

**New minerals recently approved
by the
Commission on New Minerals and Mineral Names
International Mineralogical Association**

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Some time ago the Commission on New Minerals and Mineral Names decided that we could do a distinct service to the mineralogical community if we published very short descriptions of newly approved mineral species without, of course, their names. The purpose of this is to assist mineralogists who are working on new minerals which may be the same as those already approved, but as yet not published, species. The frequency of multiple proposals for the same species is increasing and it is hoped that this service will alert prospective proposers to the existence of these new species and thus save them some time and frustration in coming in second or third with the same mineral.

J.A. Mandarino, Chairman of C.N.M.M.N.

The information given here is provided by the Commission on New Minerals and Mineral Names, I. M. A. for comparative purposes.

Each mineral is described in the following format:

IMA No.

(any relationship to other minerals)

Chemical Formula

Crystal system, space group

unit cell parameters

Diaphaneity; lustre; colour.

Optical properties.

Strongest lines in the X-ray powder diffraction pattern.

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

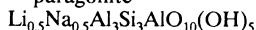
NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION.

THE FOLLOWING MINERALS WERE APPROVED DURING 1990

- IMA No. 90-002**
 $(\text{Ce,L a})\text{Al}_2\text{B}_3\text{O}_9$
 Hexagonal, $P6_2m$
 a 4.610, c 9.358 Å
 Transparent to translucent; vitreous; light yellow.
 Uniaxial (+), ω 1.703, ϵ 1.711
 3.67(100), 3.04(100), 2.458(75), 2.308(50), 2.020(50),
 1.953(50), 1.855(50), 1.835(50)
- IMA No. 90-004**
 the Mg-dominant analogue of allanite-(Ce)
 $\text{Ca}(\text{Ce,L a})\text{MgAl}_2\text{Si}_3\text{O}_{12}(\text{OH})$
 Monoclinic, $P2_1/m$
 a 8.916, b 5.700, c 10.140 Å, β 114.72°
 Transparent; vitreous; pale yellow brown in
 thin-section.
 Biaxial (+), α 1.735, β 1.741, γ 1.758, $2V(\text{meas.})$ 64°,
 $2V(\text{calc.})$ 62°.
 9.1(40), 3.50(50), 2.910(90), 2.842(50), 2.698(100),
 2.622(60), 2.177(40), 2.137(40).
- IMA No. 90-005**
 $\text{Ca}_2\text{Si}_6(\text{O,OH})_{18}\cdot 5\text{H}_2\text{O}$
 Monoclinic, Cc or $C2/c$
 a 11.331, b 7.353, c 22.67 Å, β 96.59°
 Transparent; vitreous; colourless to white.
 Biaxial (-), α 1.575, β 1.580, γ 1.585, $2V(\text{calc.})$ 89.8°.
 11.25(100), 3.745(36), 3.304(51), 3.068(45), 3.034(60),
 3.012(37), 2.811(41), 2.794(60).
- IMA No. 90-007**
 the Cu-dominant analogue of braunite and neltnerite
 $\text{Cu}^{2+}\text{Mn}_6^{3+}(\text{O}_8/\text{SiO}_4)$
 Tetragonal, $I4_1/acd$
 a 9.409, c 18.600 Å
 Opaque; metallic; black.
 In reflected light: grey, very weak anisotropism, weak
 bireflectance, nonpleochroic. R-values: (20.8,
 21.2%) 470nm, (19.6, 20.0%) 546nm, (19.2, 19.7%)
 589nm, (18.7, 19.2%) 650nm.
 2.703(100), 2.352(14), 2.135(16), 1.6516(30),
 1.4167(10), 1.4023(12).
- IMA No. 90-008**
 $\text{Ca}(\text{Na,K})_7(\text{Si}_6\text{Al}_6\text{O}_{24})(\text{S}^{2-})_{1.5}\cdot \text{H}_2\text{O}$
 Hexagonal (trigonal), $P31c$
 a 12.855, c 10.700 Å
 Transparent; vitreous; yellow.
 Uniaxial (-), ω 1.584, ϵ 1.660
 4.824(70), 3.919(80), 3.720(100), 3.313(90), 2.694(35),
 2.676(70), 2.471(35).
- IMA No. 90-009**
 $(\text{Na,Ca,K})_8(\text{Si}_6\text{Al}_6\text{O}_{24})(\text{SO}_4)_2\text{Cl}\cdot 0.5\text{H}_2\text{O}$
 Hexagonal, $P6_22$
 a 12.843, c 32.239 Å
 Transparent; vitreous; green to greenish-yellow.
 Uniaxial (+), ω 1.528, ϵ 1.543
 4.84(40), 3.711(100), 3.314(80), 3.035(20), 2.988(16),
 2.687(25), 2.470(16), 2.139(25).
- IMA No. 90-010**
 $\text{Fe}_{8-2x}[(\text{As}_{1-x}\text{S}_x)\text{O}_4]_6(\text{OH})_6\cdot 5\text{H}_2\text{O}$ x is about 0.2
 Orthorhombic, Pbcm
 a 6.412, b 19.45, c 8.941 Å
 Transparent to translucent; greasy; cadmium orange.
 Biaxial (-), α 1.94, β 2.05, γ 2.06, $2V(\text{meas.})$ 5°,
 $2V(\text{calc.})$ 32°.
 9.75(10), 4.476(4), 3.208(9), 3.047(5), 2.680(4),
 2.153(4), 1.604(4).
- IMA No. 90-011**
 $\text{HgAg}(\text{Cl,Br,I})\text{S}$
 Orthorhombic, $P2_12_12$
 a 6.803, b 12.87, c 4.528 Å
 Transparent to opaque; subadamantine to submetallic;
 black.
 Biaxial (probably -), $\alpha \sim 2.2$, $\gamma \sim 2.3$.
 6.43(40), 3.762(60), 3.637(60), 3.283(30), 2.664(100),
 2.265(40), 2.047(20).
- IMA No. 90-012**
 $\text{Na}_3\text{K}_2(\text{Si}_6\text{Al}_6\text{O}_{24})(\text{SO}_4)\cdot 2\text{H}_2\text{O}$
 Hexagonal, $P6_3$
 a 22.121, c 5.221 Å
 Transparent; vitreous; colourless.
 Uniaxial (-), ω 1508., ϵ 1506.
 6.39(S), 4.77(vS), 3.69(m), 3.27(vS), 2.769(m),
 2.650(m).
- IMA No. 90-013**
 $\text{Na}_3[\text{Al}_5\text{Si}_5\text{O}_{24}]\text{CO}_3\cdot 3\text{H}_2\text{O}$
 Hexagonal, $P6_3mc$
 a 12.575, c 5.105 Å
 Transparent; vitreous; dark- to light-lilac.
 Uniaxial (-), ω 1.509, ϵ 1.490
 6.30(70), 4.61(50), 3.65(90), 3.22(100), 2.722(50),
 2.597(20), 2.402(20), 2.097(20).
- IMA No. 90-014**
 $\text{Na}_3[\text{Al}_5\text{Si}_5\text{O}_{24}](\text{OH})_2\cdot 2\text{H}_2\text{O}$
 Hexagonal, $P6_3$
 a 12.74, c 5.183 Å
 Transparent; vitreous; light blue or colourless.
 Uniaxial (+), ω 1.494, ϵ 1.501
 6.43(25), 4.70(60), 3.68(70), 3.26(100), 2.756(50),
 2.433(30).
- IMA No. 90-015**
 $\text{Na}_3(\text{Y,REE})(\text{CO}_3)_3\cdot 3\text{H}_2\text{O}$
 Orthorhombic, space group unknown, lattice is
 primitive
 a 10.136, b 17.348, c 5.970 Å
 Transparent; vitreous to dull; colourless.
 Biaxial (+), α 1.528, β 1.529, γ 1.531, $2V(\text{meas.})$ 45°,
 $2V(\text{calc.})$ 71°.
 6.53(55), 5.05(50), 4.85(65), 2.858(70), 2.597(50),
 2.229(50), 2.076(100).
- IMA No. 90-016**
 an orthorhombic polymorph of natisite
 $\text{Na}_2\text{TiSiO}_5$
 Orthorhombic, Pmma
 a 9.827, b 9.167, c 4.799 Å
 Translucent; adamantine; yellow, orange-yellow,
 orange-brown.
 Biaxial (+), α 1.740, β 1.741, γ 1.765, $2V(\text{meas.})$ 20°,
 $2V(\text{calc.})$ 23°.
 2.748(100), 2.257(25), 1.720(30), 1.680(30), 1.475(33),
 1.443(35).

IMA No. 90-018

a regular 1:1 interstratification of cookeite and paragonite



Monoclinic, C2/m

a 5.158, b 8.914, c 23.83 Å, β 94.23°

Transparent; pearly; white.

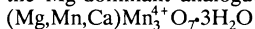
Biaxial (-), α 1.58 < 1.59, β 1.58 < 1.59,

γ 1.59 < 1.60, 2V(meas.) 30-50°.

11.89(70), 4.456(90), 4.325(90), 2.547(100), 2.476(70), 1.486(90).

IMA No. 90-019

the Mg-dominant analogue of chalcophanite



Triclinic, P1

a 7.534, b 7.525, c 8.204 Å, α 89.753°, β 117.375°,

γ 120.000°

Opaque; dull; coffee black.

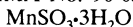
In reflected light: grey, clear anisotropism, weak

bireflectance, nonpleochroic. R-values:

(23.0%)470nm, (193.9%)546nm, (19.1%)589nm, (18.6%)650nm.

6.965(100), 5.539(3), 4.086(4), 3.522(3), 3.483(11), 2.230(8).

IMA No. 90-020



Orthorhombic, Pnma

a 9.762, b 5.639, c 9.558 Å

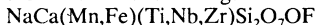
Transparent; vitreous; colourless.

Biaxial (+), α 1.590, β 1.596, γ 1.636, 2V(meas.) 41°, 2V(calc.) 43°.

6.83(S), 4.33(VS), 3.43(VS), 2.704(M), 2.666(M), 2.414(M), 1.726(M).

IMA No. 90-021

the Ti-dominant analogue of lavenite



Monoclinic, P2₁/a

a 10.828, b 9.790, c 7.054 Å, β 108.20°

Translucent to transparent; vitreous; orange-brown, yellow.

Biaxial (-), α 1.743, β 1.785, γ 1.810, 2V(meas.) 72-84°, 2V(calc.) 74°.

3.942(20), 3.234(30), 2.859(100), 2.807(70), 1.762(20), 1.741(20), 1.727(20), 1.688(20), 1.627(20).

IMA No. 90-023



Orthorhombic, Pnc2 or Pncm

a 8.025, b 17.43, c 6.935 Å

Translucent to transparent; vitreous; bright yellow.

Biaxial (-), α 1.618, β 1.738, γ 1.765, 2V(meas.) 43°, 2V(calc.) 48°.

8.01(100), 4.01(70), 3.468(60), 3.186(50), 3.119(70), 2.912(80), 2.471(40).

IMA No. 90-024

the Mn-dominant analogue of fenaksite



Triclinic, P1

a 6.993, b 8.219, c 10.007 Å, α 105.11°, β 100.76°,

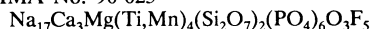
γ 114.79°

Transparent; vitreous; colourless to light pinkish-cream.

Biaxial (-), α 1.540, β 1.551, γ 1.557, 2V(meas.) 73°, 2V(calc.) 72°.

6.89(70), 3.45(100), 3.26(90), 3.05(80), 2.880(70), 2.715(70), 2.463(70).

IMA No. 90-025



Triclinic, P1

a 5.412, b 7.079, c 26.56 Å, α 95.21°, β 93.51°,

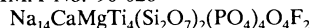
γ 90.10°

Translucent to transparent; vitreous to pearly; light brown.

Biaxial (-), α 1.600, β 1.658, γ 1.676, 2V(meas.) 56°, 2V(calc.) 57°.

2.937(10), 2.702(9), 2.659(8), 2.048(8B), 1.771(5B), 1.730(5).

IMA No. 90-026



Triclinic, P1

a 5.415, b 7.081, c 20.34 Å, α 86.85°, β 94.40°,

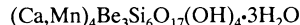
γ 89.94°

Translucent to transparent; vitreous to pearly; light brown.

Biaxial (-), α 1.630, β 1.678, γ 1.697, 2V(meas.) 62°, 2V(calc.) 63°.

2.880(10), 2.702(8B), 2.636(7), 2.050(5), 1.662(4B), 1.600(5).

IMA No. 90-027



Orthorhombic, space group unknown

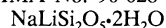
a 8.724, b 23.14, c 4.923 Å

Translucent; vitreous; white to pale grey or beige.

Biaxial, average index of refraction is 1.604.

11.64(93), 5.80(68), 3.87(76), 3.16(74), 2.889(75), 2.837(100), 2.494(58).

IMA No. 90-028



Monoclinic, A2/n

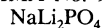
a 5.061, b 8.334, c 14.383 Å, β 96.67°

Transparent to opaque; vitreous to earthy; colourless to white.

Biaxial (+), α 1.515, β 1.516, γ 1.518, 2V(meas.) 64°, 2V(calc.) 71°.

7.14(100), 4.24(80), 4.14(100), 4.02(80), 2.847(100), 2.698(50), 1.610(40), 1.557(40).

IMA No. 90-030



Orthorhombic, Pmnb

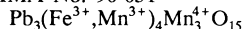
a 6.884, b 9.976, c 4.927 Å

Transparent to translucent; vitreous; colourless, white, very pale blue, very pale yellow.

Biaxial (-), α 1.533, β 1.540, γ 1.541, 2V(meas.) 49°, 2V(calc.) 41°.

4.020(100), 3.507(100), 3.441(100), 2.833(40), 2.712(40), 2.493(90), 2.462(90), 1.721(40).

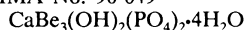
IMA No. 90-031



Hexagonal, P6₃/mcm

- a 10.037, c 13.67 Å
 Opaque; metallic; black.
 In reflected light: bright white, strong anisotropism, moderate bireflectance, nonpleochroic. R_O & R_E : (31.0,26.1%)470nm, (29.5,25.1%)546nm, (28.5,24.4%)589nm, (27.2,23.4 %)650nm.
 3.42(5), 3.18(8), 2.828(7), 2.663(10), 2.366(6), 1.687(8).
- IMA No. 90-032
 $Mg_3Ba(PO_4)_4 \cdot 8H_2O$
 Orthorhombic, Pmma, Pmc₂₁ or Pma2
 a 12.829, b 8.335, c 18.312 Å
 Transparent; vitreous with a silky sheen; yellow-brown to light pink.
 Biaxial (+), α 1.552, β 1.552, γ 1.558, 2V(meas.) 23°, 2V(calc.) 0°.
 10.51(100), 3.874(32), 3.520(34), 3.081(78), 3.054(41), 2.969(44), 2.839(34).
- IMA No. 90-033
 $Pb_4Cu_4Si_4O_{12}(HCO_3)_4ClH$
 Tetragonal, I4/m
 a 14.234, c 6.103 Å
 Transparent; vitreous; bright blue.
 Uniaxial (+), ω 1.786, ϵ 1.800
 10.2(10), 5.644(7), 4.495(10), 3.333(10), 3.013(9), 2.611(5).
- IMA No. 90-036
 $Cu_4Al_2[HSbO_4]_2SO_4(OH)_{10}(CO_3)_2 \cdot 2H_2O$
 Monoclinic, P2₁
 a 10.765, b 2.903, c 12.527 Å, β 95.61°
 Transparent; silky; green-blue.
 Biaxial (+), α 1.626, β 1.646, γ 1.682, 2V(meas.) 77°, 2V(calc.) 75°.
 5.62(50), 5.160(90), 4.276(100), 3.565(40), 2.380(35), 2.326(35).
- IMA No. 90-037
 $Cu_4(UO_2)(MoO_4)_2(OH)_6$
 Monoclinic, A121, A1m1 or A12/m1
 a 5.529, b 6.112, c 19.83 Å, β 103.9°
 Transparent; vitreous to greasy; dark green to black.
 Biaxial (-), α 1.90, β 1.93, γ 1.96, 2V(meas.) 90°, 2V(calc.) 89°.
 4.815(80), 4.425(40), 4.276(40), 4.100(100), 3.734(90), 3.254(40), 2.628(40), 2.482(60).
- IMA No. 90-040
 $Ca_3Cu_5Si_9O_{26}$
 Monoclinic, C2/c
 a 10.160, b 10.001, c 19.973 Å, β 91.56°
 Transparent; vitreous; greenish blue.
 Biaxial (+), α 1.722, β 1.723, γ 1.734, 2V(meas.) 73°, 2V(calc.) 34°.
 7.13(60), 6.70(70), 3.12(90), 3.00(100), 2.45(60), 2.41(70).
- IMA No. 90-041
 $Ca_3(SO_3)_2SO_4 \cdot 12H_2O$
 Hexagonal, R3m
 a 11.350, c 28.321 Å
 Transparent; vitreous; colourless.
 Uniaxial (+), ω 1.4941, ϵ 1.4960
 8.11(80), 5.73(100), 3.63(60), 3.28(40), 2.69(80), 2.11(40).
- IMA No. 90-042
 $Mn(Mg,Mn)_2Zn_2(OH)_{10} \cdot 4H_2O$
 Monoclinic, C2/m
 a 15.47, b 6.369, c 5.576 Å, β 101.29°
 Mostly opaque but also translucent; vitreous to dull to earthy; dark brown.
 In reflected light: gray, weak anisotropism, very weak bireflectance, nonpleochroic. R(min., max.): (8.54,8.65%)470nm, (8.07,8.23%)546nm, (8.00,8.19%)589nm, (7.89,8.18%)650nm.
 7.61(10), 3.96(5), 3.45(3), 2.997(4), 2.745(6), 2.673(3).
- IMA No. 90-043
 the monoclinic dimorph of mimetite
 $Pb_5(AsO_4)_3Cl$
 Monoclinic, P2₁/b
 a 10.189, b 20.372, c 7.46 Å, β 119.88°
 Translucent; resinous; yellowish-white.
 Biaxial (-), α , β and $\gamma > 1.8$, 2V(meas.) 8°.
 3.342(50), 3.048(100), 3.008(70), 2.947(70), 2.106(60), 1.961(50), 1.903(50).
- IMA No. 90-044
 $NaVO_3$
 Orthorhombic, Pnma
 a 14.134, b 3.648, c 5.357 Å
 Transparent; silky; colourless.
 Biaxial (+), α 1.780, β 1.800, $\gamma > 1.85$, 2V(meas.) 30-40°.
 7.07(11), 5.05(100), 3.530(25), 3.241(18), 3.016(13), 2.957(35), 2.685(12).
- IMA No. 90-045
 $Bi_2Cu_3(OH)_2O_2(PO_4)_2 \cdot 2H_2O$
 Monoclinic, C2/m
 a 12.358, b 6.331, c 9.060 Å, β 122.70°
 Translucent; vitreous; sky blue to dark azure blue.
 Biaxial (-), β 1.89, 2V(meas.) 68°.
 7.623(8), 6.093(6), 5.405(6), 5.201(7), 3.039(10), 2.921(9), 2.197(6).
- IMA No. 90-047
 Pt_5Se_4
 Monoclinic, P2₁/c
 a 6.61, b 4.60, c 11.10 Å, β 101.4°
 Opaque; metallic; dark bronze to black.
 In reflected light: white with a brownish hue, very strong anisotropism, very strong bireflectance, weak pleochroism. R (max. & min.): (54.8,35.2%)470nm, (58.6,38.6%)546nm, (60.8,40.2%)589nm, (63.2,42.4%)650nm.
 5.45(60), 3.27(60), 2.93(80), 2.78(60), 2.648(60B), 2.465(60), 1.875(100B), 1.812(70).
- IMA No. 90-048
 $PdBiSe$
 Cubic, P4₃2 or P4₃2
 a 6.448 Å
 Opaque; metallic; light yellow.
 In reflected light: pinkish-yellow, no anisotropism, no bireflectance, nonpleochroic. R: (47.5%)470nm, (48.3%)546nm, (46.8%)589nm, (45.6%)650nm.
 2.89(10), 2.63(9), 1.943(9), 1.724(5), 1.376(4).

