti-rich	46- 1440	i	5.335	9.240	40.030	1971.36	mC171.28	(K,Na)(Mg,Fe,Ti) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH,O) <sub>2</sub>

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Minium group (G/L/Q)L<sub>2</sub>O<sub>4</sub></b>								
Kusachiite	48-1886	i	8.511	8.511	5.823	421.80	tP28	CuBi <sub>2</sub> O <sub>4</sub>
Kusachiite, syn	42-334	★	8.500	8.500	5.817	420.25	tP28	CuBi <sub>2</sub> O <sub>4</sub>
Minium, syn	41-1493	★	8.816	8.816	6.566	510.29	tP28	Pb <sub>3</sub> O <sub>4</sub>
Schafarzikite	25-1181	C	8.590	8.590	5.920	436.83	tP28	FeSb <sub>2</sub> O <sub>4</sub>
Schafarzikite	25-1406	O	8.590	8.590	5.920	436.83	tP28	FeSb <sub>2</sub> O <sub>4</sub>
Trippkeite, syn	31-451		8.592	8.592	5.573	411.41	tP28	CuAs <sub>2</sub> O <sub>4</sub>
<b>Mixed-layer family (Sheet)<sub>1,3</sub>(Sheet')</b>								
<b>Random subfamily</b>								
Chlorite-vermiculite-montmorillonite	39-381		5.100	8.900	14.400			Na <sub>0.5</sub> Al <sub>6</sub> (Si,Al) <sub>8</sub> O <sub>20</sub> (OH) <sub>10</sub> •H <sub>2</sub> O
Illite-montmorillonite	35-652		5.150		12.000		tP43	KAl <sub>4</sub> (Si,Al) <sub>8</sub> O <sub>10</sub> (OH) <sub>4</sub> •4H <sub>2</sub> O
Kaolinite-montmorillonite	29-1490							Na <sub>0.3</sub> Al <sub>3</sub> Si <sub>6</sub> O <sub>15</sub> (OH) <sub>6</sub> •4H <sub>2</sub> O
Karpinskite	42-1313	O						Mg <sub>4</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>4</sub> •2H <sub>2</sub> O
Unnamed mineral	46-1450	O			16.000			(Fe,Al,Mg) <sub>6</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>4</sub> •H <sub>2</sub> O
<b>Regular subfamily</b>								
Aliettite	7-357	i	5.216	5.216	24.600	579.62	hP54.20	Ca <sub>2</sub> Mg <sub>6</sub> (Si,Al) <sub>8</sub> O <sub>20</sub> (OH) <sub>4</sub> •4H <sub>2</sub> O
Corrensite	31-794	i	5.337	5.337	28.500	703.02	hP69	(Mg,Al) <sub>3</sub> (Si,Al) <sub>3</sub> O <sub>20</sub> (OH) <sub>10</sub> •4H <sub>2</sub> O
Corrensite, glycerol	42-620		5.337	5.337	32.060	790.84	hP63	Mg <sub>3</sub> (Si,Al) <sub>3</sub> O <sub>20</sub> (OH) <sub>10</sub> •2H <sub>2</sub> O
Dozyite	47-1866	i	5.323	9.214	21.450	1048.90	mC108	Mg <sub>7</sub> Al <sub>4</sub> Si <sub>4</sub> O <sub>15</sub> (OH) <sub>12</sub>
Hydrobiotite	13-465	i	5.200	5.200	24.400	571.38	hP58	K(Mg,Fe) <sub>3</sub> (Si,Al) <sub>3</sub> O <sub>20</sub> (OH) <sub>4</sub> •4H <sub>2</sub> O
Hydrobiotite	49-1057	O			24.510		hP58.00	K-Mg-Al-SiO <sub>2</sub> -H <sub>2</sub> O
Kulkeite	42-584		5.304	5.304	23.702	577.46	hP57	(Mg <sub>8</sub> Al)(Si <sub>7</sub> Al)O <sub>20</sub> (OH) <sub>10</sub>
Lunijianlaite	45-1397	i	5.085	5.085	23.367	523.28	hP55	LiAl <sub>6</sub> (Si <sub>7</sub> Al)O <sub>20</sub> (OH) <sub>10</sub>
Rectorite	25-781	★	5.130	5.130	23.765	541.63	hP47	NaAl <sub>4</sub> (Si,Al) <sub>3</sub> O <sub>20</sub> (OH) <sub>4</sub> •2H <sub>2</sub> O
Rectorite	29-1495	★	5.159	5.159	25.570	589.38	hP53.20	K <sub>1.2</sub> Al <sub>4</sub> Si <sub>3</sub> O <sub>20</sub> (OH) <sub>4</sub> •4H <sub>2</sub> O
Saliotite	47-1844	i	5.158	8.914	23.830	1092.68	mC112	Li <sub>0.5</sub> Na <sub>0.5</sub> Al <sub>4</sub> Si <sub>3</sub> O <sub>10</sub> (OH) <sub>5</sub>
Tarasovite	26-970	★	5.130	5.130	44.010	1003.04	hP88	NaKAl <sub>6</sub> (Si,Al) <sub>16</sub> O <sub>40</sub> (OH) <sub>8</sub> •2H <sub>2</sub> O
Tosudite	12-231	i	5.214	5.214	29.800	701.60	hP66.30	Na <sub>0.3</sub> Al <sub>6</sub> (Si,Al) <sub>3</sub> O <sub>20</sub> (OH) <sub>10</sub> •4H <sub>2</sub> O
Tosudite	22-956		5.125	5.125	29.780	677.40	hP66.30	Na <sub>0.3</sub> Al <sub>6</sub> (Si,Al) <sub>3</sub> O <sub>20</sub> (OH) <sub>10</sub> •4H <sub>2</sub> O
Tosudite	46-1463		5.185	5.185	29.610	689.39	hP66.80	(K,Ca) <sub>0.8</sub> Al <sub>6</sub> (Si,Al) <sub>3</sub> O <sub>20</sub> (OH) <sub>10</sub> •4H <sub>2</sub> O
<b>Mixite group Cu<sub>6</sub>D(TO<sub>4</sub>)<sub>3</sub>(OH)<sub>6</sub>•3H<sub>2</sub>O</b>								
Agardite-(Y)	25-183	i	13.550	13.550	5.870	933.36	hP86	Cu <sub>6</sub> (Y,Ca)(AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
Chlorotile	13-413	i	13.580	13.580	5.915	944.68	hP124	Cu <sub>6</sub> (AsO <sub>4</sub> ) <sub>3</sub> •6H <sub>2</sub> O
Goudeyite	29-526	i	13.472	13.472	5.902	927.67	hP86	Cu <sub>6</sub> Al(AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
Mixite	13-414	i	13.598	13.598	5.907	945.92	hP86	Cu <sub>6</sub> <sup>2+</sup> Bi(AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
Petersite-(Y)	44-1434	i	13.248	13.248	5.863	891.15	hP86	YCu <sub>6</sub> (PO <sub>4</sub> ) <sub>3</sub> (OH) <sub>6</sub> •3H <sub>2</sub> O
<b>Modderite group GX or GG'</b>								
Cherepanovite	38-407	O	5.700	3.590	6.000	122.78	oP7.91	RhAs
Modderite, syn	9-94		3.458	5.869	5.292	107.40	oP8	CoAs
Ruthenarsenite	26-947		5.633	3.239	6.165	112.48	oP8	RuAs
Westerveldite, syn	12-799	★	5.436	6.024	3.372	110.44	oP8	FeAs
<b>Molybdenite supergroup GX<sub>2</sub></b>								
<b>2H group</b>								
Drysdallite-2H	29-914	i	3.287	3.287	12.925	120.94	hP6	MoSe <sub>2</sub>
Molybdenite-2H, syn	37-1492	★	3.161	3.161	12.299	106.43	hP6	MoS <sub>2</sub>
Tungstenite-2H, syn	8-237	i	3.154	3.154	12.362	106.50	hP6	WS <sub>2</sub>
<b>3R group</b>								
Chloromagnesite, syn	37-774	i	3.640	3.640	17.673	202.79	hR3	MgCl <sub>2</sub>
Lawrencite, syn	1-1106		3.604	3.604	17.591	197.87	hR3	FeCl <sub>2</sub>
Molybdenite-3R	17-744		3.160	3.160	18.330	158.51	hR3	MoS <sub>2</sub>
Scacchite, syn	22-720	★	3.706	3.706	17.569	208.98	hR3	MnCl <sub>2</sub>
Tungstenite-3R	35-651		3.149	3.149	18.434	158.33	hR3	WS <sub>2</sub>
<b>Monazite group (D/L)(TX<sub>4</sub>)</b>								
<b>Arsenate subgroup</b>								
Gasparite-(Ce), syn	15-772	★	6.960	7.158	6.738	324.65	mP24	CeAsO <sub>4</sub>
Rooseveltite, syn	25-89	★	6.882	7.164	6.734	320.94	mP24	BiAsO <sub>4</sub>
<b>Chromate subgroup</b>								
Crocoite, syn	8-209	i	7.120	7.440	6.800	351.81	mP24	PbCrO <sub>4</sub>
<b>Phosphate subgroup</b>								
Brabantite, syn	31-311	i	6.713	6.916	6.419	289.48	mP24	CaTh(PO <sub>4</sub> ) <sub>2</sub>
Cheralite-(Ce)	33-1095	★	6.752	6.963	6.468	295.17	mP24	(Ln,Th,Ca,U)(PO <sub>4</sub> ,SiO <sub>4</sub> )
Monazite-(Ce)	46-1295	i	6.811	7.039	6.501	303.01	mP24	(Ce,La,Nd)PO <sub>4</sub>
Monazite-(Ce), syn	32-199	★	6.800	7.023	6.472	300.60	mP24	CePO <sub>4</sub>
Monazite-(La), syn	46-1326	i	6.836	7.070	6.503	305.92	mP24	LaPO <sub>4</sub>
Monazite-(Nd)	46-1392	i	6.779	6.984	6.438	296.09	mP24.12	(Nd,Ca,Ce)PO <sub>4</sub>
Monazite-(Nd), syn	46-1328	i	6.742	6.957	6.409	292.02	mP24	NdPO <sub>4</sub>
<b>Silicate subgroup</b>								
Huttonite, syn	34-188	★	6.776	6.965	6.498	296.23	mP24	ThSiO <sub>4</sub>
Tombarthite-(Y)	21-1314	O	7.120	7.270	6.700	338.59	mP?	Ln <sub>4</sub> (Si,H <sub>4</sub> ) <sub>4</sub> O <sub>12-x</sub> (OH) <sub>4</sub>
<b>Related structures</b>								
Raspite	16-156	i	13.525	4.968	5.546	355.01	mP24	PbWO <sub>4</sub>
Raspite	29-784	C	13.555	4.976	5.561	357.47	mP24	PbWO <sub>4</sub>
<b>Montgomeryite group Ca<sub>4</sub>EG<sub>4</sub>(PO<sub>4</sub>)<sub>6</sub>(OH)<sub>4</sub>•12H<sub>2</sub>O</b>								
Calcioferrite	39-380		10.340	24.200	6.310	1578.40	mC166	Ca <sub>4</sub> MgFe <sub>4</sub> <sup>+3</sup> (PO <sub>4</sub> ) <sub>6</sub> (OH) <sub>4</sub> •12H <sub>2</sub> O
Kingsmuntite	35-694	i	10.029	24.460	6.258	1534.83	mC166	Ca <sub>4</sub> FeAl <sub>4</sub> (PO <sub>4</sub> ) <sub>6</sub> (OH) <sub>4</sub> •12H <sub>2</sub> O
Montgomeryite	35-624	★	10.007	24.090	6.236	1502.79	mC166	Ca <sub>4</sub> MgAl <sub>4</sub> (PO <sub>4</sub> ) <sub>6</sub> (OH) <sub>4</sub> •12H <sub>2</sub> O
Zodacite	41-1454	i	10.152	24.140	6.308	1545.59	mC166	Ca <sub>4</sub> MnFe <sub>4</sub> (PO <sub>4</sub> ) <sub>6</sub> (OH) <sub>4</sub> •12H <sub>2</sub> O
<b>Natrochalcite supergroup (G/L)(G'/Q)(TO<sub>4</sub>)<sub>2</sub>X<sub>2</sub></b>								
Ferrilotharmeyerite	45-1390	i	8.997	6.236	7.390	373.48	mC42	Ca(Zn,Cu)(Fe <sup>+3</sup> ,Zn)(AsO <sub>3</sub> OH) <sub>2</sub> (OH) <sub>3</sub>
Gartrellite	46-1306	i	5.458	7.652	5.686	198.37	aP15.60	Pb(Cu <sup>+2</sup> ,Fe <sup>+2</sup> ) <sub>2</sub> (AsO <sub>4</sub> ,SO <sub>4</sub> ) <sub>2</sub> (CO <sub>3</sub> ,H <sub>2</sub> O) <sub>0.7</sub>
Helmutwinklerite	33-781		5.630	7.760	5.600	204.27	aP19	PbZn <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Lotharmeyerite	35-620	i	13.426	6.244	9.064	747.61	mC84	CaZnMn(AsO <sub>4</sub> ) <sub>2</sub> (OH)•2H <sub>2</sub> O
Mawbyite	45-1468	i	9.052	6.277	7.580	391.69	mC34	Pb(Fe,Zn) <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> H <sub>2</sub> O <sub>2</sub>

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Mounanaite</b>	22- 657		5.550	7.660	5.560	198.44	aP17	PbFe <sub>2-3</sub> (VO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub>
<b>Natrochalcite</b>	45-1364	★	8.807	6.186	7.507	358.70	mC36	NaCu <sub>2-3</sub> (SO <sub>4</sub> ) <sub>2</sub> OH•H <sub>2</sub> O
<b>Thometzekite</b>	39- 340	i	9.088	6.311	7.656	392.08	mC38	PbCu <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
<b>Tsumcorite</b>	25- 399	i	9.131	6.326	7.583	396.00	mC32	FePbZn(AsO <sub>4</sub> ) <sub>2</sub> •H <sub>2</sub> O
<b><i>Nepheline supergroup</i> DE<sub>3</sub>[T<sub>4</sub>T'<sub>4</sub>O<sub>16</sub>]</b>								
<b>1H group</b>								
<b>Godovikovite</b>	23- 1	★	4.737	4.737	8.281	160.95	hP16	NH <sub>4</sub> Al(SO <sub>4</sub> ) <sub>2</sub>
<b>Ice, syn</b>	16- 687	i	4.498	4.498	7.338	128.57	hP12	H <sub>2</sub> O
<b>Kalsilite, syn</b>	11- 579	★	5.159	5.159	8.703	200.60	hP14	KAlSiO <sub>4</sub>
<b>Sabieite, syn</b>	24- 44	★	4.839	4.839	8.314	168.61	hP16	NH <sub>4</sub> Fe(SO <sub>4</sub> ) <sub>2</sub>
<b>Steklite</b>	47-1883		4.739	4.739	7.995	155.50	hP12	KAl(SO <sub>4</sub> ) <sub>2</sub>
<b>4H group</b>								
<b>Nepheline, K-rich, syn</b>	12- 198	i	10.237	10.237	8.508	772.15	hP56	(K,Na)AlSiO <sub>4</sub>
<b>Nepheline, syn</b>	9- 338	i	10.060	10.060	8.417	737.71	hP56	K(Na,K) <sub>3</sub> Al <sub>4</sub> Si <sub>4</sub> O <sub>16</sub>
<b>Nepheline, syn</b>	35- 424	★	9.978	9.978	8.330	718.23	hP56	NaAlSiO <sub>4</sub>
<b>Yoshiokaite</b>	46-1336	i	9.939	9.939	8.245	705.35	hP56	Ca(Al,Si) <sub>2</sub> O <sub>4</sub>
<b>Related structures</b>								
<b>Kaliophilite</b>	11- 313	i	26.930	26.930	8.522	5352.35	hP378	KAlSiO <sub>4</sub>
<b>Panunzite</b>	31-1081	i	20.513	20.513	8.553	3116.79	hP224	(K,Na)AlSiO <sub>4</sub>
<b>Tridymite-M, syn</b>	18-1170	i	18.504	5.006	23.845	2125.08	mC144	SiO <sub>2</sub>
<b>Tridymite-O</b>	42-1401	i	17.086	9.931	16.304	2766.56	oF204	SiO <sub>2</sub>
<b>Trikalsilite, syn</b>	12- 197	i	15.350	15.350	8.538	1742.22	hP126	(K,Na)AlSiO <sub>4</sub>
<b><i>Nickeline group</i> G<sub>1-8</sub>X or G<sub>1-8</sub>G'; δ=0&lt;=&gt;0.13</b>								
<b>Achavalite, syn</b>	26- 795	i	3.626	3.626	5.940	67.64	hP4	FeSe
<b>Breithauptite</b>	41-1439		3.926	3.926	5.138	68.57	hP4	NiSb
<b>Freiboldtite</b>	15- 464	O	3.632	3.632	5.301	60.54	hP4	CoSe
<b>Hexatestibiopanickeite</b>	29- 932		3.983	3.983	5.339	73.35	hP3.93	(Ni,Pd) <sub>2</sub> SbTe
<b>Imgreite, syn</b>	38-1393	★	3.929	3.929	5.366	71.74	hP4	NiTe
<b>Jaipurite, syn</b>	25-1081		3.384	3.384	5.196	51.53	hP4.01	CoS <sub>1.035</sub>
<b>Kotulskite, Bi-rich</b>	15- 394	O	4.190	4.190	5.670	86.21	hP3.24	Bi <sub>0.4</sub> PdTe <sub>1.18</sub>
<b>Kotulskite, syn</b>	29- 971		4.152	4.152	5.670	84.65	hP4	PdTe
<b>Langsite</b>	24- 333	i	3.538	3.538	5.127	55.58	hP4	(Co,Ni)As
<b>Nickeline</b>	31- 900		3.622	3.622	5.013	56.95	hP4	NiAs
<b>Nickeline</b>	47-1737	★	3.622	3.622	5.041	57.29	hP4	NiAs
<b>Niggliite, syn</b>	25- 614	i	4.100	4.100	5.432	79.08	hP4	PtSn
<b>Sederholmite</b>	18- 888		3.624	3.624	5.288	60.14	hP3.70	Ni <sub>0.85</sub> Se
<b>Sobolevskite</b>	29- 238	i	4.220	4.220	5.709	88.05	hP4	PdBi
<b>Stannopalladinite, syn</b>	4- 801		4.390	4.390	5.655	94.38	hP5	Pd <sub>3</sub> Sn <sub>2</sub>
<b>Stumpflite</b>	25-1482	i	4.175	4.175	5.504	83.08	hP4	Pt(Sb,Bi)
<b>Sudburyite, syn</b>	26- 888		4.078	4.078	5.588	80.48	hP4	PdSb
<b>Zlatogorite</b>	50-1598	i	4.049	4.049	5.136	72.91	hP4	CuNiSb <sub>2</sub>
<b>Related structures</b>								
<b>Pyrrhotite-11T</b>	29- 726		6.897	6.897	63.222	2604.39	hP168.08	Fe <sub>1-x</sub> S
<b>Pyrrhotite-3T, syn</b>	24- 220	C	6.867	6.867	17.062	696.78	hP45	Fe <sub>7</sub> S <sub>8</sub>
<b>Pyrrhotite-3T, syn</b>	25- 411	i	6.900	6.900	17.280	712.48	hP45	Fe <sub>7</sub> S <sub>8</sub>
<b>Pyrrhotite-4H</b>	22-1120	i	6.880	6.880	22.900	938.73	hP64	Fe <sub>1-x</sub> S
<b>Pyrrhotite-4M</b>	29- 723	i	12.811	6.870	11.885	930.60	mC60	Fe <sub>7</sub> S <sub>8</sub>
<b>Pyrrhotite-5T</b>	29- 724	i	6.888	6.888	28.670	1178.00	hP76	Fe <sub>1-x</sub> S
<b>Pyrrhotite-6T</b>	29- 725	i	6.898	6.898	34.519	1422.53	hP91.97	Fe <sub>1-x</sub> S
<b>Pyrrhotite-7T, syn</b>	20- 534		6.894	6.894	40.150	1652.57	hP82.94	Fe <sub>1-x</sub> S
<b>Smythite</b>	10- 437		3.470	3.470	34.500	359.76	hR6.67	Fe <sub>9</sub> S <sub>11</sub>
<b>Troilite-2H</b>	37- 477	★	5.968	5.968	11.761	362.72	hP24	FeS
<b><i>Nordite group</i> Na<sub>3</sub>SrEG[Si<sub>6</sub>O<sub>17</sub>]</b>								
<b>Ferronordite-(Ce)</b>	50-1639	i	14.460	5.187	19.848	1488.68	oP116	Na <sub>3</sub> Sr(Ce,La)(Fe,Mn,Zn)Si <sub>6</sub> O <sub>17</sub>
<b>Manganonordite-(Ce)</b>	50-1638	i	14.449	5.187	19.849	1487.62	oP116	Na <sub>3</sub> Sr(Ce,La)(Mn,Fe,Zn)Si <sub>6</sub> O <sub>17</sub>
<b>Nordite-(La)</b>	41- 584	i	14.369	5.180	19.766	1471.21	oP116	Na <sub>3</sub> SrZnLaSi <sub>6</sub> O <sub>17</sub>
<b>Nordite-(La)</b>	46-1413	i	14.436	5.191	19.819	1485.12	oP120	Na <sub>3</sub> SrLaCe(Zn,Mg,Fe,Mn)Si <sub>6</sub> O <sub>17</sub>
<b><i>Northupite group</i> Na<sub>6</sub>G<sub>2</sub>(SO<sub>4</sub>)<sub>0,1</sub>(CO<sub>3</sub>)<sub>4</sub>X<sub>1,0</sub></b>								
<b>Ferrotchite</b>	35- 707		13.962	13.962	13.962	2721.72	cF232	Na <sub>6</sub> Fe <sub>2</sub> (CO <sub>3</sub> ) <sub>4</sub> (SO <sub>4</sub> )
<b>Manganotchite</b>	43-1482	i	13.995	13.995	13.995	2741.12	cF232	Na <sub>6</sub> Mn <sub>2</sub> (CO <sub>3</sub> ) <sub>4</sub> (SO <sub>4</sub> )
<b>Northupite</b>	19-1213		13.980	13.980	13.980	2732.26	cF208	Na <sub>6</sub> Mg(CO <sub>3</sub> ) <sub>2</sub> Cl
<b>Tychite</b>	22- 479	i	13.898	13.898	13.898	2684.46	cF232	Na <sub>6</sub> Mg <sub>2</sub> (CO <sub>3</sub> ) <sub>4</sub> (SO <sub>4</sub> )
<b><i>Nowackiite group</i> Cu<sub>6</sub>T<sub>3</sub>L<sub>4</sub>S<sub>12</sub></b>								
<b>Aktashite</b>	25- 298		13.720	13.720	9.320	1519.34	hR25	Cu <sub>6</sub> Hg <sub>3</sub> As <sub>4</sub> S <sub>12</sub>
<b>Gruzdevite</b>	35- 659		13.902	13.902	9.432	1578.66	hR25	Cu <sub>6</sub> Hg <sub>3</sub> Sb <sub>4</sub> S <sub>12</sub>
<b>Nowackiite</b>	25- 323		13.505	13.505	9.400	1484.73	hR25	Cu <sub>6</sub> Zn <sub>3</sub> As <sub>4</sub> S <sub>12</sub>
<b><i>Olivine group</i> (G/Q)(G'/Q')(TO<sub>4</sub>)</b>								
<b>Beryllate subgroup</b>								
<b>Chrysoberyl</b>	11- 448	i	5.488	9.423	4.433	229.25	oP28	BeAl <sub>2</sub> O <sub>4</sub>
<b>Chrysoberyl</b>	45-1445	★	4.429	9.413	5.480	228.46	oP28	Al <sub>2</sub> BeO <sub>4</sub>
<b>Borate subgroup</b>								
<b>Sinhalite, syn</b>	25-1379	i	9.874	5.671	4.335	242.74	oP28	MgAlBO <sub>4</sub>
<b>Phosphate subgroup</b>								
<b>Buchwaldite</b>	29-1194		5.167	9.259	6.737	322.31	oP28	NaCa(PO <sub>4</sub> )
<b>Ferrisicklerite</b>	29- 808	i	5.916	10.026	4.796	284.45	oP28	Li <sub>1-x</sub> (Fe,Mn)PO <sub>4</sub>
<b>Heterosite</b>	34- 134	i	5.824	9.823	4.786	273.80	oP24	(Fe,Mn)PO <sub>4</sub>
<b>Lithiophilite</b>	13- 336		6.050	10.320	4.710	294.07	oP28	Li(Mn,Fe)PO <sub>4</sub>
<b>Lithiophilite</b>	33- 803	i	6.108	10.459	4.732	302.30	oP28	LiMn <sup>2+</sup> PO <sub>4</sub>
<b>Lithiophilite, syn</b>	33- 804	★	6.106	10.454	4.749	303.14	oP28	LiMn <sup>2+</sup> PO <sub>4</sub>
<b>Maricite</b>	29-1216	i	6.867	9.889	5.049	311.66	oP28	NaFe <sup>2+</sup> PO <sub>4</sub>
<b>Natrophilite</b>	25- 846	i	10.517	4.985	6.314	331.05	oP28	NaMn <sup>2+</sup> PO <sub>4</sub>
<b>Purpurite</b>	37- 478	★	5.824	9.766	4.777	271.69	oP24	(Mn,Fe)PO <sub>4</sub>
<b>Sicklerite, Fe-rich</b>	33- 802	★	5.947	10.063	4.793	286.86	oP28	Li(Mn,Fe)PO <sub>4</sub>
<b>Triphylite</b>	40-1499	★	6.019	10.347	4.704	292.95	oP28	LiFePO <sub>4</sub>