IMA No. 90-049



Monoclinic, Cc

a 11.897, b 9.707, c 9.633 Å, β 95.76°

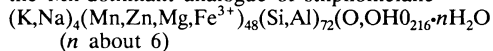
Translucent; vitreous; colourless.

Biaxial (+), α 1.5203, β 1.5205, γ 1.5300, 2V(meas.) < 10°, 2V(calc.) 17°.

5.92(60), 4.33(50), 3.421(70), 2.959(60), 2.945(45), 2.5130(100).

IMA No. 90-050

the Mn-dominant analogue of stilpnomelane

Triclinic, P1 or P $\bar{1}$

a 5.521, b 9.560, c 36.57 Å (orthohexagonal cell)

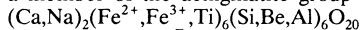
Transparent to translucent; vitreous; dark brown.

Biaxial (-), α 1.545, β 1.583, γ 1.583, 2V(meas.) 10°, 2V(calc.) 0°.

12.3(100), 2.737(30), 2.583(40), 2.362(30), 1.594(30), 1.580(30).

IMA No. 90-051

a member of the aenigmatite group

Triclinic, P1 or P $\bar{1}$ a 10.385, b 10.751, c 8.959 Å, α 104.76°, β 97.03°, γ 125.47°

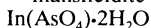
Opaque to subtranslucent; vitreous; black.

Biaxial (-?), α 1.78, γ 1.82, 2V(meas.) large.

8.029(90), 3.122(46), 2.9243(59), 2.6756(48), 2.5291(100), 2.0993(63), 2.0758(47).

IMA No. 90-052

the indium-dominant analogue of scorodite and mansfieldite



Orthorhombic, Pcab

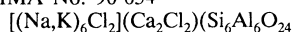
a 10.45, b 10.32, c 9.09 Å

Transparent; vitreous; pale green to yellowish-green.

Biaxial (-), mean n about 1.65, 2V(meas.) 55-76°.

5.719(70), 4.537(100), 4.162(40), 3.2461(80), 3.1073(80), 2.6568(50), 2.5426(45).

IMA No. 90-054

Hexagonal, P6 $_3$ or P6 $_3$ /m

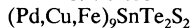
a 25.771, c 5.371 Å

Transparent; vitreous; colourless.

Uniaxial (+), ω 1.529, ϵ 1.532

4.85(S), 3.71(vS), 3.31(vS), 2.788(S), 2.677(m), 2.474(m), 2.147(m), 1.804(m), 1.380(m).

IMA No. 90-055



Tetragonal, space group unknown

a 9.044, c 4.937 Å

Opaque; metallic; megascopic colour unknown.

In reflected light: yellowish-rose, strong anisotropism,

distinct to strong birefractance, pronounced

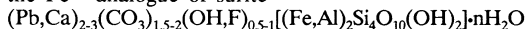
pleochroism. R_{min} , R_{max} : (33.7, 41.6%)470nm,

(38.5, 48.7%)546nm, (40.4, 51.8%)589nm,

(42.0, 54.9%)650nm.

2.472(10), 2.260(9), 2.022(6), 1.361(4), 1.213(5), 1.205(5), 1.129(5).

IMA No. 90-056

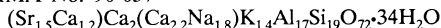
the Fe³⁺-analogue of suriteMonoclinic, P2 $_1$ or P2 $_1$ /ma 5.241, b 9.076, c 16.23 Å, β 90.03°

Transparent; silky; light yellow green to dark forest green.

Biaxial (+), α 1.757, β 1.763, γ 1.773, 2V(calc.) 76°.

16.1(40), 4.53(100), 3.727(35), 3.240(90), 2.612(80), 2.272(50).

IMA No. 90-057

Hexagonal, P6 $_3$ /mmc

a 13.244, c 15.988 Å

Transparent; vitreous; colourless.

Uniaxial (-), ω 1.522, ϵ 1.507

6.58(80), 3.80(100), 2.95(70), 2.70(50), 2.50(50), 2.21(70), 1.83(50).

**New minerals recently approved
by the
Commission on New Minerals and Mineral Names
International Mineralogical Association**

JOSEPH A. MANDARINO

Department of Mineralogy, Royal Ontario Museum, 100 Queen's Park,
Toronto, Ontario, Canada M5S 2C6

Some time ago the Commission on New Minerals and Mineral Names decided that we could do a distinct service to the mineralogical community if we published very short descriptions of newly approved mineral species without, of course, their names. The purpose of this is to assist mineralogists who are working on new minerals which may be the same as these already approved, but as yet not published, species. The frequency of multiple proposals for the same species is increasing and it is hoped that this service will alert prospective proposers to the existence of these new species and thus save them some time and frustration in coming in second or third with the same mineral.

J.A. Mandarino, Chairman of C.N.M.M.N.

The information given here is provided by the Commission on New Minerals and Mineral Names, I. M. A. for comparative purposes.

Each mineral is described in the following format:

IMA No. (any relationship to other minerals)

Chemical Formula.

Crystal system, space group
unit cell parameters.

Colour; lustre; diaphaneity.

Optical properties.

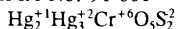
Strongest lines in the X-ray powder diffraction pattern.

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION.

1991 PROPOSALS

IMA No. 91-001

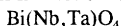
Triclinic: $\bar{1}$ a 8.116, b 9.501, c 6.891 Å, α 100.43°, β 110.24°, γ 82.80°

Orange-red; adamantine; transparent.

Biaxial (sign unknown), all indices of refraction are greater than 2.

5.72 (90), 3.373 (60), 3.008 (100), 2.864 (50b), 2.774 (50), 2.536 (50), 2.486 (50), 2.425 (60).

IMA No. 91-003 The niobium analogue of bismutotantalite.

Orthorhombic: $\text{Pc}mn$

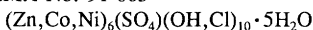
a 4.992, b 5.677, c 11.731 Å

Black; semi-metallic; transparent in small (<0.03 mm) fragments.

Biaxial (+), α 2.38, β 2.42, γ 2.47, $2V(\text{calc.})$ 85°.

3.164 (100), 2.934 (90), 2.842 (45), 2.495 (45), 1.769 (45), 1.734 (80).

IMA No. 91-005

Hexagonal: $\text{P}6_3$, $\text{P}6_3/m$ or $\text{P}6_322$

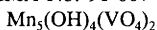
a 8.344, c 21.59 Å

Bright to deep pink; vitreous to pearly; transparent.

Uniaxial (-), ω 1.584, ϵ 1.544

10.8 (100), 3.300 (90), 2.725 (60), 2.563 (50), 2.351 (40), 1.575 (30).

IMA No. 91-007

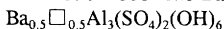
Monoclinic: $\text{C}2/m$ a 9.604, b 9.558, c 5.393 Å, β 98.45°

Orange-red; vitreous; transparent.

Biaxial (-), α' 1.803, γ' 1.810, $2V(\text{meas.})$ large.

4.76 (S), 3.00(M), 2.680 (VS), 2.656 (M), 2.155 (M), 1.565 (M), 1.510 (M).

IMA No. 91-008 The Ba-dominant end-member of the alunite group.

Hexagonal: $\bar{3}m$

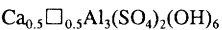
a 6.992, c 17.22 Å

White to light yellowish; vitreous; transparent.

Uniaxial (+), ω 1.588, ϵ 1.604.

5.73 (50), 3.49 (55), 2.98 (100), 2.283 (80), 1.909 (70), 1.747 (60).

IMA No. 91-009 The Ca-dominant end-member of the alunite group.

Hexagonal: $\bar{3}m$

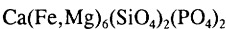
a 6.983, c 16.759 Å

White to light yellowish; vitreous; transparent.

Uniaxial (+), indices of refraction unknown.

4.91 (69), 2.97 (100), 2.231 (51), 1.899 (43), 1.745 (37), 1.375 (40).

IMA No. 91-010

Hexagonal: $\bar{3}m$

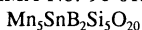
a 6.240, c 26.784 Å

Yellow-brown; vitreous; transparent.

Uniaxial (-), ω 1.770, ϵ 1.759.

5.00 (60), 3.119 (100), 2.689 (80), 2.558 (100), 2.505 (80), 1.560 (80).

IMA No. 91-012



Monoclinic: P2/m

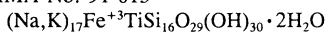
a 28.77, b 7.01, c 13.72(2) Å, β 96.6(2)°.

Orange-yellow; vitreous; transparent.

Biaxial (-), α 1.696, β 1.711, γ 1.715, 2V(meas.) 57°, 2V(calc.) 54°.

3.41 (8), 3.22 (8), 2.83 (10), 2.81 (10), 2.24 (7), 1.750 (6).

IMA No. 91-013

Orthorhombic: Cmc₂, Cmc₂ or C2cm

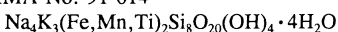
a 29.77, b 11.03, c 17.111(5) Å

Colourless (white or grey in aggregates); vitreous; transparent.

Biaxial (-), α 1.532, β 1.548, γ 1.559(2), 2V(meas.) 79°, 2V(calc.) 79°.

10.38 (100), 4.516 (75), 3.220 (65), 3.097 (80), 2.972 (65), 2.773 (90).

IMA No. 91-014

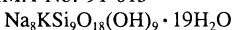
Triclinic: P $\bar{1}$ a 10.244, b 11.924, c 5.276 Å, α 103.491°, β 96.960°, γ 91.945°.

Olive-green with brownish or yellowish shades; vitreous; transparent.

Biaxial (+), α 1.569, β 1.574, γ 1.590, 2V(meas.) 58°, 2V(calc.) 59°.

11.57 (100), 3.386 (19), 3.006 (21), 2.992 (28), 2.716 (22), 2.598 (26).

IMA No. 91-015

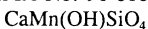
Monoclinic: P2₁/ca 24.91, b 11.94, c 14.92 Å, β 94.47(9)°.

Colourless; vitreous; transparent.

Biaxial (-), α 1.460, β 1.478, γ 1.481, 2V(meas.) 43°, 2V(calc.) 44°.

4.26 (60), 3.08 (100), 2.938 (70B), 2.649 (60B), 2.400 (35), 2.289 (35).

IMA No. 91-016 A member of the adelite-descloizite group.

Orthorhombic: P2₁2₁

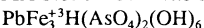
a 5.838, b 7.224, c 8.690(1) Å

Deep red; vitreous; transparent.

Biaxial (+), α 1.840, β (calc.) 1.854, γ 1.920, 2V(meas.) 50°.

5.558 (S), 3.070 (S), 2.687 (S), 2.584 (VS), 1.565 (M).

IMA No. 91-017 The ferric-analogue of philipsbornite.



Hexagonal: R3m

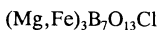
a 7.359, c 17.113(8) Å

Greenish-yellow; vitreous to adamantine; translucent to transparent.

Uniaxial (-), ω 1.975, ϵ 1.955.

5.966 (50), 3.678 (40), 3.092 (100), 2.283 (30), 1.992 (30), 1.840 (25).

IMA No. 91-018 The Mg-dominant analogue of congolite and the rhombohedral dimorph of boracite.



Hexagonal: R3c

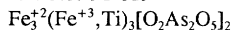
a 8.574, c 20.99 Å

Colourless; vitreous; transparent.

Uniaxial (-), ω 1.684, ϵ 1.668.

3.497 (34), 3.028 (100), 2.711 (66), 2.144 (37), 2.050 (73), 1.828 (25).

IMA No. 91-019

Monoclinic: $P2_1/m$ a 10.625, b 3.264, c 8.990 Å, β 109.15°.

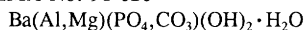
Dark brown to black; submetallic to metallic; opaque (translucent in thin fragments).

In reflected light: creamy white (in oil, white with a weak brown tint); no internal reflections; anisotropy visible along grain boundaries (in oil, clearly visible); bireflectance not visible (in oil, very weak along grain boundaries); nonpleochroic.

R-values: (15.5-15.9 %)470nm, (15.0-15.5 %)546nm, (14.8-15.0 %)589nm, (14.2-14.5 %)650nm.

2.985 (67), 2.811 (94), 2.749 (100), 2.391 (85), 1.779 (48), 1.709 (35).

IMA No. 91-020

Orthorhombic: $Pnna$ or $Pnmm$

a 8.939, b 5.669, c 11.073(3) Å

Pale blue; silky; translucent.

Biaxial (-), α 1.616, β 1.629, γ 1.640, 2V(meas.) 70°-90°, 2V(calc.) 85°.

5.54 (79), 3.479 (82), 3.345 (59), 2.768 (100), 2.543 (61), 2.072 (41).

IMA No. 91-021 A polymorph of mundrabillaite.



Orthorhombic: space group unknown

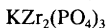
a 20.959, b 7.403, c 6.478(5) Å

White; vitreous; transparent.

Biaxial (-), α 1.506, β 1.510, γ 1.512, 2V(meas.) 65°, 2V(calc.) 70°.

10.5 (57), 6.99 (100), 4.739 (36), 3.705 (89), 3.651 (39), 3.177 (55).

IMA No. 91-022

Hexagonal: $R\bar{3}c$

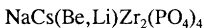
a 8.687, c 23.877(7) Å

Pale blue to blue-green to nearly colourless; vitreous; transparent.

Uniaxial (+), ω 1.656, ϵ 1.682.

6.41 (50), 4.679 (50), 4.329 (100), 3.806 (90), 2.928 (90), 2.502 (50).

IMA No. 91-023 The Cs-analogue of gainesite

Tetragonal: $I4_1/amd$

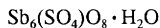
a 6.573, c 17.28 Å

White to colourless; vitreous; translucent to transparent.

Uniaxial (+), ω 1.634, ϵ 1.645.

6.159 (90), 4.326 (80), 4.099 (40), 3.281 (80), 3.060 (100), 2.896 (30), 1.849 (30).

IMA No. 91-024

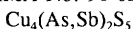
Triclinic: $P1$ a 11.434, b 29.77, c 11.314(4) Å, α 91.07°, β 119.24°, γ 92.82°.

Colourless to white; adamantine; transparent to translucent.

Biaxial (+), mean n 2.08, birefringence low, 2V(meas.) >> 60°.

14.835 (50), 9.270 (41), 6.810 (67), 3.304 (93), 3.200 (39), 3.092 (100).

IMA No. 91-025



Orthorhombic: space group unknown

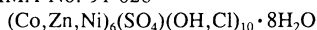
a 14.51, b 13.30, c 17.96(1) Å

Silvery lead grey; metallic; opaque.

In reflected light: grey, weak anisotropism, weak bireflectance, nonpleochroic. R_{\min} .& R_{\max} : (31.5, 32.5 %)470nm, (31.1, 32.0 %)546nm, (30.3, 31.15 %)589nm, (27.2, 23.4 %)650nm.

3.36(7), 2.999(100), 2.594(20), 2.238(6), 1.833(40), 1.564(15b).

IMA No. 91-026



Hexagonal: space group unknown

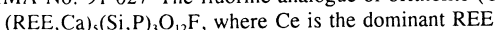
a 8.363, c 26.18(7) Å

Pink to light pink; pearly; transparent.

Uniaxial (-), ω 1.568, ϵ 1.542.

13.1 (100), 3.523 (30), 2.985 (30), 2.681 (40), 2.527 (90).

IMA No. 91-027 The fluorine-analogue of britholite-(Ce) of the apatite group.

Hexagonal: $\text{P6}_3/\text{m}$

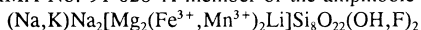
a 9.517, c 6.983(4) Å

Tan, reddish-brown; adamantine; opaque to translucent.

Uniaxial (-), ω 1.792, ϵ 1.786.

2.845 (100), 2.822 (40), 2.747 (30), 1.970 (30), 1.870 (40).

IMA No. 91-028 A member of the amphibole group.

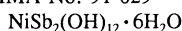
Monoclinic: $\text{C2}/\text{m}$ a 9.808, b 17.850, c 5.289(1) Å, β 104.22(2)°.

Dark red; vitreous; translucent.

Biaxial (+), α 1.667, β 1.675, γ 1.691, 2V(meas.) 59-71°, 2V(calc.) 71°.

8.399 (56), 3.383 (18), 3.254 (20), 3.122 (100), 2.798 (48), 2.696 (15).

IMA No. 91-029

Hexagonal: $\text{P}\bar{3}1\text{m}$, P31m or P312

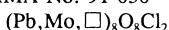
a 16.016, c 9.789(2) Å

Light-blue; vitreous; transparent.

Uniaxial (+), ω 1.600, ϵ 1.605.

4.6195 (100), 3.3537 (100), 2.3431 (80), 2.0909 (60), 1.8050 (70), 1.7496 (60).

IMA No. 91-030

Tetragonal: $\text{I4}/\text{mmm}$, $\text{I}\bar{4}2\text{m}$, $\text{I}\bar{4}\text{m}2$, $\text{I}\bar{4}\text{mm}$ or $\text{I}\bar{4}22$

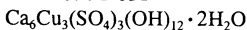
a 3.9922, c 22.514(2) Å

Carmine; adamantine; translucent.

In reflected light: grey, weak to moderate anisotropy, moderate birefractance, weak pleochroism, internal reflections abundant, R_1 & R_2 (19.6, 22.0 %)470nm, (18.0, 20.5 %)546nm, (17.4, 19.6 %)589nm, (16.95, 18.8 %)650nm.

3.507 (32), 2.983 (100), 2.816 (78), 1.989 (75), 1.658 (51), 1.586 (33).

IMA No. 91-031

Monoclinic: $\text{P2}_1/\text{c}$ (pseudo $\text{C2}/\text{c}$)a 15.122, b 14.358, c 22.063 Å, β 108.68°.

Dark blue; vitreous; transparent.

Biaxial (-), α 1.590, β 1.610, γ 1.619, 2V(meas.) 65°, 2V(calc.) 67°.

3.393 (100), 3.368 (55), 3.200 (53), 3.188 (65), 3.120 (85), 3.098 (57).

IMA No. 91-032

Orthorhombic Immm (pseudocubic)

a 7.544, b 7.558, c 7.560(4) Å

Dark bottle green; vitreous to adamantine; transparent.

Biaxial (-), the indices of refraction are between 1.92 and 1.94.

3.774 (100), 2.671 (35), 2.395 (30), 1.904 (15), 1.697 (60), 1.548 (40).

IMA No. 91-033

Au₂Pb

Cubic: Fd3m

a 7.933(5) Å

Colour unknown because of the small grain size; metallic; opaque.

In reflected light: silvery grey, dark grey when highly oxidized; no anisotropy, bireflectance, pleochroism or internal reflections; R (56.0%)470nm, (59.5%)546nm, (60.0%)589nm, (62.0%)650nm.

4.595 (21), 2.810 (30), 2.391 (100), 2.301 (25), 1.526 (23), 1.196 (26).

IMA No. 91-034

Ca(UO₂)₃(CO₃)₄·3H₂OOrthorhombic: Pmnm, Pmn2₁ or P2₁nm

a 15.337, b 17.051, c 6.931 Å

Canary yellow; vitreous; transparent.

Biaxial (-), α 1.603(calc.), β 1.690, γ 1.710, 2V(meas.) 49°.

8.55 (100), 6.94 (50), 4.11 (60), 3.723 (60), 3.460 (50), 2.772 (70).

IMA No. 91-037

[Ag₅(Pb,Fe)Bi₇]₁₃(Sb,Bi)₂S₁₇

Monoclinic: C2/m or Cm

a 13.515, b 4.098, c 26.000 Å, β 93.00°.

Grey; metallic; opaque.

In reflected light: white, distinct anisotropy, very weak bireflectance, no pleochroism, no internal reflections, R_{max} & R_{min}. (42.2, 39.7 %)470nm, (41.4, 38.8 %)546nm, (40.8, 37.9 %)589nm, (39.8, 36.9 %)650nm.

3.49 (8), 3.37 (9), 3.24 (9), 2.82 (10), 2.01 (7), 1.992 (8), 1.967 (6).

IMA No. 91-038

Pb₂(Mn,Fe,Mg)₃Fe₄²⁺O₂₆Hexagonal: P6₃/mmc, P6₃mc or P6̄2c

a 5.951, c 33.358 Å

Black; submetallic; opaque.

In reflected light: grey with pale brownish tint, moderate anisotropy, weak bireflectance, no pleochroism, no internal reflections, R_O & R_E. (23.6, 22.3%) 470nm, (22.8, 21.9%) 546nm, (22.2, 21.5%)589nm, (21.3, 21.0%)650nm.

4.168 (55), 3.011 (60), 2.9750 (70), 2.8017 (95), 2.6236 (100), 2.6125 (90).

IMA No. 91-042

N(CH₃)₄[Si₂(Si_{0.5}Al_{0.5})O₆]₂

Orthorhombic: I222

a 8.984, b 8.937, c 8.927 Å

White, colourless, light yellow; vitreous; transparent.

Biaxial (-), α 1.529, β(calc.) 1.530, γ 1.531, 2V(meas.) 76°.

6.33 (8), 4.46 (8), 3.66 (10), 2.60 (8), 1.760 (8), 1.351 (8).

IMA No. 91-043 The Sb-dominant member of the colusite group.

Cu₂₆V₂(Sb,Sn,As)₆S₃₂

Cubic: P4̄3n

a 10.705 Å

Colour not observed because of the small size; metallic; opaque.

In reflected light: grey with a light-brown tint; no anisotropy, bireflectance, pleochroism or internal reflections; R (25.2 %) 470nm, (28.3 %) 546nm, (29.9 %) 589nm, (31.0 %) 650nm.

3.10 (10), 1.892 (9), 1.614 (7), 1.226 (4), 1.094 (6), 1.030 (4).

IMA No. 91-044 The Ge-dominant member of the colusite group.

Cu₂₆V₂(Ge,As)₆S₃₂

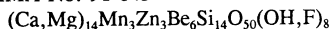
Cubic: P4̄3n

a 10.568 Å

Grey-black; metallic; opaque.

In reflected light: greenish-yellow, olive-yellowish-cream; no internal reflections, anisotropy, bireflectance or pleochroism; R (23.8%) 470nm, (27.3%) 546nm, (27.9%)589nm, (27.9%)650nm.
3.05 (10), 2.64 (4), 1.870 (5), 1.595 (3), 1.320 (3), 1.212 (3), 1.079 (3), 1.017 (5).

IMA No. 91-045

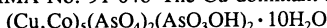
Monoclinic: P2₁/c

a 9.08, b 18.03, c 14.59(4) Å, β 104.8°.

Colourless; vitreous; transparent.

Biaxial (-), α 1.674, β 1.680, γ 1.681, 2V(meas.) 29.0°, 2V(calc.) 44°. 2.863 (100), 2.771 (40), 2.653 (50), 2.388 (50), 2.272 (30), 1.832 (30).

IMA No. 91-046 The Cu-dominant analogue of geigerite and chudobaite.



Triclinic: P1 or P1̄

a 8.033, b 10.374, c 6.446(5) Å, α 79.62°, β 84.95°, γ 86.21°.

Green; vitreous; transparent.

Biaxial (+), α 1.634, β 1.662, γ 1.720, 2V(meas.) 75°, 2V(calc.) 72°. 10.2 (100), 8.01 (60), 4.001 (50), 3.667 (60), 3.151 (50), 3.063 (50).

IMA No. 91-047



Orthorhombic: Pnma

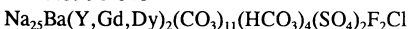
a 8.894, b 10.855, c 9.079 Å.

Dark red; adamantine to submetallic; opaque to translucent.

In reflected light: red, red internal reflections, strong anisotropy, strong bireflectance, no pleochroism. R_{max} and R_{min} are: (4.78, 3.93 %) 481nm, (4.64, 3.86 %) 547nm, (8.64, 7.81 %) 591nm, (13.72, 11.78 %) 644nm.

4.14 (M), 3.99 (S), 3.80 (M), 3.47 (MSb), 3.35 (M), 2.813 (VS), 2.537 (M), 2.264 (MSb).

IMA No. 91-048

Hexagonal: P6₃/m

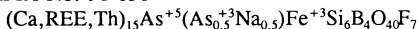
a 8.811, c 37.03(3) Å

Light green to yellowish-green; vitreous; transparent.

Uniaxial (-), ω 1.536, ε 1.510.

4.79 (42), 3.32 (40), 2.829 (100), 2.659 (51b), 2.531 (71b), 2.270 (90).

IMA No. 91-050



Hexagonal: R3m

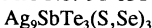
a 10.795, c 27.336(4) Å

Yellowish-green; vitreous; transparent.

Uniaxial (-), ω 1.757, ε 1.722.

2.993 (S), 2.950 (S), 1.839 (MS), 1.802 (MS), 1.686 (MS), 1.572 (MS).

IMA No. 91-051



Monoclinic: P2, P2/m or Pm

a 8.900, b 8.302, c 19.49 Å, β 82.98°.

Colour unknown because of the small grain size; metallic; opaque.

In reflected light: grey with faint green-blue hue, anisotropy present with brownish-grey tone, weak bireflectance, no pleochroism, no internal reflections, R_{max} and R_{min}.

(38.0,34.2%)470nm, (36.6,32.2%)546nm, (35.7,31.8%)589nm, (34.0,30.2%)650nm. 3.82 (6), 2.89 (4), 2.83 (4), 2.22 (10), 2.14 (3), 2.13 (4).

IMA No. 91-052 The Sb-analogue of skutterudite.

CoSb₃

Cubic: Im $\bar{3}$

a 9.0411 Å

Tin-white; metallic; opaque.

In reflected light: tin-white, isotropic, no bireflectance, nonpleochroic, no internal reflections, R (59.0 %)470nm, (58.7 %)546nm, (58.7 %)589nm, (58.7 %)650nm. 2.85 (100), 2.01 (80), 1.92 (80), 1.84 (80), 1.50 (80), 1.185 (80), 1.147 (80), 0.780 (100).

IMA No. 91-053

Zn₁₂(CO₃)₃(SO₄)(OH)₁₆

Orthorhombic: P22₁2

a 15.724, b 6.256, c 5.427(5) Å

White; vitreous; translucent.

Biaxial (probably +), α 1.635(3), β 1.650(3), γ could not be measured, 2V about 60°. 15.44 (100), 7.88 (100), 5.25 (20), 2.714 (40), 2.577 (20), 2.397 (20), 1.565 (30b).

IMA No. 91-054

Na₂₆Ce₆(SiO₃)₆(PO₄)₆(CO₃)₆(SO₂)O

Hexagonal: R $\bar{3}$

a 16.025, c 19.773 Å

Colourless to pale brown; vitreous; transparent.

Uniaxial (-), ω 1.589, ϵ 1.586.

8.076 (80), 6.544 (90), 4.659 (75), 3.776 (90), 3.159 (85), 2.683 (100).

IMA No. 91-055 A member of the epidote group, related to dollaseite-(Ce).

(Ca,REE)REE(Mg,Fe)MnAlSi₃O₁₁(OH)(F,O)

Monoclinic: P2₁/m

a 8.903, b 5.748, c 10.107 Å, β 113.41°.

Dark greyish-brown; vitreous; transparent.

Biaxial (-), α 1.773, β 1.790, γ 1.803, 2V(meas.) 83°, 2V(calc.) 82°.

9.32 (2), 5.23 (2), 4.67 (2), 3.52 (4), 2.91 (10), 2.73 (7), 2.63 (8), 1.437 (2).

**NEW MINERALS RECENTLY APPROVED
BY THE
COMMISSION ON NEW MINERALS AND MINERAL NAMES
INTERNATIONAL MINERALOGICAL ASSOCIATION**

The information given here is provided by the Commission on New Minerals and Mineral Names, I. M. A. for comparative purposes and as a service to mineralogists working on new species.

Each mineral is described in the following format:

- IMA No. (any relationship to other minerals)
Chemical Formula
Crystal system, space group
unit cell parameters
Colour; lustre; diaphaneity.
Optical properties.
Strongest lines in the X-ray powder diffraction pattern.

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION.

J. A. Mandarino, Chairman
Commission on New Minerals and Mineral Names
International Mineralogical Association

1992 PROPOSALS

- IMA No. 92-001
 $\text{FeZr}(\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$
Monoclinic: P2/c
a 9.12 b 5.42 c 19.17 Å β 94.8°
Pale yellowish white; vitreous to dull; transparent.
Biaxial (+), α 1.644, β 1.652, γ 1.652, 2V(meas.) 0°, 2V(calc.) 0°.
9.58 (75), 4.572 (65), 4.382 (80), 4.092 (60), 3.160 (100), 2.640 (70).
- IMA No. 92-002
 $\text{Bi}_2\text{O}(\text{OH})_2\text{SO}_4$
Monoclinic: P2/c
a 7.700 b 13.839 c 5.686 Å β 109.11°
Colourless; adamantine; transparent.
Biaxial, indices of refraction calculated from reflectance data at 589nm: R_1 1.91, R_2 1.99.
3.644 (60), 3.466 (60), 3.206 (100), 2.924 (70), 2.782 (50), 1.984 (90).
- IMA No. 92-003 The selenium analogue of stibnite.
 Sb_2Se_3
Orthorhombic: Pbnm
a 11.593 b 11.747 c 3.984 Å
Black; metallic; opaque.
In reflected light: white, distinct anisotropism, distinct bireflectance, pleochroic white to greyish white. R_{max} & R_{min} : (42.62, 40.55 %)/470nm, (41.95, 39.02 %)/546nm, (41.23, 39.42 %)/589nm, (44.39, 41.56 %)/650nm.
3.70 (70), 3.17 (50), 2.870 (100), 2.625 (60), 1.930 (30), 1.764 (35).
- IMA No. 92-005
 $\text{Mg}[\text{UO}_2(\text{AsO}_4)_2(\text{AsO}_4)_{1-x}\text{H}_2\text{O}]_x$ x about %
Monoclinic: C2/m
a 18.194 b 7.071 c 6.670 Å β 99.70°
Bright yellow to straw yellow; vitreous; transparent.
Biaxial (-), α 1.610, β 1.730, γ 1.740, 2V(meas.) 34°, 2V(calc.) 30°.
9.02 (100), 4.90 (40), 4.48 (80), 4.00 (40), 3.53 (40), 3.28 (50), 3.01 (60), 2.849 (60).
- IMA No. 92-006 The nickel-analogue of hydromagnesite.
 $\text{Ni}_2(\text{CO}_3)_2(\text{OH})_2 \cdot 4\text{H}_2\text{O}$
Monoclinic: P2/c
a 10.06 b 8.75 c 8.32 Å β 114.3°
Bluish-green; silky; transparent.
Biaxial (sign unknown), α' 1.630, γ' 1.640, 2V unknown.
6.30 (5), 5.75 (10), 4.36 (4), 4.14 (3), 2.871 (4b), 2.458 (2b), 2.120 (3).
- IMA No. 92-008
 $\text{NaH}(\text{CO}_3)\text{H}_3(\text{BO}_3) \cdot 2\text{H}_2\text{O}$
Monoclinic: C2
a 16.119 b 6.928 c 6.730 Å β 100.46°
Colourless; vitreous; transparent.
Biaxial (-), α 1.351 (calc.), β 1.459, γ 1.486, 2V(meas.) 50°.
6.36 (25), 4.203 (6), 3.464 (100), 3.173 (59), 2.608 (5), 1.731 (19).
- IMA No. 92-010 A triclinic polymorph of 92-011.
 $\text{Ca}_2\text{B}_2\text{O}_7(\text{OH})_{2x}\text{Cl}_4 \cdot 13\text{H}_2\text{O}$
Triclinic: P1
a 12.759 b 13.060 c 9.733 Å α 102.14° β 102.03° γ 85.68°
Colourless to very pale yellow; vitreous; translucent to transparent.
Biaxial (+), α 1.537, β 1.548, γ 1.570, 2V(meas.) 77°, 2V(calc.) 71°.
9.21 (70), 7.69 (100), 5.74 (60), 4.63 (40), 3.845 (35), 2.199 (30b).
- IMA No. 92-011 A monoclinic polymorph of 92-010.
 $\text{Ca}_2\text{B}_2\text{O}_7(\text{OH})_{2x}\text{Cl}_4 \cdot 13\text{H}_2\text{O}$
Monoclinic: P2
a 19.88 b 9.715 c 17.551 Å β 114.85°
Colourless to very pale yellow; vitreous; translucent to transparent.
Biaxial (+), α 1.542, β 1.545, γ 1.565, 2V(meas.) 47°, 2V(calc.) 43°.
9.03 (60), 8.56 (100), 6.62 (70), 6.14 (30b), 5.12 (30), 4.09 (30), 3.768 (30), 3.493 (30).

IMA No. 92-012

$\text{Ca}_2(\text{CaMn})(\text{SiO}_3\text{OH})_2(\text{OH})_2$
Orthorhombic: Pbc
a 9.398 b 9.139 c 10.535 Å
Colourless; vitreous; transparent.
Biaxial (+), α 1.634, β 1.640, γ 1.656, 2V(meas.) 65°, 2V(calc.) 63°.
4.18 (45), 3.231 (87), 3.188 (100), 3.135 (95), 2.789 (35), 2.391 (42), 2.042 (28).

IMA No. 92-013 The phosphate analogue of preisingerite and schumacherite.

$\text{Bi}_3\text{O}(\text{OH})(\text{PO}_3)_2$
Triclinic: P1
a 9.798 b 7.250 c 6.866 Å α 88.28° β 115.27° γ 110.70°
White to pale pink, sometimes brown; vitreous; transparent to translucent.
Mean index of refraction estimated from reflectance data: 2.01 at 589nm.
4.437 (46), 3.247 (87), 3.188 (100), 3.135 (95), 3.026 (75), 2.953 (47), 2.165 (41).

IMA No. 92-014

$\text{Na}_2\text{Ca}_2\text{Cu}_2(\text{Mg}_2\text{Fe}^{3+}\text{Al})_2(\text{AsO}_4)_2$ $x \sim 0.76$, $y \sim 0.42$, $z \sim 0.39$
Monoclinic: C2/c
a 11.882 b 12.760 c 6.647 Å β 112.81°
Light blue; vitreous; translucent.
Biaxial (-), α 1.714, β 1.744, γ 1.783, 2V(meas.) 60°, 2V(calc.) 84°.
4.35 (40), 4.06 (50), 3.56 (40), 3053 (40), 3.495 (60), 3.066 (40), 2.744 (140), 2.605 (40).

IMA No. 92-015 The ferric analogue of millosevichite.

$(\text{Fe},\text{Al})_2(\text{SO}_4)_3$
Hexagonal: R3
a 8.14 c 21.99 Å
White to light brown; dull; transparent.
Uniaxial (sign unknown), n is between 1.555 and 1.625.
5.99 (28), 4.35 (23), 3.56 (100), 2.97 (20), 2.72 (20), 2.64 (11).

IMA No. 92-016 The phosphate analogue of arsenoclasite.

$\text{Mn}_3(\text{PO}_4)_2(\text{OH})_4$
Orthorhombic: P2₁2₁2₁
a 9.097 b 5.693 c 18.00 Å
Pale yellow, yellow, pale burnt orange; adamantine; transparent.
Biaxial (sign unknown), α' 1.74, γ' 1.76, 2V unknown.
2.900 (100), 2.853 (70), 2.802 (50), 2.702 (80), 2.022 (15), 1.608 (15).

IMA No. 92-017 A member of the garnet group.

$\text{Ca}_3(\text{Ti},\text{Fe}^{3+}\text{Fe}^{2+})(\text{Si},\text{Fe}^{3+})_2\text{O}_{12}$
Cubic: Ia3d
a 12.162 Å
Black; adamantine; opaque.
Isotropic, n 1.955.
3.039 (72), 2.720 (100), 2.483 (51), 2.385 (21), 1.973 (24), 1.687 (26), 1.626 (56).

IMA No. 92-018

$\text{Ca}_2\text{Y}(\text{AsO}_4)(\text{WO}_4)_2$
Tetragonal: I4/a
a 5.135 c 33.882 Å
Creamy yellow; vitreous to adamantine; translucent.
Uniaxial (+), n_o 1.874, n_e 1.918.
4.674 (18), 3.059 (100), 2.571 (19), 1.901 (32), 1.818 (16), 1.674 (17), 1.562 (32).

IMA No. 92-019

Cu_2H_9
Monoclinic: P2₁
a 8.392 b 6.181 c 9.558 Å β 98.48°
Colourless to greyish-white; vitreous to waxy; transparent.
Biaxial (+), n_{min} ~ 1.75, n_{max} ~ 1.95, 2V(meas.) ~ 90°.
9.434 (100), 4.941 (11), 4.724 (11), 4.546 (5), 4.028 (13), 3.371 (10).