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Silicate subgroup</b>								
Fayalite, Mg-rich	31- 633	i	4.799	10.393	6.063	302.40	oP28	(Fe,Mg) <sub>2</sub> SiO <sub>4</sub>
Fayalite, Mn-rich	12- 220	i	4.868	10.588	6.157	317.35	oP28	(Fe,Mn) <sub>2</sub> SiO <sub>4</sub>
Fayalite, syn	34- 178	★	6.090	10.481	4.821	307.75	oP28	Fe <sub>2</sub> <sup>2+</sup> SiO <sub>4</sub>
Forsterite, Fe-rich	31- 795	i	4.784	10.318	6.027	297.50	oP28	(Mg,Fe) <sub>2</sub> SiO <sub>4</sub>
Forsterite, syn	34- 189	★	5.982	10.198	4.755	290.07	oP28	Mg <sub>2</sub> SiO <sub>4</sub>
Glaucochroite	14- 376		4.920	11.140	6.500	356.26	oP28	(Ca,Mn) <sub>2</sub> SiO <sub>4</sub>
Kirschsteinite, syn	34- 98	★	6.441	11.159	4.875	350.42	oP28	CaFe <sup>2+</sup> SiO <sub>4</sub>
Liebenbergite, syn	15- 388	i	4.725	10.118	5.908	282.45	oP28	Ni <sub>2</sub> SiO <sub>4</sub>
Monticellite, syn	35- 590	★	6.367	11.074	4.822	340.00	oP28	CaMgSiO <sub>4</sub>
Tephroite, Ca-rich	45-1396	i	4.908	10.772	6.302	333.18	oP28	(Mn,Ca) <sub>2</sub> SiO <sub>4</sub>
Tephroite, syn	35- 748	★	6.259	10.604	4.903	325.39	oP28	Mn <sub>2</sub> SiO <sub>4</sub>
<b>Related structures</b>								
Laihunite-1M	30- 664		10.189	4.805	5.801	283.96	mP26.40	Fe <sub>1.6</sub> SiO <sub>4</sub>
Larnite, syn	33- 302	★	9.310	6.756	5.506	345.29	mP28	Ca <sub>2</sub> SiO <sub>4</sub>
Sarcopsidite, syn	39- 341	i	10.442	4.787	6.029	301.32	mP26	Fe <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>
<b>Osumilite supergroup DE<sub>2</sub>[T<sub>3</sub>T'<sub>12</sub>O<sub>30</sub>]<sup>0</sup>•0•2H<sub>2</sub>O</b>								
<b>1H group</b>								
Berezanskite	50-1663	i	9.903	9.903	14.276	1212.47	hP96	KLi <sub>3</sub> Ti <sub>2</sub> Si <sub>12</sub> O <sub>30</sub>
Brannockite	26- 853	i	10.017	10.017	14.245	1237.85	hP96	Li <sub>3</sub> KSn <sub>2</sub> Si <sub>12</sub> O <sub>30</sub>
Chayesite	45-1472	i	10.153	10.153	14.388	1284.46	hP96	K(Mg,Fe <sup>2+</sup> ) <sub>4</sub> Fe <sup>2+</sup> (Si <sub>12</sub> O <sub>30</sub> )
Darapioisite	29- 825	O	10.320	10.320	14.390	1327.24	hP98	LiKNa <sub>2</sub> MnZnZrSi <sub>12</sub> O <sub>30</sub>
Eifelite	35- 588		10.150	10.150	14.223	1268.98	hP100	KNa <sub>3</sub> Mg <sub>4</sub> Si <sub>12</sub> O <sub>30</sub>
Merrillueite	21-1270		10.160	10.160	14.320	1280.15	hP98	(K,Na) <sub>2</sub> (Fe <sup>2+</sup> ,Mg) <sub>5</sub> Si <sub>12</sub> O <sub>30</sub>
Milarite	12- 450	i	10.406	10.406	13.825	1296.35	hP106	KCa <sub>2</sub> (Be <sub>4</sub> Al)Si <sub>12</sub> O <sub>30</sub> •H <sub>2</sub> O
Milarite	35- 459	i	10.414	10.414	13.673	1284.19	hP104	K <sub>2</sub> Ca <sub>2</sub> (Be <sub>2</sub> Al)Si <sub>12</sub> O <sub>30</sub> •H <sub>2</sub> O
Osumilite-(Fe)	25- 658	i	10.152	10.152	14.257	1272.51	hP94	(K,Na)(Fe <sup>2+</sup> ,Mg) <sub>2</sub> (Al,Fe <sup>2+</sup> ) <sub>2</sub> (Si,Al) <sub>12</sub> O <sub>30</sub>
Osumilite-(Mg), syn	29-1016	i	10.078	10.078	14.317	1259.31	hP96	KMg <sub>2</sub> Al <sub>3</sub> (Si <sub>10</sub> Al <sub>2</sub> )O <sub>30</sub>
Poudretteite	42-1376	i	10.239	10.239	13.485	1224.32	hP96	KNa <sub>2</sub> B <sub>3</sub> Si <sub>12</sub> O <sub>30</sub>
Roedderite	23- 76	O	10.127	10.127	14.245	1265.19	hP98	NaK(Mg,Fe) <sub>5</sub> (Al,Si) <sub>12</sub> O <sub>30</sub>
Sogdianite	21- 501		10.090	10.090	13.980	1232.59	hP98	(K,Na) <sub>2</sub> Li <sub>2</sub> (Li,Fe,Al) <sub>2</sub> ZrSi <sub>12</sub> O <sub>30</sub>
Sugilite	47-1840	i	10.031	10.031	14.021	1221.92	hP102	(K,Na)Na <sub>2</sub> (Fe,Na,Mn) <sub>3</sub> (Li,Al,Fe) <sub>3</sub> Si <sub>12</sub> O <sub>30</sub>
Unnamed mineral	47-1841		10.312	10.312	14.380	1324.27	hP98.60	(K,Na,Sr)(Na,Ca) <sub>1.3</sub> (Mg,Na,Mn) <sub>2</sub> (Mg,Fe,Al,Ti) <sub>3</sub> (Si,Al) <sub>12</sub> O <sub>30</sub>
Yagiite	21-1365	i	10.090	10.090	14.290	1259.93	hP103	(Na <sub>3</sub> ,K) <sub>3</sub> Mg <sub>4</sub> (Al,Mg) <sub>6</sub> (Si,Al) <sub>24</sub> O <sub>60</sub>
<b>20-disordered group</b>								
Armenite	45-1481	★	13.871	18.648	10.695	2766.44	oP216	BaCa <sub>2</sub> Al <sub>6</sub> Si <sub>9</sub> O <sub>30</sub> •2H <sub>2</sub> O
<b>20-ordered group</b>								
Emeleusite	29- 832	i	10.073	17.350	14.010	2448.48	oC200	Li <sub>2</sub> Na <sub>4</sub> Fe <sub>2</sub> <sup>2+</sup> Si <sub>12</sub> O <sub>30</sub>
Tuhualite	10- 440		14.310	17.280	10.110	2499.97	oC204	(Na,K) <sub>2</sub> Fe <sub>4</sub> Si <sub>12</sub> O <sub>30</sub> •H <sub>2</sub> O
Zektzerite	29- 835	i	14.306	17.330	10.140	2513.94	oC192	LiNaZrSi <sub>6</sub> O <sub>15</sub>
<b>Ottrelite supergroup GG'<sub>2</sub>(TO<sub>4</sub>)O(OH)<sub>2</sub></b>								
<b>1A group</b>								
Carborite	35- 586		9.513	5.569	9.296	479.81	aP52	Fe <sup>2+</sup> Al <sub>2</sub> GeO <sub>5</sub> (OH) <sub>2</sub>
Chloritoid-A	14- 344	i	9.500	5.480	9.160	463.28	aP52	FeAl <sub>2</sub> SiO <sub>5</sub> (OH) <sub>2</sub>
<b>2M group</b>								
Chloritoid-M	14- 62	i	9.483	5.487	18.187	925.99	mC104	FeAl <sub>2</sub> SiO <sub>5</sub> (OH) <sub>2</sub>
Magnesioclhoritoid	44-1427	★	9.446	5.466	18.161	919.10	mC104	(Mg,Fe)Al <sub>2</sub> SiO <sub>5</sub> (OH) <sub>2</sub>
Ottrelite	39- 397	O	9.505	5.484	18.214	929.45	mC104	Mn <sub>2</sub> Al <sub>4</sub> Si <sub>2</sub> O <sub>10</sub> (OH) <sub>4</sub>
<b>Overite group EGG'(PO<sub>4</sub>)<sub>2</sub>(OH)•2,4H<sub>2</sub>O</b>								
Juonniite	50-1664	i	15.030	18.950	7.590	2161.77	oP216	CaMgSc(PO <sub>4</sub> ) <sub>2</sub> (OH)•4H <sub>2</sub> O
Lunjakite	37- 456		14.950	18.710	6.960	1946.81	oP216	MgMnAl(PO <sub>4</sub> ) <sub>2</sub> (OH)•4H <sub>2</sub> O
Manganosegelerite	46-1478	i	14.890	18.790	7.408	2072.63	oP216	(Mn <sup>2+</sup> ,Ca)(Mn <sup>2+</sup> ,Fe <sup>2+</sup> ,Mg)Fe <sup>2+</sup> (PO <sub>4</sub> ) <sub>2</sub> (OH)•4H <sub>2</sub> O
Overite	16- 157		14.780	18.780	7.130	1979.06	oC216	CaMgAl(PO <sub>4</sub> ) <sub>2</sub> (OH)•4H <sub>2</sub> O
Segelerite	26-1061	i	14.662	18.633	7.261	1983.68	oP216	CaMgFe(PO <sub>4</sub> ) <sub>2</sub> (OH)•4H <sub>2</sub> O
Wilhelmvierlingite	38- 429		14.800	18.700	7.310	2023.12	oP168	CaMnFe(PO <sub>4</sub> ) <sub>2</sub> (OH)•2H <sub>2</sub> O
<b>Paravauxite group GG'<sub>2</sub>(PO<sub>4</sub>)<sub>2</sub>X<sub>2</sub>•8H<sub>2</sub>O</b>								
Gordonite	14- 313	i	5.240	10.490	6.960	332.30	aP41	MgAl <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
Laueite	14- 246	O	5.280	10.660	7.140	346.76	aP41	Mn <sup>2+</sup> Fe <sup>2+</sup> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
Mangangordonite	45-1409	i	5.251	10.368	7.088	340.38	aP41	MnAl <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
Paravauxite	29-1424	i	5.239	10.560	6.972	336.12	aP41	Fe <sup>2+</sup> Al <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
Sigloite	14- 171		5.260	10.520	7.060	334.38	aP39	FeAl <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (O,OH) <sub>2</sub> •8H <sub>2</sub> O
Ushkovite	35- 685	i	5.196	10.700	7.140	350.62	aP41	MgFe <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
<b>Parkerite supergroup G<sub>3</sub>L<sub>2</sub>S<sub>2</sub></b>								
Parkerite-M, syn	26-1283	★	7.965	8.085	7.965	512.61	mC28	Ni <sub>3</sub> Bi <sub>2</sub> S <sub>2</sub>
Parkerite-O, syn	25- 401	C	5.545	5.731	4.052	128.77	oP7	Ni <sub>3</sub> Bi <sub>2</sub> S <sub>2</sub>
Rhodplumbsite	35- 720		5.725	5.725	13.976	396.65	hR7	Rh <sub>3</sub> Pb <sub>2</sub> S <sub>2</sub>
Shandite, syn	26-1287	★	5.591	5.591	13.579	367.60	hR7	Ni <sub>3</sub> Pb <sub>2</sub> S <sub>2</sub>
<b>Paulkerrite group D<sub>0&lt;=&gt;1</sub>E<sub>2</sub>E'<sub>2</sub>Ti(PO<sub>4</sub>)<sub>4</sub>(OH)<sub>3</sub>•15H<sub>2</sub>O</b>								
Benyacarite	50-1552	★	10.561	20.661	12.489	2725.11	oP308	KMn <sub>2</sub> Fe <sub>2</sub> Ti(PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>3</sub> •15H <sub>2</sub> O
Benyacarite	50-1621	i	10.561	20.585	12.516	2720.96	oP308	KMn <sub>2</sub> Fe <sub>2</sub> Ti(PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>3</sub> •15H <sub>2</sub> O
Mantienneite	37- 438	O	10.409	20.330	12.312	2605.40	oP314	K <sub>0.5</sub> (Mg <sub>1.5</sub> Fe <sub>0.5</sub> ) <sub>2</sub> Al <sub>2</sub> Ti(PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>3</sub> •15H <sub>2</sub> O
Paulkerrite	38- 390		10.490	20.750	12.440	2707.78	oP308	KMg <sub>2</sub> Fe <sub>2</sub> Ti(PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>3</sub> •15H <sub>2</sub> O
<b>Pentlandite group GT<sub>8</sub>S<sub>8</sub></b>								
Argentopentlandite	25- 406	i	10.500	10.500	10.500	1157.63	cF67.20	(Fe,Ni) <sub>8</sub> Ag <sub>1-3</sub> S <sub>8</sub>
Cobaltpentlandite	12- 723	i	9.973	9.973	9.973	991.92	cF68	(Co,Fe,Ni) <sub>8</sub> S <sub>8</sub>
Cobaltpentlandite	30- 444	C	9.977	9.977	9.977	993.12	cF68	(Co,Ni,Fe) <sub>8</sub> S <sub>8</sub>
Cobaltpentlandite, syn	19- 364	O	9.932	9.932	9.932	979.74	cF68	Co <sub>8</sub> S <sub>8</sub>
Geffroyite	35- 523	i	10.889	10.889	10.889	1291.11	cF68	(Cu,Fe,Ag) <sub>8</sub> (Se,S) <sub>8</sub>
Manganeseshadlunite	25-1425		10.730	10.730	10.730	1235.38	cF67.60	(Cu,Fe) <sub>8</sub> (Mn,Pb) <sub>8</sub> S <sub>8</sub>
Pentlandite	8- 90	i	10.042	10.042	10.042	1012.65	cF68	(Fe,Ni) <sub>8</sub> S <sub>8</sub>
Shadlunite	25-1426		10.910	10.910	10.910	1298.60	cF68	(Cu,Fe) <sub>8</sub> (Pb,Cd) <sub>8</sub> S <sub>8</sub>

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Perovskite supergroup (D&lt;=&gt;E)GX<sub>3</sub></b>								
<b>1C group</b>								
Isolueshite	50- 1626		3.906	3.906	3.906	59.60	cP5	(Na,Ca,La)(Nb,Ti)O <sub>3</sub>
Loparite-(Ce)	49- 1808	i	3.892	3.892	3.892	58.95	cP5	(Ce,Na,Ca,La)(Ti,Nb)O <sub>3</sub>
Loparite-(Ce), Sr-rich	35- 618		3.886	3.886	3.886	58.69	cP5	(Sr,Ce,Na)(Ti,Nb)O <sub>3</sub>
Lueshite	19- 1221	O	3.910	3.910	3.910	59.78	cP5	NaNbO <sub>3</sub>
Tausonite, Ba-rich, syn	39- 1395	★	3.947	3.947	3.947	61.49	cP5	Ba <sub>0.5</sub> Sr <sub>0.5</sub> TiO <sub>3</sub>
Tausonite, syn	35- 734	★	3.905	3.905	3.905	59.55	cP5	SrTiO <sub>3</sub>
<b>1Q group</b>								
Macedonite, syn	6- 452	★	3.899	3.899	4.153	63.15	tP5	PbTiO <sub>3</sub>
<b>4O group</b>								
Latrappite	16- 694		5.448	7.777	5.553	235.28	oP20	(Ca,Na)(Nb,Ti,Fe)O <sub>3</sub>
Neighborite	13- 303		5.363	7.676	5.503	226.54	oP20	NaMgF <sub>3</sub>
Perovskite, syn	22- 153	★	5.440	7.644	5.381	223.78	oP20	CaTiO <sub>3</sub>
Perovskite, syn	42- 423	★	5.442	7.642	5.381	223.78	oP20	CaTiO <sub>3</sub>
<b>Pharmacosiderite supergroup D<sub>1,2</sub>G<sub>4</sub>(AsO<sub>4</sub>)<sub>3</sub>(OH)<sub>4,5</sub>•5&lt;=&gt;7H<sub>2</sub>O</b>								
<b>Cubic group</b>								
Alumopharmacosiderite-1Q	35- 670	i	7.745	7.745	7.745	464.58	cP47.50	KAl <sub>4</sub> (AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>4</sub> •6.5H <sub>2</sub> O
Bariumalumopharmacosiderite	19- 94		7.713	7.713	7.713	458.92	cP45	BaAl <sub>4</sub> (AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>5</sub> •5H <sub>2</sub> O
Bariumpharmacosiderite-1Q	34- 154	★	7.965	7.965	8.072	512.10	tP45	BaFe <sub>4</sub> (AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>5</sub> •5H <sub>2</sub> O
Sodiumpharmacosiderite	38- 388	i	8.012	8.012	8.012	514.31	cP52	Na <sub>2</sub> Fe <sub>4</sub> (AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>5</sub> •7H <sub>2</sub> O
<b>Tetragonal group</b>								
Alumopharmacosiderite, Ba-Zn-rich-8Q	47- 1812	i	15.476	15.476	15.675	3754.27	tI360	(Ba,K) <sub>0.5</sub> (Zn,Cu) <sub>0.5</sub> (Al,Fe) <sub>4</sub> (AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>5</sub> •5H <sub>2</sub> O
Bariumpharmacosiderite-8Q	34- 153	★	15.850	15.850	16.052	4032.62	tI360	BaFe <sub>4</sub> (AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>5</sub> •5H <sub>2</sub> O
Pharmacosiderite	34- 155	★	15.961	15.961	15.961	4066.12	cI399.20	K <sub>2</sub> Fe <sub>4</sub> (AsO <sub>4</sub> ) <sub>3</sub> (OH) <sub>5</sub> •6.3H <sub>2</sub> O
<b>Phenakite group TT'SiO<sub>4</sub></b>								
Eucryptite	14- 667	★	13.480	13.480	9.001	1416.45	hR42	LiAlSiO <sub>4</sub>
Phenakite	9- 431	i	12.472	12.472	8.252	1111.63	hR42	Be <sub>2</sub> SiO <sub>4</sub>
Willemite, syn	37- 1485	★	13.938	13.938	9.310	1566.35	hR42	Zn <sub>2</sub> SiO <sub>4</sub>
<b>Phosphoferrite group GG'<sub>2</sub>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>x</sub>•(3-x)H<sub>2</sub>O; x=0</b>								
Garyansellite	35- 638	i	9.452	9.890	8.198	766.35	oP82	(Mg,Fe) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>1.5</sub> •1.5H <sub>2</sub> O
Kryzhanovskite	24- 731		9.450	10.013	8.179	773.92	oP80	Mn <sup>2+</sup> Fe <sup>2+</sup> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •H <sub>2</sub> O
Landesite	16- 603	i	9.458	10.185	8.543	822.94	oP88	FeMn <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH)•2H <sub>2</sub> O
Phosphoferrite	9- 479		9.410	10.020	8.660	816.54	oP88	(Fe <sup>2+</sup> ,Mn <sup>2+</sup> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> •3H <sub>2</sub> O
Reddingite	9- 496		9.490	10.080	8.700	832.23	oP88	(Mn,Fe) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> •3H <sub>2</sub> O
<b>Phosphuranylite supergroup (D/L)<sub>0</sub>∧<sub>2</sub>[(UO<sub>2</sub>)<sub>3</sub>(TO<sub>4</sub>)<sub>2</sub>(OH)<sub>2</sub>](OH)<sub>0-4</sub>•mH<sub>2</sub>O; m=4</b>								
<b>1M group</b>								
Dumontite	12- 158		8.160	16.730	7.020	900.55	mP76	Pb <sub>2</sub> (UO <sub>2</sub> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>1</sub> •3H <sub>2</sub> O
Hügelite	34- 1476	i	8.130	17.270	7.010	930.62	mP76	Pb <sub>2</sub> (UO <sub>2</sub> ) <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub> •3H <sub>2</sub> O
<b>4O group</b>								
Arsenuranylite	14- 268	i	15.400	17.400	13.770	3689.81	oC294	Ca(UO <sub>2</sub> ) <sub>4</sub> (AsO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub> •6H <sub>2</sub> O
Bergenite	20- 154		16.050	17.760	13.860	3950.77	oC330	Ba(UO <sub>2</sub> ) <sub>4</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub> •8H <sub>2</sub> O
Dewindtite	39- 1350	★	15.826	17.299	13.641	3734.55	oC332	Pb <sub>3</sub> (UO <sub>2</sub> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •12H <sub>2</sub> O
Phosphuranylite	13- 419		15.880	17.240	13.760	3767.09	oC372	(Th,Ca,Pb)H <sub>2</sub> (UO <sub>2</sub> ) <sub>4</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>5</sub> •7H <sub>2</sub> O
Phosphuranylite	19- 898	i	15.850	17.420	13.760	3799.23	oC344	Ca(UO <sub>2</sub> )[(UO <sub>2</sub> ) <sub>3</sub> (OH) <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> ] <sub>2</sub> •12H <sub>2</sub> O
Phurcalite	30- 285	i	15.957	17.366	13.548	3754.28	oP328	Ca <sub>2</sub> (UO <sub>2</sub> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub> •4H <sub>2</sub> O
Yingjiangite	46- 1406		15.707	17.424	13.692	3747.21	oC292	(K <sub>2</sub> ,Ca)(UO <sub>2</sub> ) <sub>7</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>6</sub> •6H <sub>2</sub> O
<b>Related structures</b>								
Bergenite	43- 668	i	23.171	17.126	20.548	8143.62	mP846	Ba <sub>2</sub> (UO <sub>2</sub> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub> •6H <sub>2</sub> O
Metavanmeerscheite	35- 548	i	34.180	33.880	14.074	16297.95	oF1216	U <sup>6+</sup> (UO <sub>2</sub> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>6</sub> •2H <sub>2</sub> O
Mundite	35- 535		17.080	30.980	13.760	7280.94	oP680	Al(UO <sub>2</sub> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>3</sub> •5.5H <sub>2</sub> O
Phuralumite	33- 38		13.870	20.790	9.380	2507.84	mP252	Al <sub>2</sub> (UO <sub>2</sub> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>6</sub> •10H <sub>2</sub> O
Upalite	35- 619		13.712	16.825	9.291	1992.40	mP176	Al(UO <sub>2</sub> ) <sub>3</sub> O(OH)(PO <sub>4</sub> ) <sub>2</sub> •7H <sub>2</sub> O
Vanmeerscheite	35- 547	i	17.060	16.760	7.023	2008.06	oP176	U(UO <sub>2</sub> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>6</sub> •4H <sub>2</sub> O
<b>Picromerite group D<sub>2</sub>(G/Q)(SO<sub>4</sub>)<sub>2</sub>•6H<sub>2</sub>O</b>								
Boussingaultite, syn	35- 771	★	9.325	12.605	6.208	697.49	mP78	(NH <sub>4</sub> ) <sub>2</sub> Mg(SO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Cyanochoirite, syn	35- 769	★	9.080	12.123	6.164	657.08	mP62	K <sub>2</sub> Cu <sup>+</sup> (SO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Mohrite, syn	35- 764	★	9.292	12.601	6.249	700.53	mP78	(NH <sub>4</sub> ) <sub>2</sub> Fe <sup>2+</sup> (SO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Nickelboussingaultite, syn	31- 62	★	9.186	12.468	6.242	683.97	mP78	(NH <sub>4</sub> ) <sub>2</sub> Ni(SO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
Picromerite, syn	21- 1400	★	9.096	12.254	6.128	660.38	mP62	K <sub>2</sub> Mg(SO <sub>4</sub> ) <sub>2</sub> •6H <sub>2</sub> O
<b>Polybasite supergroup (G/Q)<sub>16</sub>L<sub>2</sub>S<sub>11</sub></b>								
<b>1H group</b>								
Antimonpearceite, syn	36- 392	★	7.430	7.430	11.823	565.22	hP29	(Ag,Cu) <sub>16</sub> Sb <sub>2</sub> S <sub>11</sub>
Pearceite, syn	36- 393	i	7.345	7.345	11.925	557.10	hP29	(Ag,Cu) <sub>16</sub> As <sub>2</sub> S <sub>11</sub>
<b>2H group</b>								
Arsenopolybasite, syn	37- 428	i	14.727	14.727	24.092	4525.14	hP232	(Ag,Cu) <sub>16</sub> As <sub>2</sub> S <sub>11</sub>
Polybasite, syn	36- 391	★	15.072	15.072	23.834	4688.92	hP232	(Ag,Cu) <sub>16</sub> Sb <sub>2</sub> S <sub>11</sub>
<b>Preisingerite group Bi<sub>3</sub>O(TO<sub>4</sub>)<sub>2</sub>(OH)</b>								
Petitjeanite	46- 1477	i	9.798	7.250	6.866	408.35	aP32	Bi <sub>3</sub> O(PO <sub>4</sub> ) <sub>2</sub> OH
Preisingerite	35- 543	i	9.993	7.404	6.937	430.07	aP32	Bi <sub>3</sub> O(OH)(AsO <sub>4</sub> ) <sub>2</sub>
Schumacherite	35- 587		10.050	7.460	6.900	430.96	aP32	Bi <sub>3</sub> O(OH)(VO <sub>4</sub> ) <sub>2</sub>
<b>Pumpellyite supergroup E<sub>2</sub>GG'<sub>2</sub>(SiO<sub>4</sub>)<sub>2</sub>[Si<sub>2</sub>O<sub>7</sub>](OH)<sub>2</sub>•(H<sub>2</sub>O,OH)</b>								
<b>1M group</b>								
Macfallite	35- 471		10.235	6.086	8.970	522.50	mP50	Ca <sub>2</sub> (Mn,Al) <sub>3</sub> (SiO <sub>4</sub> ) <sub>2</sub> (Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>3</sub>
Macfallite	42- 601	C	10.235	6.086	8.970	522.50	mP50	Ca <sub>2</sub> Mn <sub>3-3</sub> (Si <sub>2</sub> O <sub>7</sub> )(SiO <sub>4</sub> )(OH) <sub>3</sub>
Sursassite	37- 479	★	8.703	5.795	9.787	466.83	mP50	Mn <sub>2</sub> Al <sub>3</sub> (SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>3</sub>
<b>2M group</b>								
Julgoldite-(Fe <sup>2+</sup> )	23- 117	C	19.433	6.081	8.922	1045.07	mC104	Ca <sub>2</sub> (Fe,Al) <sub>3</sub> (SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>2</sub> •H <sub>2</sub> O
Julgoldite-(Fe <sup>2+</sup> )	24- 198		8.920	6.090	19.370	1043.23	mC104	Ca <sub>2</sub> (Fe,Al) <sub>3</sub> (SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>2</sub> •H <sub>2</sub> O
Okhotskite	42- 1387		8.887	6.000	19.530	1033.44	mC104	Ca <sub>2</sub> MnMn <sub>2</sub> (SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>2</sub> •H <sub>2</sub> O
Pumpellyite-(Al)	25- 156	★	8.820	5.904	19.118	987.26	mC104	Ca <sub>2</sub> MgAl <sub>2</sub> (SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>2</sub> •H <sub>2</sub> O
Pumpellyite-(Fe <sup>3+</sup> )	39- 1368		8.825	5.945	19.131	995.23	mC104	Ca <sub>2</sub> FeAl <sub>2</sub> (SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>2</sub> •H <sub>2</sub> O