IMA No. 92-020 A member of the amphibole group.

$(\text{Na},\text{K})(\text{Ca},\text{Na})_2(\text{Mg}_2\text{Fe}^{3+},\text{Fe}^{2+})_2\text{Si}_6\text{O}_{22}(\text{F},\text{OH},\text{O})_2$
Monoclinic: C2/m
a 9.762 b 17.888 c 5.122 Å β 102.25°
Blue green and green; vitreous; transparent.
Biaxial (-), α 1.618, β 1.624, γ 1.627, 2V(meas.) 71°, 2V(calc.) 70°.
9.9 (70), 3.69 (60), 3.34 (100), 3.18 (60), 3.13 (90), 2.82 (70), 1.98 (90), 1.439 (60).

IMA No. 92-024

CuBi_2O_6
Tetragonal: P4/ncc
a 8.511 c 5.823 Å
Black; metallic; opaque.
In reflected light: grey, weak anisotropism, weak but distinct birefractance, pleochroic grey with a faint bluish tint and brownish grey. R_{max} & R_{min} : (21.1, 19.0 %)482nm, (20.2, 18.0 %)545nm, (19.7, 17.6 %)589nm, (19.5, 17.3 %)659nm.
4.26 (17), 3.191 (100), 2.913 (16), 2.695 (18), 1.947 (18).

IMA No. 92-025

$\text{Cu}_3\text{TeO}_6\text{H}_2\text{O}$
Cubic: P-lattice, space group unknown
a 9.555 Å
Emerald green; adamantine; transparent to translucent.
Isotropic, n 2.01 calculated from reflectance values at 589nm.
4.26 (40), 2.763 (100), 2.384 (70), 1.873 (40), 1.689 (80), 1.440 (60).

IMA No. 92-026 The -2H polytype of 92-027.

$\text{Mn}_4\text{Al}_2(\text{OH})_{12}\text{CO}_3\cdot 3\text{H}_2\text{O}$
Hexagonal: P6₂22
a 10.985 c 15.10 Å
Orange-brown, pale brown, pale blue, colourless; vitreous; transparent.
Uniaxial (-), n 1.587, ϵ 1.547.
7.53 (100), 3.768 (60), 2.578 (50), 2.221 (40), 1.856 (40), 1.552 (40).

IMA No. 92-027 The -3T polytype of 92-026.

$\text{Mn}_4\text{Al}_2(\text{OH})_{12}\text{CO}_3\cdot 3\text{H}_2\text{O}$
Hexagonal (trigonal): P3₁12 or P3₂12
a 10.985 c 22.63 Å
Orange-brown, pale brown; vitreous; transparent.
Uniaxial (-), n 1.587, ϵ could not be measured.
7.55 (100), 3.770 (90), 2.670 (70), 2.346 (70), 1.973 (60), 1.586 (30), 1.662 (30).

IMA No. 92-028 The -2H polytype of 92-029.

$\text{Mg}_6\text{Al}_2(\text{OH})_{12}\text{CO}_3\cdot 3\text{H}_2\text{O}$
Hexagonal: P6₂22
a 10.571 c 15.139 Å
Orange-brown, pale brown; vitreous; transparent.
Uniaxial (+), n 1.533, ϵ 1.533.
7.63 (100), 3.785 (100), 2.603 (15), 2.496 (15), 2.341 (15), 2.166 (15), 1.991 (15), 1.825 (20), 1.495 (15).

IMA No. 92-029 The -3T polytype of 92-028.

$\text{Mg}_6\text{Al}_2(\text{OH})_{12}\text{CO}_3\cdot 3\text{H}_2\text{O}$
Hexagonal (trigonal): P3₁12 or P3₂12
a 10.558 c 22.71 Å
Yellow to pale yellow; vitreous; transparent.
Uniaxial (+ or -), n 1.533, ϵ 1.533.
7.57 (100), 3.778 (90), 2.570 (40), 2.281 (40), 1.932 (40), 1.524 (20), 1.493 (20).

IMA No. 92-030

$\text{Fe}_3\text{Al}_2(\text{OH})_{12}\text{CO}_3\cdot 3\text{H}_2\text{O}$
Hexagonal (trigonal): P3₁12 or P3₂12
a 10.805 c 22.48 Å
Green-brown with black coating; vitreous; transparent.
Uniaxial (-), n 1.599, ϵ 1.570.
7.49 (100), 3.746 (50), 2.625 (40), 2.314 (50), 1.948 (40), 1.558 (15), 1.526 (20).

IMA No. 92-031

$\text{Na}_6\text{YzrSi}_6\text{O}_{18}\cdot 6\text{H}_2\text{O}$
Hexagonal (trigonal): R32
a 10.825 c 15.809 Å
Light green to yellow green; vitreous; transparent to translucent.
Uniaxial (-), n 1.585, ϵ 1.578.
6.03 (32), 5.40 (63), 3.236 (84), 3.127 (88), 3.030 (100), 1.805 (21).

IMA No. 92-032 A member of the amphibole group.

$(\text{K},\text{Na})(\text{Na},\text{Li})_2(\text{Mg},\text{Mn}^{2+},\text{Fe}^{2+},\text{Li})_2\text{Si}_8\text{O}_{22}(\text{OH})_2$
Monoclinic: P2₁/m
a 9.94 b 17.80 c 5.302 Å β 105.5°
Dark red to brownish lilac; vitreous; transparent.
Biaxial (-), α 1.654, β 1.675 (calculated), γ 1.696, 2V(meas.) 88-92°.
8.890 (M), 8.427 (M), 5.077 (M), 4.442 (M), 3.357 (M), 3.257 (S), 3.132 (S), 2.812 (S), 2.553 (S) plus seven other lines of intensity (M).

IMA No. 92-033

$\text{SrMn}_2^+[\text{Si}_3\text{O}_{10}](\text{OH})_2\cdot \text{H}_2\text{O}$
Orthorhombic: Cmc21
a 6.245 b 9.031 c 13.404 Å
Orange-brown; vitreous; translucent.
Biaxial (+), $n_s > 1.82$, 2V(meas.) 63°.
4.804 (86), 3.373 (66), 2.833 (30), 2.807 (82), 2.695 (98), 2.401 (68).

IMA No. 92-034 A member of the tourmaline group.

$\square(\text{Fe}^{2+}\text{Al})\text{Al}_2\text{Si}_6\text{O}_{18}(\text{BO}_3)_2(\text{OH})_2$
Hexagonal (trigonal): R3m
a 15.967 c 7.126 Å
Bluish black; vitreous; transparent.
Uniaxial (-), n 1.664, ϵ 1.642.
6.358 (84), 4.212 (48), 3.989 (38), 3.452 (91), 2.944 (71), 2.573 (100).

IMA No. 92-035 The magnesium-analogue of staurolite.

$(\text{Mg},\text{Li},\text{Fe},\square)_2\text{Al}_2\text{Si}_6\text{O}_{18}(\text{OH})_2$
Monoclinic: C2/m
a 7.872 b 16.55 c 5.634 Å β 90.0°
Colourless in thin section; vitreous to resinous; transparent.
Biaxial (sign unknown), mean n 1.709, 2V unknown.
4.139 (24), 2.678 (38), 2.390 (50), 2.370 (33), 2.356 (24), 1.968 (100).

IMA No. 92-036 The zinc-analogue of staurolite.

$(\text{Zn},\text{Li},\text{Fe},\text{Mg},\square)_2\text{Al}_2\text{Si}_6\text{O}_{18}(\text{OH})_2$
Monoclinic: C2/m
a 7.853 b 16.54 c 5.639 Å β 90.0°
Colourless in thin section; vitreous to resinous; transparent.
Biaxial (sign unknown), $\alpha \sim 1.722$, β unknown, γ 1.734, 2V unknown.
3.001 (61), 2.678 (70), 2.390 (87), 2.363 (46), 2.349 (45), 1.968 (61), 1.964 (48), 1.391 (100).

IMA No. 92-037 The tetragonal, lead-analogue of lavendulan.

$\text{NaPbCu}_2(\text{AsO}_4)_4\text{Cl}\cdot 5\text{H}_2\text{O}$
Tetragonal: P4₂22 or P4₂22
a 10.066 c 39.39 Å
Intense blue; vitreous; translucent.
Uniaxial (-), n 1.770, ϵ 1.710.
9.83 (100), 4.925 (60), 4.482 (50), 3.132 (90), 2.772 (40), 2.515 (50), 1.778 (40).

IMA No. 92-038

$\text{Cu}_{20}(\text{Fe},\text{Cu},\text{Zn})_8\text{Mo}_6\text{Ge}_2\text{S}_{32}$
Cubic: space group unknown
a 10.64 Å
Megascopic colour unknown; metallic; opaque.
In reflected light: pale yellow to greyish yellow, no anisotropism, no birefractance, nonpleochroic. R: (23.7 %)470nm, (25.5 %)346nm, (25.7 %)589nm, (25.6 %)650nm.
3.07 (10), 2.66 (2), 1.884 (8), 1.603 (4), 1.536 (4), 1.331 (1), 1.220 (2), 1.190 (1).

IMA No. 92-039

$\text{Cu}_{20}(\text{Fe,Zn,Cu})_6\text{W}_2\text{Ge}_2\text{S}_{32}$
Cubic; space group unknown
a 10.675 Å

Megascopic colour unknown; metallic; opaque.

In reflected light: pale yellowish pink, no anisotropism, no bireflectance, nonpleochroic.

R: (23.2 %)470nm, (23.7 %)546nm, (24.0 %)589nm, (23.8 %)650nm.
4.36 (1), 3.38 (1), 3.08 (10), 2.67 (2), 1.887 (7), 1.612 (5), 1.543 (1), 1.333 (1), 1.225 (1½), 1.192 (½).

IMA No. 92-040

$\text{Na}_4\text{Zn}_2\text{Si}_4\text{O}_{18}\cdot 5\text{H}_2\text{O}$

Orthorhombic: F2dd

a 10.211 b 39.88 c 10.304 Å

Colourless to light mauve; vitreous; transparent.

Biaxial (+), α 1.520, β 1.521, γ 1.524, 2V(meas.) 61°, 2V(calc.) 60°. 6.346 (10), 4.959 (3), 3.240 (6), 3.167 (4), 3.140 (4), 2.821 (3).

IMA No. 92-041 The thallium-analogue of jarosite.

$(\text{Tl,K})\text{Fe}_3(\text{SO}_4)_2(\text{OH})_6$

Hexagonal (trigonal): R $\bar{3}m$

a 7.3301 c 17.6631 Å

Gold yellow; adamantine; transparent.

Uniaxial (-), ω 1.822, ϵ 1.768.

5.974 (87), 3.666 (34), 3.112 (100), 2.9877 (22), 2.5773 (21), 1.9912 (29), 1.8329 (23).

IMA No. 92-043

$\text{Ca}(\text{UO}_2)_4(\text{SO}_4)_2(\text{OH})_8\cdot 6\text{H}_2\text{O}$

Orthorhombic: P-lattice, space group unknown

a 8.73 b 17.09 c 15.72 Å

Sulphur yellow; vitreous; translucent.

Biaxial (-), α 1.617 (calculated), β 1.710, γ 1.758, 2V(meas.) 68°. 7.90 (100), 4.17 (30), 3.98 (40), 3.49 (80), 3.38 (70), 2.844 (30b).

IMA No. 92-045 The phosphate-analogue of segnitite.

$\text{PbFe}_3^+(\text{PO}_4)_2(\text{OH,H}_2\text{O})_6$

Hexagonal (trigonal): R $\bar{3}m$

a 7.325 c 16.900 Å

Cream to brownish yellow to yellowish green; adamantine; translucent.

Uniaxial (-), ω 1.955, ϵ 1.935.

5.96 (90), 3.67 (60), 3.07 (100), 2.538 (50), 2.257 (50), 1.979 (50).

IMA No. 92-046

$\text{AlF}_3\cdot 3\text{H}_2\text{O}$

Tetragonal: P4/n

a 7.715 c 3.648 Å

Colourless; vitreous; transparent.

Uniaxial (-), ω 1.427, ϵ 1.403.

5.47 (100), 2.439 (72), 2.027 (70), 1.775 (78), 1.725 (85), 1.306 (70).

IMA No. 92-048

$\text{Na}_x\text{REE}_y(\text{CO}_3)_z$ with Ce the dominant REE

Monoclinic: P2 $_1$

a 20.84 b 6.374 c 10.578 Å β 120.45°

Grey with slight pinkish tint; vitreous; translucent.

Biaxial (+ or -), α 1.623, β 1.636, γ 1.649, 2V(meas.) 90°, 2V(calc.) 89°. 9.13 (3), 5.22 (5), 4.13 (3), 3.70 (4), 2.607 (10), 2.148 (3), 1.921 (3).

IMA No. 92-050 The magnesium-analogue of dumortierite.

$(\text{Mg,Tl,}\square)(\text{Al,Mg})_2\text{Al}_2\text{Si}_2\text{O}_{18}\cdot (\text{OH})_2\text{B}$ $x \approx 3$

Orthorhombic: Pmcn

a 12.02 b 20.22 c 4.732 Å

Pink to red; vitreous; transparent.

Biaxial (-), α 1.678, β 1.700, γ 1.701, 2V(meas.) 38°, 2V(calc.) 24°.

6.01 (59), 5.88 (100), 3.489 (60), 3.255 (82), 3.074 (53), 2.927 (74), 2.131 (50), 2.090 (48).

NOTE:

The following three minerals from previous years also have been approved.

IMA No. 90-006

$\text{Fe}_{16}\text{O}_{16}(\text{OH})_2(\text{SO}_4)_2$ where $16 - y = 2z$ and $2.0 \leq z \leq 3.5$

Tetragonal: probably P4/m

a 10.66 c 6.04 Å

Brownish yellow; dull; translucent.

Optical properties unknown.

4.86 (37), 3.38 (46), 2.55 (100), 2.28 (23), 1.66 (21), 1.51 (24), 1.46 (18).

IMA No. 90-046 The uranium-analogue of polycrase-(Y).

$(\text{U,Y})(\text{Tl,Nb,Ta})_2\text{O}_6$

Orthorhombic: Pbcn

a 14.48 b 5.559 c 5.223 Å

Brown-red; adamantine; opaque.

In reflected light: pale grey with bluish tones; no anisotropism, bireflectance, or

pleochroism. R: (23.6 %)470nm, (21.5 %)546nm, (22.3 %)589nm, (25.1 %)650nm.

3.73 (W), 3.21 (W), 2.99 (S), 2.78 (W), 1.90 (MS), 1.86 (W), 1.77 (MW), 1.48 (M).

IMA No. 91-036

$\text{Fe}_2(\text{OH})_2\text{Cl}$

Orthorhombic: Pnam

a 6.31 b 9.20 c 7.10 Å

Megascopic colour unknown; lustre probably dull; transparent.

Index of refraction: 1.6 to 1.7.

Electron diffraction pattern: 5.68, 5.07, 2.93, 2.37, 2.14, 1.65.

**New minerals recently approved
by the
Commission on New Minerals and Mineral Names
International Mineralogical Association**

JOSEPH A. MANDARINO

Department of Mineralogy, Royal Ontario Museum, 100 Queen's Park,
Toronto, Ontario, Canada M5S 2C6

Some time ago the Commission on New Minerals and Mineral Names decided that we could do a distinct service to the mineralogical community if we published very short descriptions of newly approved mineral species without, of course, their names. The purpose of this is to assist mineralogists who are working on new minerals which may be the same as these approved species, which have not been published yet. The frequency of multiple proposals for the same species is increasing and it is hoped that this service will alert prospective proposers to the existence of these new species and thus save them some time and frustration in coming in second or third with the same mineral.

J.A. Mandarino, Chairman of C.N.M.M.N.

The information given here is provided by the Commission on New Minerals and Mineral Names, I.M.A. for comparative purposes .

Each mineral is described in the following format:

- I.M.A. No. (any relationship to other minerals)
- Chemical formula.
- Crystal system, space group
unit cell parameters.
- Colour; lustre; diaphaneity.
- Optical properties.
- Strongest lines in the X-ray powder diffraction pattern.

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION.

1993 PROPOSALS

- IMA No. 93-001 The calcium-analogue of burbankite and khanneshite.
 $\text{Na}_3(\text{Ca}, \text{REE}, \text{Sr})_3(\text{CO}_3)_5$
 Hexagonal: $\text{P6}_3\text{mc}$, $\text{P6}_3\text{c}$ or $\text{P6}_3\text{mmc}$
 a 10.447 c 6.318 Å
 Deep orange; vitreous; translucent.
 Uniaxial (-), ω 1.636, ϵ 1.631.
 5.20 (4), 3.68 (3), 3.01 (5), 2.601 (10), 2.130 (6), 1.649 (3).
- IMA No. 93-002 The nickel-analogue of chalcophanite.
 $\text{NiMn}_3\text{O}_7 \cdot 3\text{H}_2\text{O}$
 Hexagonal (trigonal): $\text{R}\bar{3}$ or R3
 a 7.514 c 20.52 Å
 Very dark brown to almost black; submetallic to vitreous; opaque, but translucent in thin plates.
 Uniaxial (-), $\omega > 2.00$, ϵ 1.97.
 6.84 (10), 4.01 (2), 2.219 (3), 1.884 (2), 1.575 (2).
- IMA No. 93-003 The arsenate-analogue of berlinite.
 AlAsO_4
 Hexagonal (trigonal): P3_121 or P3_221
 a 5.031 c 11.226 Å
 Colourless, white, cream; vitreous; transparent.
 Uniaxial (+), ω 1.596, ϵ 1.608.
 4.36 (20), 4.06 (31), 3.442 (100), 2.359 (15), 1.873 (16), 1.4202 (11).
- IMA No. 93-004 The aluminum-analogue of klyuchevskite.
 $\text{K}_3\text{Cu}_3\text{AlO}_2(\text{SO}_4)_4$
 Monoclinic: I2
 a 18.423 b 5.139 c 18.690 Å β 101.72°
 Dark green; vitreous; transparent.
 Biaxial (+), α 1.542, β 1.548, γ 1.641, $2V(\text{meas.})$ unknown, $2V(\text{calc.})$ 30°.
 9.15 (84), 9.04 (100), 7.20 (52), 3.781 (37), 3.757 (33), 2.786 (21).
- IMA No. 93-005
 $\text{NaBa}_3(\text{Mn}^{2+}, \text{Mn}^{3+})_4[\text{Si}_4\text{O}_{10}(\text{OH})_2][\text{Si}_2\text{O}_7]\text{O}_2\text{F} \cdot \text{H}_2\text{O}$
 Orthorhombic: Pnma
 a 23.42 b 12.266 c 7.181 Å
 Black with a green shade; vitreous to greasy; translucent.
 Biaxial (+), α 1.767, β 1.793, γ 1.871, $2V(\text{meas.})$ 60-65°, $2V(\text{calc.})$ 62°.
 4.580 (5), 3.303 (9), 2.999 (10), 2.715 (5), 2.655 (10), 2.156 (4), 1.648 (5).
- IMA No. 93-006 A tetragonal polymorph of rooseveltite.
 BiAsO_4
 Tetragonal: $\text{I4}_1/\text{a}$
 a 5.085 c 11.69 Å
 White to yellowish white; earthy; opaque.
 Uniaxial (+), mean $n > 2.0$.
 4.660 (11), 3.066 (100), 2.546 (12), 1.797 (11), 1.581 (10), 1.551 (17).
- IMA No. 93-008
 NH_4BF_4
 Orthorhombic: Pnma
 a 9.0615 b 5.6727 c 7.2672 Å
 Colourless to white and yellowish; vitreous; transparent to translucent.
 Biaxial, mean n calculated from Gladstone-Dale is 1.308.
 4.472 (75), 3.540 (90), 3.183 (100), 2.8982 (80), 2.5362 (65), 2.2822 (65), 2.1631 (70).