Mineral Group Classification



**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
Pumpellyite-(Mg)	10- 447	i	8.810	5.940	19.140	992.82	mC104	Ca <sub>2</sub> FeAl <sub>2</sub> (SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>2</sub> •H <sub>2</sub> O
Pumpellyite-(Mn)	35- 514	i	8.923	5.995	19.156	1016.80	mC104	Ca <sub>2</sub> Mn(Al,Mn) <sub>2</sub> (SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>2</sub> •H <sub>2</sub> O
Shuiskite	39-1369	i	8.780	5.963	19.010	985.42	mC116	Ca <sub>2</sub> MgCr <sub>2</sub> (SiO <sub>4</sub> )(Si <sub>2</sub> O <sub>7</sub> )(OH) <sub>2</sub> •2H <sub>2</sub> O
<b>Pyribole subfamily (D,E,G)<sub>n-p</sub>[T<sub>n</sub>O<sub>3n+q</sub>]X<sub>0</sub>∧<sub>2</sub>•0∧<sub>3</sub>H<sub>2</sub>O</b>								
Chesterite	31- 637	C	18.614	45.306	5.297	4466.76	oC412	(Mg,Fe <sup>2+</sup> ) <sub>17</sub> Si <sub>20</sub> O <sub>54</sub> (OH) <sub>6</sub>
Clinojimthompsonite	31- 639	C	9.874	27.240	5.316	1348.07	mC124	(Mg,Fe <sup>2+</sup> ) <sub>5</sub> Si <sub>6</sub> O <sub>16</sub> (OH) <sub>2</sub>
Jimthompsonite	31- 638	C	18.626	27.230	5.297	2686.56	oP248	(Mg,Fe <sup>2+</sup> ) <sub>5</sub> Si <sub>6</sub> O <sub>16</sub> (OH) <sub>2</sub>
<b>Pyrite supergroup GXX' or GTT'</b>								
<b>Cobaltite group</b>								
Cobaltite	18- 431		5.574	5.573	5.576	173.22	oP12	(Co,Fe)AsS
Cobaltite	42-1345	★	5.582	5.585	5.569	173.61	oP12	CoAsS
Gersdorffite-Pca <sub>2</sub>	20- 778	★	5.685	5.685	5.685	183.73	oP12	(Ni,Co)AsS
Willyamite	26-1106	i	5.860	5.860	5.860	201.23	oP12.04	(Co,Ni)SbS
<b>Pyrite group</b>								
Aurostibite, syn	8- 460	i	6.659	6.659	6.659	295.26	cP12	AuSb <sub>2</sub>
Cattierite	41-1471	★	5.538	5.538	5.538	169.81	cP12	CoS <sub>2</sub>
Dzharkenite	48-1881	i	5.776	5.776	5.776	192.70	cP12	FeSe <sub>2</sub>
Erlichmanite, syn	19- 882	i	5.620	5.620	5.620	177.47	cP12	OsS <sub>2</sub>
Fukuchilite, syn	24- 365	i	5.604	5.604	5.604	175.99	cP12	(Fe,Cu)S <sub>2</sub>
Gersdorffite-Pa <sub>3</sub>	42-1392	★	5.696	5.696	5.696	184.82	cP11.96	Ni(As,S) <sub>2</sub>
Geversite, Bi-rich	45-1341	O	6.480	6.480	6.480	272.10	cP11.20	Pt(Sb,Bi) <sub>2</sub>
Geversite, syn	14- 141		6.440	6.440	6.440	267.09	cP12	PtSb <sub>2</sub>
Hauerite, syn	25- 549	i	6.100	6.100	6.100	226.99	cP12	MnS <sub>2</sub>
Hollingworthite, Ru-rich	30-1037		5.769	5.769	5.769	192.00	cP12	(Rh,Ru,Pt)AsS
Insizwaite, Sb-rich	25- 612		6.625	6.625	6.625	290.78	cP12	Pt(Bi,Sb) <sub>2</sub>
Insizwaite, syn	26- 221	i	6.691	6.691	6.691	299.55	cP12	PtBi <sub>2</sub>
Irarsite	19- 591	i	5.777	5.777	5.777	192.80	cP14.20	(Ir,Ru)AsS
Jolliffeite	45-1383	i	5.831	5.831	5.831	198.26	cP11.92	(Ni,Co)AsSe
Krutaitite, Co-rich	25- 309	i	6.056	6.056	6.056	222.10	cP12	(Cu,Co)Se <sub>2</sub>
Krutaitite, syn	26-1115	★	6.116	6.116	6.116	228.77	cP12	CuSe <sub>2</sub>
Krutovite	29- 928	O	5.794	5.794	5.794	194.51	cP12	Ni <sub>1-x</sub> As <sub>2</sub>
Laurite, syn	19-1107	i	5.609	5.609	5.609	176.51	cP12	RuS <sub>2</sub>
Maslovite	39-1389	i	6.687	6.687	6.687	299.02	cP12	PtBiTe
Mayingite	48-1875	i	6.496	6.496	6.496	274.13	cP12	BiIrTe
Penroseite	41-1495	★	5.991	5.991	5.991	215.03	cP12	NiSe <sub>2</sub>
Penroseite, S-rich	29-1417	i	5.891	5.891	5.891	204.44	cP12.04	(Ni,Co,Cu)(Se,S) <sub>2</sub>
Platarsite	29- 974	i	5.791	5.791	5.791	194.17	cP12	(Pt,Rh,Ru)(As,S) <sub>2</sub>
Platarsite	42- 566	C	5.788	5.788	5.788	193.90	cP12	Pt(As,S) <sub>2</sub>
Pyrite	42-1340	★	5.418	5.418	5.418	159.04	cP12	FeS <sub>2</sub>
Pyrite, Ni-rich	2- 850	O	5.570	5.570	5.570	172.81	cP12	(Fe,Ni)S <sub>2</sub>
Sperryite	9- 452		5.967	5.967	5.967	212.46	cP12	PtAs <sub>2</sub>
Sperryite	42-1341	★	5.969	5.969	5.969	212.69	cP12	PtAs <sub>2</sub>
Trogtalite, Cu-rich	25- 253		5.931	5.931	5.931	208.63	cP12	(Co,Cu)Se <sub>2</sub>
Trogtalite, syn	9- 234		5.859	5.859	5.859	201.11	cP12	CoSe <sub>2</sub>
Vaesite	11- 99		5.670	5.670	5.670	182.28	cP12	NiS <sub>2</sub>
Villamaninite, Fe-rich	29- 556	i	5.694	5.694	5.694	184.65	cP11.88	(Cu,Fe)S <sub>2</sub>
Villamaninite, syn	32- 348	C	5.789	5.789	5.789	194.01	cP12	CuS <sub>2</sub>
<b>Ullmannite group</b>								
Changchengite	50-1617		6.164	6.164	6.164	234.20	cP12	IrBiS
Gersdorffite-P <sub>2</sub> 3	42-1343	★	5.692	5.692	5.692	184.40	cP12	NiAsS
Gersdorffite-P <sub>2</sub> 3, Sb-rich	42-1344	i	5.745	5.745	5.745	189.61	cP12	Ni(As,Sb)S
Michenerite, syn	25- 92		6.651	6.651	6.651	294.21	cP12	BiPdTe
Padmaite	46-1382	i	6.448	6.448	6.448	268.09	cP12	PdBiSe
Testibiopalladite	29- 961	O	6.572	6.572	6.572	283.85	cP12	Pd(Sb,Bi)Te
Tolovite	35- 656	O	6.027	6.027	6.027	218.93	cP12	IrSbS
Ullmannite	41-1472	★	5.933	5.933	5.933	208.81	cP12	NiSbS
Ullmannite, As-rich	41-1470	★	5.882	5.882	5.882	203.52	cP12	Ni(Sb,As)S
<b>Pyrochlore group (E/L/Q)<sub>1</sub>∧<sub>2</sub>G<sub>2</sub>X<sub>6</sub>X'</b>								
<b>Aluminate subgroup</b>								
Ralstonite	18-1085	i	9.996	9.996	9.996	998.80	cF96	NaMgAlF <sub>6</sub> •H <sub>2</sub> O
Ralstonite	45-1331	i	9.926	9.926	9.926	977.96	cF96	NaMgAl(F,OH) <sub>6</sub> •H <sub>2</sub> O
Unnamed mineral	45-1330		10.081	10.081	10.081	1024.50	cF96	(Na,Ca) <sub>2</sub> (Mg,Al) <sub>2</sub> F <sub>6</sub> (OH,O)
<b>Antimonate subgroup</b>								
Bindheimite	42-1355	★	10.407	10.407	10.407	1127.10	cF88	Pb <sub>2</sub> Sb <sub>2</sub> O <sub>7</sub>
Bismutostibiconite	42- 591		10.380	10.380	10.380	1118.39	cF84.32	BiSb <sub>2</sub> O <sub>7</sub>
Lewisite, syn	32- 154	i	10.257	10.257	10.257	1079.10	cF96	CaSb <sub>2</sub> O <sub>5</sub> (OH) <sub>2</sub>
Partzite	7- 303		10.250	10.250	10.250	1076.89	cF88	Cu <sub>2</sub> Sb <sub>2</sub> (O,OH) <sub>7</sub>
Romeite	27- 89		10.284	10.284	10.284	1087.64	cF80	CaSb <sub>2</sub> O <sub>6</sub> (F,O,OH)
Stetefeldite	8- 12		10.460	10.460	10.460	1144.45	cF72	AgSb <sub>2</sub> (O,OH,H <sub>2</sub> O) <sub>6</sub>
Stibiconite	10- 388		10.270	10.270	10.270	1083.21	cF88	Sb <sub>3</sub> O <sub>6</sub> (OH)
<b>Niobate subgroup</b>								
Bariopyrochlore	12- 285	i	10.549	10.549	10.549	1173.91	cF88	(Ba,Sr)Nb <sub>2</sub> O <sub>6</sub> (OH)
Cerriopyrochlore-(Ce)	41-1385	O	10.340	10.340	10.340	1105.51	cF88	Ce <sub>2</sub> Nb <sub>2</sub> O <sub>6</sub> (OH)
Kalipyrochlore	48-1868	i	10.570	10.570	10.570	1180.80	cF78.40	(K,H <sub>2</sub> O) <sub>2</sub> (Nb,Ti) <sub>1.8</sub> (O,OH) <sub>6</sub>
Plumbopyrochlore	25- 453		10.534	10.534	10.534	1168.91	cF96	(Pb,Ln) <sub>2</sub> (Nb,Ta) <sub>2</sub> O <sub>6</sub> (OH)
Pyrochlore	13- 254		10.420	10.420	10.420	1131.37	cF96	(Na,Ca,U) <sub>2</sub> (Nb,Ta) <sub>2</sub> O <sub>6</sub> (OH,F)
Pyrochlore	17- 746		10.430	10.430	10.430	1134.63	cF88	(Ca,Nb) <sub>2</sub> (Nb,Ti) <sub>2</sub> O <sub>6</sub> F
Pyrochlore, heated	17- 747	i	10.366	10.366	10.366	1113.87	cF88	(Ca,Nb) <sub>2</sub> (Nb,Ti) <sub>2</sub> O <sub>6</sub> F
Strontiopyrochlore	46-1287		10.436	10.436	10.436	1136.59	cF92	SrNb <sub>6</sub> O <sub>16</sub>
Uranpyrochlore	29-1411		10.440	10.440	10.440	1137.89	cP80	(U,Ca,Pb)(Nb,Ta) <sub>2</sub> O <sub>7</sub>
Ytropyrochlore-(Y), heated	25-1015		10.300	10.300	10.300	1092.73	cP80	YNb <sub>2</sub> (O,OH) <sub>7</sub>
<b>Tantalate subgroup</b>								
Bariomicrolite	16- 616		10.556	10.556	10.556	1176.25	cF80	BaTa <sub>2</sub> (O,OH) <sub>7</sub>
Bismutomicrolite	26-1042		10.430	10.430	10.430	1134.63	cF88	(Bi,Ca)(Ta,Nb) <sub>2</sub> O <sub>6</sub> (OH)
Cesstibtantite	35- 672	O	10.526	10.526	10.526	1166.25	cF72	(Cs,Na)Sb <sup>3+</sup> Ta <sub>4</sub> O <sub>12</sub>
Microlite	3-1139		10.400	10.400	10.400	1124.86	cF88	(Ca,Na,Fe) <sub>2</sub> Ta <sub>2</sub> (O,OH,F) <sub>7</sub>
Microlite	48-1873	★	10.440	10.440	10.440	1137.89	cF96	(Ca,Na) <sub>2</sub> (Ta,Nb) <sub>2</sub> O <sub>6</sub> (OH,F)

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Natrobismantite</b>	35- 706	O	10.502	10.502	10.502	1158.29	cF72	(Na,Cs)Bi(Ta,Nb,Sb) <sub>4</sub> O <sub>12</sub>
<b>Plumbomicroilite</b>	44- 670		10.518	10.518	10.518	1163.59	cP96	Pb <sub>2</sub> Ta <sub>2</sub> O <sub>6</sub> (OH)
<b>Stannomicroilite</b>	23-1441		10.570	10.570	10.570	1180.93	cF88	Sn <sub>2</sub> (Ta,Nb) <sub>2</sub> O <sub>7</sub>
<b>Stibiomicroilite</b>	40- 516	i	10.445	10.445	10.445	1139.53	cF86	(Sb,Na) <sub>2</sub> Ta <sub>2</sub> O <sub>7</sub>
<b>Uranmicroilite</b>	43- 693		10.328	10.328	10.328	1101.66	cF92	(Ca,U) <sub>2-x</sub> Ta <sub>2</sub> O <sub>6</sub> (OH)
<b>Titanate subgroup</b>								
<b>Betafite-C, heated</b>	13- 197	i	10.265	10.265	10.265	1081.63	cF88	(Ca,U) <sub>2-x</sub> (Nb,Ti) <sub>2</sub> O <sub>6</sub> (OH,F) <sub>1-2</sub>
<b>Betafite-C, syn</b>	45-1477	i	10.158	10.158	10.158	1048.12	cF88	(Ca,U) <sub>2</sub> Ti <sub>2</sub> O <sub>7</sub>
<b>Calciobetafite</b>	42- 2	C	10.298	10.298	10.298	1092.03	cF88	Ca <sub>2</sub> (Ti,Nb) <sub>2</sub> O <sub>7</sub>
<b>Stibiobetafite, heated</b>	35- 695	i	10.351	10.351	10.351	1109.04	cF88	(Ca,Sb) <sub>2</sub> (Ti,Nb,Ta) <sub>2</sub> (O,OH) <sub>7</sub>
<b>Tungstate subgroup</b>								
<b>Ferritungstite</b>	11- 331	i	10.289	10.289	10.289	1089.23	cF60	(W,Fe)(O,OH) <sub>3</sub>
<b>Jixianite</b>	33- 760		10.359	10.359	10.359	1111.74	cF80	Pb(W,Fe <sup>+3</sup> ) <sub>2</sub> (O,OH) <sub>7</sub>
<b>Related structures</b>								
<b>Betafite-Q, heated</b>	18-1154		6.380	6.380	6.060	246.67	tP?	(U,Ca)(Nb,Ta,Ti) <sub>3</sub> O <sub>8</sub> •xH <sub>2</sub> O
<b>Parabariummicroilite</b>	39- 401	i	7.429	7.429	18.505	884.46	hR25	BaTa <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •2H <sub>2</sub> O
<b>Yttrobetafite-(Y), heated</b>	41-1434		6.531	6.531	5.963	254.35	tP24	Y <sub>2</sub> Ti <sub>2</sub> O <sub>6</sub> (OH)
<b>Zirconolite-2M</b>	34- 167	C	12.431	7.224	11.483	1014.48	mC88	CaZrTi <sub>2</sub> O <sub>7</sub>
<b>Zirconolite-3T, heated</b>	15- 12	i	7.293	7.293	16.964	781.40	hP66	CaZrTi <sub>2</sub> O <sub>7</sub>
<b>Zirkelite, heated</b>	38- 450		5.057	5.057	5.057	129.35	cF12	(Ca,Fe)(Nb,Ti,Ta,Zr) <sub>4</sub>
<b>Zirkelite, syn</b>	48- 72	★	12.442	7.274	11.363	1010.93	mP88	CaZrTi <sub>2</sub> O <sub>7</sub>
<b>Pyrosmalite subfamily E<sub>8</sub>[T<sub>6</sub>O<sub>15</sub>]X<sub>10</sub></b>								
<b>2M group</b>								
<b>Friedelite</b>	35- 572		23.330	13.396	7.447	2247.25	mC196	Mn <sub>8</sub> <sup>+2</sup> Si <sub>6</sub> O <sub>15</sub> (OH,Cl) <sub>10</sub>
<b>Nelenite</b>	38- 355	i	23.240	13.418	7.382	2221.32	mC202	(Mn <sup>+2</sup> ,Fe <sup>+2</sup> ) <sub>16</sub> Si <sub>12</sub> As <sub>3</sub> <sup>+3</sup> O <sub>36</sub> (OH) <sub>17</sub>
<b>H supergroup</b>								
<b>Ferropyrosmalite</b>	12- 268	i	13.360	13.360	7.160	1106.77	hP98	(Mn <sup>+2</sup> ,Fe <sup>+2</sup> ) <sub>8</sub> Si <sub>6</sub> O <sub>15</sub> (OH,Cl) <sub>10</sub>
<b>Manganopyrosmalite</b>	12- 249		13.360	13.360	7.160	1106.77	hP98	(Mn <sup>+2</sup> ,Fe <sup>+2</sup> ) <sub>8</sub> (Si <sub>6</sub> O <sub>15</sub> )(OH,Cl) <sub>10</sub>
<b>Mcgillite</b>	33- 891		13.459	13.459	85.970	13486.62	hR376	Mn <sub>3</sub> Si <sub>6</sub> O <sub>15</sub> (OH) <sub>8</sub> Cl <sub>2</sub>
<b>Schallerite</b>	12- 248		13.430	13.430	14.310	2235.23	hP196	(Mn,Mg,Fe) <sub>8</sub> (Si,As) <sub>6</sub> O <sub>15</sub> (OH) <sub>10</sub>
<b>Schallerite</b>	12- 253		13.360	13.360	14.240	2201.17	hP196	(Mn,Mg,Fe) <sub>8</sub> (Si,As) <sub>6</sub> O <sub>15</sub> (OH) <sub>10</sub>
<b>Related structures</b>								
<b>Bementite</b>	25- 546		14.500	17.500	29.100	7384.13	oP558	Mn <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>6</sub>
<b>Bementite</b>	44-1456	i	14.833	17.572	14.699	3813.46	mP392	Mn <sub>3</sub> Si <sub>6</sub> O <sub>15</sub> (OH) <sub>10</sub>
<b>Manganarsite</b>	40- 484		11.451	11.451	7.252	823.52	hP68	Mn <sub>3</sub> <sup>+2</sup> As <sub>2</sub> <sup>+3</sup> O <sub>4</sub> (OH) <sub>4</sub>
<b>Unnamed mineral</b>	39- 387		3.319	3.319	21.718	207.14	hP17	Mn <sub>3</sub> As <sub>2</sub> O <sub>4</sub> (OH) <sub>4</sub>
<b>Pyroxene supergroup (E&lt;-&gt;G)G'[TO<sub>3</sub>]<sub>2</sub></b>								
<b>1M supergroup</b>								
<b>Aegirine</b>	18-1222	i	9.657	8.801	5.291	429.11	mC40	NaFe <sup>+3</sup> Si <sub>2</sub> O <sub>6</sub>
<b>Aegirine, syn</b>	34- 185	★	9.528	8.807	5.287	429.13	mC40	NaFe <sup>+3</sup> (Si <sub>2</sub> O <sub>6</sub> ) <sub>2</sub>
<b>Augite</b>	24- 201	i	9.783	8.965	5.272	445.11	mC40	Ca(Fe,Mg)Si <sub>2</sub> O <sub>6</sub>
<b>Augite</b>	24- 203	i	9.755	8.928	5.204	435.43	mC40	Ca(Mg,Fe)Si <sub>2</sub> O <sub>6</sub>
<b>Augite, Al-rich</b>	41-1483	i	9.743	8.894	5.272	438.92	mC40	Ca(Mg,Fe,Al)(Si,Al) <sub>2</sub> O <sub>6</sub>
<b>Clinoenstatite, syn</b>	35- 610	★	9.606	8.818	5.171	415.92	mP40	MgSiO <sub>3</sub>
<b>Clinoferrosilite, syn</b>	17- 548		9.530	9.210	5.150	430.86	mP40	FeSiO <sub>3</sub>
<b>Clinopyroxene, Ti-Al-rich</b>	25- 306	C	9.800	8.850	5.360	447.75	mC40	Ca(Ti,Mg,Al)(Si,Al) <sub>2</sub> O <sub>6</sub>
<b>Diopside</b>	41-1370	★	9.732	8.867	5.279	438.05	mC40	Ca(Mg,Al)(Si,Al) <sub>2</sub> O <sub>6</sub>
<b>Esseneite, Na-rich</b>	31- 305	i	9.776	8.939	5.270	442.25	mC40	Ca(Na)(Fe,Mn,Zn)Si <sub>2</sub> O <sub>6</sub>
<b>Esseneite, syn</b>	25- 143	i	9.840	8.825	5.398	451.35	mC40	Ca(Fe <sub>1.4</sub> Al <sub>0.6</sub> )Si <sub>2</sub> O <sub>6</sub>
<b>Hedenbergite</b>	41-1372	★	9.865	9.047	5.259	453.43	mC40	CaFe <sup>+2</sup> Si <sub>2</sub> O <sub>6</sub>
<b>Jadeite</b>	22-1338	★	9.437	8.574	5.225	403.02	mC40	NaAlSi <sub>2</sub> O <sub>6</sub>
<b>Jervisite</b>	35- 542	i	9.853	9.042	5.312	453.48	mC40	NaScSi <sub>2</sub> O <sub>6</sub>
<b>Jervisite, syn</b>	21-1369		9.830	9.060	5.370	456.86	mC40	NaScSi <sub>2</sub> O <sub>6</sub>
<b>Johannsenite</b>	35- 539	C	9.978	9.156	5.293	466.02	mC40	CaMn <sup>+2</sup> Si <sub>2</sub> O <sub>6</sub>
<b>Johannsenite</b>	38- 413	i	9.875	9.044	5.274	453.80	mC40	CaMn <sup>+2</sup> Si <sub>2</sub> O <sub>6</sub>
<b>Kanoite</b>	29- 865	i	9.739	8.939	5.260	434.10	mP40	(Mn <sup>+2</sup> ,Mg) <sub>2</sub> (Si <sub>2</sub> O <sub>6</sub> )
<b>Kosmochlor, syn</b>	26-1484	i	9.574	8.712	5.265	418.84	mC40	NaCr <sup>+3</sup> Si <sub>2</sub> O <sub>6</sub>
<b>Namansilite</b>	46-1451	★	9.500	8.611	5.356	423.22	mC40	NaMn <sup>+3</sup> Si <sub>2</sub> O <sub>6</sub>
<b>Natalyite</b>	49-1832	i	9.591	8.724	5.275	421.52	mC40	Na(Cr <sup>+3</sup> ,V <sup>+3</sup> )Si <sub>2</sub> O <sub>6</sub>
<b>Omphacite</b>	17- 522		9.662	8.819	5.228	426.91	mC40	NaCaMgAl(Si <sub>2</sub> O <sub>6</sub> ) <sub>2</sub>
<b>Omphacite</b>	42- 568	i	9.526	8.692	5.246	414.92	mC40.88	(Na,Ca)(Al,Mg)Si <sub>2</sub> O <sub>6</sub>
<b>Petedunnite, syn</b>	40- 495	i	9.803	8.975	5.243	443.97	mC40	CaZnSi <sub>2</sub> O <sub>6</sub>
<b>Pigeonite</b>	13- 421	i	9.712	8.959	5.251	433.02	mC40	(Fe,Mg,Ca)SiO <sub>3</sub>
<b>Spodumene</b>	33- 786	★	9.466	8.394	5.221	389.41	mC40	LiAlSi <sub>2</sub> O <sub>6</sub>
<b>2O group</b>								
<b>Donpeacorite</b>	38- 358	i	18.384	8.878	5.226	852.95	oP80	MgMnSi <sub>2</sub> O <sub>6</sub>
<b>Enstatite, syn</b>	19- 768	★	18.225	8.815	5.175	831.31	oP80	MgSiO <sub>3</sub>
<b>Ferrosilite, Mg-rich</b>	31- 634	i	18.325	8.918	5.216	852.41	oP80	(Fe,Mg)SiO <sub>3</sub>
<b>Ferrosilite, syn</b>	29- 721	i	18.418	9.078	5.243	876.62	oP80	FeSiO <sub>3</sub>
<b>Pyroxenoid subfamily (E/L)<sub>n</sub>(G/L)<sub>p</sub>[TX<sub>3</sub>]<sub>q</sub>X<sub>r</sub>•0,4H<sub>2</sub>O;n+p=2,5,7,9,12, q=3,7,12, r=0,1</b>								
<b>3 chains supergroup</b>								
<b>Bustamite, Ca-rich</b>	44-1455	★	7.848	7.263	13.968	771.14	aP30	Ca(Mn <sup>+2</sup> ,Ca)Si <sub>2</sub> O <sub>6</sub>
<b>Bustamite, Fe-rich</b>	26-1066	i	7.691	7.734	7.121	365.09	aP30	Ca(Mn <sup>+2</sup> ,Fe)Si <sub>2</sub> O <sub>6</sub>
<b>Bustamite, Fe-rich</b>	33- 292	C	9.864	10.790	7.139	736.12	aP30	Ca(Mn <sup>+2</sup> ,Fe)Si <sub>2</sub> O <sub>6</sub>
<b>Bustamite, syn</b>	27- 86		7.736	7.755	7.157	370.21	aP30	CaMn <sup>+2</sup> Si <sub>2</sub> O <sub>6</sub>
<b>Cascandite</b>	34- 169	C	9.791	10.420	7.076	694.22	aP30	CaScSi <sub>3</sub> O <sub>8</sub> (OH)
<b>Cascandite</b>	35- 541	i	7.529	7.051	6.755	345.71	aP30	CaScSi <sub>3</sub> O <sub>8</sub> (OH)
<b>Ferrobustamite</b>	29- 336		7.854	7.862	7.253	385.43	aP30	(Ca,Fe,Mn) <sub>3</sub> Si <sub>3</sub> O <sub>9</sub>
<b>Pectolite-1A</b>	33-1223	i	7.999	7.033	7.032	384.41	aP32	NaCa <sub>2</sub> HSi <sub>3</sub> O <sub>9</sub>
<b>Pectolite-1A, Mn-rich</b>	33-1227	C	10.059	10.880	6.978	737.85	aP30	Na(Ca,Mn) <sub>2</sub> Si <sub>3</sub> O <sub>9</sub>
<b>Serandite</b>	25- 723	i	7.706	6.893	6.730	347.72	aP32	NaMn <sub>2</sub> Si <sub>3</sub> O <sub>8</sub> (OH)
<b>Wollastonite-1A</b>	42- 547	C	10.104	11.054	7.305	788.04	aP30	CaSiO <sub>3</sub>
<b>Wollastonite-1A</b>	42- 550	C	10.121	11.070	7.312	791.41	aP30	CaSiO <sub>3</sub>
<b>Wollastonite-1A, Fe-rich</b>	27-1056		7.857	7.261	6.995	386.53	aP30	(Ca,Fe)SiO <sub>3</sub>
<b>Wollastonite-1A, syn</b>	29- 372		7.894	7.371	7.037	397.26	aP30	CaSiO <sub>3</sub>
<b>4 chains group</b>								
<b>Suzukiite</b>	35- 681	i	7.089	15.261	5.364	580.31	oC44	BaVS <sub>2</sub> O <sub>7</sub>