IMA No. 93-009 A tetragonal polymorph of bismite.



Tetragonal: $P4_2/n$ or $P4_212$

a 8.08 c 6.46 Å

Green, yellowish; adamantine; translucent.

Uniaxial (+), ω 2.13, ϵ 2.18.

5.73 (7), 3.44 (5), 3.16 (10), 3.01 (4), 2.56 (4dif.), 2.02 (5), 1.902 (6).

IMA No. 93-010 The magnesium analogue of fillowite and johnsomervilleite.



Hexagonal (trigonal): $R\bar{3}$

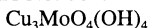
a 14.967 c 42.595 Å

Colourless; vitreous; transparent.

Uniaxial, indices of refraction calculated from reflectance values: n_1 1.60, n_2 1.62.

3.694 (S), 3.558 (M), 2.960 (S), 2.753 (S), 2.500 (M), 2.126 (M), 1.851 (M).

IMA No. 93-011



Orthorhombic: $Pnmm$

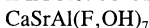
a 8.499 b 12.527 c 6.067 Å

Dark green; adamantine; transparent.

Biaxial (+), α slightly < 1.89, β unknown, γ slightly < 1.91, $2V(\text{meas.})$ 74°.

5.471 (S), 3.754 (S), 3.043 (S), 2.591 (VS), 1.519 (S).

IMA No. 93-013



Monoclinic: $P2_1/c$

a 8.215 b 11.989 c 6.076 Å β 96.22°

Colourless; vitreous; transparent.

Biaxial (+), α 1.4240, β 1.4320, γ 1.4415, $2V(\text{meas.})$ 85.5°, $2V(\text{calc.})$ 85.6°.

6.758 (7), 4.250 (9), 3.643 (8), 3.148 (7), 3.063 (8), 3.030 (7), 2.840 (7), 2.125 (8).

IMA No. 93-016



Cubic: $Pa\bar{3}$

a 6.502 Å

Steel black; metallic; opaque.

In reflected light: bright white with a yellowish tint, moderate anisotropism, no birefractance, nonpleochroic. R: (51.0%)470nm, (52.6%)546nm, (52.9%)589nm, (49.2%)650nm.

2.89 (70), 1.955 (100), 1.735 (80), 1.250 (80), 1.207 (70), 1.148 (70), 1.054 (70).

IMA No. 93-017



Cubic: $Pa\bar{3}$

a 6.413 Å

Steel black; metallic; opaque.

In reflected light: bright white with bluish tint, no anisotropism, no birefractance, nonpleochroic.

R: (44.3%)470nm, (46.0%)546nm, (46.9%)589nm, (45.5%)650nm.

2.86 (70), 1.93 (100), 1.235 (80), 1.132 (90), 1.040 (80), 0.9780 (80).

IMA No. 93-018



Hexagonal: $P\bar{3}m1$

a 3.933 c 5.390 Å

Steel black; metallic; opaque.

In reflected light: bright yellowish white with bluish tint, moderate anisotropism with bluish or yellowish tint, no birefractance, nonpleochroic. R_0 & R_E : (41.4, 49.0%)470nm,

(40.2, 48.2%)546nm, (41.1, 49.0%)589nm, (45.2, 51.2%)650nm.

2.85 (100), 2.10 (80), 1.95 (60), 1.580 (70), 1.160 (60), 1.110 (70).

IMA No. 93-019



Orthorhombic: space group unknown

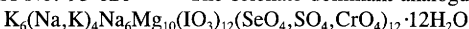
a 5.689 b 10.791 c 5.308 Å

Yellow green to light green; adamantine; transparent.

Biaxial n 's > 2 . In reflected light, R: (14.8%)470nm, (13.0%)546nm, (13.2%)589nm, (13.6%)650nm.

3.146 (100), 2.841 (80), 2.694 (20), 1.956 (10), 1.695 (20), 1.631 (10).

IMA No. 93-020 The selenate-dominant analogue of 93-021

Hexagonal: $\text{P}\bar{3}\text{c}1$

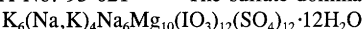
a 9.590 c 27.60 Å

Pale yellow; vitreous; transparent.

Uniaxial (-), ω 1.655, ϵ 1.642.

13.75 (30), 7.10 (20), 3.974 (16), 3.561 (100), 3.082 (32), 3.058 (39), 2.715 (39).

IMA No. 93-021 The sulfate-dominant analogue of 93-020

Hexagonal: $\text{P}\bar{3}\text{c}1$

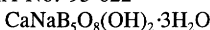
a 9.4643 c 27.336 Å

Pale yellow; vitreous; transparent.

Uniaxial (-), ω 1.622, ϵ 1.615.

13.67 (50), 7.05 (40), 3.927 (100), 3.515 (24), 3.023 (41), 2.681 (33), 2.3273 (21).

IMA No. 93-022

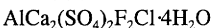
Monoclinic: $\text{P}2_1/\text{c}$ a 6.506 b 13.280 c 11.462 Å β 92.97°

White; silky to pearly; translucent.

Biaxial (-), α 1.540, β 1.554, γ 1.558, $2V(\text{meas.})$ 60°, $2V(\text{calc.})$ 56°.

8.64 (100), 6.62 (30), 4.18 (17), 2.868 (26), 2.845 (16), 2.795 (17), 2.587 (15).

IMA No. 93-023

Tetragonal: $\text{I}4/\text{m}$

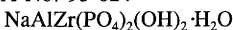
a 6.859 c 13.310 Å

White; vitreous; transparent.

Uniaxial (+), ω 1.509, ϵ 1.526.

6.67 (60), 3.922 (50), 3.729 (40), 3.431 (100), 3.335 (80), 3.052 (40), 2.483 (40).

IMA No. 93-024



Monoclinic: space group unknown

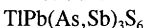
a 20.840 b 9.871 c 11.195 Å β 104.41°

Pale pinkish orange; vitreous; translucent.

Biaxial, n 's vary from 1.62 (parallel to fibres) to 1.64 (normal to fibres)

8.865 (40), 4.128 (80), 3.711 (65), 3.465 (60), 3.243 (35), 2.603 (100).

IMA No. 93-025

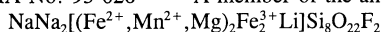
Monoclinic: $\text{P}2_1/\text{a}$ a 8.444 b 23.97 c 5.844 Å β 113.58°

Brilliant black, but dark red in thin fragments; metallic to submetallic; opaque, but translucent in thin fragments.

In reflected light: greyish white, clearly visible anisotropism from bluish to very weak reddish, visible bireflectance, nonpleochroic. $R_{\text{min.}}$ & $R_{\text{max.}}$: (29.7, 35.4%)470nm, (28.8, 33.1%)546nm, (26.7, 30.3%)589nm, (26.6, 29.9%)650nm.

5.346 (32), 3.998 (74), 3.816 (54), 3.587 (86), 2.823 (100), 2.778 (84), 2.670 (58).

IMA No. 93-026 A member of the amphibole group



Monoclinic: C2/m

a 9.792 b 17.938 c 5.3133 Å β 103.87°

Bluish black to black; vitreous; opaque.

Biaxial (+), α 1.675, β 1.683, γ 1.694, 2V(meas.) 87°, 2V(calc.) 81°.

8.426 (45), 4.481 (54), 3.404 (57), 2.985 (38), 2.710 (100), 2.585 (38), 2.536 (92).

IMA No. 93-028

AuSn

Hexagonal: P6₃/mmc

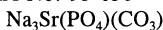
a 4.316 c 5.510 Å

White, greyish-black to black (when oxidized); metallic; opaque.

In reflected light: white with light yellow tint, clear anisotropism light yellow with a brown tint, faint bireflectance, nonpleochroic. R₀ & R_E: (65.4, 65.2 %)470nm, (76.7, 74.8 %)546nm, (80.5, 77.9 %)589nm, (82.8, 79.5 %)650nm.

3.726 (34), 3.087 (38), 2.218 (100), 2.159 (57), 1.546 (31), 1.258 (25), 1.256 (26).

IMA No. 93-030



Monoclinic: P2₁

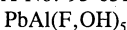
a 9.187 b 6.707 c 5.279 Å β 89.98°

Colourless to white; vitreous; transparent.

Biaxial (-), α 1.520, β 1.564, γ 1.565, 2V(meas.) 20°, 2V(calc.) 17°.

3.35 (50), 2.708 (100), 2.648 (90), 2.172 (100), 2.080 (50), 1.891 (80), 1.676 (50), 1.415 (70).

IMA No. 93-031



Triclinic: P1 or P1̄

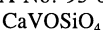
a 6.259 b 6.791 c 5.053 Å α 90.92° β 107.45° γ 104.45°

White to colourless; vitreous; transparent.

Biaxial (-), α 1.629, β 1.682, γ 1.691, 2V(meas.) 41°, 2V(calc.) 44°.

4.42 (100), 4.05 (35), 3.221 (40), 2.595 (70), 2.190 (65), 2.030 (50), 2.015 (40).

IMA No. 93-032



Monoclinic: C2/c

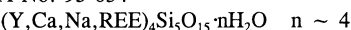
a 6.526 b 8.691 c 7.032 Å β 113.88°

Deep red; adamantine; transparent.

Biaxial (sign unknown), $\alpha \sim 1.95$, β unknown, γ 2.105, 2V(meas.) unknown.

4.90 (W), 3.22 (VS), 2.97 (M), 2.59 (S), 2.271 (W), 1.641 (W).

IMA No. 93-034



Triclinic: P1 or P1̄

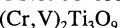
a 9.245 b 9.684 c 5.510 Å α 97.44° β 100.40° γ 116.70°

White; vitreous; translucent.

Biaxial (-), α 1.602, β 1.607, γ 1.611, 2V(meas.) 73°, 2V(calc.) 83°.

8.44 (80), 8.01 (50), 4.51 (50), 3.76 (70), 2.973 (100), 2.930 (60).

IMA No. 93-035 The chromium-dominant analogue of schreyerite



Monoclinic: C2/c, Cc, P2₁/c, P2/c or Pc

a 7.03 b 5.02 c 18.83 Å β 119.60°

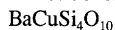
Black; metallic; opaque.

In reflected light: white, faint anisotropism, faint bireflectance, faint pleochroism pale brown.

R_{min} & R_{max}: (18.1, 20.1 %)470nm, (18.5, 19.9 %)546nm, (18.4, 19.8 %)589nm, (18.6, 20.9 %)650nm.

2.88 (2), 2.75 (3), 2.43 (2), 1.635 (3), 1.386 (2).

IMA No. 93-036



Tetragonal: P4/ncc

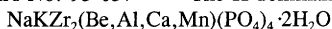
a 7.441 c 16.133 Å

Blue; vitreous; transparent.

Uniaxial (-), ω 1.633, ϵ 1.593.

8.055 (100), 4.031 (35), 3.544 (15), 3.200 (21), 2.688 (18), 2.395 (19), 2.016 (26).

IMA No. 93-037 The K-dominant analogue of gainesite

Tetragonal: I4₁/amd

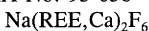
a 6.570 c 17.142 Å

Intense bluish purple or pale lilac; vitreous; transparent.

Uniaxial (+), ω 1.624, ϵ 1.636.

6.161 (100), 4.291 (25), 3.286 (50), 3.039 (30), 2.895 (20).

IMA No. 93-038



Hexagonal: P3

a 6.099 c 11.066 Å

Pale pink to colourless; vitreous; transparent.

Uniaxial (+), ω 1.483, ϵ 1.503.

5.29 (70), 3.036 (100), 2.146 (70), 1.757 (80), 1.152 (40), 0.9189 (40).

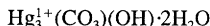
IMA No. 93-040 The PO₄-analogue of atelestite and a monoclinic polymorph of petitjeaniteMonoclinic: P2₁/ca 6.954 b 7.494 c 10.869 Å β 107.00°

White to yellow; adamantine; translucent.

Biaxial (+), α 2.05, β 2.06, γ 2.09, 2V(meas.) 45°, 2V(calc.) 61°.

4.268 (17), 3.271 (51), 3.254 (100), 3.145 (34), 2.727 (29), 1.885 (16).

IMA No. 93-041



Orthorhombic: Pcab

a 11.130 b 11.139 c 10.725 Å

Black to very dark red-brown; sub-metallic to adamantine; opaque.

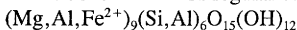
In reflected light: grey with slight bluish tinge, weak anisotropism (dull and dark greys and browns),

weak to moderate bireflectance, nonpleochroic. R_{\min} & R_{\max} : (11.4, 12.15 %)470nm,

(10.95, 11.6 %)546nm, (10.85, 11.5 %)589nm, (10.7, 11.2 %)650nm.

4.84 (50), 2.969 (70), 2.786 (70), 2.648 (100), 2.419 (60), 1.580 (50).

IMA No. 93-042 A regular interstratification of amesite and clinocllore



Monoclinic: Cm

a 5.323 b 9.214 c 21.45 Å β 94.43°

Colourless to very pale green; nacreous; translucent.

Biaxial (+), α 1.575, β 1.575, γ 1.581, 2V(meas.) 0°, 2V(calc.) 0°.

7.1 (100), 4.61 (60), 3.560 (80), 2.557 (40), 2.427 (60), 1.536 (70).

IMA No. 93-044



Isostructural with ilmenite and geikielite

Hexagonal: R3

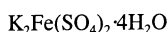
a 5.301 c 15.932 Å

Colourless; pearly; transparent.

Uniaxial (-), ω 1.1.84, ϵ 1.631.

5.30 (53), 3.00 (55), 2.650 (67), 2.365 (69), 1.874 (100), 1.471 (69).

IMA No. 93-045 The Fe-analogue of leonite



Monoclinic: C2/m

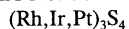
a 11.843 b 9.552 c 9.945 Å β 94.89°

Colourless to light yellow; vitreous; transparent.

Biaxial (+), α 1.497, β 1.501, γ 1.509, 2V(meas.) 73°, 2V(calc.) 71°.

4.776 (30), 3.504 (52), 3.439 (100), 3.330 (48), 3.051 (29), 2.405 (30), 2.389 (49).

IMA No. 93-046



Monoclinic: F2/m

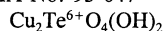
a 13.44 b 10.749 c 10.448 Å β 118.32°

Megascopic colour not observed; metallic; opaque.

In reflected light: pale slightly brownish grey, weak anisotropism in greys and browns, weak bireflectance, pleochroism weak. R_1 & R_2 : (47.2, 48.9 %)470nm, (48.4, 50.3 %)546nm, (49.1, 50.7 %)589nm, (49.8, 51.0 %)650nm.

3.156 (100), 3.081 (100), 2.957 (90), 2.234 (60), 1.871 (80), 1.791 (90), 1.532 (70).

IMA No. 93-047



Monoclinic: P2₁/n

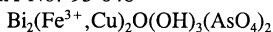
a 9.095 b 5.206 c 4.604 Å β 98.69°

Medium leaf green; adamantine; transparent.

In reflected light: pale grey, weak anisotropism with brown rotation tints, weak bireflectance, nonpleochroic. The mean index of refraction calculated from the reflectances at 589nm is 2.00.

4.506 (40), 4.337 (60), 3.838 (50), 2.891 (70), 2.598 (100), 1.834 (40), 1.713 (40), 1.500 (40).

IMA No. 93-048



Triclinic: P1 or P1

a 4.569 b 6.162 c 8.993 Å α 94.56° β 99.68° γ 94.31°

Brown-yellow; adamantine; transparent to translucent.

Biaxial (-), α 2.04, β 2.10 (calc.), γ 2.11, 2V(meas.) 45°.

8.822 (62), 3.749 (100), 3.596 (77), 3.468 (58), 2.903 (69), 2.810 (51), 2.685 (48).

IMA No. 93-049



Hexagonal: R $\bar{3}$ c or R3c

a 8.638 c 11.850 Å

Greyish white; vitreous; transparent.

Uniaxial (-), ω 1.726, ϵ 1.630.

2.915 (100), 2.756 (61), 2.493 (44), 2.160 (19), 2.044 (21), 1.976 (18), 1.895 (75).

IMA No. 93-050



Triclinic: P1

a 7.393 b 8.707 c 17.58 Å α 103.81° β 91.79° γ 109.50°

Black; metallic; opaque.

In reflected light: white, distinct to strong anisotropism with blue or blue-green colours, weak to medium bireflectance, pleochroism white to white with grey-blue tints. $R_{\min.}$ & $R_{\max.}$:

(34.0, 36.7 %)470nm, (32.0, 34.9 %)546nm, (30.5, 33.0 %)589nm, (28.1, 29.7 %)650nm.

3.459 (100), 3.388 (64), 3.177 (54), 3.076 (65), 2.802 (44), 2.287 (57), 1.736 (38).

IMA No. 93-051



Monoclinic: space group unknown

a 9.717 b 7.280 c 6.559 Å β 95.00°

Yellow; metallic; opaque.

In reflected light: yellow, strong anisotropism with orange, yellow-orange and greenish grey colours, distinct bireflectance, pleochroism greyish brown, orange, yellow orange. $R_{\min.}$ & $R_{\max.}$:

(19.5, 32.1 %)470nm, (23.8, 36.8 %)546nm, (24.6, 37.4 %)589nm, (25.1, 37.3 %)650nm.
2.709 (10), 2.419 (8), 2.323 (7), 1.92 (6), 1.758 (8), 0.9605 (6), 0.9576 (7).

IMA No. 93-052



Monoclinic: C2/c

a 12.94 b 8.910 c 5.446 Å β 107.0°

Colourless to white; vitreous; transparent.

Biaxial (+), α 1.6178, β 1.6184, γ 1.6516, 2V(meas.) 12°, 2V(calc.) 15.5° (synthetic material).
4.460 (43), 3.609 (13), 3.515 (100), 2.882 (13), 2.605 (36), 2.440 (21), 1.764 (20).

IMA No. 93-053



Orthorhombic: P2₁22₁ or P2₁2₁2₁

a 9.294 b 9.000 c 5.133 Å

White; waxy; transparent to opaque.

The mean index of refraction calculated from the reflectance value at 589nm is 2.09.

6.49 (30), 4.02 (40), 3.215 (100), 3.181 (90), 2.858 (40), 2.564 (35).

IMA No. 93-054 The Se-analogue of pyrite



Cubic: Pa3

a 5.783 Å

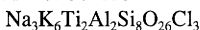
Black; metallic; opaque.

In reflected light: pink-yellow, no anisotropism, no bireflectance, nonpleochroic.

R: (42.4 %)470nm, (42.7 %)546nm, (45.7 %)589nm, (49.8 %)650nm.

2.888 (50), 2.588 (100), 2.364 (80), 2.045 (40), 1.743 (50), 1.546 (60), 1.1131 (40).

IMA No. 93-055



Monoclinic: C2/m

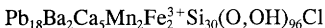
a 10.37 b 16.32 c 9.16 Å β 105.6°

Colourless; vitreous; transparent.

Biaxial (+), α 1.601, β 1.625, γ 1.654, 2V(meas.) 85°, 2V(calc.) 86°.

8.22 (71), 3.50 (42), 3.157 (35), 3.049 (100), 2.900 (71), 2.835 (84).

IMA No. 93-056



Hexagonal: R3

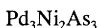
a 9.863 c 79.45 Å

Colourless; adamantine; transparent.

Uniaxial (-), ω 1.845, ϵ 1.815.

13.4 (50), 4.43 (30), 3.98 (30), 3.32 (100), 3.11 (40), 2.969 (40), 2.671 (80).

IMA No. 93-057



Hexagonal: P6₃/m, P6₃ or P6₃22

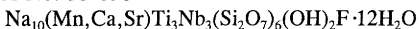
a 8.406 c 6.740 Å

Megascopic colour not observed; metallic; opaque.

In reflected light: rose, distinct anisotropism from light grey to greyish-brown, no bireflectance, nonpleochroic. R_{\min} & R_{\max} : (48.4, 50.2 %)470nm, (51.2, 53.2 %)546nm, (53.2, 55.3 %)589nm, (56.6, 58.7 %)650nm.

2.626 (10), 2.477 (10), 2.429 (8), 2.283 (7), 1.978 (7), 1.818 (7), 1.781 (7).

IMA No. 93-058



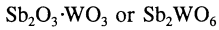
Monoclinic: Pm, P2 or P2/m

a 5.468 b 7.18 c 31.1 Å β 94.0°

Colourless, white, silvery, pale pink or cream; greasy to pearly; transparent to translucent.

Biaxial (+), α 1.608, β 1.630, γ 1.660, 2V(meas.) 82°, 2V(calc.) 83°. 15.56 (9), 5.16 (6), 3.11 (10), 2.850 (7), 2.665 (7), 2.627 (7), 2.217 (6), 1.795 (6).

IMA No. 93-059



Orthorhombic: probably P2₂2₁

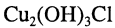
a 8.59 b 9.58 c 6.12 Å

Green to dark green; pearly to dull; translucent to opaque.

Biaxial (+), α 2.285, β 2.40, γ 2.58, 2V(meas.) large, 2V(calc.) 82°.

3.32 (10), 3.06 (10), 2.98 (4), 2.73 (6), 2.46 (5), 1.919 (4).

IMA No. 93-060 A monoclinic polymorph of atacamite, botallackite and paratacamite



Monoclinic: P2₁/n

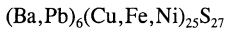
a 6.157 b 6.814 c 9.104 Å β 99.65°

Green to dark greenish black; adamantine; translucent to transparent.

Biaxial (-), indices of refraction could not be measured because mineral reacts with immersion liquids, 2V(meas.) 75°.

5.44 (100), 2.887 (40), 2.767 (60), 2.742 (70), 2.266 (60), 2.243 (50), 1.704 (50).

IMA No. 93-061



Cubic: Pm3m

a 10.373 Å

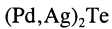
Megascopic colour unknown; metallic; opaque.

In reflected light: pale brownish grey, no anisotropism, no bireflectance, nonpleochroic.

R: (22.0 %)470nm, (24.85 %)546nm, (26.2 %)589nm, (27.55 %)650nm.

3.460 (40), 3.281 (40), 2.996 (90), 2.378 (90), 1.835 (100), 1.779 (40).

IMA No. 93-062



Tetragonal: P4₂22, P4₂/m or P4₂

a 8.913 c 6.098 Å

Megascopic colour unknown; metallic; opaque.

In reflected light: brownish-rose, distinct to strong anisotropism from white to rose-brown, distinct bireflectance, pleochroic from brownish-grey to violet-rose. $R_{\text{min.}}$ & $R_{\text{max.}}$: (38.7, 48.7%)470nm, (44.0, 55.5 %)546nm, (47.3, 58.2 %)589nm, (50.7, 60.7 %)650nm.

3.051 (6), 2.825 (10), 2.553 (4), 2.231 (6), 2.042 (5), 1.326 (3).

I.M.A. NEWS

NOTICE

Dr. J. A. Mandarino retires as Chairman of the Commission on New Minerals and Mineral Names (CNMMN) of the International Mineralogical Association on 31 December 1994. After that date, all proposals for new minerals should be sent to the new Chairman:

Dr. J. D. Grice
Mineral Sciences Division
Canadian Museum of Nature
P.O. Box 3443
Station 'D'
Ottawa, Ontario
K1P 6P4 CANADA

Dr. E. H. Nickel remains the Vice-chairman of the CNMMN and will continue to handle redefinitions, discreditations and revalidations. Proposals of these kinds should be sent to:

Dr. E. H. Nickel
Division of Mineral Products
CSIRO
Private Bag
P. O. Wembley
Western Australia 6014
AUSTRALIA

Dr. C. E. S. Arps retires as Secretary of the CNMMN on 31 December 1994. The new Secretary is:

Dr. W. D. Birch
Department of Mineralogy and Petrology
Museum of Victoria
285 Russell Street
Melbourne
Victoria 3000
AUSTRALIA

**NEW MINERALS RECENTLY APPROVED BY THE COMMISSION
ON NEW MINERALS AND MINERAL NAMES,
INTERNATIONAL MINERALOGICAL ASSOCIATION**

The information given here is provided by the Commission on New Minerals and Mineral Names of the International Mineralogical Association, for comparative purposes and as a service to mineralogists working on new species.

Each mineral is described in the following format:

IMA No. (any relationship to other minerals)
Chemical Formula
Crystal system, space group
Unit-cell parameters
Color; luster; diaphaneity
Optical properties
Strongest lines in the X-ray powder-diffraction pattern: d in Å (relative intensity).

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION.

J.A. Mandarino, Chairman Emeritus
Commission on New Minerals and Mineral Names
International Mineralogical Association

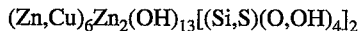
1994 PROPOSALS

IMA No. 94-001 The Fe³⁺-dominant analogue of warwickite
Mg(Fe³⁺, Fe²⁺, Al, Ti, Mg)(BO₃)O
Orthorhombic: *Pnam*
 a 9.258(6), b 9.351(4), c 3.081(2) Å
Black; adamantine to submetallic; subtranslucent to nearly opaque.
In reflected light: light grey, weak anisotropism, indistinct bireflectance, pleochroic from dark red to dark brown.
 R_{\max} : (9.99%) 470 nm, (9.66%) 540 nm, (9.29%) 589 nm, (8.79%) 650 nm.
6.563(23), 4.176(38), 2.957(30), 2.570(100), 2.088(20), 1.591(18), 1.550(19).

IMA No. 94-002
Mn₂SiO₃(OH)₂·H₂O
Orthorhombic: *Pca2₁*
 a 12.682(4), b 7.214(2), c 5.337(1) Å
Brown-yellowish; vitreous; transparent.
Biaxial (-), α 1.681, β 1.688, γ 1.690, $2V(\text{meas.})$ 54.4°, $2V(\text{calc.})$ 56.1°.
7.220(60), 4.083(60), 3.011(100), 2.547(80), 2.456(80), 2.440(80), 1.552(60).

IMA No. 94-004 A member of the amphibole group
NaN₂Mn₂²⁺Mn₃³⁺Si₈O₂₄
Monoclinic: *C2/m*
 a 9.89(2), b 18.04(3), c 5.29(1) Å, β 104.6(1)°
Cherry red to very dark red; adamantine; transparent.
Biaxial (-), α 1.717, β 1.780, γ 1.800, $2V(\text{meas.})$ 51°, $2V(\text{calc.})$ 57°.
3.400(8), 3.146(9), 2.544(9), 2.176(10), 1.656(8), 1.447(9).

IMA No. 94-005

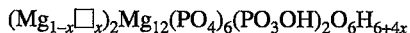
Hexagonal (trigonal): $P\bar{3}$ a 8.322(1), c 7.376(1) Å

Light green; vitreous; transparent.

Uniaxial (-), ω 1.705, ϵ 1.611.

7.37(100), 3.623(25), 3.282(30), 2.724(30), 2.556(50), 2.191(15), 1.572(20).

IMA No. 94-006

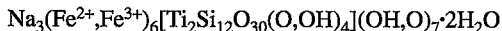
 $x = 0$ to 0.3Hexagonal: $P6_3mc$ a 12.47(1), c 5.036(6) Å

Azure blue; vitreous; transparent.

Uniaxial (-), \bar{n} ~ 1.61, Δ ~ 0.01.

3.66(65), 3.15(100), 3.109(100), 2.692(95), 2.213(70), 1.803(50), 1.552(50).

IMA No. 94-007

Monoclinic: $P2/c$ a 5.353(4), b 16.18(1), c 21.95(2) Å, β 94.6(2)°

Dark brown-green; vitreous to silky; translucent.

Biaxial (-), α 1.627, β 1.667, γ 1.693, $2V(\text{meas.})$ 75°, $2V(\text{calc.})$ 76°.

13.00(30), 10.94(100), 4.44(30), 2.728(50), 2.641(40), 2.547(30), 2.480(30).

IMA No. 94-008

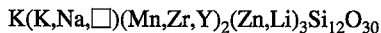
Tetragonal: $P4_2mc$ a 5.64(1), c 10.34(3) Å

Megascopic color not observed; metallic; opaque.

In reflected light: cream with a greyish tint, moderate anisotropism, no bireflectance, nonpleochroic. $R_{\text{min.}}$ and $R_{\text{max.}}$: (27.2, 30.1%) 470 nm, (32.3, 36.4%) 546 nm, (33.0, 37.1%) 589 nm, (31.2, 35.3%) 650 nm.

3.15(10), 2.445(2), 2.340(≤2), 1.910(4), 1.692(2).

IMA No. 94-010



A member of the milarite group

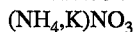
Hexagonal: $P6/mcc$ a 10.196(5), c 14.284(8) Å

Dark blue, violet blue, greyish brown-blue; vitreous; transparent.

Uniaxial (-), ω 1.590, ϵ 1.586.

7.13(30), 4.15(45), 3.75(50), 3.25(100), 2.924(39), 2.777(32), 2.548(520).

IMA No. 94-011

Orthorhombic: $Pbnm$ a 7.075(5), b 7.647(5), c 5.779(5) Å

White; vitreous; transparent.

Biaxial (-), α 1.458, β 1.527, γ 1.599, $2V(\text{meas.})$ ~ 90°, $2V(\text{calc.})$ 87°.

3.863(75), 3.364(85), 3.212(95), 3.194(100), 2.805(35), 2.595(90), 2.400(50).

IMA No. 94-012

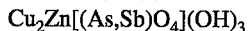
Hexagonal: $P\bar{3}$ a 8.773(1), c 10.746(2) Å

Yellow to orange-brown; vitreous; transparent.

Uniaxial (-), ω 1.548, ϵ 1.537.

6.20(40), 4.39(80), 2.774(80), 2.532(100), 2.240(80), 2.067(30), 1.657(40).

IMA No. 94-013

Hexagonal (trigonal): $P\bar{3}$ a 8.201(1), c 7.315(1) Å

Emerald green; adamantine; transparent.

Uniaxial (-), ω 1.801, ϵ 1.796.

2.522(100), 2.166(88), 1.805(92), 1.550(100), 1.513(85).

IMA No. 94-014

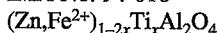
Hexagonal (trigonal): $P\bar{3}m1$ a 4.0489(2), c 5.1358(3) Å

Silver-white; metallic; opaque.

In reflected light: white with yellowish hue, distinct anisotropism, weak bireflectance, nonpleochroic. R_O and R_E : (59.3, 52.4%) 470 nm, (63.0, 56.8%) 546 nm, (65.5, 60.9%) 589 nm, (68.6, 64.9%) 650 nm.

2.901(100), 2.572(10), 2.074(65), 2.023(51), 1.660(11), 1.284(10).

IMA No. 94-016



The Zn-dominant analogue of hōgbomite-8H

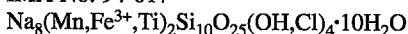
 $x \approx 0.12$ Hexagonal: most probably $P6_3mc$ a 5.708(4), c 18.31(2) Å

Deep brown to black; adamantine; transparent in thin sections.

Uniaxial (-), ω 1.878, ϵ 1.832.

2.85(50), 2.60(80), 2.42(100), 1.592(60), 1.550(50), 1.470(70), 1.425 (80).

IMA No. 94-017

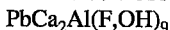
Orthorhombic: $C222_1$ a 13.46(2), b 14.98(1), c 17.51(2) Å

Yellow to orange; vitreous; transparent.

Biaxial (+), α 1.532, β 1.540, γ 1.550, $2V(\text{meas.})$ 89°, $2V(\text{calc.})$ 84°.

10.049(100), 8.823(50), 5.025(20), 3.806(20), 2.718(50).

IMA No. 94-018

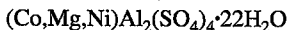
Monoclinic: $A2, A2/m$ or Am a 23.905(5), b 7.516(2), c 7.699(2) Å, β 92.25(2)°

White to colorless; vitreous; transparent.

Biaxial (-), α 1.510, β 1.528, γ 1.531, $2V(\text{meas.})$ 36°, $2V(\text{calc.})$ 44°.

11.9(100), 3.71(70), 3.51(85), 2.98(60), 2.94(60), 2.027(60), 1.971(60).

IMA No. 94-019



The cobalt-dominant member of the halotrichite group

Monoclinic: $P2_1/c$ a 6.189(4), b 24.23(1), c 21.20(1) Å, β 100.33(5)°

Empire rose; silky; transparent.

Biaxial (sign unknown), α 1.477, β unknown, γ 1.484, $2V$ unknown.

6.03(22), 4.790(100), 4.295(27), 4.106(22), 3.945(26), 3.768(33), 3.494(92).

IMA No. 94-020



A member of the magnetoplumbite group

Hexagonal: $P6_3/mmc$ a 5.854(1), c 22.882(6) Å

Black; metallic; opaque.

In reflected light: black, isotropic, no bireflectance, nonpleochroic. R_{mean} : (23.8%) 470 nm, (22.4%) 546 nm, (21.7%) 589 nm, (20.7%) 650 nm.

11.39(45), 3.811(100), 2.858(75), 2.745(50), 2.605(40), 2.407(25), 1.6361(30).

IMA No. 94-021 The gallium-dominant analogue of beudantite
 $\text{Pb}(\text{Ga}, \text{Al}, \text{Fe})_3(\text{AsO}_4)(\text{SO}_4)(\text{OH})_6$
 Hexagonal: $R\bar{3}m$
 a 7.225(4), c 17.03(2) Å
 Pale yellow; vitreous; transparent.
 Uniaxial (-), ω 1.763, ϵ 1.750.
 5.85(90), 3.59(40), 3.038(100), 2.851(30), 2.513(30), 2.271(40), 1.948(30).

IMA No. 94-022 The F-analogue of thalenite-(Y)
 $\text{Y}_3\text{Si}_3\text{O}_{10}\text{F}$
 Monoclinic: $P2_1/n$
 a 7.321(2), b 11.133(4), c 10.375(6) Å, β 97.17(2)°
 Colorless to white; adamantine; translucent.
 Biaxial (-), α 1.719, β 1.739, γ 1.748, $2V(\text{meas.})$ 73°, $2V(\text{calc.})$ 67°.
 5.60(5), 3.81(5), 3.12(10), 2.828(8), 2.253(8), 2.187(4), 2.131(4).

IMA No. 94-023 The Ir-dominant analogue of isoferroplatinum
 Ir_3Fe
 Cubic: $Pm\bar{3}m$
 a 3.792(5) Å
 Steel black; metallic; opaque.
 In reflected light: bright white with yellowish tint, isotropic, nonbireflectant, nonpleochroic. R : (66.2%) 470 nm, (69.3%) 546 nm, (71.1%) 589 nm, (72.5%) 650 nm.
 2.18(80), 1.89(60), 1.34(70), 1.26(20), 1.200(15), 1.142(100), 1.094(80).

IMA No. 94-024 An orthorhombic polymorph of walpurgite
 $(\text{UO}_2)\text{Bi}_4\text{O}_4(\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O}$
 Orthorhombic: $Pbcm$
 a 5.492(1), b 13.324(2), c 20.685(3) Å
 Yellow; adamantine; transparent.
 Biaxial (-), α 1.90, β 1.99, γ 2.00 (calc.), $2V(\text{meas.})$ 36°.
 10.354(94), 5.610(40), 3.277(56), 3.208(100), 3.088(76), 2.999(50), 2.852(46).

IMA No. 94-025
 $(\text{UO}_2)_8(\text{SO}_4)(\text{OH})_{14} \cdot 13\text{H}_2\text{O}$
 Monoclinic: $P2_1/a$
 a 18.553(8), b 9.276(2), c 13.532(7) Å, β 125.56(2)°
 Yellow; vitreous; translucent.
 Biaxial (-), α 1.715, β 1.718, γ 1.720, $2V(\text{calc.})$ 78°.
 7.56(100), 7.13(48), 3.771(34), 3.554(20), 3.234(10), 3.206(13), 2.052(8).

IMA No. 94-026
 $\text{NaCa}_2[\text{B}_9\text{O}_{14}(\text{OH})_4] \cdot 2\text{H}_2\text{O}$
 Monoclinic: $P2_1/c$
 a 11.4994(8), b 12.5878(9), c 10.5297(10) Å, β 99.423(6)°
 Colorless to light dirty-yellow and light grey; vitreous; transparent.
 Biaxial (+), α 1.532, β 1.538, γ 1.564, $2V(\text{meas.})$ 54°, $2V(\text{calc.})$ 52°.
 5.41(66), 5.20(57), 4.20(56), 3.35(89), 3.27(59), 3.04(100), 2.210(59).

IMA No. 94-030
 $\text{Pb}_2\text{Bi}_2(\text{S}, \text{Se})_3$
 Hexagonal (trigonal): $P\bar{3}$ or $P\bar{3}m$
 a 4.191(2), c 39.60(3) Å
 Silver-grey; metallic; opaque.
 In reflected light: yellowish white, distinct anisotropism, practically absent bireflectance, bluish grey to brownish pleochroism. R_1 & R_2 : (49.7, 48.5%) 470 nm, (48.4, 47.4%) 546 nm, (47.9, 46.8%) 589 nm, (47.9, 46.2%) 650 nm.
 3.42(5), 3.04(10), 2.096(8), 1.806(6), 1.725(5), 1.298(7), 1.233(6).