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>5 chains group</b>								
Babingtonite	45-1387	i	7.470	12.493	6.692	575.65	aP48	Ca <sub>2</sub> FeSi <sub>5</sub> O <sub>14</sub> (OH)
Lithiomarsturite	46-1358	i	7.652	12.119	6.805	584.45	aP52	LiCa <sub>2</sub> Mn <sub>2</sub> <sup>2+</sup> HSi <sub>5</sub> O <sub>15</sub>
Manganbabingtonite	42-1400	i	7.492	12.320	6.701	570.21	aP50	Ca <sub>2</sub> MnFeSi <sub>5</sub> O <sub>14</sub> (OH)
Marsturite	31-585	i	7.700	12.030	6.780	583.57	aP52	Mn <sub>3</sub> CaNaHSi <sub>5</sub> O <sub>15</sub>
Marsturite	45-1326	i	7.710	12.030	6.780	583.80	aP54	Na <sub>2</sub> CaMn <sub>7</sub> H <sub>2</sub> Si <sub>10</sub> O <sub>28</sub> (OH) <sub>2</sub>
Nambulite, Na-rich	29-833	i	7.621	11.761	6.731	573.34	aP50.92	(Li,Na)Mn <sub>4</sub> <sup>2+</sup> Si <sub>5</sub> O <sub>14</sub> (OH)
Nambulite, syn	27-1253	i	7.549	11.778	6.726	569.37	aP52	LiMn <sub>4</sub> Si <sub>5</sub> O <sub>14</sub> (OH)
Natronambulite	39-332	i	7.620	11.762	6.737	574.36	aP52	NaMn <sub>4</sub> Si <sub>5</sub> O <sub>14</sub> (OH)
Rhodonite	13-138		7.699	12.220	6.702	583.78	aP50	MnSiO <sub>3</sub>
<b>6 chains supergroup</b>								
Chkalovite	42-572	i	21.188	21.129	6.881	3080.49	oF264	Na <sub>2</sub> BeSi <sub>2</sub> O <sub>6</sub>
Stokesite	13-109	i	14.485	11.606	5.250	882.58	oP80	CaSnSi <sub>3</sub> O <sub>9</sub> •2H <sub>2</sub> O
<b>7 chains group</b>								
Pyroxferroite	20-1		6.620	7.540	17.350	781.96	aP70	(Fe <sub>0.86</sub> Ca <sub>0.14</sub> )SiO <sub>3</sub>
Pyroxmangite, Fe-rich	25-147	i	6.660	7.540	17.330	787.45	aP70	(Mn,Fe)SiO <sub>3</sub>
Pyroxmangite, syn	29-895	i	6.717	7.603	17.448	807.44	aP70	MnSiO <sub>3</sub>
<b>12 chains group</b>								
Alamosite	29-782		12.247	7.059	11.236	893.35	mP60	PbSiO <sub>3</sub>
<b>Related structures</b>								
Denisovite	37-440	i	30.920	7.200	18.270	4051.86	m?300	(K,Na)Ca <sub>2</sub> Si <sub>3</sub> O <sub>8</sub> (F,OH)
Haradaite	49-1858	i	5.318	14.695	7.040	550.16	oC44	SrV <sup>4+</sup> OSi <sub>2</sub> O <sub>6</sub>
Saneroite	35-484	i	9.741	9.974	9.108	745.19	aP66	Na <sub>2</sub> Mn <sub>10</sub> VSi <sub>11</sub> O <sub>34</sub> (OH) <sub>4</sub>
Santaclarait	35-639	i	15.633	7.603	12.003	1322.06	aP62	CaMn <sub>4</sub> Si <sub>5</sub> O <sub>14</sub> (OH) <sub>2</sub> •H <sub>2</sub> O
Wollastonite-2M	27-88	C	15.426	7.320	7.066	794.34	mP60	CaSiO <sub>3</sub>
Wollastonite-2M	43-1460	★	15.429	7.325	7.069	795.43	mP60	CaSiO <sub>3</sub>
<b>Quartz supergroup E<sub>8</sub>[TT'O<sub>4</sub>]; δ=0,2</b>								
Alarsite, syn	31-2	★	5.030	5.030	11.230	246.06	hP18	AlAsO <sub>4</sub>
Berlinite, syn	10-423	i	4.942	4.942	10.970	232.03	hP18	AlPO <sub>4</sub>
Quartz, syn	46-1045	★	4.913	4.913	5.405	113.01	hP9	SiO <sub>2</sub>
Rodolicoite	50-1635	i	5.048	5.048	11.215	247.50	hP18	FePO <sub>4</sub>
Virgilite	31-707	i	5.132	5.132	5.454	124.40	hP9	Li <sub>x</sub> Al <sub>1-x</sub> Si <sub>3-x</sub> O <sub>6</sub>
<b>Related structures</b>								
Moganite	38-360		4.934	10.761	8.533	452.70	mC36	SiO <sub>2</sub>
Moganite	46-1441	O	8.770	4.879	10.720	458.70	m??	SiO <sub>2</sub>
<b>Reyerite supergroup D<sub>0</sub>↔<sub>1</sub>E<sub>7</sub>[T<sub>4</sub>O<sub>10</sub>][T'<sub>8</sub>O<sub>19</sub>](OH)<sub>4</sub>•0,3H<sub>2</sub>O</b>								
<b>1A group</b>								
Gyrolite	42-1452	i	9.740	9.740	22.400	1824.13	aP152	Ca <sub>4</sub> (Si <sub>6</sub> O <sub>15</sub> )(OH) <sub>2</sub> •3H <sub>2</sub> O
Tungusite	48-1899	i	9.714	9.721	22.090	1780.81	aP151	Ca <sub>14</sub> Fe <sub>9</sub> Si <sub>24</sub> O <sub>60</sub> (OH) <sub>22</sub>
<b>1H group</b>								
Reyerite	29-1039	i	9.751	9.751	18.964	1561.56	hP120	(Na,K)Ca <sub>7</sub> Si <sub>11</sub> AlO <sub>29</sub> (OH) <sub>4</sub> •H <sub>2</sub> O
Truscottite	29-382		9.731	9.731	18.836	1544.66	hP118	Ca <sub>14</sub> Si <sub>24</sub> O <sub>58</sub> (OH) <sub>8</sub> •2H <sub>2</sub> O
<b>2H group</b>								
Minehillite	38-371		9.770	9.770	33.010	2728.76	hP223	K <sub>3</sub> Ca <sub>28</sub> Zn <sub>4</sub> Al <sub>4</sub> Si <sub>40</sub> O <sub>112</sub> (OH) <sub>16</sub>
Orlymanite	46-1340		9.600	9.600	35.920	2866.88	hP212	Ca <sub>4</sub> Mn <sub>3</sub> <sup>2+</sup> Si <sub>8</sub> O <sub>20</sub> (OH) <sub>6</sub> •2H <sub>2</sub> O
Orlymanite	46-1341	i	9.600	9.600	35.920	2866.88	hP212	Ca <sub>4</sub> Mn <sub>3</sub> <sup>2+</sup> Si <sub>8</sub> O <sub>20</sub> (OH) <sub>6</sub> •2H <sub>2</sub> O
<b>Rhabdophane group D(PO<sub>4</sub>)•mH<sub>2</sub>O; m≈1</b>								
Brockite	15-248		6.980	6.980	6.400	270.04	hP27	(Ca,Th,Ln)(PO <sub>4</sub> )•H <sub>2</sub> O
Grayite	42-1389		6.957	6.957	6.396	268.09	hP27	ThPO <sub>4</sub> •H <sub>2</sub> O
Rhabdophane-(Ce)	35-614	i	6.960	6.960	6.372	267.32	hP27	CePO <sub>4</sub> •H <sub>2</sub> O
Rhabdophane-(Ce), Ca-rich	46-1303		7.030	7.030	6.440	275.63	hP27	(Ca,Ce,La)PO <sub>4</sub> •H <sub>2</sub> O
Rhabdophane-(La)	12-277	i	6.980	6.980	6.390	269.61	hP27	(La,Y)PO <sub>4</sub> •H <sub>2</sub> O
Rhabdophane-(La), syn	46-1439	i	7.100	7.100	6.494	283.50	hP22.50	LaPO <sub>4</sub> •0.5H <sub>2</sub> O
Tristramite	35-613	i	6.913	6.913	6.422	265.79	hP36	(Ca,U)(PO <sub>4</sub> )•2H <sub>2</sub> O
<b>Related structures</b>								
Ningyoite	12-273	i	6.780	12.100	6.380	523.40	oP45	CaU(PO <sub>4</sub> ) <sub>2</sub> •H <sub>2</sub> O
<b>Rosasite group (G/Q)<sub>2</sub>(CO<sub>3</sub>)(OH)<sub>2</sub>•mH<sub>2</sub>O; m≈1</b>								
Glaukosphaerite	27-178	O	9.340	11.930	3.070	342.08	mP40	(Cu,Ni) <sub>2</sub> CO <sub>3</sub> (OH) <sub>2</sub>
Kolwezite	29-1416		9.368	12.070	3.389	383.20	mP40	(Cu <sup>2+</sup> ,Co) <sub>2</sub> (CO <sub>3</sub> )(OH) <sub>2</sub>
Meguinnessite	35-481	i	9.398	12.011	3.379	380.79	mP40	(Mg,Cu <sup>2+</sup> ) <sub>2</sub> (CO <sub>3</sub> )(OH) <sub>2</sub>
Nullaginite	35-501	i	9.236	12.001	3.091	342.60	mP40	Ni <sub>2</sub> (CO <sub>3</sub> )(OH) <sub>2</sub>
Pokrovskite	37-454		9.430	12.270	3.395	390.22	mP46	Mg <sub>2</sub> CO <sub>3</sub> (OH) <sub>2</sub> •0.5H <sub>2</sub> O
Rosasite	36-1475	i	12.873	9.354	3.156	356.28	mP40	CuZn(CO <sub>3</sub> )(OH) <sub>2</sub>
<b>Related structures</b>								
Malachite, syn	41-1390	i	9.500	11.944	3.249	364.40	mP40	Cu <sub>2</sub> <sup>2+</sup> (CO <sub>3</sub> )(OH) <sub>2</sub>
<b>Roselite group D<sub>2</sub>(G/Q)(TO<sub>4</sub>)<sub>2</sub>•2H<sub>2</sub>O</b>								
Brandtite	29-348	i	5.899	12.968	5.684	413.42	mP38	Ca <sub>2</sub> Mn <sup>2+</sup> (AsO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Kröhnkite	47-1798	i	5.805	12.661	5.507	383.99	mP38	Na <sub>2</sub> Cu <sup>2+</sup> (SO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Kröhnkite, syn	25-826	★	5.800	12.651	5.512	383.66	mP38	Na <sub>2</sub> Cu <sup>2+</sup> (SO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Roselite	29-315	i	5.801	12.898	5.617	401.00	mP38	Ca <sub>2</sub> (Co,Mg)(AsO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Wendwilsonite	41-607	i	5.806	12.912	5.623	402.25	mP38	Ca <sub>2</sub> Mg(AsO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Zincroselite	40-498		5.834	12.875	5.641	403.61	mP38	Ca <sub>2</sub> Zn(AsO <sub>4</sub> ) <sub>2</sub> •2H <sub>2</sub> O
<b>Rozenite group G(SO<sub>4</sub>)•4H<sub>2</sub>O</b>								
ApLOWite, syn	16-488	★	5.937	13.546	7.888	634.34	mP72	CoSO <sub>4</sub> •4H <sub>2</sub> O
Boyleite	31-818		5.946	13.600	7.951	642.95	mP72	(Zn,Mg)SO <sub>4</sub> •4H <sub>2</sub> O
Ilesite, syn	32-651		6.020	13.760	8.010	663.45	mP72	MnSO <sub>4</sub> •4H <sub>2</sub> O
Rozenite	16-699	i	5.945	13.590	7.940	641.47	mP72	FeSO <sub>4</sub> •4H <sub>2</sub> O
Rozenite, syn	19-632	i	5.959	13.610	7.961	645.63	mP72	FeSO <sub>4</sub> •4H <sub>2</sub> O
Starkeyite, syn	24-720	★	7.902	13.594	5.920	635.85	mP72	MgSO <sub>4</sub> •4H <sub>2</sub> O

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Rutile supergroup</b> $(G/L)_n(G'/L')_pX_2(n+p)$ ; $n+p=1\wedge 3$								
<b>1Q group</b>								
Argutite, syn	35- 729	★	4.396	4.396	2.863	55.33	tP6	GeO <sub>2</sub>
Cassiterite, syn	41- 1445	★	4.738	4.738	3.187	71.55	tP6	SnO <sub>2</sub>
Ilmenorutile	31- 645	O	4.606	4.606	2.982	63.26	tP6	Fe <sub>2</sub> (Nb,Ta) <sub>2x</sub> Ti <sub>1-x</sub> O <sub>2</sub>
Plattnerite, syn	41- 1492	★	4.956	4.956	3.388	83.22	tP6	PbO <sub>2</sub>
Pyrolusite, syn	24- 735	i	4.400	4.400	2.874	55.64	tP6	MnO <sub>2</sub>
Rutile, Nb-rich	16- 934	i	4.635	4.635	2.986	64.15	tP6	(Ti,Nb,Ta,Fe)O <sub>2</sub>
Rutile, syn	21- 1276	★	4.593	4.593	2.959	62.43	tP6	TiO <sub>2</sub>
Sellaite, syn	41- 1443	★	4.620	4.620	3.051	65.12	tP6	MgF <sub>2</sub>
Squawcreekite	46- 1387	★	4.667	4.667	3.101	67.54	tP6	FeSbO <sub>4</sub>
Stishovite	45- 1374	★	4.179	4.179	2.666	46.56	tP6	SiO <sub>2</sub>
Strüverite	17- 543		4.645	4.645	2.999	64.71	tP6	(Ti,Ta,Fe)O <sub>2</sub>
<b>2Q group</b>								
Ilmenorutile	31- 646	O	4.623	4.623	5.976	127.72	tP12	Fe <sub>2</sub> (Nb,Ta) <sub>2x</sub> Ti <sub>1-x</sub> O <sub>2</sub>
Paratellurite, syn	42- 1365	★	4.810	4.810	7.612	176.12	tP12	TeO <sub>2</sub>
<b>3Q group</b>								
Byströmite, syn	37- 1470	★	4.650	4.650	9.235	199.71	tP18	MgSb <sub>2-6</sub> O <sub>6</sub>
Ferrotapiolite, syn	23- 1124	i	4.750	4.750	9.205	207.69	tP18	FeTa <sub>2</sub> O <sub>6</sub>
Manganotapiolite	35- 626	i	4.762	4.762	9.272	210.26	tP18	(Mn <sup>+2</sup> ,Fe <sup>+2</sup> )(Ta,Nb) <sub>2</sub> O <sub>6</sub>
Manganotapiolite, syn	49- 1870	i	4.766	4.766	9.277	210.73	tP18	(Mn,Fe)Ta <sub>2</sub> O <sub>6</sub>
Ordenezite, syn	38- 453	★	4.667	4.667	9.265	201.76	tP18	ZnSb <sub>2-6</sub> O <sub>6</sub>
Tripuyite	7- 349		4.630	4.630	9.140	195.93	tP18	FeSb <sub>2</sub> O <sub>6</sub>
<b>Related structures</b>								
Pseudorutile	47- 1777	★	2.867	2.867	4.598	32.73	hP?	Fe <sub>2</sub> Ti <sub>3</sub> O <sub>9</sub>
Tugarinovite, syn	32- 671	★	5.607	4.859	5.537	131.48	mP12	MoO <sub>2</sub>
<b>Scapolite supergroup</b> $D_4[T_4O_8]_3(X,Z)_{2/v}$ ; $v=1,2$								
Marialite	31- 1279	i	12.071	12.071	7.589	1105.79	tI82	(Na,Ca) <sub>2</sub> (Si,Al) <sub>6</sub> (O,OH) <sub>12</sub> (Cl,CO <sub>3</sub> ) <sub>0.5</sub>
Marialite, syn	49- 1854	★	12.039	12.039	7.542	1093.15	tI82	Na <sub>4</sub> Al <sub>3</sub> Si <sub>9</sub> O <sub>24</sub> Cl
Meionite	2- 405	O	12.260	12.260	7.610	1143.84	tI90	Ca <sub>4</sub> Al <sub>6</sub> (SiO <sub>4</sub> ) <sub>6</sub> (SO <sub>4</sub> ,CO <sub>3</sub> )
Meionite, Na-rich	44- 1399	★	12.138	12.138	7.563	1114.19	tI88	(Ca,Na) <sub>2</sub> (Si,Al) <sub>6</sub> O <sub>12</sub> (CO <sub>3</sub> ) <sub>0.5</sub>
Sarcolite	42- 1367	★	12.378	12.378	15.480	2371.77	tI188	Na(Ca,Na) <sub>7</sub> Al <sub>4</sub> Si <sub>6</sub> (S,P,Si)O <sub>27</sub> F
<b>Seidozerite group</b> $D_2E_2^4G_{2,3}[Si_2O_7]_2O_2X_{1,2}$								
Barytolamprophyllite	50- 224	i	19.675	7.111	5.419	753.03	mC58	(Na,K) <sub>2</sub> (Ba,Ca,Sr) <sub>2</sub> (Ti,Fe) <sub>3</sub> (SiO <sub>4</sub> ) <sub>4</sub> (O,OH) <sub>2</sub>
Ericssonite	29- 186		20.460	7.030	5.340	764.54	mC64	BaMn <sub>2</sub> Fe(Si <sub>2</sub> O <sub>7</sub> )(OH)
Lamprophyllite	17- 751		19.760	7.060	5.400	748.49	mC62	Na <sub>2</sub> (Sr,Ba) <sub>2</sub> Ti <sub>3</sub> (SiO <sub>4</sub> ) <sub>4</sub> (OH,F) <sub>2</sub>
Seidozerite	13- 576	O	5.530	7.100	18.300	700.93	mP58	Na <sub>4</sub> MnTi(Zr <sub>1.5</sub> Ti <sub>0.5</sub> )O <sub>2</sub> (F,OH)(Si <sub>2</sub> O <sub>7</sub> ) <sub>2</sub>
<b>Related structures</b>								
Bafertisitite	14- 541		7.550	10.980	5.360	444.34	oP30	BaFe <sub>2-2</sub> TiSi <sub>2</sub> O <sub>9</sub>
Orthoericssonite	29- 185	i	20.300	6.986	5.387	763.96	oP64	BaMn <sub>2-2</sub> Fe <sup>+3</sup> Si <sub>2</sub> O <sub>8</sub> (OH)
<b>Sepiolite family</b> $G_{4+n}[Si_2O_5]_{3+n}(OH)_2 \cdot 6+2nM$ ; $n=0,1$								
<b>2M supergroup</b>								
Palygorskite	21- 958	i	12.780	17.830	5.240	1187.98	mP122	(Mg,Al) <sub>5</sub> (Si,Al) <sub>8</sub> O <sub>20</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
Palygorskite	29- 855		17.864	12.681	5.127	1160.56	mP120	MgAlSi <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Palygorskite	31- 783	i	12.725	17.872	5.242	1192.14	oP122	Mg <sub>5</sub> (Si,Al) <sub>8</sub> O <sub>20</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
Tuperssuatsiaite	38- 372		13.729	18.000	4.828	1156.24	mC102	NaFe <sub>3</sub> Si <sub>8</sub> O <sub>20</sub> (OH) <sub>2</sub> •5H <sub>2</sub> O
Yofortierite	27- 312		12.759	18.369	5.024	1176.77	mP122	Mn <sub>5</sub> Si <sub>8</sub> O <sub>20</sub> (OH) <sub>2</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
<b>30 group</b>								
Falcondoite	29- 1433		13.500	26.900	5.240	1902.91	oP188	(Ni,Mg) <sub>4</sub> Si <sub>6</sub> O <sub>15</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Sepiolite	13- 595	i	13.500	26.970	5.255	1913.32	oP188	Mg <sub>4</sub> Si <sub>6</sub> O <sub>15</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Sepiolite	26- 1226	i	13.430	26.880	5.281	1906.43	oP188	Mg <sub>4</sub> Si <sub>6</sub> O <sub>15</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Sepiolite	29- 1492	O	13.500	26.970	5.255	1913.32	oP188	Mg <sub>4</sub> Si <sub>6</sub> O <sub>15</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Sepiolite, Fe-rich	29- 863	O	5.210	26.730	13.500	1880.05	oP188	(Mg,Fe) <sub>4</sub> Si <sub>6</sub> O <sub>15</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
<b>Skutterudite group</b> $DL_3\delta$								
Kieffite	47- 1769		9.041	9.041	9.041	739.03	cI32	CoSb <sub>3</sub>
Nickelskutterudite	25- 566		8.303	8.303	8.303	572.41	cI32	(Ni,Co,Fe)As <sub>3-x</sub>
Skutterudite, syn	10- 328	★	8.204	8.204	8.204	552.18	cI32	CoAs <sub>3</sub>
<b>Smectite family</b> $D_8G_{2,3}[T_4O_{10}]X_2 \cdot 2\wedge 8H_2O$ ; $\delta=0.3$								
<b>Diocahedral supergroup</b>								
Beidellite-12A	43- 688	i	5.172	5.172	12.389	287.00	hP52.60	Na <sub>0.3</sub> Al <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •2H <sub>2</sub> O
Beidellite-18A, glycerol	19- 150		5.181	5.181	17.580	408.67	hP38.20	Ca <sub>0.2</sub> Al <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Montmorillonite-14A	13- 259	O						Na <sub>0.3</sub> (Al,Mg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •xH <sub>2</sub> O
Montmorillonite-15A	13- 135		5.169	5.169	15.020	347.55	hP32.20	Ca <sub>0.2</sub> (Al,Mg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Montmorillonite-15A	29- 1498	O	5.165	5.165	15.540	359.02	hP32.30	Na <sub>0.3</sub> (Al,Mg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Montmorillonite-18A	12- 219	i	5.195	5.195	17.930	419.07	hP39.30	Na <sub>0.3</sub> (AlMg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Montmorillonite-22A	29- 1499	★	5.210	5.210	22.000	517.16	hP44.30	Na <sub>0.3</sub> (Al,Mg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
Nontronite-15A	29- 1497	★	5.210	5.210	14.880	349.79	hP32.30	Na <sub>0.3</sub> Fe <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Nontronite-15A	34- 842	i	5.260	5.260	14.920	357.50	hP32.10	Ca <sub>0.1</sub> Fe <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Volkonskoite	42- 619		5.172	5.172	15.120	350.27	hP32.40	Ca <sub>0.3</sub> (Cr,Mg) <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Yakhontovite	41- 1447		5.200	5.200	14.410	337.44	hP29.50	Ca <sub>0.3</sub> (Cu <sub>1.2</sub> Fe <sub>1.0</sub> )Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •3H <sub>2</sub> O
<b>Triocahedral supergroup</b>								
Hectorite-16A	9- 31	i	5.274	5.274	16.130	388.55	hP33	(Mg,Li) <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Hectorite-16A, syn	25- 1385	i	5.232	5.232	15.930	377.64	hP33.20	Na <sub>0.2</sub> (Mg,Li) <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Pimelite	43- 664	i	5.255	5.255	14.820	354.42	hP36	Ni <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •5H <sub>2</sub> O
Saponite-15A	13- 86		5.311	5.311	14.660	358.11	hP33	Mg <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Saponite-15A	29- 1491	i	5.282	5.282	15.350	370.88	hP33.20	Ca <sub>0.2</sub> Mg <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Saponite-15A, Al-rich	30- 789	i	5.300	5.300	14.520	353.22	hP33	(Mg <sub>2</sub> Al)(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Saponite-16A, Fe-rich	13- 305	i	5.293	5.293	15.560	377.52	hP33.50	Ca <sub>0.5</sub> (Mg,Fe) <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Saponite-17A, glycol, syn	12- 168	i	5.314	5.314	16.850	412.07	hP39.30	Na <sub>0.3</sub> Mg <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Saponite-18A, glycerol	6- 2	i	5.291	5.291	18.050	437.61	hP39.30	Ca <sub>0.3</sub> Mg <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Sauconite-15A	8- 243	i	5.340	5.340	15.800	390.18	hP33.30	Na <sub>0.3</sub> Zn <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Sauconite-15A	8- 445	i	5.340	5.340	15.450	381.54	hP33.30	Na <sub>0.3</sub> Zn <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Sauconite-15A	29- 1500	★	5.260	5.260	15.530	372.11	hP33.30	Na <sub>0.3</sub> Zn <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Sauconite-17A	8- 444	i	5.400	5.400	16.700	421.73	hP39.30	Na <sub>0.3</sub> Zn <sub>3</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Stevensite-15A	25- 1498	★	5.251	5.251	15.360	366.78	hP33.10	Ca <sub>0.2</sub> Mg <sub>2.9</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Swinefordite-13A	29- 809	i	5.205	5.205	12.650	296.80	hP27	Ca <sub>0.1</sub> (Li,Al) <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> •2H <sub>2</sub> O

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Sodalite supergroup</b> see Zeolite family								
<b>Spangolite group</b> $Cu_6E(SO_4)_{2,1}Cl_{0,1} \cdot 3 \leftrightarrow 8H_2O$								
Namuwite	35- 528		8.290	8.290	10.500	624.93	hP66	$(Zn,Cu^{+2})_4SO_4(OH)_6 \cdot 4H_2O$
Schulenbergite	38- 349	i	8.249	8.249	7.183	423.29	hP46	$(Cu,Zn)_7(SO_4)_2(OH)_{10} \cdot 3H_2O$
Schulenbergite, Cu-rich	47-1800	i	8.211	8.211	7.106	414.90	hP46	$Cu_6Zn(SO_4)_2(OH)_{10} \cdot 3H_2O$
Spangolite	5- 142		8.260	8.260	14.530	858.53	hP92	$Cu_6Al(SO_4)Cl(OH)_{12} \cdot 3H_2O$
<b>Related structures</b>								
Theisite	35- 527	i	8.225	7.123	14.970	877.04	oP96	$Cu_5Zn_5(As,Sb)_4O_{12}(OH)_{14}$
<b>Sphalerite supergroup</b> see Diamond supergroup								
<b>Spinel supergroup</b> $(G/Q)_2TX_4$								
<b>1C-chalcogenide group</b>								
Bornhardtite	15- 463	O	10.200	10.200	10.200	1061.21	cP56	$Co^{+2}Co_2^{+3}Se_4$
Carrollite	42-1450	i	9.474	9.474	9.474	850.35	cF56	$CuCo_2S_4$
Carrollite, Pt-rich	29- 541	O	9.742	9.742	9.742	924.58	cF56	$Cu(Co,Pt)_2S_4$
Cuproiridsite	39- 329		9.920	9.920	9.920	976.19	cF56	$CuIr_2S_4$
Cuprorhodsitite, syn	17- 644	i	9.720	9.720	9.720	918.33	cF56	$CuRh_2S_4$
Daubreelite, syn	4- 651		9.995	9.995	9.995	998.50	cF56	$Fe^{+2}Cr_2S_4$
Fletcherite	29- 540		9.520	9.520	9.520	862.80	cF56	$Cu(Ni,Co)_2S_4$
Florensovite	43-1468	i	10.005	10.005	10.005	1001.50	cF56	$(Cu,Zn)(Cr,Sb)_2S_4$
Greigite	16- 713	i	9.876	9.876	9.876	963.26	cF56	$Fe_3S_4$
Indite	16- 170		10.634	10.634	10.634	1202.51	cF56	$Fe^{+2}In_2S_4$
Indite	33- 613	C	10.618	10.618	10.618	1197.09	cF56	$Fe^{+2}In_2S_4$
Kalininite, syn	16- 507		9.974	9.974	9.974	992.22	cF56	$Cr_2ZnS_4$
Linnaeite	42-1448		9.437	9.437	9.437	840.43	cF56	$Co_3S_4$
Linnaeite	47-1738	★	9.423	9.423	9.423	836.75	cF56	$Co_3S_4$
Linnaeite, Ni-rich, syn	20- 782	i	9.387	9.387	9.387	827.14	cF56	$NiCo_2S_4$
Malanite	38- 406		9.920	9.920	9.920	976.19	cF56	$CuPt_2S_4$
Malanite	50-1624		9.910	9.910	9.910	973.24	cF56	$CuPt_2S_4$
Polydymite	43-1469	i	9.471	9.471	9.471	849.55	cF56	$Ni_3S_4$
Polydymite	47-1739	★	9.476	9.476	9.476	850.92	cF56	$Ni_3S_4$
Siegenite, syn	24- 334	i	9.428	9.428	9.428	838.00	cF56	$CoNi_2S_4$
Trüstedtite	18- 889		9.940	9.940	9.940	982.11	cF56	$Ni_3Se_4$
Tyrrellite	8- 1	i	10.014	10.014	10.014	1004.21	cF56	$(Cu,Co,Ni)_3Se_4$
Violarite	42-1449		9.431	9.431	9.431	838.80	cF56	$FeNi_2S_4$
Violarite	47-1740	★	9.458	9.458	9.458	846.05	cF56	$FeNi_2S_4$
Xingzhongite	42-1328		9.959	9.959	9.959	987.75	cF56	$CuIr_2S_4$
<b>1C-oxide group</b>								
Brunogeierite, syn	25- 359	i	8.408	8.408	8.408	594.40	cF56	$Fe_2GeO_4$
Chromite, Al-rich	3- 873		8.300	8.300	8.300	571.79	cF56	$Fe(Cr,Al)_2O_4$
Chromite, syn	34- 140	★	8.379	8.379	8.379	588.27	cF56	$Fe^{+2}Cr_2O_4$
Cochromite, syn	22-1084	★	8.330	8.330	8.330	577.99	cF56	$CoCr_2O_4$
Coulsonite	15- 122		8.297	8.297	8.297	571.17	cF56	$Fe^{+2}V_3^{+3}O_4$
Cuprospinel	25- 283		8.349	8.349	8.349	581.97	cF56	$CuFe_2O_4$
Filipstadite	46-1301		8.640	8.640	8.640	644.97	cF56	$(Mn,Mg)_2(Sb_{0.5^{+5}}Fe_{0.5^{+3}})O_4$
Franklinite, syn	22-1012	i	8.441	8.441	8.441	601.45	cF56	$ZnFe_2O_4$
Gahnite, syn	5- 669	★	8.085	8.085	8.085	528.45	cF56	$ZnAl_2O_4$
Galaxite, syn	29- 880	★	8.204	8.204	8.204	552.18	cF56	$MnAl_2O_4$
Hercynite, syn	34- 192	★	8.153	8.153	8.153	542.02	cF56	$Fe^{+2}Al_2O_4$
Jacobsite, syn	10- 319	i	8.499	8.499	8.499	613.91	cF56	$MnFe_2O_4$
Maghemite-C, syn	39-1346	★	8.351	8.351	8.351	582.50	cP53.33	$Fe_2O_3$
Magnesiochromite, Fe-rich	9- 353		8.277	8.277	8.277	567.05	cF56	$(Mg,Fe)(Cr,Al)_2O_4$
Magnesiochromite, syn	10- 351	★	8.333	8.333	8.333	578.63	cF56	$MgCr_2O_4$
Magnesiocoulsonite	48-1896		8.385	8.385	8.385	589.53	cF56	$Mg(V,Cr)_2O_4$
Magnesiocoulsonite, disordered, syn	36- 398	★	8.387	8.387	8.387	590.02	cF56	$MgFe_2^{+3}O_4$
Magnesiocoulsonite, ordered, syn	17- 464	i	8.375	8.375	8.375	587.43	cF56	$MgFe_2^{+3}O_4$
Magnetite, syn	19- 629	★	8.396	8.396	8.396	591.86	cF56	$Fe^{+2}Fe_2^{+3}O_4$
Manganochromite	31- 630	i	8.470	8.470	8.470	607.65	cF56	$(Mn^{+2},Fe^{+2})(Cr^{+3},V^{+5})_2O_4$
Nichromite, syn	23-1271	O	8.316	8.316	8.316	575.10	cF56	$NiCr_2O_4$
Qandilite, syn	25-1157	★	8.441	8.441	8.441	601.40	cF56	$Mg_2TiO_4$
Ringwoodite, Fe-rich	21-1258	i	8.113	8.113	8.113	534.00	cF56	$(Mg,Fe)_2SiO_4$
Spinel, Fe-rich	21- 540	i	8.191	8.191	8.191	549.45	cF56	$Mg(Al,Fe)_2O_4$
Spinel, syn	21-1152	★	8.083	8.083	8.083	528.12	cF56	$MgAl_2O_4$
Trevorite, syn	10- 325	i	8.339	8.339	8.339	579.89	cF56	$NiFe_2O_4$
Ulvöspinel, syn	34- 177	★	8.535	8.535	8.535	621.79	cF56	$Fe_2TiO_4$
Vuorelainenite	35- 550		8.480	8.480	8.480	609.80	cF56	$(Mn,Fe)(V,Cr)_2O_4$
Zincochromite, syn	22-1107	★	8.328	8.328	8.328	577.49	cF56	$ZnCr_2O_4$
<b>1Q-oxide group</b>								
Hausmannite, syn	24- 734	★	5.762	5.762	9.470	314.41	tI28	$Mn_3O_4$
Hetaerolite, syn	24-1133	★	5.720	5.720	9.245	302.52	tI28	$ZnMn_2^{+3}O_4$
Hydrohetaerolite	9- 459		5.735	5.735	9.005	296.18	tI34	$Zn_2Mn_4^{+3}O_8 \cdot H_2O$
<b>Related structures</b>								
Donathite	22- 349	i	8.342	8.342	8.305	577.94	tP56	$(Fe,Mg)(Cr,Fe)_2O_4$
Iwakiite	38- 430	i	8.519	8.519	8.540	619.78	tP55.96	$MnFe_2O_4$
Maghemite-Q, syn	25-1402	i	8.340	8.340	25.020	1740.28	tP160	$Fe_2O_3$
Marokite	16- 709		9.641	10.002	3.155	304.23	oP28	$CaMn_2^{+3}O_4$
<b>Stibnite supergroup</b> $G_{0 \leftrightarrow 1}L_2X_3$								
<b>10 group</b>								
Aikinite	45- 892	i	11.631	4.040	11.314	531.64	oP24	$CuPbBiS_3$
Aikinite	47-1736	★	11.643	4.040	11.329	532.85	oP24	$CuPbBiS_3$
Bismuthinite, Cu-Pb-rich	42- 541	C	11.392	4.014	11.222	513.15	oP20.80	$(Bi,Cu,Pb)_2S_3$
Bismuthinite, syn	17- 320	i	11.149	11.304	3.981	501.72	oP20	$Bi_2S_3$
Guanajuatite	10- 475		11.370	11.550	4.054	532.39	oP20	$Bi_2(Se,S)_3$
Hammarite-10	22- 240	O	11.219	11.447	3.991	512.54	oP22.61	$Pb_2Cu_2Bi_4S_9$
Hammarite-10, syn	34-1478	i	11.280	11.548	4.034	525.47	oP?	$Bi_4Pb_2Cu_2S_9$
Krupkaite	29- 563	i	4.003	11.200	11.560	518.28	oP22	$CuPbBi_3S_6$
Krupkaite, syn	30- 490	C	11.495	4.022	11.264	520.77	oP22	$CuPbBi_3S_6$
Stibnite	42-1393	★	11.239	11.313	3.841	488.38	oP20	$Sb_2S_3$

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>30 group</b>								
Friedrichite	29- 561	i	33.840	11.650	4.010	1580.89	oP70	Cu <sub>5</sub> Pb <sub>5</sub> Bi <sub>7</sub> S <sub>18</sub>
Friedrichite	34- 906	i	33.840	11.650	4.010	1580.89	oP70	Cu <sub>5</sub> Pb <sub>5</sub> Bi <sub>7</sub> S <sub>18</sub>
Gladite	25- 1422		33.660	11.450	4.020	1549.34	oP64	CuPbBi <sub>5</sub> S <sub>9</sub>
Gladite	29- 562	C	11.486	4.003	33.531	1541.70	oP64	CuPbBi <sub>5</sub> S <sub>9</sub>
Hammarite-30	30- 179	C	33.772	11.585	4.010	1568.91	oP68	Bi <sub>4</sub> Cu <sub>2</sub> Pb <sub>2</sub> S <sub>9</sub>
Pekoite	29- 560	i	11.472	33.744	4.016	1554.64	oP62	CuPbBi <sub>11</sub> S <sub>18</sub>
<b>50 group</b>								
Lindströmite	42- 543	C	56.115	11.569	4.001	2597.54	oP112	Cu <sub>3</sub> Pb <sub>3</sub> Bi <sub>7</sub> S <sub>15</sub>
Lindströmite	43- 675		56.115	11.569	4.001	2597.54	oP112	Cu <sub>3</sub> Pb <sub>3</sub> Bi <sub>7</sub> S <sub>15</sub>
<b>Stilpnomelane family D<sub>0</sub>↔<sub>1</sub>G<sub>24</sub>[T<sub>36</sub>O<sub>84</sub>]O<sub>6</sub>(OH)<sub>24</sub>•mH<sub>2</sub>O</b>								
Franklinphillite	46- 1455		5.521	9.566	36.570	1931.40	aP134.25	K <sub>4</sub> Mn <sub>48</sub> (Si,Al) <sub>72</sub> (O,OH) <sub>216</sub> •6H <sub>2</sub> O
Lennilenapeite	37- 430	i	22.050	22.050	12.170	5124.34	hP390.50	K <sub>6.5</sub> (Mg,Mn,Fe,Zn) <sub>48</sub> (Si,Al) <sub>72</sub> (O,OH) <sub>216</sub> •16H <sub>2</sub> O
Parsettenite-M	44- 1443		39.040	22.610	12.427	10915.58	mP1160	K(Mn,Al) <sub>7</sub> Si <sub>8</sub> O <sub>20</sub> (OH) <sub>8</sub> •2H <sub>2</sub> O
Parsettenite-O	25- 8		39.280	22.590	12.380	10930.89	mP1280	Mn <sub>2</sub> Si <sub>6</sub> O <sub>13</sub> (OH) <sub>8</sub>
Stilpnomelane	25- 174		21.955	21.955	17.619	5050.93	aP425	Ca <sub>4</sub> Fe <sub>47</sub> Si <sub>72</sub> O <sub>180</sub> (OH) <sub>36</sub> •xH <sub>2</sub> O
Stilpnomelane, Fe-rich	45- 1356	i	21.724	21.724	17.740	5074.01	aP425	K <sub>5</sub> (Fe,Mg) <sub>48</sub> (Si <sub>63</sub> Al <sub>9</sub> )O <sub>168</sub> (OH) <sub>48</sub> •12H <sub>2</sub> O
Stilpnomelane, Mg-Fe-rich	45- 1355	i	21.880	21.880	17.740	5147.14	aP425	K <sub>5</sub> (Fe,Mg) <sub>48</sub> (Si <sub>63</sub> Al <sub>9</sub> )O <sub>168</sub> (OH) <sub>48</sub> •12H <sub>2</sub> O
Stilpnomelane, Mn-rich	45- 1354	i	22.110	22.110	17.740	5255.92	aP425	K <sub>5</sub> (Fe,Mn) <sub>48</sub> (Si <sub>63</sub> Al <sub>9</sub> )O <sub>168</sub> (OH) <sub>48</sub> •12H <sub>2</sub> O
<b>Stottite supergroup GG'(OH)<sub>6</sub></b>								
<b>1C-ordered group</b>								
Burtite, syn	9- 30	i	8.128	8.128	8.128	536.97	cP56	CaSn(OH) <sub>6</sub>
Natanite, syn	31- 653	i	7.830	7.830	7.830	480.05	cP56	Fe <sup>+2</sup> Sn <sup>+4</sup> (OH) <sub>6</sub>
Schoenfliesite, syn	9- 27		7.755	7.755	7.755	466.39	cP56	MgSn(OH) <sub>6</sub>
Vismirnovite	33- 1376	O	7.720	7.720	7.720	460.10	cP56	ZnSn(OH) <sub>6</sub>
Wickmanite	20- 727	i	7.873	7.873	7.873	488.00	cP56	MnSn(OH) <sub>6</sub>
<b>1C-söhngeite group</b>								
Dzhalindite, syn	16- 161	O	7.958	7.958	7.958	503.98	cP56	In(OH) <sub>3</sub>
Söhngeite	18- 532		7.462	7.462	7.462	415.49	cl56	Ga(OH) <sub>3</sub>
<b>1O group</b>								
Bernalite	46- 1436	★	7.568	7.568	7.571	433.64	ol56	Fe <sup>+3</sup> (OH) <sub>3</sub>
<b>1Q group</b>								
Jeanbandyite	35- 663	i	7.648	7.648	7.648	447.35	tP56	(Fe <sup>+3</sup> ,Mn <sup>+2</sup> )Sn <sup>+4</sup> (OH) <sub>6</sub>
Mopungite	38- 411		7.994	7.994	7.859	502.22	tP56	NaSb <sup>+3</sup> (OH) <sub>6</sub>
Mopungite, syn	46- 101	i	8.016	8.016	7.894	507.25	tP56	NaSb <sup>+3</sup> (OH) <sub>6</sub>
Mushistonite, syn	20- 369	i	7.576	7.576	8.099	464.85	tP56	CuSn(OH) <sub>6</sub>
Stottite	11- 161		7.557	7.557	7.471	426.66	tP56	FeGe(OH) <sub>6</sub>
Tetrawickmanite	25- 553	i	7.870	7.870	7.797	482.92	tP56	MnSn(OH) <sub>6</sub>
<b>Strunzite group GF<sub>2</sub>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>2,3</sub>•5,6H<sub>2</sub>O</b>								
Ferristrunzite	41- 1383	i	10.010	9.730	7.334	633.46	aP68	Fe <sup>+3</sup> Fe <sub>2</sub> <sup>+3</sup> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>3</sub> •5H <sub>2</sub> O
Ferrostrunzite	42- 595	i	10.230	9.770	7.370	646.47	aP70	Fe <sup>+2</sup> Fe <sub>2</sub> <sup>+3</sup> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
Strunzite	46- 1347		10.228	9.837	7.284	641.34	aP70	MnFe <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
<b>Related structures</b>								
Vauxite	33- 640	i	9.142	11.599	6.158	611.42	aP70	FeAl <sub>2</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •6H <sub>2</sub> O
<b>Talc family G<sub>2,3</sub>[Si<sub>4</sub>O<sub>10</sub>](OH)<sub>2</sub></b>								
<b>Diocahedral supergroup</b>								
Ferripyrophyllite	42- 569		5.260	9.100	19.100	910.03	mC80	Fe <sub>2</sub> <sup>+3</sup> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Pyrophyllite-1A	25- 22	i	5.161	8.957	9.351	425.14	aP20	Al <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Pyrophyllite-2M	46- 1308	i	5.175	8.902	18.673	846.89	mC80	Al <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
<b>Triocahedral supergroup</b>								
Minnesotaitite	41- 594	i	5.623	9.419	14.234	505.46	aP100.50	(Fe,Mg) <sub>27</sub> Si <sub>36</sub> O <sub>86</sub> (OH) <sub>26</sub>
Talc-2M	13- 558	i	5.287	9.158	18.950	904.94	mC84	Mg <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Talc-2M	19- 770	i	5.287	9.171	18.964	906.61	mC84	Mg <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Talc-2M	29- 1493		5.319	9.126	18.975	907.77	mC84	Mg <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
Willemseite	22- 711	i	5.316	9.149	18.994	909.84	mC84	(Ni,Mg) <sub>3</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub>
<b>Tetraauricupride supergroup GG'Q<sub>2</sub></b>								
<b>1Q group</b>								
Potarite, syn	13- 149		3.031	3.031	3.692	33.92	tP2	HgPd
Tulameenite	42- 1359		2.758	2.758	3.586	27.28	tP2	(Cu,Fe)Pt
<b>2Q group</b>								
Ferronickelplatinum	35- 702		3.871	3.871	3.635	54.47	tP4	Pt <sub>2</sub> FeNi
Tetraauricupride, syn	25- 1220	C	3.960	3.960	3.670	57.55	tP4	AuCu
Tetraferroplatinum, syn	43- 1359	i	3.852	3.852	3.713	55.11	tP4	FePt
<b>Tetradymite supergroup L<sub>n</sub>X<sub>n+1</sub> or L<sub>n</sub>G<sub>n+1</sub>; n=1-5</b>								
<b>1H group</b>								
Selenium, syn	6- 362	i	4.366	4.366	4.954	81.78	hP3	Se
Tellurium, syn	36- 1452	★	4.458	4.458	5.927	102.01	hP3	Te
<b>2R group</b>								
Antimony, Bi-rich	35- 517	i	4.326	4.326	11.330	183.63	hR2	(Sb,Bi)
Antimony, syn	35- 732	★	4.307	4.307	11.273	181.10	hR2	Sb
Arsenic, syn	5- 632	i	3.760	3.760	10.548	129.14	hR2	As
Stibarsen	47- 1746	★	4.053	4.053	10.854	154.42	hR2	AsSb
<b>3H group</b>								
Hedleyite	42- 540		4.473	4.473	17.805	308.55	hP9	Bi <sub>2</sub> Te
<b>4H-disordered group</b>								
Ingodite	41- 1408		4.248	4.248	23.075	360.56	hP12	Bi <sub>2</sub> TeS
Ingodite, syn	44- 668	★	4.236	4.236	23.025	357.80	hP12	Bi(S,Te)
Nevskite	37- 442		4.197	4.197	22.800	347.81	hP12	Bi(S <sub>2</sub> S)
Nevskite, syn	29- 246	C	4.180	4.180	22.800	345.00	hP12	BiSe
Sulphotsumoite	38- 442		4.305	4.305	23.475	376.69	hP12	Bi <sub>3</sub> (Te,S) <sub>3</sub>
Sulphotsumoite, syn	44- 669	i	4.288	4.288	23.404	372.68	hP12	Bi <sub>3</sub> STe <sub>2</sub>
Tsumoite	22- 117		4.364	4.364	24.320	401.11	hP12	(Bi,Te)Te
Tsumoite, syn	19- 176		4.453	4.453	23.900	410.43	hP12	Bi(Te,Bi)
Tsumoite, syn	44- 667		4.426	4.426	24.069	408.33	hP12	BTTe

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>4H-ordered group</b>								
Bohdanowiczite	29-1441	i	4.205	4.205	19.650	300.89	hP12	AgBiSe <sub>2</sub>
Matildite	24-1031		4.066	4.066	18.958	271.46	hP12	AgBiS <sub>2</sub>
Volynskite	18-1173		4.468	4.468	20.750	358.74	hP12	AgBiTe <sub>2</sub>
<b>5R group</b>								
Kawazulite	29-248	i	4.240	4.240	29.660	461.78	hR5	Bi <sub>2</sub> Te <sub>2</sub> Se
Kawazulite, syn	29-247	C	4.280	4.280	29.860	473.71	hR5	Bi <sub>2</sub> SeTe <sub>2</sub>
Paraguanajuatite, Te-S-rich	46-1273		4.166	4.166	28.742	432.00	hR5	Bi <sub>2</sub> (Se,Te,S) <sub>3</sub>
Paraguanajuatite, syn	33-214	★	4.140	4.140	28.636	424.97	hR5	Bi <sub>2</sub> Se <sub>3</sub>
Skippenite	42-1373	i	4.183	4.183	29.120	441.26	hR5	Bi <sub>2</sub> Se <sub>2</sub> Te
Tellurantimony, syn	15-874	i	4.262	4.262	30.450	479.01	hR5	Sb <sub>2</sub> Te <sub>3</sub>
Tellurobismuthite	8-27		4.430	4.430	29.910	508.34	hR5	Bi <sub>2</sub> Te <sub>3</sub>
Tellurobismuthite, syn	15-863	★	4.385	4.385	30.483	507.65	hR5	Bi <sub>2</sub> Te <sub>3</sub>
Tetradymite, syn	42-1447	★	4.239	4.239	29.576	460.25	hR5	Bi <sub>2</sub> Te <sub>2</sub> S
<b>7R group</b>								
Ikunolite	12-730	i	4.150	4.150	39.190	584.52	hR7	Bi <sub>4</sub> (S,Se) <sub>3</sub>
Ikunolite	25-1175	C	4.150	4.150	39.190	584.52	hR7	Bi <sub>4</sub> (S <sub>2</sub> ,Se <sub>2</sub> ,S <sub>0.24</sub> )
Ikunolite, Te-rich	43-1492		4.258	4.258	39.540	620.84	hR7	(Bi,Te) <sub>4</sub> (S,Te) <sub>3</sub>
Joselite	47-1747	★	4.250	4.250	39.859	623.50	hR7	Bi <sub>4</sub> TeS <sub>2</sub>
Laitakarite	14-220		4.225	4.225	39.930	617.28	hR7	Bi <sub>4</sub> (Se,S) <sub>3</sub>
Laitakarite, syn	28-176	C	4.270	4.270	40.000	631.61	hR7	Bi <sub>4</sub> Se <sub>3</sub>
Pilsenite, syn	33-216	C	4.451	4.451	41.888	718.68	hR7	Bi <sub>4</sub> Te <sub>3</sub>
Poubaite	29-245	C	4.230	4.230	40.400	626.03	hR7	Bi <sub>3</sub> Se <sub>4</sub>
Poubaite	42-1374	i	4.271	4.271	40.270	636.17	hR7	(Bi <sub>2</sub> Pb)(Se <sub>2</sub> Te <sub>2</sub> )
Rucklidgeite	38-458	i	4.416	4.416	41.490	700.70	hR6.90	Bi <sub>3</sub> Te <sub>4</sub>
<b>9H group</b>								
Protojoseite	42-611		4.339	4.339	57.804	942.30	hP27	Bi <sub>5</sub> (Te,S) <sub>4</sub>
<b>12H group</b>								
Aleksite	29-765		4.242	4.242	79.730	1242.67	hP42	PbBi <sub>2</sub> Te <sub>2</sub> S <sub>2</sub>
Kochkarite	44-1439	i	4.416	4.416	72.090	1217.49	hP36	PbBi <sub>4</sub> Te <sub>7</sub>
<b>Tetrahedrite family R<sub>6</sub>T<sub>4</sub>(T'/L)<sub>2</sub>L'<sub>4</sub>X<sub>12</sub>X' or R<sub>6</sub>T<sub>4</sub>(T'/L)<sub>2</sub>L'<sub>4</sub>X<sub>12</sub>G</b>								
<b>Germanite supergroup</b>								
Colusite	44-1474	★	10.622	10.622	10.622	1198.58	cP66	Cu <sub>26</sub> V <sub>2</sub> (As,Sn) <sub>6</sub> S <sub>32</sub>
Germanite	36-395	★	10.586	10.586	10.586	1186.37	cP66	Cu <sub>13</sub> Ge <sub>2</sub> Fe <sub>2</sub> S <sub>16</sub>
Germanocolusite	46-1280		10.568	10.568	10.568	1180.26	cP66	Cu <sub>26</sub> V <sub>2</sub> (Ge,As) <sub>6</sub> S <sub>32</sub>
Hemusite	46-1272	i	10.800	10.800	10.800	1259.71	cF64	Cu <sub>6</sub> MoSnS <sub>8</sub>
Kiddcreekite	37-427		10.856	10.856	10.856	1279.41	cP64	Cu <sub>6</sub> SnWS <sub>8</sub>
Morozevichite	44-1464	O	10.610	10.610	10.610	1194.39	cP64	Pb <sub>3</sub> GeS <sub>4</sub>
Nekrasovite	41-1410		10.730	10.730	10.730	1235.38	cP66	Cu <sub>13</sub> Sn <sub>3</sub> VS <sub>16</sub>
Polkovicite	39-410	O	10.610	10.610	10.610	1194.39	cP50.96	Fe <sub>3</sub> GeS <sub>4</sub>
Stibicolusite	46-1289		10.705	10.705	10.705	1226.76	cP66	Cu <sub>26</sub> V <sub>2</sub> (Sb,Sn,As) <sub>6</sub> S <sub>32</sub>
<b>Tetrahedrite group</b>								
Argentotennantite	45-1351	i	10.584	10.584	10.584	1185.63	cI58	(Ag,Cu) <sub>10</sub> (Zn,Fe) <sub>2</sub> (As,Sb) <sub>4</sub> S <sub>13</sub>
Freibergite, syn	27-190		10.554	10.554	10.554	1175.58	cI57.98	(Cu,Ag,Zn) <sub>12</sub> Sb <sub>4</sub> S <sub>12.6</sub>
Giraudite	35-525		10.578	10.578	10.578	1183.62	cI57.40	(Cu,Zn,Ag) <sub>12</sub> (As,Sb) <sub>4</sub> (Se,S) <sub>13</sub>
Goldfieldite	29-531	i	10.304	10.304	10.304	1094.00	cI58	Cu <sub>12</sub> (Te,As,Sb) <sub>4</sub> S <sub>13</sub>
Hakite	25-297	i	10.880	10.880	10.880	1287.91	cI58	(Cu,Hg) <sub>12</sub> Sb <sub>4</sub> Se <sub>13</sub>
Hakite, Ag-rich	42-1383	i	10.977	10.977	10.977	1322.67	cI58	(Cu,Hg,Ag) <sub>12</sub> Sb <sub>4</sub> Se <sub>13</sub>
Tennantite	43-1478	★	10.221	10.221	10.221	1067.81	cI58	(Cu,Fe) <sub>12</sub> As <sub>4</sub> S <sub>13</sub>
Tennantite, Hg-rich	29-569		10.300	10.300	10.300	1092.73	cI58	(Cu,Hg) <sub>12</sub> As <sub>4</sub> S <sub>13</sub>
Tetrahedrite, Ag-rich	11-101		10.480	10.480	10.480	1151.02	cI58	(Cu,Ag,Fe) <sub>12</sub> Sb <sub>4</sub> S <sub>13</sub>
Tetrahedrite, Hg-rich, syn	41-1498	★	10.507	10.507	10.507	1159.97	cI56	(Cu <sub>10</sub> Hg <sub>2</sub> )Sb <sub>4</sub> S <sub>12</sub>
Tetrahedrite, syn	24-1318	★	10.327	10.327	10.327	1101.34	cI58	Cu <sub>12</sub> Sb <sub>4</sub> S <sub>13</sub>
Tetrahedrite, syn	42-560	C	10.448	10.448	10.448	1140.51	cI53.76	Cu <sub>14</sub> Sb <sub>4</sub> S <sub>13</sub>
Tetrahedrite, syn	42-561	C	10.323	10.323	10.323	1100.06	cI56.46	Cu <sub>12</sub> Sb <sub>4</sub> S <sub>13</sub>
<b>Related structures</b>								
Chameanite	35-524		11.039	11.039	11.039	1345.21	cI72	(Cu,Fe) <sub>4</sub> As(Se,S) <sub>4</sub>
Eulytite, syn	33-215	★	10.291	10.291	10.291	1089.87	cI76	Bi <sub>4</sub> (SiO <sub>4</sub> ) <sub>3</sub>
Galkhaite	35-533	C	10.365	10.365	10.365	1113.55	cI46	(Cs,Tl)(Hg,Cu,Zn) <sub>6</sub> (As,Sb) <sub>4</sub> S <sub>12</sub>
Renierite	41-591	★	10.623	10.623	10.551	1190.53	tP66	Cu <sub>10</sub> Fe <sub>4</sub> ZnGe <sub>2</sub> S <sub>16</sub>
<b>Thortveitite group DD<sup>+</sup>[Si<sub>2</sub>O<sub>7</sub>]</b>								
Gittinsite	33-322	i	6.878	8.674	4.697	274.36	mC22	CaZrSi <sub>2</sub> O <sub>7</sub>
Keiviite	21-1014		6.850	9.010	4.730	285.76	mC22	Ln <sub>2</sub> Si <sub>2</sub> O <sub>7</sub>
Keiviite-(Y), syn	38-440	i	6.875	8.970	4.721	285.05	mC22	Y <sub>2</sub> Si <sub>2</sub> O <sub>7</sub>
Keiviite-(Yb)	37-458		6.840	8.916	4.745	282.94	mC22	Yb <sub>2</sub> Si <sub>2</sub> O <sub>7</sub>
Keiviite-(Yb), syn	25-1345	C	6.802	8.875	4.703	277.58	mC22	Yb <sub>2</sub> Si <sub>2</sub> O <sub>7</sub>
Thortveitite, Y-rich	19-1125	i	6.650	8.620	4.680	262.21	mC22	(Sc,Y) <sub>2</sub> Si <sub>2</sub> O <sub>7</sub>
Thortveitite, syn	20-1037	i	6.508	8.506	4.677	252.57	mC22	Sc <sub>2</sub> Si <sub>2</sub> O <sub>7</sub>
<b>Tilasite group EG(TO<sub>4</sub>)X</b>								
<b>Arsenate subgroup</b>								
Durangite	36-424	i	6.574	8.505	7.019	354.69	mC32	NaAl(AsO <sub>4</sub> )F
Maxwellite	46-1386	O	7.161	8.780	6.687	382.34	mC32	NaFe <sup>+</sup> (AsO <sub>4</sub> )F
Tilasite	2-485		6.670	8.970	7.580	388.73	mC32	CaMgAsO <sub>4</sub> F
<b>Phosphate subgroup</b>								
Isokite	7-406	i	6.520	8.750	7.510	365.31	mC32	CaMgPO <sub>4</sub> F
Lacroixite	39-325	★	6.414	8.207	6.885	327.20	mC32	NaAlFPO <sub>4</sub>
Panasqueiraite	35-511	i	6.535	8.753	6.919	366.09	mC36	CaMgPO <sub>4</sub> (OH,F)
<b>Silicate subgroup</b>								
Malayaite, syn	25-176	i	7.146	8.887	6.668	388.78	mC32	CaSnSiO <sub>5</sub>
Titanite, syn	25-177	i	7.066	8.705	6.561	368.87	mC32	CaTiO(SiO <sub>4</sub> )
Vanadomalayaite	47-1772	i	6.532	8.692	7.039	365.44	mC32	Ca(Ti,V)O(SiO <sub>4</sub> )
<b>Tourmaline group D<sub>0,1</sub>G<sub>3</sub>G'<sub>6</sub>(BO<sub>3</sub>)<sub>3</sub>[Si<sub>6</sub>O<sub>18</sub>]X<sub>3</sub>X'</b>								
<b>Ca subgroup</b>								
Feruvite	46-1385	i	16.012	16.012	7.245	1608.64	hR54	CaFe <sub>3</sub> (Al,Mg) <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (OH) <sub>4</sub>
Liddicoatite	30-748	★	15.847	15.847	7.108	1545.87	hR54	Ca(Li <sub>2</sub> Al)Al <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (OH) <sub>4</sub>
Uvite	29-342		15.960	15.960	7.195	1587.18	hR54	CaMg <sub>3</sub> (Al,Mg) <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (OH) <sub>4</sub>