IMA No. 94-031

HgSAg(Cl,Br)

Hexagonal: $P6_2, P6_4, P6_22$ or $P6_422$ a 8.234(4), c 19.38(1) Å

Red to brownish red; adamantine; translucent.

Uniaxial (-), ω 2.3 (from polished section), ϵ could not be measured.

6.47(20), 4.124(30), 3.357(60), 3.237(30), 3.127(50), 2.879(100), 2.009(50).

IMA No. 94-032

 Si_3N_4 Hexagonal (trigonal): $P31c$ a 7.758(5), c 5.623(5) Å

Brownish red to colorless; probably adamantine; transparent.

Uniaxial (-), ω 2.03, ϵ 2.02.

2.893(85), 2.599(75), 2.547(100), 2.320(60), 1.486(70), 1.418(60), 1.351(75).

IMA No. 94-033

Isostructural with the arrojadite–dickinsonite series

 $(Ba,K,Pb)Na_3(Ca,Sr)(Fe,Mg,Mn)_{14}Al(OH)_2(PO_4)_{12}$ Monoclinic: $C2/c$ a 16.406(5), b 9.945(3), c 24.470(5) Å, β 105.73(2)°

Greenish grey; greasy; translucent.

Biaxial (sign unknown), n_{average} 1.65.

3.186(45), 3.018(100), 2.824(39), 2.813(36), 2.685(50), 2.530(35).

IMA No. 94-034

The magnesium-analogue of coulsonite

 $Mg(V,Cr)_2O_4$ Cubic: $Fd\bar{3}m$ a 8.385(3) Å

Black; metallic; opaque.

In reflected light: light grey, isotropic, no bireflectance, nonpleochroic. R : (14.0%) 470 nm, (13.7%) 546 nm, (13.7%) 589 nm, (13.7%) 650 nm.

4.84(9), 2.52(10), 2.093(8), 1.612(8), 1.482(9), 1.092(7), 1.048(5).

IMA No. 94-035

 $(Na,Ca,K)Cu_3(AsO_4)_2Cl \cdot 5H_2O$ Tetragonal: $P4_22_1$ or $P4_22$ a 10.085(2), c 23.836(8) Å

Intense blue to emerald green; vitreous; translucent.

Uniaxial (-), ω 1.686, ϵ 1.635.

11.90(100), 9.29(60), 7.132(50), 5.043(60), 4.641(40), 3.098(80), 3.061(70).

IMA No. 94-036

 $Hg_6^{1+}Hg^{2+}[Cl,(OH)]_2O_3$ Orthorhombic: $Pbma$ a 11.790(3), b 13.881(4), c 6.450(2) Å

Black to very dark brown; metallic; opaque.

In reflected light: white, strong anisotropism, moderate bireflectance, pleochroic from white to a higher reflecting blue-white. R_1 & R_2 : (22.8, 29.6%) 470 nm, (20.7, 25.7%) 546 nm, (20.3, 24.6%) 589 nm, (20.2, 23.2%) 650 nm. 5.25(80), 3.164(60), 3.053(100), 2.954(70), 2.681(50), 2.411(50).

IMA No. 94-038

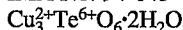
 $Ag(Cd,Pb)AsS_3$ Tetragonal: $I4/amd$ a 5.499(5), c 33.91(4) Å

Grey; metallic; opaque.

In reflected light: greyish white with bluish tint; anisotropism, bireflectance and pleochroism not observed. R_G : (31.3%) 470 nm, (30.4%) 543 nm, (29.3%) 587 nm, (27.1%) 657 nm.

3.19(50), 2.77(100), 1.960(80), 1.679(70), 1.598(70), 1.274(60).

IMA No. 94-043

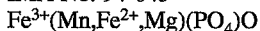
Monoclinic: $P2_1/n$ a 9.204(2), b 9.170(2), c 7.584(1) Å, β 102.32(3)°

Emerald green; adamantine; transparent.

Biaxial (sign unknown), n 1.91 – 1.92.

6.428(100), 3.217(70), 2.601(40), 2.530(50), 2.144(35), 1.750(35).

IMA No. 94-045

Monoclinic: $I2/a$ a 9.977(2), b 6.339(2), c 11.836(3) Å, β 105.77(3)°

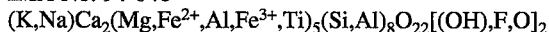
Black; weakly submetallic; opaque.

Optical properties could not be measured owing to the opaque nature of the mineral.

3.256(23), 2.970(100), 2.861(35), 2.810(98), 2.064(25), 1.778(22).

IMA No. 94-046

A member of the amphibole group

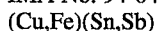
Monoclinic: $C2/m$ a 9.9199(4), b 18.0591(8), c 5.3180(3) Å, β 105.36(1)°

Black; vitreous; opaque, but translucent in thin splinters.

Biaxial (-), α 1.654, β 1.664, γ 1.670, $2V(\text{meas.}) = 79^\circ$, $2V(\text{calc.}) = 75^\circ$.

8.45(95), 3.283(45), 3.140(100), 2.707(35), 2.344(70), 2.018(35), 1.652(40).

IMA No. 94-047



Tetragonal: space group unknown

 a 4.22(1), c 5.10(3) Å

Megascopic color was not observed; metallic; opaque.

In reflected light: pinkish white, distinct anisotropism, distinct bireflectance, pleochroic from light pink to pinkish white. $R_{\text{max.}}$ & $R_{\text{min.}}$: (72.6, 64.8%) 470 nm, (77.4, 68.2%) 546 nm, (78.5, 68.9%) 589 nm, (79.0, 69.0%) 650 nm.

2.96(9), 2.10(10), 1.72(3), 1.488(3), 1.214(4), 1.092(4).

IMA No. 94-048

A member of the epidote group

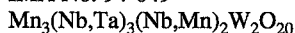
Monoclinic: $P2_1/m$ a 8.891(3), b 5.704(3), c 10.107(8) Å, β 113.99(2)°

Brown-red; vitreous; transparent.

Because of the small grain-size, most of the optical properties could not be determined.

2.897(100), 2.857(45), 2.707(60), 2.615(60), 2.178(60), 2.145(60).

IMA No. 94-049

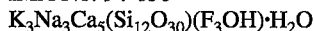
Monoclinic: $P2_1$ a 24.73(2), b 5.056(3), c 5.760(3) Å, β 103.50(7)°

Red to brown-red; metallic; opaque.

In reflected light: light grey, weak anisotropism, weak bireflectance, nonpleochroic. $R_{\text{max.}}$ & $R_{\text{min.}}$: (19.2, 18.0%) 470 nm, (18.5, 17.5%) 546 nm, (19.3, 18.5%) 589 nm, (16.5, 16.0%) 650 nm.

6.0(5), 3.74(8), 3.69(8), 2.98(10), 1.783(5), 1.744(6), 1.732(7), 1.456(5).

IMA No. 94-050

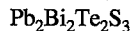
An F-dominant, triclinic polymorph of canasite with additional H_2O Triclinic: $P1$ a 10.0941(3), b 12.6913(2), c 7.2405(1) Å, α 90.00(2)°, β 111.02(2)°, γ 110.20(2)°

Lilac-grey, blue-grey, rarely greenish; vitreous; translucent.

Biaxial (-), α 1.536, β 1.539, γ 1.542, $2V(\text{meas.}) = 70^\circ$, $2V(\text{calc.}) = 89.8^\circ$.

5.88(37), 4.70(54), 4.21(40), 3.01(25), 2.915(100), 2.354(30), 2.307(21).

IMA No. 94-051



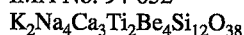
Hexagonal: space group unknown

 a 4.230(4), c 33.43(2) Å

Dark grey to black; metallic; opaque.

In reflected light: greyish white with a slight pinkish tint, very faint anisotropism, very weak bireflectance, nonpleochroic. R_O & R_E : (40.4, 39.3%) 470 nm, (42.1, 40.8%) 546 nm, (41.3, 40.8%) 589 nm, (41.9, 40.9%) 650 nm. 3.35(40), 3.06(100), 2.22(25), 2.115(50), 1.311(25), 1.213(25).

IMA No. 94-052

Orthorhombic: Fdd a 12.778(4), b 14.343(3), c 33.69(1) Å

Pink, dark red, seldom white; vitreous; transparent.

Biaxial (+), α 1.630, β 1.644(calc.), γ 1.675, $2V(\text{meas.}) = 70^\circ$.

9.23(9), 4.15(10), 3.30(10), 3.16(10), 2.53(10), 2.42(10), 1.582(9).

IMA No. 94-053

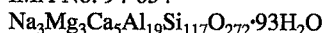
Monoclinic: $P2_1/a$ a 10.426(9), b 5.255(5), c 3.479(3) Å, β 93.14(8)°

Pale yellow; vitreous; transparent.

Biaxial (-), α 1.415, β 1.524, γ 1.592, $2V(\text{meas.}) = 72^\circ$, $2V(\text{calc.}) = 72^\circ$.

5.203(13), 2.898(27), 2.826(100), 2.602(56), 2.334(33), 2.177(13), 2.041(14).

IMA No. 94-054

Orthorhombic: $Cmca$ a 13.698(2), b 25.213(3), c 22.660(2) Å

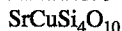
Colorless to light straw; vitreous; transparent.

Biaxial (-), α 1.480, β 1.485, γ 1.486, $2V(\text{meas.}) < 60^\circ$, $2V(\text{calc.}) 48^\circ$.

11.34(100), 10.64(31), 4.64(35), 4.37(79), 4.01(57), 3.938(36), 3.282(68).

A member of the zeolite group

IMA No. 94-055

Tetragonal: $P4/ncc$ a 7.366(1), c 15.574(3) Å

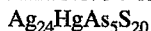
Colorless; vitreous; transparent.

Uniaxial (-), ω 1.630, ϵ 1.590.

7.79(35), 3.444(40), 3.330(100), 3.119(55), 3.033(50), 2.605(30), 2.322(30).

A member of the cuprorivaite group

IMA No. 94-056



Hexagonal: space group unknown

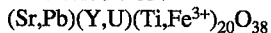
 a 15.00(1), c 15.46(3) Å

Wine-red to violet; metallic; opaque.

In reflected light: grey, weak to moderate anisotropism, very low bireflectance, weak pleochroism. $R_{\text{max.}}$ & $R_{\text{min.}}$: (31.0, 30.3%) 470 nm, (29.2, 27.6%) 546 nm, (27.6, 26.0%) 589 nm, (24.6, 23.9%) 650 nm.

3.17(6), 3.091(10), 2.998(4), 2.755(3), 1.878(8).

IMA No. 94-057

Hexagonal (rhombohedral): $R\bar{3}$ a 9.197(1), α 68.75(2)°

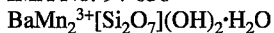
Black; metallic; opaque.

In reflected light: ash-grey with pale bluish tones, weak anisotropism, low bireflectance, very weak pleochroism.

 R_1 & R_2 : (17.73, 17.22%) 470 nm, (17.14, 16.50%) 546 nm, (16.54, 16.11%) 589 nm, (16.48, 16.00%) 650 nm. 3.412(m), 2.902(m), 2.846(mw), 2.499(mw), 1.916(mw), 1.603(m), 1.441(m).

A member of the crichtonite group

IMA No. 94-058

Orthorhombic: *Cmcm* (?)*a* 6.325(1), *b* 9.120(1), *c* 13.618(1) Å

Dark brown; earthy to brilliant; translucent to transparent.

Biaxial (-), α 1.82, β 1.845 (calc.), γ 1.85, $2V(\text{meas.})$ 46°.

4.85(100), 4.557(50), 4.322(59), 3.416(77), 2.869(80), 2.729(82).

The Ba-analogue of hennomartinite

IMA No. 94-059

Monoclinic: *C2/m**a* 9.893(4), *b* 18.015(5), *c* 5.279(3) Å, β 104.61(4)°

Grey to black; vitreous; opaque, but thin fragments are transparent.

Biaxial (-), α 1.603, β 1.613, γ 1.623, $2V(\text{meas.})$ 90°, $2V(\text{calc.})$ 89°.

9.06(6), 8.46(8), 3.282(9), 3.140(10), 2.703(6), 1.443(7).

A member of the amphibole group

**NEW MINERALS RECENTLY APPROVED
BY THE COMMISSION ON NEW MINERALS AND MINERAL NAMES,
INTERNATIONAL MINERALOGICAL ASSOCIATION**

The information given here is provided by the Commission on New Minerals and Mineral Names, IMA, for comparative purposes and as a service to mineralogists working on new species.

Each mineral is described in the following format:

IMA No. (any relationship to other minerals)
Chemical Formula
Crystal system, space group
unit-cell parameters
Color; luster; diaphaneity
Optical properties
Strongest lines in the X-ray powder-diffraction pattern

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves. No other information will be released by the Commission.

J.A. Mandarino, Chairman Emeritus, and J.D. Grice, Chairman
Commission on New Minerals and Mineral Names
International Mineralogical Association

1995 PROPOSALS

IMA No. 95-001 A member of the crandallite group
 $\text{SrFe}_3^{3+}(\text{PO}_4)_2(\text{OH}, \text{H}_2\text{O})_6$
Hexagonal (trigonal): $R\bar{3}m$
 a 7.28, c 16.85 Å
Yellow, brown; vitreous to resinous; transparent to translucent.
Uniaxial (-), ω 1.872, ϵ 1.862
5.88(10), 3.65(6), 3.06(9), 2.96(5), 2.81(5), 2.53(5), 2.25(6), 1.969(5), 1.820(5).

IMA No. 95-002 The Mn^{2+} and (O,F) analogue of paulkerrite
 $(\text{H}_2\text{O}, \text{K})_2\text{Ti}(\text{Mn}^{2+}, \text{Fe}^{2+})_2(\text{Fe}^{3+}, \text{Ti}^{4+})_2(\text{PO}_4)_4(\text{O}, \text{F})_2 \cdot 14\text{H}_2\text{O}$
Orthorhombic: $Pbca$
 a 10.561, b 20.858, c 12.516 Å
Greenish yellow, in some cases light brown; vitreous; transparent.
Biaxial (+), α 1.612, β 1.621, γ 1.649, $2V(\text{calc.})$ 59.9°
10.40(90), 7.50(80), 6.28(100), 5.22(40), 3.97(40), 3.77(50), 3.13(100), 2.88(40).

IMA No. 95-003
 $\text{Cu}(\text{Pt}, \text{Ir})_2\text{S}_4$
Cubic: $Fd\bar{3}m$
 a 9.940 Å
Steel grey; metallic; opaque.
In reflected light: white with greenish tint, isotropic, no bireflectance or pleochroism. R: (37.3%) 470 nm, (37.7%) 546 nm, (38.1%) 589 nm, (38.6%) 650 nm.
5.72(4), 2.98(6), 2.48(5), 1.90(7), 1.75(10), 1.29(5), 1.014(5).

IMA No. 95-005

The strontium end-member of the cryptomelane group

 $(\text{Sr}, \text{Ba}, \text{K})\text{Mn}_8\text{O}_{16}$ Monoclinic: $P2_1/n$ a 10.00, b 5.758, c 9.88 Å, β 90.64°

Black; submetallic; opaque.

In reflected light: grey; strong anisotropism, grey-blue to white bireflectance, pleochroism strong. R_{\max} and R_{\min} : (34.2, 26.0%) 470 nm, (31.7, 24.4%) 546 nm, (30.6, 23.4%) 589 nm, (27.9, 22.3%) 650 nm.

3.15(100), 3.13(80), 2.409(80), 2.229(40), 2.170(60), 2.170(60), 1.556(50).

IMA No. 95-006

The silver analogue of roquesite in the chalcopyrite group

 AgInS_2 Tetragonal: $I4_2d$ a 5.880, c 11.21 Å

Havana brown; metallic; opaque.

In reflected light: brownish grey; abundant red internal reflections; strong anisotropism in oil from red brick with orange tint to bluish grey and purplish; pleochroism weak, brown to clear brown-grey in oil. R_{\max} and R_{\min} : (29.3, 27.8%) 460 nm, (27.5, 25.9%) 540 nm, (27.65, 25.6%) 580 nm, (27.4, 27.5%) 660 nm.

3.351(100), 2.941(80), 2.082(75), 2.030(75), 1.767(80), 1.188(40).

IMA No. 95-007

Probably belongs to the marcasite group

 CoSbAs

Orthorhombic: space group unknown

 a 3.304, b 6.092, c 10.26 Å

White; metallic; opaque.

In reflected light: silver-white, weak to distinct anisotropism, weak bireflectance, nonpleochroic. R_2 and R_1 : (58.2, 55.5%) 470 nm, (56.8, 55.6%) 546 nm, (55.8, 55.5%) 589 nm, (55.0, 55.5%) 650 nm.

2.63(10), 2.53(8), 1.942(10), 1.730(4), 1.640(4), 1.3963(4), 1.1182(8).

IMA No. 95-009

The natural analogue of synthetic PtSe_2 PtSe_2 Hexagonal (trigonal): $P\bar{3}m1$ a 3.730, c 5.024 Å

Silvery lead grey; metallic; opaque.

In reflected light: white; anisotropism moderate to strong with tints from pinkish yellow to dark grey – lilac; strong bireflectance; pleochroism: R_{\max} light yellow, R_{\min} light lilac. R_{\max} and R_{\min} : (48.4, 35.1%) 470 nm, (48.3, 35.0%) 546 nm, (49.1, 35.3%) 589 nm, (50.8, 36.5%) 650 nm.

5.04(3), 2.72(10), 1.983(5), 1.859(5), 1.747(3), 1.360(4).

IMA No. 95-011

 $\text{Cu}(\text{Mg}, \text{Cu}, \text{Fe}, \text{Zn})_2\text{Te}^{6+}\text{O}_6 \cdot 6\text{H}_2\text{O}$ Hexagonal (trigonal): $P3$ a 5.305, c 9.693 Å

Pale yellow to pale orange-yellow; vitreous; transparent to somewhat translucent.

Uniaxial (-), ω 1.803, ϵ 1.581 (calc.).

9.70(100), 4.834(80), 4.604(60), 2.655(60), 2.556(70), 2.326(70), 1.789(40).

IMA No. 95-012

 $\text{Cu}[\text{AsO}_3\text{OH}] \cdot 2\text{H}_2\text{O}$ Triclinic: $P\bar{1}$ a 6.020, b 7.632, c 11.168 Å, α 74.43°, β 89.32°, γ 86.55°

Turquoise blue; vitreous; transparent.

Biaxial (-), α 1.615, β 1.660, γ 1.700, $2V(\text{meas.})$ 82°, $2V(\text{calc.})$ 84°.

7.35(100), 5.239(50), 4.440(60), 3.936(60), 3.302(40), 3.008(50), 2.840(35).