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>D-site vacant subgroup</b>								
Foiteite	46-1460	i	15.967	15.967	7.126	1573.34	hR53	Fe <sub>2</sub> <sup>2+</sup> (Al,Fe <sup>3+</sup> )Al <sub>6</sub> Si <sub>6</sub> O <sub>18</sub> (BO <sub>3</sub> ) <sub>3</sub> (OH) <sub>4</sub>
<b>Na subgroup</b>								
Buergerite	25-703	i	15.860	15.860	7.176	1563.22	hR50	NaFe <sub>3</sub> <sup>2+</sup> Al <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (O <sub>3</sub> F)
Chromdravite	35-717	i	16.110	16.110	7.270	1634.02	hR54	NaMg <sub>3</sub> Cr <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (OH) <sub>4</sub>
Dravite, Cr-rich	25-1307	i	15.934	15.934	7.218	1587.07	hR53.80	Na <sub>0.8</sub> Mg <sub>3</sub> Al <sub>6</sub> B <sub>3</sub> O <sub>9</sub> Si <sub>6</sub> O <sub>18</sub> (OH) <sub>4</sub>
Dravite, Cr-rich	45-1340	i	15.920	15.920	7.155	1570.27	hR53.24	Na <sub>0.24</sub> (Mg,Al,Cr) <sub>3</sub> Al <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (OH) <sub>4</sub>
Dravite, V-rich	44-1457	★	15.960	15.960	7.189	1585.82	hR54	Na(Mg,V) <sub>3</sub> Al <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (OH) <sub>4</sub>
Elbaite	49-1833	i	15.854	15.854	7.105	1546.58	hR56	Na(Li,Al) <sub>3</sub> Al <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (OH) <sub>5</sub>
Olenite	39-336	i	15.803	15.803	7.086	1532.54	hR50	NaAl <sub>9</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (O,OH) <sub>4</sub>
Olenite, Mn-rich	38-348	i	15.915	15.915	7.123	1562.45	hR53	Na(Al,Mn,Li) <sub>3</sub> Al <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (O,OH,F) <sub>3</sub>
Povondraite	33-1261	i	16.200	16.200	7.470	1697.78	hR42	(Na,K)(Fe,Mg) <sub>3</sub> (Fe,Mg,Al) <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> (Si <sub>6</sub> O <sub>18</sub> (O,OH) <sub>4</sub> )
Schorl	43-1464	★	15.992	15.992	7.172	1588.46	hR54	NaFe <sub>3</sub> Al <sub>6</sub> (BO <sub>3</sub> ) <sub>3</sub> Si <sub>6</sub> O <sub>18</sub> (OH) <sub>4</sub>
<b>Triplite supergroup G<sub>2</sub>(TO<sub>4</sub>)X</b>								
<b>1M group</b>								
Magniotriplite	42-582		12.035	6.432	9.799	720.58	mC64	Mg <sub>2</sub> (PO <sub>4</sub> )F
Magniotriplite, Fe-rich	25-4		11.880	6.375	9.770	704.23	mC64	(Mg,Fe) <sub>2</sub> PO <sub>4</sub> F
Triplite	25-1080		11.970	6.527	10.094	759.50	mC64	(Mn,Fe) <sub>2</sub> PO <sub>4</sub> (F,OH)
Zwieselite	21-811		12.085	6.536	9.910	753.93	mC64	(Fe,Mn,Ca) <sub>2</sub> PO <sub>4</sub> (F,OH)
Zwieselite	30-654		12.046	6.446	9.888	732.57	mC64	(Fe,Mn) <sub>2</sub> PO <sub>4</sub> F
<b>2M group</b>								
Sarkinite	14-214	i	12.680	13.540	10.170	1653.89	mP144	Mn <sub>2</sub> AsO <sub>4</sub> (OH)
Sarkinite, syn	48-1863	i	10.211	13.602	12.771	1679.73	mP144	Mn <sub>2</sub> (AsO <sub>4</sub> )(OH)
Stankite	50-1627	i	11.844	12.662	9.985	1440.72	mP128	Fe(Mn,Fe,Mg)(PO <sub>4</sub> )O
Triploidite	26-1239	C	12.366	13.276	9.943	1550.42	mP144	Mn <sub>1.5</sub> Fe <sub>0.5</sub> PO <sub>4</sub> (OH)
Triploidite	26-1240		12.330	13.280	9.924	1541.72	mP144	(Mn,Fe) <sub>2</sub> PO <sub>4</sub> (OH)
Wagnerite	42-1330	i	11.926	12.671	9.641	1383.36	mP128	Mg <sub>2</sub> PO <sub>4</sub> F
Wolfite	41-1411	★	12.319	13.230	9.840	1521.74	mP144	Fe <sub>2</sub> PO <sub>4</sub> (OH)
<b>Turquoise group (G/Q)<sub>0,1</sub>G'<sub>6</sub>[(TO<sub>4</sub>)<sub>4-6</sub>(T'<sub>3</sub>O<sub>3</sub>OH)<sub>x</sub>](OH)<sub>8</sub>•4H<sub>2</sub>O</b>								
Aheylite	50-1653	★	7.400	9.896	7.627	460.65	aP55	(Fe,Zn)Al <sub>6</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>8</sub> •4H <sub>2</sub> O
Chalcosiderite	37-446	★	7.672	7.885	10.199	502.16	aP55	Cu <sup>2+</sup> Fe <sub>6-8</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>8</sub> •4H <sub>2</sub> O
Coeruleolactite	12-166		7.652	10.153	7.648	478.69	aP55	CaAl <sub>6</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>8</sub> •4H <sub>2</sub> O
Faustite	6-216	O	7.440	9.890	7.670	470.09	aP55	(Zn,Cu <sup>2+</sup> )Al <sub>6</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>8</sub> •4H <sub>2</sub> O
Planerite	50-1654	i	7.505	9.723	7.814	464.23	aP56	Al <sub>6</sub> (PO <sub>4</sub> ) <sub>2</sub> (PO <sub>3</sub> OH) <sub>2</sub> (OH) <sub>8</sub> •4H <sub>2</sub> O
Planerite, Cu-rich	47-1849		7.704	10.109	7.390	476.22	aP56	(Cu,Zn)Al <sub>6</sub> (PO <sub>4</sub> ) <sub>3</sub> (PO <sub>3</sub> OH)(OH) <sub>8</sub> •4H <sub>2</sub> O
Planerite, Cu-rich	50-1652	i	7.640	9.931	7.870	471.89	aP55.50	(Cu,Zn) <sub>10.5</sub> Al <sub>6</sub> (PO <sub>4</sub> ) <sub>3</sub> (PO <sub>3</sub> OH)(OH) <sub>8</sub> •4H <sub>2</sub> O
Turquoise	50-1655	i	7.409	9.914	7.635	460.55	aP55	CuAl <sub>6</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>8</sub> •4H <sub>2</sub> O
Turquoise, Fe-rich	25-260	i	7.680	10.000	7.490	473.60	aP55	Cu(Al,Fe) <sub>6</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>8</sub> •4H <sub>2</sub> O
<b>Uranophane family (E/L/Q)<sub>2/v</sub>[(UO<sub>2</sub>)<sub>2</sub>(SiX<sub>4</sub>)<sub>2</sub>•mH<sub>2</sub>O; m≈3, v=1,2</b>								
Boltwoodite	35-490	★	7.073	7.064	6.638	319.21	mP26	K(H <sub>2</sub> O)(UO <sub>2</sub> )(SiO <sub>4</sub> )
Cuprosklodowskite	8-290		9.210	6.630	7.060	381.31	aP37	Cu(UO <sub>2</sub> ) <sub>2</sub> (SiO <sub>3</sub> OH) <sub>2</sub> •6H <sub>2</sub> O
Cuprosklodowskite	19-413	i	9.210	6.630	7.060	381.31	aP37	Cu(UO <sub>2</sub> ) <sub>2</sub> (SiO <sub>3</sub> OH) <sub>2</sub> •6H <sub>2</sub> O
Kasolite	29-788		13.310	7.020	6.720	607.34	mP48	Pb(UO <sub>2</sub> ) <sub>2</sub> SiO <sub>4</sub> •H <sub>2</sub> O
Oursinite	35-600	i	12.740	17.550	7.050	1576.29	oC136	(H <sub>2</sub> O) <sub>2</sub> (Co,Mg)(UO <sub>2</sub> ) <sub>2</sub> (SiO <sub>4</sub> ) <sub>2</sub> •3H <sub>2</sub> O
Sklodowskite	29-875		17.280	7.030	6.560	766.49	mC68	Mg(UO <sub>2</sub> ) <sub>2</sub> (SiO <sub>3</sub> OH) <sub>2</sub> •5H <sub>2</sub> O
Sodiumboltwoodite	29-1044		27.400	7.020	6.650	1279.11	oP128	(Na,K)(H <sub>2</sub> O)UO <sub>2</sub> SiO <sub>4</sub> •H <sub>2</sub> O
Swamboite	35-660		17.640	21.000	20.120	7250.34	mP870	UH <sub>6</sub> (UO <sub>2</sub> SiO <sub>4</sub> ) <sub>6</sub> •30H <sub>2</sub> O
Uranophane	39-1360	★	15.920	7.013	6.673	738.98	mP68	Ca(UO <sub>2</sub> ) <sub>2</sub> (SiO <sub>3</sub> OH) <sub>2</sub> •5H <sub>2</sub> O
Uranophane-β	47-1809	i	13.964	15.488	6.628	1433.04	mP136	Ca(UO <sub>2</sub> ) <sub>2</sub> (SiO <sub>3</sub> OH) <sub>2</sub> •5H <sub>2</sub> O
<b>Valleriite supergroup TT'S<sub>2</sub>•1.2&lt;-&gt;1.6(E,G)(OH)<sub>2</sub></b>								
Haapalaite	26-1135		3.640	3.640	34.020	390.36	hP36	(Fe,Ni) <sub>2</sub> Mg <sub>1.6</sub> S <sub>2</sub> (OH) <sub>3.2</sub>
Tochilinite	41-590		5.350	15.540	10.890	902.20	mP72.80	6Fe <sub>0.9</sub> S•5(Mg,Fe)(OH) <sub>2</sub>
Tochilinite	42-613		5.350	15.580	10.920	907.12	mP72.80	6Fe <sub>0.9</sub> S•5(Mg,Fe)(OH) <sub>2</sub>
Valleriite	29-554		3.792	3.792	34.100	424.64	hR11.65	CuFeS <sub>2</sub> •1.53(Mg,Al)(OH) <sub>2</sub>
Yushkinite	38-432	O	3.200	3.200	11.300	100.21	hP9.34	V <sub>0.6</sub> S•0.6(Mg,Al)(OH) <sub>2</sub>
<b>Variscite supergroup G(TO<sub>4</sub>)•2H<sub>2</sub>O</b>								
<b>1M group</b>								
Kolbeckite	38-431	i	5.418	10.193	8.893	491.07	mP48	ScPO <sub>4</sub> •2H <sub>2</sub> O
Kolbeckite	44-1444	i	5.451	10.246	8.937	499.12	mP48	ScPO <sub>4</sub> •2H <sub>2</sub> O
Metavariscite	33-32	i	5.182	9.512	8.452	416.56	mP48	AlPO <sub>4</sub> •2H <sub>2</sub> O
Phosphosiderite	33-666	★	5.329	9.798	8.710	454.76	mP48	Fe <sup>3+</sup> PO <sub>4</sub> •2H <sub>2</sub> O
<b>2O group</b>								
Mansfieldite	23-123	i	10.100	9.800	8.790	870.03	oP96	AlAsO <sub>4</sub> •2H <sub>2</sub> O
Scorodite	37-468	★	8.952	10.327	10.042	928.33	oP96	FeAsO <sub>4</sub> •2H <sub>2</sub> O
Strengite	33-667	i	10.122	9.886	8.723	872.91	oP96	FePO <sub>4</sub> •2H <sub>2</sub> O
Strengite, Al-rich, syn	15-391		9.990	9.780	8.660	846.10	oP96	(Fe,Al)PO <sub>4</sub> •2H <sub>2</sub> O
Variscite-2O	33-33	★	9.822	8.558	9.622	808.81	oP96	AlPO <sub>4</sub> •2H <sub>2</sub> O
Yanomamite	47-1780	i	10.446	9.085	10.345	981.76	oP96	InAsO <sub>4</sub> •2H <sub>2</sub> O
Yanomamite, syn	47-1781	★	10.471	9.092	10.341	984.49	oP96	InAsO <sub>4</sub> •2H <sub>2</sub> O
<b>4O group</b>								
Variscite-4O	25-18	O	9.900	9.660	17.180	1642.99	oP192	AlPO <sub>4</sub> •2H <sub>2</sub> O
<b>Vivianite supergroup G<sub>3</sub>(TO<sub>4</sub>)<sub>2</sub>•8H<sub>2</sub>O</b>								
<b>1A group</b>								
Metaköttigite	35-563	i	7.960	9.440	4.720	331.75	aP37	(Zn,Fe) <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8(H <sub>2</sub> O,OH)
Symplesite	8-172		7.870	9.410	4.720	325.42	aP37	Fe <sub>2</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Vivianite	26-1137		7.810	9.080	4.650	310.22	aP37	Fe <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>2M group</b>								
Annabergite, Mg-rich	35-568	i	10.211	13.335	4.728	621.93	mC74	(Ni,Mg) <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Annabergite, syn	34-141	★	10.054	13.303	4.716	616.73	mC74	Ni <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Arupite	46-1388		9.889	13.225	4.645	592.67	mC74	Ni <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Arupite, syn	33-951	★	9.846	13.203	4.634	588.67	mC74	Ni <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
Baricite	29-705	i	10.075	13.416	4.670	610.09	mC74	(Mg,Fe <sup>2+</sup> ) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O

Mineral Group Classification



**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Erythrite, syn</b>	33- 413	★	10.118	13.433	4.762	633.32	mC74	Co <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>Hörnseite, syn</b>	33- 856	★	10.137	13.455	4.754	634.90	mC74	Mg <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>Köttigite, syn</b>	33-1467	★	10.118	13.431	4.761	633.30	mC74	Zn <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>Parasymplesite</b>	35- 461	i	10.349	13.515	4.789	647.24	mC74	Fe <sub>3</sub> •2(AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>Parasymplesite, Zn-rich</b>	42- 536	i	10.276	13.480	4.771	638.30	mC74	(Fe,Zn) <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>Vivianite, syn</b>	30- 662	★	10.034	13.449	4.707	619.78	mC74	Fe <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>4M group</b>								
<b>Bobierite, syn</b>	16- 330	i	10.070	27.840	4.695	1271.68	mC148	Mg <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>Manganesehörsnesite</b>	8- 141		10.380	28.090	4.774	1340.04	mP148	(Mn <sup>+2</sup> ,Mg) <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> •8H <sub>2</sub> O
<b>Wardite group DG<sub>3</sub>(TO<sub>4</sub>)<sub>2</sub>X<sub>4</sub>•2H<sub>2</sub>O</b>								
<b>Cyrilovite</b>	31-1308	i	7.334	7.334	19.368	1041.76	tP112	NaFe <sub>3</sub> •3(PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub> •2H <sub>2</sub> O
<b>Cyrilovite, Al-rich</b>	43- 672	i	7.235	7.235	19.260	1008.17	tP112	Na(Fe,Al) <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub> •2H <sub>2</sub> O
<b>Millisite</b>	13- 370		7.000	7.000	19.070	934.43	tP110	(Na,K)CaAl <sub>6</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>3</sub> •3H <sub>2</sub> O
<b>Millisite</b>	13- 371		7.000	7.000	19.070	934.43	tP110	(Na,K)CaAl <sub>6</sub> (PO <sub>4</sub> ) <sub>4</sub> (OH) <sub>3</sub> •3H <sub>2</sub> O
<b>Wardite</b>	33-1202	★	7.059	7.059	19.062	949.77	tP112	NaAl <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>4</sub> •2H <sub>2</sub> O
<b>Weeksite family D<sub>2</sub>[(UO<sub>2</sub>)(Si<sub>6</sub>O<sub>15</sub>)]•mH<sub>2</sub>O, m≈4</b>								
<b>Haiweeite</b>	12- 721	i	17.650	14.204	18.576	4657.01	oC344	Ca(UO <sub>2</sub> ) <sub>2</sub> Si <sub>6</sub> O <sub>15</sub> •5H <sub>2</sub> O
<b>Haiweeite</b>	13- 118		20.323	13.988	18.670	5307.47	oC528	Ca <sub>2</sub> (UO <sub>2</sub> ) <sub>4</sub> Si <sub>10</sub> O <sub>35</sub> •24H <sub>2</sub> O
<b>Haiweeite</b>	22- 160	i	16.957	13.069	18.357	4068.11	oC344	Ca(UO <sub>2</sub> ) <sub>2</sub> Si <sub>6</sub> O <sub>15</sub> •5H <sub>2</sub> O
<b>Metahaiweeite</b>	12- 722							CaO•2UO <sub>3</sub> •6SiO <sub>2</sub> •xH <sub>2</sub> O
<b>Ursilite</b>	17- 463	O						Mg <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> Si <sub>5</sub> O <sub>16</sub> •9H <sub>2</sub> O
<b>Weeksite</b>	12- 462		14.260	35.880	14.200	7265.41	oP656	K <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> (Si <sub>6</sub> O <sub>15</sub> )•4H <sub>2</sub> O
<b>Weeksite, Ba-rich</b>	50-1610	i	14.230	35.780	14.170	7214.65	oP608	(K,Ba) <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> Si <sub>6</sub> O <sub>15</sub> •3H <sub>2</sub> O
<b>Weeksite, syn</b>	50-1660	i	7.112	17.940	7.100	905.88	oP?	K <sub>2</sub> (UO <sub>2</sub> ) <sub>2</sub> (Si <sub>2</sub> O <sub>5</sub> ) <sub>3</sub> •4H <sub>2</sub> O
<b>Wilksmanite group GG'<sub>2</sub>X<sub>4</sub></b>								
<b>Brezinaite</b>	24- 310		5.960	3.425	11.270	229.97	mC14	Cr <sub>3</sub> S <sub>4</sub>
<b>Heideite, syn</b>	20-1303	i	5.929	3.426	11.460	232.78	mC14	Fe <sup>2+</sup> Ti <sub>2</sub> S <sub>4</sub>
<b>Wilksmanite</b>	18- 890		6.220	3.630	10.520	237.52	mC14	Ni <sub>3</sub> Se <sub>4</sub>
<b>Wöhlerite group DD'<sub>2</sub>G[Si<sub>2</sub>O<sub>7</sub>]X<sub>2</sub></b>								
<b>Baghdadite, syn</b>	47-1854	i	7.360	10.177	10.451	782.75	mP60	Ca <sub>3</sub> ZrSi <sub>2</sub> O <sub>9</sub>
<b>Burpalite</b>	42-1322		10.117	10.445	7.256	766.76	mP60	Na <sub>2</sub> CaZr(Si <sub>2</sub> O <sub>7</sub> )F <sub>2</sub>
<b>Cuspidine</b>	41-1474	i	10.909	10.547	7.539	817.21	mP60	Ca <sub>4</sub> Si <sub>2</sub> O <sub>7</sub> F <sub>2</sub>
<b>Lavenite</b>	50- 222	i	10.783	9.962	7.158	731.20	mP60	(Na,Ca) <sub>2</sub> (Mn <sup>+2</sup> ,Fe <sup>+2</sup> )(Zr,Ti)Si <sub>2</sub> O <sub>7</sub> (O,OH,F) <sub>2</sub>
<b>Niocalite</b>	11- 622	i	10.830	10.420	7.380	784.08	mP60	(Ca,Nb) <sub>4</sub> Si <sub>2</sub> (O,OH,F) <sub>9</sub>
<b>Normandite</b>	50-1630	i	10.828	9.790	7.054	710.36	mP60	NaCa(Mn,Fe)(Ti,Nb,Zr)(Si <sub>2</sub> O <sub>7</sub> )OF
<b>Wöhlerite</b>	10- 462	i	10.870	10.270	7.320	772.18	mP60	NaCa <sub>2</sub> (Zr,Nb)Si <sub>2</sub> O <sub>8</sub> (O,OH,F)
<b>Related structures</b>								
<b>Hjørtdahlite</b>	27- 668		11.012	10.940	7.353	786.01	aP?	(Na,Ca,Ln,Y) <sub>3</sub> Zr <sub>1-x</sub> (Si <sub>2</sub> O <sub>7</sub> )(F,OH,O) <sub>2</sub>
<b>Janhaugite</b>	35- 641	i	10.668	9.787	13.931	1384.72	mP132	Na <sub>3</sub> Mn <sub>3</sub> •2Ti <sub>2</sub> Si <sub>4</sub> O <sub>15</sub> (OH,F,O) <sub>3</sub>
<b>Nacareniobsite-(Ce)</b>	46-1379	i	18.901	5.683	7.462	786.02	mP60	NbNa <sub>3</sub> Ca <sub>3</sub> Ce(Si <sub>2</sub> O <sub>7</sub> ) <sub>2</sub> OF <sub>3</sub>
<b>Rosenbuschite</b>	14- 447	i	10.126	11.377	7.358	766.77	aP60	(Na,Ca) <sub>3</sub> (Fe,Ti,Zr)(SiO <sub>4</sub> ) <sub>2</sub> F
<b>Wolframite supergroup (E/L)(TO<sub>4</sub>)<sub>2</sub></b>								
<b>1M group</b>								
<b>Ferberite</b>	46-1446	i	4.739	5.718	4.965	134.54	mP12	Fe <sup>+2</sup> WO <sub>4</sub>
<b>Hübnerite, syn</b>	12- 727	i	4.783	5.733	4.983	136.63	mP12	(Fe,Mn)WO <sub>4</sub>
<b>Hübnerite, syn</b>	13- 434	i	4.829	5.759	4.998	138.97	mP12	Mn <sup>+2</sup> WO <sub>4</sub>
<b>Sanmartinitite, syn</b>	15- 774		4.691	5.720	4.925	132.14	mP12	ZnWO <sub>4</sub>
<b>2Q group</b>								
<b>Powellite, syn</b>	29- 351	★	5.226	5.226	11.430	312.17	tI24	CaMoO <sub>4</sub>
<b>Scheelite, syn</b>	41-1431	★	5.243	5.243	11.373	312.63	tI24	CaWO <sub>4</sub>
<b>Stolzite, syn</b>	19- 708	★	5.462	5.462	12.049	359.45	tI24	PbWO <sub>4</sub>
<b>TetRARoseveltite</b>	47-1766		5.085	5.085	11.690	302.27	tI24	Bi(AsO <sub>4</sub> )
<b>TetRARoseveltite</b>	47-1850	i	5.064	5.064	11.663	299.09	tI24	BiAsO <sub>4</sub>
<b>TetRARoseveltite, syn</b>	5- 573		5.058	5.058	11.638	297.74	tI24	BiAsO <sub>4</sub>
<b>Wulfenite, syn</b>	44-1486	★	5.433	5.433	12.110	357.46	tI24	PbMoO <sub>4</sub>
<b>Wurtzite supergroup TX or TT'</b>								
<b>2H group</b>								
<b>Bromellite</b>	43-1000	C	2.698	2.698	4.378	27.60	hP4	BeO
<b>Bromellite, syn</b>	35- 818	★	2.698	2.698	4.378	27.60	hP4	BeO
<b>Cadmoselite, syn</b>	8- 459	i	4.299	4.299	7.010	112.20	hP4	CdSe
<b>Greenockite, syn</b>	41-1049	★	4.141	4.141	6.720	99.79	hP4	CdS
<b>Iodargyrite, syn</b>	9- 374	★	4.592	4.592	7.510	137.16	hP4	AgI
<b>Moissanite-2H, syn</b>	29-1126	C	3.081	3.081	5.031	41.36	hP4	SiC
<b>Moissanite-2H, syn</b>	29-1130	O	3.076	3.076	5.048	41.37	hP4	SiC
<b>Wurtzite-2H, Mn-rich</b>	11- 513		3.868	3.868	6.322	81.92	hP4	(Zn,Mn)S
<b>Wurtzite-2H, syn</b>	36-1450	★	3.821	3.821	6.257	79.12	hP4	ZnS
<b>Zincite, syn</b>	36-1451	★	3.250	3.250	5.207	47.62	hP4	ZnO
<b>4H group</b>								
<b>Moissanite-4H, syn</b>	22-1317	i	3.073	3.073	10.053	82.22	hP8	SiC
<b>Moissanite-4H, syn</b>	29-1127	C	3.081	3.081	10.061	82.71	hP8	SiC
<b>Silver-4H</b>	41-1402	i	2.886	2.886	10.000	72.14	hP4	Ag
<b>5H group</b>								
<b>Moissanite-5H</b>	42-1360	O	3.059	3.059	12.584	101.98	hP10	SiC
<b>6H group</b>								
<b>Moissanite-6H, syn</b>	29-1131	★	3.073	3.073	15.080	123.33	hP12	SiC
<b>8H group</b>								
<b>Moissanite-8H, syn</b>	48- 708	★	3.079	3.079	20.147	165.41	hP16	SiC
<b>Wurtzite-8H</b>	39-1363		3.820	3.820	24.960	315.43	hP16	ZnS
<b>10H group</b>								
<b>Wurtzite-10H</b>	12- 688		3.820	3.820	31.200	394.29	hP20	ZnS
<b>Lonsdaleite group</b>								
<b>Lonsdaleite, syn</b>	19- 268		2.520	2.520	4.120	22.66	hP4	C

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Related structures</b>								
Enargite	35- 775	★	6.437	7.404	6.153	293.23	oP16	Cu <sub>3</sub> AsS <sub>4</sub>
Enargite, syn	35- 580	★	6.431	7.402	6.149	292.69	oP16	Cu <sub>3</sub> AsS <sub>4</sub>
Moissanite-15R, syn	22-1301		3.073	3.073	37.700	308.32	hR10	SiC
Moissanite-15R, syn	39-1196	C	3.073	3.073	37.700	308.32	hR10	SiC
Moissanite-33R, syn	22-1316		3.073	3.073	82.940	678.30	hR22	SiC
Moissanite-51R, syn	4- 756		3.073	3.073	128.170	1048.20	hR34	SiC
Picotpaulite	25- 953	i	5.400	10.720	9.040	523.31	oC24	TlFe <sub>2</sub> S <sub>3</sub>
<b>Zeolite family</b> D <sub>n/v</sub> [Al <sub>n</sub> Si <sub>p</sub> O <sub>2(n+p)</sub> ] <sup>•x</sup> (H <sub>2</sub> O,M); n ≤ p, v=1,3								
<b>Analcime supergroup</b>								
Ammonioleucite	40- 474	i	13.214	13.214	13.713	2394.42	tI209.92	(NH <sub>4</sub> ,K)AlSi <sub>2</sub> O <sub>6</sub>
Ammonioleucite, syn	14- 19		13.570	13.570	13.570	2498.85	cl?	NH <sub>4</sub> Al(SiO <sub>3</sub> ) <sub>2</sub> •H <sub>2</sub> O
Ammonioleucite, syn	46- 219	O						0.57Na <sub>2</sub> O•0.42(NH <sub>4</sub> ) <sub>2</sub> O•Al <sub>2</sub> O <sub>3</sub> •3.62SiO <sub>2</sub> •1.19H <sub>2</sub> O
Ammonioleucite, syn	46- 220	O						0.30Na <sub>2</sub> O•0.65(NH <sub>4</sub> ) <sub>2</sub> O•Al <sub>2</sub> O <sub>3</sub> •3.61SiO <sub>2</sub> •0.60H <sub>2</sub> O
Analcime, Mg-rich	42-1378	i	14.706	14.706	14.706	3180.41	cP232	Na <sub>10</sub> Mg <sub>3</sub> Al <sub>16</sub> Si <sub>32</sub> O <sub>96</sub> •25H <sub>2</sub> O
Analcime-C	41-1478	★	13.707	13.707	13.707	2575.13	cl208	Na(Si <sub>2</sub> Al)O <sub>6</sub> •H <sub>2</sub> O
Analcime-O	19-1180		13.720	13.714	13.714	2580.37	oP208	Na(Si <sub>2</sub> Al)O <sub>6</sub> •H <sub>2</sub> O
Hsianghualite	36- 412	i	12.880	12.880	12.880	2136.72	cl200	Li <sub>2</sub> Ca <sub>3</sub> Be <sub>3</sub> (SiO <sub>4</sub> ) <sub>3</sub> F <sub>2</sub>
Leucite, syn	38-1423	★	13.065	13.065	13.755	2348.11	tI160	KAlSi <sub>2</sub> O <sub>6</sub>
Pollucite	25- 194	i	13.674	13.674	13.674	2556.74	cl?	CsAlSi <sub>2</sub> O <sub>6</sub> •xH <sub>2</sub> O
Pollucite, syn	29- 407	i	13.667	13.667	13.667	2552.82	cl160	CsAlSi <sub>2</sub> O <sub>6</sub>
Viscite	5- 616		6.890	6.890	18.065	742.69	hR28	CaAl <sub>3</sub> (PO <sub>3</sub> OH)(SiO <sub>3</sub> OH)(OH) <sub>6</sub>
Wairakite	42-1451	★	13.695	13.638	13.550	2530.50	mC200	CaAl <sub>2</sub> Si <sub>4</sub> O <sub>12</sub> •2H <sub>2</sub> O
<b>Brewsterite group</b>								
Brewsterite-Sr	41-1356	★	6.779	17.520	7.749	917.53	mP80	Sr(Si <sub>6</sub> Al <sub>2</sub> )O <sub>16</sub> •5H <sub>2</sub> O
<b>Cancrinite supergroup</b>								
Cancrinite	34- 176	C	12.590	12.590	5.117	702.42	hP49.90	Na <sub>6</sub> Ca <sub>1.5</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (CO <sub>3</sub> ) <sub>1.6</sub>
Cancrinite	46-1332	i	12.605	12.605	5.126	705.33	hP58	Na <sub>6</sub> Ca <sub>2</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (CO <sub>3</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Cancrinite	48-1862	★	12.620	12.620	5.127	707.14	hP53	Na <sub>6</sub> CaAl <sub>6</sub> Si <sub>6</sub> (CO <sub>3</sub> ) <sub>2</sub> •2H <sub>2</sub> O
Cancrisilite	46-1381		12.575	12.575	5.105	699.10	hP56	Na <sub>7</sub> (Al <sub>5</sub> Si <sub>7</sub> O <sub>24</sub> )CO <sub>3</sub> •3H <sub>2</sub> O
Davyne	50-1578	★	12.671	12.671	5.328	740.81	hP47	(Na,Ca) <sub>8</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (Cl,CO <sub>3</sub> ,SO <sub>4</sub> ) <sub>3</sub>
Hydroxycancrinite	46-1457	i	12.740	12.740	5.183	728.54	hP54	Na <sub>8</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (OH) <sub>2</sub> •2H <sub>2</sub> O
Hydroxycancrinite, syn	31-1272	O	12.700	12.700	5.170	722.15	h??	1.06Na <sub>2</sub> O•Al <sub>2</sub> O <sub>3</sub> •1.60SiO <sub>2</sub> •1.60H <sub>2</sub> O
Microsommitte	20- 743	i	22.120	22.120	5.337	2261.51	hP139.50	(Na,Ca,K) <sub>8</sub> (Si,Al) <sub>12</sub> O <sub>24</sub> Cl <sub>2.5</sub>
Pitiglianoite	46-1390		22.121	22.121	5.221	2212.55	hP165	Na <sub>6</sub> K <sub>2</sub> Si <sub>6</sub> Al <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> )•2H <sub>2</sub> O
Quadridavyne	46-1474		25.771	25.771	5.371	3089.22	hP192	(Na,K) <sub>6</sub> Ca <sub>2</sub> Cl <sub>2</sub> (Si <sub>6</sub> Al <sub>6</sub> O <sub>24</sub> )
Tiptopite	38- 374	i	11.655	11.655	4.692	551.97	hP50.94	K <sub>2</sub> (Li,Na) <sub>2</sub> Be <sub>6</sub> (PO <sub>4</sub> ) <sub>6</sub> (OH) <sub>2</sub> •H <sub>2</sub> O
Toukuite	50-1541	i	12.843	12.843	32.239	4605.16	hP348	(Na,Ca,K) <sub>8</sub> (Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> )(SO <sub>4</sub> ) <sub>2</sub> Cl•H <sub>2</sub> O
Vishnevitte	46-1333	i	12.789	12.789	5.236	741.66	hP55	Na <sub>8</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> )•2H <sub>2</sub> O
Vishnevitte, K-rich	46-1338		12.839	12.839	5.272	752.61	hP58	(Na,K) <sub>8</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> )•3H <sub>2</sub> O
<b>Chabazite supergroup</b>								
Chabazite-Ca	34- 137	★	13.784	13.784	14.993	2467.00	hR74	Ca <sub>2</sub> Al <sub>4</sub> Si <sub>8</sub> O <sub>24</sub> •12H <sub>2</sub> O
Chabazite-Na	19-1178	i	13.799	13.799	15.102	2490.35	hR76	NaAlSi <sub>2</sub> O <sub>6</sub> •3H <sub>2</sub> O
Chabazite-Sr	45-1427	i	13.763	13.763	15.280	2506.57	hR75.09	(Ca,K,Sr) <sub>2</sub> Al <sub>4</sub> Si <sub>8</sub> O <sub>24</sub> •12H <sub>2</sub> O
Willhendersonite	35- 643	i	9.178	9.138	9.477	793.42	aP70	KCaAl <sub>3</sub> Si <sub>3</sub> O <sub>12</sub> •5H <sub>2</sub> O
<b>Dachiardite group</b>								
Dachiardite-Ca	18- 467	i	18.647	7.489	10.227	1359.42	mC113.70	(Ca,Na,K,Mg) <sub>4</sub> (Si,Al) <sub>24</sub> O <sub>48</sub> •13H <sub>2</sub> O
Dachiardite-Na	30-1149	i	18.641	7.512	10.299	1367.81	mC115	Na <sub>4</sub> (Al <sub>4</sub> Si <sub>20</sub> )O <sub>48</sub> •13H <sub>2</sub> O
<b>Erionite group</b>								
Erionite-Ca	39-1379	★	13.295	13.295	15.081	2308.54	hP204	KNaCa(Si <sub>14</sub> Al <sub>4</sub> )O <sub>36</sub> •15H <sub>2</sub> O
Erionite-K, syn	42- 369	i	13.070	13.070	15.060	2227.96	h??	K <sub>0.28</sub> Na <sub>0.192</sub> Al <sub>2</sub> Si <sub>10.43</sub> O <sub>25.86</sub> •xH <sub>2</sub> O
Erionite-K, syn	42- 370	i	13.130	13.130	15.030	2243.98	h??	K <sub>0.56</sub> Na <sub>0.054</sub> Al <sub>2</sub> Si <sub>11.18</sub> O <sub>25.61</sub> •xH <sub>2</sub> O
Erionite-K, syn	42- 372	i	13.090	13.090	15.090	2239.23	h??	K <sub>0.30</sub> Na <sub>0.24</sub> Al <sub>2</sub> Si <sub>10.26</sub> O <sub>23.79</sub> •xH <sub>2</sub> O
Erionite-K, syn	42- 373	i	13.200	13.200	15.020	2266.46	h??	K <sub>0.34</sub> Na <sub>0.066</sub> Al <sub>2</sub> Si <sub>7.79</sub> O <sub>18.78</sub> •xH <sub>2</sub> O
Erionite-Na, syn	42- 308	O						Na <sub>2</sub> O-K <sub>2</sub> O-Al <sub>2</sub> O <sub>3</sub> -SiO <sub>2</sub>
Erionite-Na, syn	42- 371	i	13.230	13.230	15.120	2291.93	h??	K <sub>0.22</sub> Na <sub>0.28</sub> Al <sub>2</sub> Si <sub>9.67</sub> O <sub>22.59</sub> •xH <sub>2</sub> O
Erionite-Na, syn	42- 374	O	13.110	13.110	15.050	2240.13	h??	K-Na-Al <sub>2</sub> -Si-O-H <sub>2</sub> O
Erionite-Na, syn	42- 375	i	13.220	13.220	15.070	2280.90	h??	K <sub>0.14</sub> Na <sub>0.126</sub> Al <sub>2</sub> Si <sub>8.31</sub> O <sub>19.75</sub> •xH <sub>2</sub> O
Faujasite-Na, syn	12- 246	i	24.960	24.960	24.960	15550.12	cF?	Na <sub>2</sub> Al <sub>2</sub> Si <sub>2.4</sub> O <sub>8.8</sub> •6.7H <sub>2</sub> O
<b>Faujasite group</b>								
Faujasite-K, syn	26- 893	★	24.973	24.973	24.973	15574.43	cF645.80	K <sub>69.8</sub> Al <sub>69.8</sub> Si <sub>122.2</sub> O <sub>384</sub>
Faujasite-K, syn	26- 894	i	24.776	24.776	24.776	15208.75	cF624.20	K <sub>48.2</sub> Al <sub>48.2</sub> Si <sub>143.8</sub> O <sub>384</sub>
Faujasite-K, syn	26- 896	★	24.692	24.692	24.692	15054.58	cF1353.20	K <sub>48.2</sub> Al <sub>48.2</sub> Si <sub>143.8</sub> O <sub>384</sub> •243H <sub>2</sub> O
Faujasite-K, syn	26- 897	★	24.920	24.920	24.920	15475.48	cF1386.80	K <sub>69.8</sub> Al <sub>69.8</sub> Si <sub>122.2</sub> O <sub>384</sub> •247H <sub>2</sub> O
Faujasite-Na	39-1380	i	24.681	24.681	24.681	15034.47	cF1408	Na <sub>2</sub> Al <sub>2</sub> Si <sub>4</sub> O <sub>12</sub> •8H <sub>2</sub> O
Faujasite-Na, syn	12- 228	i	24.830	24.830	24.830	15308.41	cF?	Na <sub>2</sub> Al <sub>2</sub> Si <sub>3.3</sub> O <sub>10.6</sub> •7H <sub>2</sub> O
Faujasite-Na, syn	28-1036							Na <sub>14</sub> Al <sub>12</sub> Si <sub>3</sub> O <sub>51</sub> •6H <sub>2</sub> O
Faujasite-Na, syn	38- 238	★	24.756	24.756	24.756	15171.95	cF?	Na <sub>1.84</sub> Al <sub>2</sub> Si <sub>4</sub> O <sub>11.92</sub> •7H <sub>2</sub> O
Faujasite-Na, syn	38- 239	i	24.727	24.727	24.727	15118.69	cF?	Na <sub>1.88</sub> Al <sub>2</sub> Si <sub>4.8</sub> O <sub>13.54</sub> •9H <sub>2</sub> O
Faujasite-Na, syn	38- 240	i	24.770	24.770	24.770	15197.71	cF?	Na <sub>2.06</sub> Al <sub>2</sub> Si <sub>3.8</sub> O <sub>11.63</sub> •8H <sub>2</sub> O
<b>Ferrierite group</b>								
Ferrierite-Na	39-1382	★	19.202	14.138	7.498	2035.54	oI166	NaMg(Si <sub>15</sub> Al <sub>3</sub> )O <sub>36</sub> •9H <sub>2</sub> O
Ferrierite-Na, syn	43- 576	O						Na <sub>0.96</sub> Al <sub>2</sub> N <sub>1.06</sub> Si <sub>11.85</sub> O <sub>27.71</sub> •5.28H <sub>2</sub> O
Ferrierite-Na, syn	43- 577		18.980	18.980	18.980	6837.36	c??	Na <sub>2</sub> Al <sub>2</sub> Si <sub>2.71</sub> O <sub>9.42</sub> •4.39H <sub>2</sub> O
Ferrierite-Na, syn	44- 104	O						Na <sub>0.22</sub> Al <sub>2</sub> Si <sub>2.9</sub> O <sub>6.45</sub> •9.9H <sub>2</sub> O
<b>Gismondine supergroup</b>								
Amicite	33-1273	i	10.226	10.422	9.884	1052.94	mC86	K <sub>2</sub> Na <sub>2</sub> Al <sub>4</sub> Si <sub>4</sub> O <sub>16</sub> •5H <sub>2</sub> O
Barrerite	29-1185	i	13.643	18.200	17.842	4040.21	oC400	(Na,K,Ca) <sub>2</sub> (Si,Al) <sub>6</sub> O <sub>18</sub> •7H <sub>2</sub> O
Garronite	39-1374	i	9.894	9.893	10.292	1007.39	oP93.50	NaCa <sub>2.5</sub> (Si <sub>10</sub> Al <sub>3</sub> )O <sub>32</sub> •14H <sub>2</sub> O
Gismondine	20- 452	i	10.024	10.614	9.841	1046.05	mP100	CaAl <sub>2</sub> Si <sub>2</sub> O <sub>8</sub> •4H <sub>2</sub> O
Gismondine	39-1373	★	10.021	10.637	9.836	1047.48	mP100	CaAl <sub>2</sub> Si <sub>2</sub> O <sub>8</sub> •4H <sub>2</sub> O
Gobbinsite	35- 559		10.450	10.145	9.788	1037.68	oP89	Na <sub>4</sub> Ca(Si <sub>10</sub> Al <sub>6</sub> )O <sub>32</sub> •12H <sub>2</sub> O
Gobbinsite, syn	25- 779		10.090	10.090	9.803	998.02	t??	Na <sub>3</sub> Al <sub>3</sub> Si <sub>5</sub> O <sub>16</sub> •6H <sub>2</sub> O
<b>Gmelinite group</b>								
Gmelinite-Na	38- 435	★	13.750	13.750	10.056	1646.50	hP152	Na <sub>2</sub> Al <sub>2</sub> Si <sub>4</sub> O <sub>12</sub> •6H <sub>2</sub> O
Gmelinite-Sr, syn	17- 141	O	13.800	13.800	10.010	1650.91	hP148	SrAl <sub>2</sub> Si <sub>4</sub> O <sub>12</sub> •6H <sub>2</sub> O

Mineral Group Classification

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	b	c	Cell Volume	PSC	Formula
<b>Heulandite supergroup</b>								
Clinoptilolite-Ca	39-1383	i	17.671	17.912	7.410	2101.38	mC185	KNa <sub>2</sub> Ca <sub>2</sub> (Si <sub>29</sub> Al <sub>7</sub> )O <sub>72</sub> •24H <sub>2</sub> O
Clinoptilolite-Na	47-1870	i	17.647	18.007	7.396	2106.94	mC167	(Na,K,Ca) <sub>5</sub> Al <sub>6</sub> Si <sub>30</sub> O <sub>72</sub> •18H <sub>2</sub> O
Heulandite-Ca	41-1357	i	17.739	17.885	7.430	2110.51	mC184	Ca(Si <sub>7</sub> Al <sub>2</sub> )O <sub>18</sub> •6H <sub>2</sub> O
Heulandite-Sr	24-469	i	17.722	17.856	7.458	2114.46	mC184	(Ca,Sr)Al <sub>2</sub> Si <sub>7</sub> O <sub>18</sub> •6H <sub>2</sub> O
Heulandite-Sr, syn	17-143		7.460	18.000	15.900	2134.32	m?184	SrAl <sub>2</sub> Si <sub>7</sub> O <sub>18</sub> •6H <sub>2</sub> O
<b>Levyne group</b>								
Levyne-Ca	26-1381	O	13.356	13.356	22.880	3534.59	hR111	Ca <sub>3</sub> Al <sub>6.5</sub> Si <sub>11.5</sub> O <sub>36</sub> •18H <sub>2</sub> O
Levyne-Ca	46-1263	C	13.338	13.338	23.014	3545.72	hR102.70	Ca <sub>2.8</sub> (Na,K) <sub>0.9</sub> Al <sub>6.5</sub> Si <sub>11.5</sub> O <sub>36</sub> •15H <sub>2</sub> O
<b>Mordenite supergroup</b>								
Mariopseite	46-1321	i	19.650	19.400	7.531	2870.89	oC253	Pb <sub>2</sub> Ca <sub>2</sub> (Si,Al) <sub>48</sub> O <sub>100</sub> •32H <sub>2</sub> O
Mordenite	6-239	i	18.160	20.450	7.540	2800.15	oC232	(Ca,Na <sub>2</sub> ,K <sub>2</sub> )Al <sub>2</sub> Si <sub>10</sub> O <sub>24</sub> •7H <sub>2</sub> O
Mordenite	29-1257	i	18.114	20.514	7.527	2796.96	oC236	(Na <sub>2</sub> ,Ca,K <sub>2</sub> )Al <sub>2</sub> Si <sub>10</sub> O <sub>24</sub> •7H <sub>2</sub> O
Mordenite, syn	49-924	i	18.067	20.284	7.491	2745.23	oC?	Na <sub>2</sub> Al <sub>2</sub> Si <sub>13.3</sub> O <sub>29.6+X</sub>
<b>Natrolite supergroup</b>								
Gonnardite	10-473	O	13.383	13.383	6.614	1184.60	tI112	CaNa <sub>4</sub> Si <sub>6</sub> Al <sub>4</sub> O <sub>20</sub> •7H <sub>2</sub> O
Gonnardite	42-1380	i	13.290	13.290	6.590	1163.95	tI101.20	(Ca,Na) <sub>2</sub> (Si,Al) <sub>5</sub> O <sub>16</sub> •3H <sub>2</sub> O
Gonnardite	45-1324	C	13.210	13.210	6.622	1155.57	tI?	(Na,Ca) <sub>2</sub> (Si,Al) <sub>5</sub> O <sub>16</sub> •3H <sub>2</sub> O
Mesolite	24-1064	i	56.700	6.530	18.470	6838.54	oF584	Na <sub>2</sub> Ca <sub>2</sub> Al <sub>6</sub> Si <sub>9</sub> O <sub>30</sub> •8H <sub>2</sub> O
Natrolite	45-1413	★	18.301	18.659	6.589	2249.78	oF184	Na <sub>2</sub> Al <sub>2</sub> Si <sub>3</sub> O <sub>10</sub> •2H <sub>2</sub> O
Paranatrolite	35-458		19.070	19.130	6.580	2400.44	oF208	Na <sub>2</sub> Al <sub>2</sub> Si <sub>3</sub> O <sub>10</sub> •3H <sub>2</sub> O
Paranatrolite	42-1386	O	18.930	19.210	6.589	2396.06	oF210	Na <sub>2</sub> K <sub>0.25</sub> (Al,Si) <sub>3</sub> O <sub>10</sub> •3H <sub>2</sub> O
Scolecite	41-1355	i	18.480	18.960	6.548	2294.10	mC200	CaAl <sub>2</sub> Si <sub>3</sub> O <sub>10</sub> •3H <sub>2</sub> O
Tetranatrolite	33-1205	i	13.098	13.098	6.635	1138.28	tI92	Na <sub>2</sub> Al <sub>2</sub> Si <sub>3</sub> O <sub>10</sub> •2H <sub>2</sub> O
Tetranatrolite, Ca-rich	42-1381	i	13.250	13.250	6.600	1158.71	tI92	(Na,Ca) <sub>2</sub> (Si,Al) <sub>3</sub> O <sub>10</sub> •2H <sub>2</sub> O
<b>Other zeolites</b>								
Afghanite	46-1264	★	12.800	12.800	21.406	3037.18	hP236	(Na,Ca,K) <sub>8</sub> (Si,Al) <sub>12</sub> O <sub>24</sub> (SO <sub>4</sub> ,Cl) <sub>3</sub>
Bellbergite, syn	41-573	C	13.280	13.280	15.210	2323.04	hP?	Ca <sub>8</sub> H <sub>27</sub> 3Al <sub>9</sub> N <sub>2</sub> 28As <sub>1</sub> O <sub>72</sub> 9Si <sub>26</sub> 6•25H <sub>2</sub> O
Bellbergite, syn	45-1482	i	13.244	13.244	15.988	2428.64	hP208	(K,Ba,Sr) <sub>2</sub> Sr <sub>2</sub> Ca <sub>2</sub> (Ca,Na) <sub>4</sub> Al <sub>18</sub> Si <sub>18</sub> O <sub>72</sub> •30H <sub>2</sub> O
Bikitaite	14-168	i	8.611	4.960	7.610	296.00	aP26	LiAlSi <sub>2</sub> O <sub>6</sub> •H <sub>2</sub> O
Boggsite	42-1379	C	20.236	23.798	12.798	6163.21	oI521.10	Na <sub>3</sub> 7Ca <sub>7</sub> Al <sub>18</sub> Si <sub>77.5</sub> O <sub>192</sub> •74H <sub>2</sub> O
Boggsite	46-1350	i	20.210	23.770	12.800	6149.01	oI509	(Ca,Na,K) <sub>11</sub> Si <sub>78</sub> Al <sub>15</sub> O <sub>192</sub> •70H <sub>2</sub> O
Bystrite	45-1373	i	12.855	12.855	10.700	1531.29	hP103	Ca(Na,K) <sub>7</sub> (Si <sub>6</sub> Al <sub>6</sub> O <sub>24</sub> (S <sub>3</sub> ) <sub>1.5</sub> •H <sub>2</sub> O
Bystrite, syn	39-221	C	12.906	12.906	10.541	1520.53	hP?	Na <sub>2</sub> Al <sub>12</sub> Si <sub>12</sub> O <sub>48</sub> •18H <sub>2</sub> O
Chiavennite	35-602		8.729	31.326	4.903	1340.70	oP128	CaMn <sub>2</sub> Be <sub>2</sub> Si <sub>5</sub> O <sub>13</sub> (OH) <sub>2</sub> •2H <sub>2</sub> O
Cowlesite	46-1405	★	23.270	30.620	25.000	17813.19	oP1632	CaAl <sub>2</sub> Si <sub>3</sub> O <sub>10</sub> •6H <sub>2</sub> O
Edingtonite	25-60	★	9.534	9.649	6.507	598.60	oP56	BaAl <sub>2</sub> Si <sub>3</sub> O <sub>10</sub> •4H <sub>2</sub> O
Epistilbite	39-1381	★	9.089	17.747	10.229	1357.33	mC124	Ca <sub>2</sub> (Si <sub>9</sub> Al <sub>3</sub> )O <sub>24</sub> •8H <sub>2</sub> O
Franzinite	30-1170	i	12.884	12.884	26.580	3821.09	hP244	(Na,Ca) <sub>7</sub> (Si,Al) <sub>12</sub> O <sub>24</sub> (SO <sub>4</sub> ,OH,CO <sub>3</sub> ) <sub>3</sub> •H <sub>2</sub> O
Gaultite	47-1842	i	10.211	39.880	10.304	4195.94	oF368	Na <sub>4</sub> Zn <sub>2</sub> Si <sub>7</sub> O <sub>18</sub> •5H <sub>2</sub> O
Giuseppettite	35-479		12.850	12.850	42.220	6037.47	hP434	(Na,K,Ca) <sub>8</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> ) <sub>2</sub> Cl <sub>0.25</sub>
Goosecreekite	35-469	i	7.520	17.560	7.350	934.32	mP80	CaAl <sub>2</sub> Si <sub>6</sub> O <sub>16</sub> •5H <sub>2</sub> O
Gottardite	49-1814	i	13.698	25.213	22.660	7826.03	oC698	Na <sub>3</sub> Mg <sub>3</sub> Ca <sub>5</sub> Al <sub>9</sub> Si <sub>11</sub> O <sub>27</sub> •93H <sub>2</sub> O
Gottardite	49-1831	★	13.698	25.213	22.660	7826.03	oC419	Na <sub>3</sub> Mg <sub>3</sub> Ca <sub>5</sub> Al <sub>9</sub> Si <sub>11</sub> O <sub>27</sub>
Kalborsite	33-999		9.851	9.851	13.060	1267.37	tP92	K <sub>6</sub> BaAl <sub>4</sub> Si <sub>6</sub> O <sub>20</sub> (OH) <sub>4</sub> Cl
Kenyaite	20-1157		7.790	19.720	6.910	1055.88	mP99	NaSi <sub>11</sub> O <sub>20.5</sub> (OH) <sub>4</sub> •3H <sub>2</sub> O
Laumontite	45-1325	C	14.820	13.100	7.565	1361.74	mC124	Ca(Al <sub>2</sub> Si <sub>4</sub> O <sub>12</sub> )•4H <sub>2</sub> O
Laumontite	46-1389	★	14.770	13.090	7.580	1358.80	mC118	Ca <sub>4</sub> Al <sub>8</sub> Si <sub>16</sub> O <sub>48</sub> •14H <sub>2</sub> O
Laumontite	47-1785	★	14.747	13.075	7.552	1350.60	mC124	Ca <sub>4</sub> Al <sub>8</sub> Si <sub>16</sub> O <sub>48</sub> •16H <sub>2</sub> O
Laumontite, syn	26-1047	i	14.761	13.077	7.561	1353.03	mC124	Ca <sub>2</sub> Al <sub>2</sub> Si <sub>4</sub> O <sub>12</sub> •4H <sub>2</sub> O
Liohtite	47-1742	★	12.858	12.858	16.090	2303.63	hP182	(Na,Ca,K) <sub>24</sub> (Si,Al) <sub>36</sub> O <sub>72</sub> (SO <sub>4</sub> ,Cl,F) <sub>10</sub>
Lovdarite	39-1367	C	39.580	6.930	7.150	1961.17	oP178	K <sub>2</sub> Na <sub>6</sub> Be <sub>4</sub> Si <sub>14</sub> O <sub>36</sub> •9H <sub>2</sub> O
Magadiite, syn	42-1350	i	7.300	7.280	15.710	829.69	mP75	Na <sub>2</sub> Si <sub>4</sub> O <sub>20</sub> •10H <sub>2</sub> O
Mazzite	38-426	i	18.392	18.392	7.646	2239.87	hP197	K <sub>2</sub> CaMg <sub>2</sub> (Si,Al) <sub>3</sub> O <sub>7</sub> •28H <sub>2</sub> O
Melanophlogite	25-7	i	26.790	26.790	13.395	9613.65	tP648	C <sub>2</sub> H <sub>17</sub> O <sub>5</sub> •Si <sub>4</sub> O <sub>9</sub> 2
Merlinoite	29-989	i	14.116	14.229	9.946	1997.72	oI175	K <sub>5</sub> Ca <sub>2</sub> (Al <sub>9</sub> Si <sub>23</sub> O <sub>64</sub> )•24H <sub>2</sub> O
Merlinoite, syn	30-902	O	10.070	14.220	14.220	2036.24	o??	K <sub>2</sub> Al <sub>2</sub> Si <sub>3</sub> O <sub>10</sub> •3H <sub>2</sub> O
Montesommaite	46-1351	i	10.099	10.099	17.307	1765.14	oF135	(K,Na) <sub>9</sub> Al <sub>9</sub> Si <sub>23</sub> O <sub>64</sub> •10H <sub>2</sub> O
Mutinaite	50-1665	i	20.223	20.052	13.491	5470.76	oP474.97	K <sub>0.11</sub> Na <sub>2.76</sub> Ca <sub>3.78</sub> Mg <sub>0.21</sub> Al <sub>11.20</sub> Si <sub>84.91</sub> O <sub>192</sub> •60H <sub>2</sub> O
Mutinaite, syn	44-2	i	19.965	19.965	13.380	5333.04	tP?	Al <sub>2</sub> O <sub>3</sub> •54SiO <sub>2</sub>
Mutinaite-Na, syn	37-361	O						Na <sub>2.6</sub> Al <sub>4</sub> (Si <sub>161.6</sub> O <sub>330.5</sub> )
Mutinaite-Na, syn	37-390	O						Na <sub>1.78</sub> Al <sub>2</sub> Si <sub>31.1</sub> O <sub>96.1</sub>
Offretite	22-803	i	13.291	13.291	7.582	1159.92	hP99	(K,Ca,Mg) <sub>3</sub> Al <sub>5</sub> Si <sub>13</sub> O <sub>36</sub> •14H <sub>2</sub> O
Offretite	25-1186	C	13.291	13.291	7.582	1159.92	hP99	(K,Ca,Mg) <sub>3</sub> Al <sub>5</sub> Si <sub>13</sub> O <sub>36</sub> •14H <sub>2</sub> O
Pahasapaite	41-1384		13.781	13.781	13.781	2617.23	cI276.50	(Ca,Li) <sub>11</sub> Li <sub>8</sub> Be <sub>24</sub> (PO <sub>4</sub> ) <sub>24</sub> •38H <sub>2</sub> O
Partheite	36-378	i	21.590	8.780	9.310	1764.22	mC164	Ca <sub>2</sub> Al <sub>4</sub> Si <sub>4</sub> O <sub>15</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Perliaite	38-395		18.490	18.490	7.510	2223.54	hP164.73	K <sub>9</sub> NaCaAl <sub>12</sub> Si <sub>24</sub> O <sub>72</sub> •15H <sub>2</sub> O
Perliaite, syn	39-224	C	18.400	18.400	7.520	2204.88	hP?	K <sub>6</sub> Na <sub>3</sub> Al <sub>9</sub> Si <sub>27</sub> O <sub>72</sub> •21H <sub>2</sub> O
Perliaite, syn	39-294		18.390	18.390	7.650	2240.55	h??	K <sub>2.02</sub> Al <sub>2</sub> Si <sub>4.76</sub> O <sub>13.53</sub>
Roggianite	39-366	★	18.366	18.366	9.183	3097.52	tI232	Be <sub>2</sub> Ca <sub>4</sub> Al <sub>4</sub> Si <sub>7</sub> O <sub>24</sub> (OH) <sub>4</sub> •3H <sub>2</sub> O
Sacrofanite	47-1741	★	12.894	12.894	74.213	10686.08	hP280.0	(Na,Ca,K) <sub>8</sub> (Si,Al) <sub>12</sub> O <sub>24</sub> (SO <sub>4</sub> ,Cl,F) <sub>3</sub> •xH <sub>2</sub> O
Silhydryte	25-1332		14.519	18.800	15.938	4350.39	oP336	Si <sub>3</sub> O <sub>6</sub> •H <sub>2</sub> O
Terranovaite	50-1714	C	9.747	23.880	20.068	4670.99	oC335.30	(Na <sub>4</sub> 2K <sub>0.2</sub> Mg <sub>0.2</sub> Ca <sub>3.7</sub> (Al <sub>12</sub> Si <sub>6</sub> 7O <sub>160</sub> )•29H <sub>2</sub> O
Thomsonite	35-498	i	13.051	13.092	13.263	2266.17	oP204	NaCa <sub>2</sub> Al <sub>5</sub> Si <sub>5</sub> O <sub>20</sub> •6H <sub>2</sub> O
Thomsonite	46-1448	i	13.080	13.100	13.220	2265.22	oP200	NaCa <sub>2</sub> Al <sub>5</sub> Si <sub>5</sub> O <sub>20</sub> •6H <sub>2</sub> O
Tschernichite	46-1396	O						(Ca,Na) <sub>6</sub> Si <sub>6</sub> Al <sub>2</sub> O <sub>16</sub> •8H <sub>2</sub> O
Tschoertnovite	50-1602		4.420	4.420	24.070	407.24	hP12	BiTe
Tschörtnerite	50-1611	C	31.620	31.620	31.620	31614.45	oF2592	Ca <sub>4</sub> (K,Ca,Ba,Sr) <sub>3</sub> Cu <sub>3</sub> (Al <sub>12</sub> Si <sub>12</sub> O <sub>48</sub> (OH) <sub>10</sub> )•20H <sub>2</sub> O
Tugtupite	38-472	★	8.640	8.640	8.871	662.16	tI46	Na <sub>4</sub> AlBeSi <sub>4</sub> O <sub>12</sub> Cl
Weinebeneite	47-1802	★	11.897	9.707	9.633	1106.84	mC120	CaBe <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •4H <sub>2</sub> O
Wenkite	19-1418	i	13.511	13.511	7.462	1179.59	hP92	Ca <sub>5</sub> Ba <sub>4</sub> Al <sub>9</sub> Si <sub>11</sub> O <sub>41</sub> (OH) <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> •H <sub>2</sub> O
Yugawaralite	39-1372	★	6.728	14.007	10.056	883.53	mP74	Ca(Si <sub>6</sub> Al <sub>2</sub> )O <sub>16</sub> •4H <sub>2</sub> O
<b>Paulingite group</b>								
Paulingite-Ca, Ba-rich	50-1604	★	35.123	35.123	35.123	43328.99	cI3420.16	K <sub>2.28</sub> Na <sub>0.38</sub> Ba <sub>1.39</sub> Ca <sub>2.57</sub> Al <sub>11.55</sub> Si <sub>30.59</sub> O <sub>84</sub> •27H <sub>2</sub> O
Paulingite-K	39-1378	★	35.114	35.114	35.114	43295.31	cI4256	K <sub>3</sub> Ca(Si <sub>16</sub> Al <sub>5</sub> )O <sub>42</sub> •22H <sub>2</sub> O
<b>Phillipsite group</b>								
Harmotome	39-1377	i	9.876	14.130	8.680	999.08	mP88	Ba(Si <sub>2</sub> Al <sub>2</sub> )O <sub>8</sub> •3H <sub>2</sub> O
Harmotome, calcian	39-1376	i	9.914	14.247	8.706	1011.58	mP88	K(Ca,Ba)(Si <sub>4</sub> Al <sub>3</sub> )O <sub>16</sub> •6H <sub>2</sub> O
Harmotome-(Na), syn	12-687							NaAl <sub>3</sub> Si <sub>6</sub> O <sub>16</sub> •6H <sub>2</sub> O
Phillipsite-Ba, syn	30-107	O						Ba-Al-Si-H <sub>2</sub> O
Phillipsite-Ba, syn	30-1158	O						(Ba,Na)•Al•SiO <sub>4</sub>

**Classification**  
**Subclassification**

Mineral Name	PDF#	QM	a	Cell Parameters b	c	Cell Volume	PSC	Formula
<b>Phillipsite-Ca</b>	<b>39- 1375</b>	i	9.876	14.318	8.689	1014.76	mP88	KCa(Si <sub>5</sub> Al <sub>3</sub> )O <sub>16</sub> •6H <sub>2</sub> O
<b>Phillipsite-K</b>	<b>46- 1427</b>	i	8.763	14.238	8.686	1017.07	mP76	(K,Na) <sub>2</sub> (Si,Al) <sub>8</sub> O <sub>16</sub> •4H <sub>2</sub> O
<b>Phillipsite-K, syn</b>	<b>16- 715</b>		9.900	14.290	14.290	2021.62	o??	(K <sub>2</sub> ) <sub>0.48</sub> Ca <sub>0.52</sub> Al <sub>2</sub> Si <sub>4</sub> O <sub>12</sub> •xH <sub>2</sub> O
<b>Phillipsite-Na, syn</b>	<b>24- 1046</b>	O	9.530	9.530	9.100	826.47	t??	Na <sub>6.4</sub> Al <sub>6.4</sub> Si <sub>9.6</sub> O <sub>32</sub> •4.6H <sub>2</sub> O
<b>Sodalite supergroup</b>								
<b>Danalite</b>	<b>11- 491</b>		8.207	8.207	8.207	552.78	cP46	(Fe,Mn) <sub>4</sub> Be <sub>3</sub> Si <sub>3</sub> O <sub>12</sub> S
<b>Genthelvite</b>	<b>38- 467</b>	★	8.117	8.117	8.117	534.81	cP46	Zn <sub>4</sub> Be <sub>3</sub> Si <sub>3</sub> O <sub>12</sub> S
<b>Häüyne</b>	<b>37- 473</b>	★	9.120	9.120	9.120	758.53	cP54	Na <sub>6</sub> Ca <sub>2</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> ) <sub>2</sub>
<b>Häüyne</b>	<b>47- 1881</b>	i	18.240	18.240	18.240	6068.40	cI540	(Na,K,Ca) <sub>8</sub> (Si,Al) <sub>12</sub> O <sub>24</sub> (SO <sub>4</sub> ) <sub>2</sub>
<b>Häüyne</b>	<b>50- 1644</b>		9.076	9.076	9.076	747.62	cP52.14	K <sub>0.28</sub> Na <sub>6.11</sub> Ca <sub>1.36</sub> Al <sub>5.86</sub> Si <sub>6.14</sub> O <sub>24</sub> [(SO <sub>4</sub> ) <sub>1.63</sub> Cl <sub>0.2</sub>
<b>Helvite</b>	<b>38- 468</b>	★	8.273	8.273	8.273	566.12	cP46	Mn <sub>4</sub> <sup>2+</sup> Be <sub>3</sub> (SiO <sub>4</sub> ) <sub>3</sub> S
<b>Lazurite-A</b>	<b>41- 1392</b>	i	9.091	12.857	25.713	3005.41	aP216	Na <sub>6</sub> Ca <sub>2</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> ) <sub>2</sub>
<b>Lazurite-C</b>	<b>17- 749</b>		9.090	9.090	9.090	751.09	cP54	Na <sub>6</sub> Ca <sub>2</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> ) <sub>2</sub>
<b>Lazurite-C</b>	<b>42- 1312</b>	i	9.072	9.072	9.072	746.64	cP54	Na <sub>6</sub> Ca <sub>2</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> ) <sub>2</sub>
<b>Lazurite-C</b>	<b>44- 1396</b>	i	9.071	9.071	9.071	746.39	cP?	Na <sub>6</sub> Ca <sub>2</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> ) <sub>2</sub>
<b>Lazurite-C</b>	<b>46- 103</b>	★	9.103	9.103	9.103	754.22	c?46	Na <sub>7</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> S <sub>3</sub>
<b>Lazurite-M</b>	<b>41- 1393</b>	★	36.360	51.400	51.400	96061.67	mP6272	Na <sub>6</sub> Ca <sub>2</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> ) <sub>2</sub>
<b>Lazurite-O</b>	<b>44- 1458</b>	i	9.072	12.830	38.490	4480.00	oP?	(Na,Ca,K) <sub>8</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> (SO <sub>4</sub> ,S,Cl) <sub>2</sub> •xH <sub>2</sub> O
<b>Nosean, syn</b>	<b>17- 538</b>	i	9.078	9.078	9.078	748.07	cP49	Na <sub>8</sub> Al <sub>6</sub> Si <sub>6</sub> O <sub>24</sub> SO <sub>4</sub>
<b>Sodalite</b>	<b>37- 476</b>	★	8.878	8.878	8.878	699.85	cP46	Na <sub>4</sub> Al <sub>3</sub> Si <sub>3</sub> O <sub>12</sub> Cl
<b>Sodalite, syn</b>	<b>41- 72</b>	O						KNa <sub>3</sub> Al <sub>3</sub> Cl(SiO <sub>4</sub> ) <sub>3</sub>
<b>Stilbite supergroup</b>								
<b>Stellerite</b>	<b>25- 124</b>	i	13.599	18.222	17.863	4426.47	oF392	Ca <sub>2</sub> Al <sub>4</sub> Si <sub>14</sub> O <sub>36</sub> •14H <sub>2</sub> O
<b>Stilbite-Ca</b>	<b>24- 894</b>	i	13.640	18.240	11.270	2209.51	mC209.20	(Ca,Na) <sub>1.3</sub> (Si,Al) <sub>8</sub> O <sub>18</sub> •8H <sub>2</sub> O
<b>Stilbite-Ca</b>	<b>44- 1479</b>	★	13.637	18.249	11.265	2210.94	mC198	(Na,K)Ca <sub>2</sub> Al <sub>5</sub> Si <sub>13</sub> O <sub>36</sub> •14H <sub>2</sub> O
<b>Zinc group D</b>								
<b>Algodonite</b>	<b>9- 429</b>		2.605	2.605	4.245	24.95	hP2	(Cu,As)
<b>Allargentum, syn</b>	<b>25- 54</b>		2.943	2.943	4.780	35.85	hP2	Ag <sub>1.5</sub> Sb <sub>x</sub>
<b>Cadmium, syn</b>	<b>5- 674</b>	★	2.979	2.979	5.618	43.19	hP2	Cd
<b>Osmium</b>	<b>41- 599</b>	i	2.724	2.724	4.333	27.84	hP2	(Ir,Os)
<b>Osmium, Ir-rich</b>	<b>41- 601</b>		2.726	2.726	4.326	27.84	hP2	(Os,Ir,Ru)
<b>Osmium, syn</b>	<b>6- 662</b>	★	2.734	2.734	4.320	27.96	hP2	Os
<b>Rhenium, syn</b>	<b>5- 702</b>	i	2.760	2.760	4.458	29.41	hP2	Re
<b>Ruthenium, syn</b>	<b>6- 663</b>	★	2.706	2.706	4.282	27.15	hP2	Ru
<b>Schachnerite, syn</b>	<b>27- 618</b>		2.977	2.977	4.840	37.14	hP2	Ag <sub>1.1</sub> Hg <sub>0.9</sub>
<b>Zinc, syn</b>	<b>4- 831</b>	★	2.665	2.665	4.947	30.43	hP2	Zn
<b>Zippeite family D<sub>4/√</sub>[(UO<sub>2</sub>)<sub>6</sub>(SO<sub>4</sub>)<sub>3</sub>(OH)<sub>10</sub>]•4•16H<sub>2</sub>O; v=1,2</b>								
<b>Cobaltzippeite, syn</b>	<b>29- 520</b>							Co <sub>2</sub> (UO <sub>2</sub> ) <sub>6</sub> (SO <sub>4</sub> ) <sub>3</sub> (OH) <sub>10</sub> •16H <sub>2</sub> O
<b>Magnesiumzippeite</b>	<b>29- 876</b>							Mg <sub>2</sub> (UO <sub>2</sub> ) <sub>6</sub> (SO <sub>4</sub> ) <sub>3</sub> (OH) <sub>10</sub> •16H <sub>2</sub> O
<b>Nickelzippeite</b>	<b>29- 944</b>							Ni <sub>2</sub> (UO <sub>2</sub> ) <sub>6</sub> (SO <sub>4</sub> ) <sub>3</sub> (OH) <sub>10</sub> •16H <sub>2</sub> O
<b>Nickelzippeite, syn</b>	<b>29- 1434</b>							Ni <sub>2</sub> (UO <sub>2</sub> ) <sub>6</sub> (SO <sub>4</sub> ) <sub>3</sub> (OH) <sub>10</sub> •16H <sub>2</sub> O
<b>Sodiumzippeite, syn</b>	<b>29- 1285</b>		8.800	68.480	14.550	8768.18	oP552	Na <sub>4</sub> (UO <sub>2</sub> ) <sub>6</sub> (SO <sub>4</sub> ) <sub>3</sub> (OH) <sub>10</sub> •4H <sub>2</sub> O
<b>Zinczippeite, syn</b>	<b>29- 1395</b>							Zn <sub>2</sub> (UO <sub>2</sub> ) <sub>6</sub> (SO <sub>4</sub> ) <sub>3</sub> (OH) <sub>10</sub> •16H <sub>2</sub> O
<b>Zippeite</b>	<b>8- 138</b>		9.100	14.020	8.700	1081.95	mC94	(UO <sub>2</sub> ) <sub>3</sub> (SO <sub>4</sub> ) <sub>2</sub> (OH) <sub>2</sub> •8H <sub>2</sub> O
<b>Zippeite</b>	<b>29- 1062</b>	i	8.880	14.100	8.830	1075.04	mC69	K <sub>2</sub> (UO <sub>2</sub> ) <sub>6</sub> (SO <sub>4</sub> ) <sub>3</sub> (OH) <sub>10</sub> •4H <sub>2</sub> O
<b>Zippeite, syn</b>	<b>49- 1861</b>	i	8.755	13.987	17.730	2105.46	mC168	K(UO <sub>2</sub> ) <sub>2</sub> (SO <sub>4</sub> )(OH) <sub>3</sub> •H <sub>2</sub> O
<b>Zircon group E(TO<sub>4</sub>)</b>								
<b>Arsenate group</b>								
<b>Chernovite-(Y), P-rich</b>	<b>26- 999</b>		6.993	6.993	6.167	301.58	tI24	Y(As,P)O <sub>4</sub>
<b>Chernovite-(Y), syn</b>	<b>13- 429</b>	★	7.039	7.039	6.292	311.75	tI24	YAsO <sub>4</sub>
<b>Borate group</b>								
<b>Behierite, syn</b>	<b>49- 1078</b>	★	6.212	6.212	5.483	211.59	tI24	TaBO <sub>4</sub>
<b>Chromate group</b>								
<b>Chromatite, syn</b>	<b>8- 458</b>	★	7.242	7.242	6.290	329.89	tI24	CaCrO <sub>4</sub>
<b>Phosphate group</b>								
<b>Xenotime-(Y)</b>	<b>11- 254</b>	i	6.904	6.904	6.035	287.66	tI24	YPO <sub>4</sub>
<b>Silicate subgroup</b>								
<b>Coffinite, Y-P-rich</b>	<b>46- 1304</b>	i	6.946	6.946	6.268	302.41	tI24	(U,Ca,Y)(Si,P)O <sub>4</sub> ]
<b>Coffinite, Y-rich</b>	<b>17- 460</b>	O	6.770	6.970	6.450	294.39	mP56	(U,Ln,Ca,Mg)(SiO <sub>4</sub> (OH) <sub>4</sub> )
<b>Coffinite, syn</b>	<b>11- 420</b>	i	6.979	6.979	6.252	304.51	tI24	USiO <sub>4</sub>
<b>Hafnon, syn</b>	<b>20- 467</b>		6.573	6.573	5.964	257.67	tI24	HfSiO <sub>4</sub>
<b>Thorite, syn</b>	<b>11- 419</b>	i	7.132	7.132	6.322	321.57	tI24	ThSiO <sub>4</sub>
<b>Thorogummite, U-rich</b>	<b>8- 440</b>	i	7.068	7.068	6.260	312.73	tI?	(Th,U,Ce)(SiO <sub>4</sub> ) <sub>1-x</sub> (OH) <sub>4x</sub>
<b>Zircon</b>	<b>6- 266</b>	★	6.604	6.604	5.979	260.76	tI24	ZrSiO <sub>4</sub>
<b>Vanadate subgroup</b>								
<b>Dreyerite, syn</b>	<b>14- 133</b>	★	7.300	7.300	6.457	344.10	tI24	BiVO <sub>4</sub>
<b>Wakefieldite-(Ce)</b>	<b>29- 398</b>	i	7.338	7.338	6.552	352.80	tI24	(Ce,Pb)VO <sub>4</sub>
<b>Wakefieldite-(Ce), syn</b>	<b>12- 757</b>	i	7.399	7.399	6.496	355.62	tI24	CeVO <sub>4</sub>
<b>Wakefieldite-(Y), syn</b>	<b>17- 341</b>	i	7.119	7.119	6.290	318.79	tI24	YVO <sub>4</sub>