IMA No. 95-013

The zinc analogue of arsenbrackebuschite

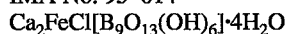
 $\text{Pb}_2(\text{Zn}, \text{Fe})[(\text{As}, \text{S})\text{O}_4]_2 \cdot \text{H}_2\text{O}$ Monoclinic: $P2_1$ or $P2_1/m$ a 8.973, b 5.955, c 7.766 Å, β 112.20°

Pale olive green with streaks of white; adamantine; transparent.

In reflected light: pale brownish grey; abundant colorless to very pale yellow internal reflections; anisotropism not detectable by eye; bireflectance measurable but not noticeable by the eye; nonpleochroic.

R_{\min} and R_{\max} : (11.2, 11.5%) 470 nm, (10.8, 10.9%) 546 nm, (10.7, 10.8%) 589 nm, (10.7, 10.8%) 650 nm.
4.85(50), 3.659(30), 3.246(100), 2.988(60), 2.769(60), 2.293(30), 2.107(50), 1.889(30).

IMA No. 95-014



Monoclinic: $P2_1$

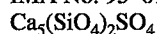
a 11.64, b 9.38, c 8.735 Å, β 98.40°

Pale yellow; vitreous; transparent.

Biaxial (+), α 1.550, β 1.554, γ 1.592, $2V(\text{meas.})$ 36.6°, $2V(\text{calc.})$ 32.6°.

8.65(3), 7.29(10), 5.32(2), 4.50(2), 2.958(3), 2.744(2), 2.113(3).

IMA No. 95-015



Orthorhombic: $Pnma$

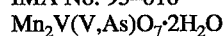
a 6.863, b 15.387, c 10.181 Å

Bright blue; vitreous; transparent.

Biaxial (-), α 1.630, β 1.637, γ 1.640, $2V(\text{meas.})$ 63.3°, $2V(\text{calc.})$ 66.2°.

3.198(27), 3.042(32), 2.853(40), 2.830(100), 2.617(32), 2.565(57), 1.9612(26), 1.8924(27).

IMA No. 95-016



Monoclinic: $P2_1/n$

a 7.809, b 14.554, c 6.705 Å, β 93.25°

Orange-red; vitreous; transparent.

Biaxial, mean n 1.82, $2V$ small.

5.32(80), 3.436(50), 3.260(50), 3.039(100), 2.723(60), 2.573(50b), 2.441(50), 1.592(60).

IMA No. 95-017

The natural analogue of synthetic FeNb_3S_6



Hexagonal: $P6_322$

a 5.771, c 12.190 Å

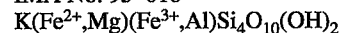
Dark grey to black; metallic; opaque.

In reflected light: grey; distinct to strong anisotropism from blue-grey to dark brown; distinct bireflectance; pleochroism, light grey to grey. R_{\max} and R_{\min} : (36.3, 29.5%) 470 nm, (36.6, 29.4%) 546 nm, (36.1, 28.9%) 589 nm, (34.7, 28.1%) 650 nm.

6.11(8), 3.04(6), 2.88(5), 2.606(8), 2.096(10), 1.665(8), 1.524(6).

IMA No. 95-018

A member of the mica group (compare 95-019)



Monoclinic: $C2/m$

a 5.270, b 9.106, c 10.125 Å, β 100.27°

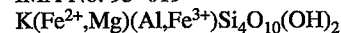
Blue green; earthy; translucent in thin section.

Complete optical data could not be measured, mean n 1.640.

3.65(52), 3.358(86), 3.321(100), 3.090(60), 2.584(50).

IMA No. 95-019

A member of the mica group (compare 95-018)



Monoclinic: $C2/m$

a 5.270, b 9.106, c 10.125 Å, β 100.27°

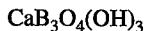
Blue green; earthy; translucent in thin section.

Complete optical data could not be measured, mean n 1.625.

3.65(52), 3.358(86), 3.321(100), 3.090(60), 2.584(50).

NOTE: The minerals represented by 95-018 and 95-019 occur intimately mixed, have the same unit-cell parameters, and give the same X-ray powder-diffraction data. They differ in chemical composition.

IMA No. 95-020

Monoclinic: *Pc*

a 7.234, b 8.130, c 8.378 Å, β 98.22°

Colorless to white; vitreous; transparent to translucent.

Biaxial (-), α 1.580, β 1.605, γ 1.623, $2V(\text{meas.})$ 63°, $2V(\text{calc.})$ 80°.

4.30(64), 3.379(100), 3.169(25), 3.122(31), 2.151(20), 1.919(20), 1.846(45).

IMA No. 95-021

Hexagonal (trigonal): *P31m*

a 5.295, c 5.372 Å

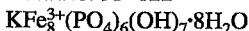
Colorless to pale yellow; resinous; transparent.

Uniaxial (-), ω 2.092, ϵ 1.920

3.49(VS), 2.648(M), 2.110(W), 1.887(W), 1.651(W), 1.531(W).

The natural analogue of synthetic PbSb_2O_6

IMA No. 95-022

Monoclinic: *C2*, *Cm* or *C2/m*

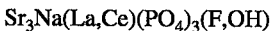
a 29.52, b 5.249, c 18.56 Å, β 109.27°

Yellowish brown, pale yellow, cream to white; vitreous to silky; translucent.

Biaxial (+), α 1.780, β 1.785, γ 1.800, $2V(\text{calc.})$ 60°.

9.41(60), 4.84(90), 4.32(70), 4.25(50), 3.470(60), 3.216(100), 3.116(80).

IMA No. 95-023

Hexagonal (trigonal): *P3*

a 9.647(1), c 7.170(1) Å

Bright yellow to greenish yellow; vitreous; transparent.

Uniaxial (-), ω 1.653, ϵ 1.635.

3.59(87), 3.30(65), 3.17(32), 2.897(100), 2.884(100), 2.790(54), 1.910(36), 1.796(36).

IMA No. 95-024

Cubic: *Pm3* or *P23*

a 3.911 Å

Brownish black; adamantine; opaque.

In reflected light: bluish; reddish brown internal reflections; isotropic; nonpleochroic. R: (15.75%) 480 nm, (15.00%) 540 nm, (14.70%) 580 nm, (14.35%) 660 nm.

3.915(35), 2.765(100), 1.953(53), 1.747(8), 1.594(30), 1.380(22), 1.234(7).

The cubic polymorph of lueshite and natroniobite

IMA No. 95-025

Hexagonal (trigonal): *P3*

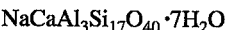
a 3.082, c 11.116 Å

Pale blue; vitreous to waxy, translucent.

Uniaxial (sign unknown), ω 1.532, ϵ unknown.

11.12(100), 5.549(24), 3.704(15), 2.595(6), 2.408(6), 2.167(4), 1.926(4).

IMA No. 95-026

Orthorhombic: *Cmcm*

a 9.747, b 23.880, c 20.068 Å

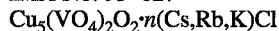
Colorless; vitreous; transparent.

Biaxial (+), α 1.476, β 1.478, γ 1.483, $2V(\text{meas.})$ 65°, $2V(\text{calc.})$ 65°.

11.94(40), 9.04(33), 8.23(29), 7.69(29), 3.79(100), 3.61(40).

A member of the zeolite group

IMA No. 95-027

Hexagonal (trigonal): $P3$ a 6.375, c 8.399 Å

Black; resinous to metallic; opaque.

Reflectance measurements could not be made because the material is too fine grained.

3.43(7), 2.810(4), 2.315(10), 2.131(3), 1.598(4).

IMA No. 95-028

An hexagonal polymorph of alabandite

MnS

Hexagonal: $P6_3mc$ a 3.9817, c 6.4447 Å

Dark brown to black; resinous; opaque.

In reflected light: steel grey; brown-red internal reflections; anisotropism, 2.62 to 2.77; bireflectance, 0.15; nonpleochroic. R_{\max} and R_{\min} : (24.5, 22.1%) 470 nm, (22.6, 20.5%) 546 nm, (22.1, 20.0%) 589 nm, (21.6, 19.6%) 650 nm.

3.445(89), 3.217(72), 3.036(66), 1.988(82), 1.820(100), 1.691(63).

IMA No. 95-029

The Mn-analogue of berthierite

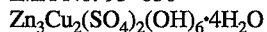
 MnSb_2S_4 Orthorhombic: $Pnam$ a 11.47, b 14.36, c 3.81 Å

Black; submetallic; opaque.

In reflected light: light grey; distinct anisotropism; faint bireflectance; nonpleochroic. R_{\max} and R_{\min} : (35.0, 24.0%) 470 nm, (36.1, 23.9%) 546 nm, (36.9, 24.9%) 589 nm, (35.6, 25.7%) 650 nm.

4.46(40), 3.69(90), 3.23(70), 3.05(40), 2.90(80), 2.65(100), 2.18(40), 1.906(40), 1.813(50).

IMA No. 95-030

Triclinic: $P\bar{1}$ a 5.415, b 6.338, c 10.475 Å, α 94.38°, β 90.08°, γ 90.24°

Greenish blue; vitreous; transparent.

Biaxial (+), α 1.629, β 1.630, γ 1.637, $2V(\text{meas.})$ 60°, $2V(\text{calc.})$ 42°.

10.459(61), 5.230(74), 3.486(40), 3.157(6), 2.728(6), 2.493(7), 2.355(7), 1.743(9).

IMA No. 95-031

Monoclinic: Cm a 14.692, b 14.164, c 7.859 Å, β 117.87°

White; vitreous; translucent.

Biaxial (+), α 1.649, β 1.655, γ 1.759, $2V(\text{meas.})$ 20°, $2V(\text{calc.})$ 28°.

7.10(9), 4.98(6), 3.262(10), 3.151(8b), 2.956(6), 2.549(4), 1.723(4), 1.591(4b), 1.451(4b).

IMA No. 95-032

(Fe,Os,Ru,Ir)

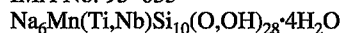
Hexagonal: $P6_3/mmc$ a 2.591, c 4.168 Å

Megascopic color unknown; metallic; opaque.

In reflected light: white; weak anisotropism. R : (57.4%) 470 nm, (53.4%) 546 nm, (53.3%) 589 nm, (54.4%) 650 nm.

2.246(5), 2.087(6), 1.976(10), 1.297(6b), 1.180(6b), 1.100(5b).

IMA No. 95-033

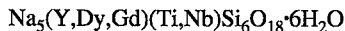
Monoclinic: $I2/m$ a 13.033, b 18.717, c 12.264 Å, β 99.62°

Yellow, pinkish yellow or pink; vitreous to greasy; translucent to transparent.

Biaxial (-), α 1.536, β 1.545, γ 1.553, $2V(\text{meas.})$ 87°, $2V(\text{calc.})$ 86°.

10.56(100), 6.38(50), 5.55(45), 4.78(40), 4.253(40), 3.196(80), 2.608(50).

IMA No. 95-034

Hexagonal (trigonal): $R\bar{3}2$

$$a \ 10.696, \ c \ 15.728 \text{ \AA}$$

Colorless; vitreous; transparent or cloudy.

Uniaxial (-), ω 1.612, ϵ 1.607.

5.99(60), 3.21(100), 3.093(40), 2.990(85), 2.61(40), 1.998(55), 1.481(44b).

IMA No. 95-035

(Nb,Ta)C

Cubic: $Fm\bar{3}m$

$$a \ 4.45 \text{ \AA}$$

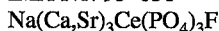
Bronze-yellow; metallic; opaque.

In reflected light: yellowish to rose-cream; no anisotropism, bireflectance or pleochroism. R: (33.9%) 480 nm, (38.5%) 540 nm, (45.1%) 580 nm, (52.8%) 660 nm.

2.56(10), 2.22(9), 1.574(8), 1.343(8), 1.289(7), 1.115(3).

IMA No. 95-036

The calcium-dominant analogue of belovite-(Ce)

Hexagonal (trigonal): $P\bar{3}$

$$a \ 9.51, \ c \ 7.01 \text{ \AA}$$

Bright yellow; vitreous; transparent.

Uniaxial (-), ω 1.682, ϵ 1.660.

3.51(30), 3.12(40), 2.84(100b), 2.753(40), 1.967(30), 1.870(30).

IMA No. 95-037

The natural analogue of synthetic $\text{Fe}^{3+}\text{PO}_7$ Hexagonal (trigonal): $R\bar{3}m$

$$a \ 7.994, \ c \ 6.855 \text{ \AA}$$

Brown to red brown; greasy; nontranslucent.

Optical data could not be obtained because of the small size of the domains.

4.86(10), 3.09(100), 2.446(16), 2.078(20), 1.997(13), 1.845(11), 1.623(23), 1.545(12), 1.440(16).

IMA No. 95-038

The natural analogue of synthetic $\text{Fe}^{3+}\text{PO}_4$ Hexagonal (trigonal): $P\bar{3}_121$

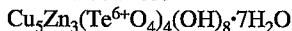
$$a \ 5.048, \ c \ 11.215 \text{ \AA}$$

Brown to red-brown; greasy; nontranslucent.

Optical data could not be obtained because of the small size of the domains.

4.360(19), 3.445(100), 2.518(7), 2.362(14), 2.298(7), 2.180(10), 1.8846(12), 1.5814(8), 1.4214(10).

IMA No. 95-039

Triclinic: $P1$ or $P\bar{1}$

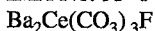
$$a \ 8.794, \ b \ 9.996, \ c \ 5.660 \text{ \AA}, \ \alpha \ 104.10^\circ, \ \beta \ 90.07^\circ, \ \gamma \ 96.34^\circ$$

Pale blue to deeper blue-green; vitreous to pearly; transparent to translucent.

In reflected light: very pale light brown; light emerald green internal reflections; anisotropism unknown; slight bireflectance. R values could not be measured with certainty.

9.638(100), 8.736(50), 4.841(100), 2.747(60), 2.600(45).

IMA No. 95-040

Monoclinic: $P2_1/m$ or $P2_1$

$$a \ 13.396, \ b \ 5.067, \ c \ 6.701 \text{ \AA}, \ \beta \ 106.58^\circ$$

Yellow; vitreous; transparent.

Biaxial (-), α 1.584, β 1.724, γ 1.728, $2V(\text{meas.})$ 16° , $2V(\text{calc.})$ 18° .

4.000(10), 3.269(100), 2.535(20), 2.140(40), 2.003(40), 1.635(10), 1.373(10).

IMA No. 95-041

In₂PtCubic: $Fm\bar{3}m$, $F4\bar{3}2$ or $F4\bar{3}m$ a 6.364 Å

Bright white; metallic; opaque.

In reflected light: bright white with yellowish tint; no anisotropism, bireflectance or pleochroism. R: (49.3%) 470 nm, (60.6 %) 550 nm, (68.5%) 590 nm, (80.1%) 650 nm.

2.25(100), 1.92(60), 1.59(60), 1.299(80), 1.125(60), 1.076(60), 1.006(60).

IMA No. 95-042

InPt₃Cubic: $Pm\bar{3}m$ a 3.988 Å

Bright white; metallic; opaque.

In reflected light: bright white with yellowish tint; no anisotropism, bireflectance or pleochroism. R: (56.1%)

470 nm, (62.5%) 550 nm, (65.7%) 590 nm, (71.3%) 650 nm.

2.30(100), 1.99(60), 1.411(40), 1.203(80), 1.151(40), 0.997(20).

IMA No. 95-043

Fe₂(Ta,Nb)Hexagonal: $P6_3/mmc$, $P6_3mc$ or $P\bar{6}2c$ a 4.87, c 7.76 Å

Greyish yellow; metallic; opaque.

In reflected light: greyish white; no anisotropism, bireflectance or pleochroism. R: (55.4%) 460 nm, (60.8%) 540 nm, (65.7%) 590 nm, (71.3%) 660 nm.

2.84(7), 2.46(6), 2.22(9), 2.00(3), 1.92(4), 1.41(3), 1.34(8).

IMA No. 95-044

Bi₁₆CrO₂₇The natural analogue of synthetic Bi₁₆CrO₂₇Tetragonal: $I4$, $I\bar{4}$ or $I4/m$ a 8.649, c 17.24 Å

Orange-brown; adamantine; translucent.

Uniaxial (+), ω 2.50, ϵ 2.55.In reflected light: greyish white to light orange; orange internal reflections; weak anisotropism; weak bireflectance; very weak pleochroism. R_E and R_O: (21.46, 19.40%) 470 nm, (27.46, 25.22%) 546 nm, (29.80, 26.22%) 589 nm, (29.98, 25.96%) 650 nm.

3.19(100), 2.730(40), 1.980(40), 1.715(30), 1.655(55), 1.124(25), 1.054(25).

IMA No. 95-045

Li₂(Mg,Fe²⁺)₃Fe³⁺Si₈O₂₂(OH)₂

A member of the amphibole group

Monoclinic: $C2/m$ a 9.474, b 17.858, c 5.268 Å, β 101.88°

Black; vitreous; translucent.

Biaxial (+), α 1.699, β 1.703, γ 1.708, $2V(\text{meas.})$ 72°, $2V(\text{calc.})$ 84°.

8.222(61), 4.458(19), 3.044(100), 2.741(53), 2.712(14), 2.341(14), 1.433(46), 1.392(14).

IMA No. 95-046

Na₂(Sr,Ba)₁₄Na₂Al₁₂F₆₄(F,OH)₄Monoclinic: $C2/m$ a 16.046, b 10.971, c 7.281 °, β 101.734°

Colorless to white; vitreous; translucent.

Biaxial (-), α 1.436, β 1.442, γ 1.442, $2V(\text{meas.})$ 0-5°, $2V(\text{calc.})$ 0°.

7.844(8), 3.643(9), 3.453(10), 3.193(10), 3.112(9), 2.989(9), 2.220(8), 2.173(9), 2.001(8).

IMA No. 95-047

IrBiS

Cubic: $P2_13$ a 6.164 Å

Steel black; metallic; opaque.

In reflected light: bright white with yellowish tint, isotropic. R: (46.2%) 470 nm, (47.2%) 550 nm, (47.6%) 590 nm, (47.4%) 650 nm.
2.75(70), 2.51(60), 1.860(100), 1.090(50), 1.090(50).

IMA No. 95-048

$\text{Cu}^{2+}(\text{AsO}_3\text{OH})\cdot\text{H}_2\text{O}$

Triclinic: $P1$ or $P\bar{1}$

a 6.435, b 11.257, c 18.662 Å, α 79.40°, β 86.48°, γ 83.59°

Very light green to colorless; vitreous; transparent.

Biaxial (+), α 1.602, β 1.642, γ 1.725, $2V(\text{meas.})$ 70°, $2V(\text{calc.})$ 73°.

18.3(25), 11.00(100), 3.171(30), 2.952(50), 2.920(60), 2.816(50), 2.492(25).

A polymorph of geminite

IMA No. 95-049

$(\text{Pt},\text{Pd},\text{Cu})_9\text{Cu}_3\text{Sn}_4$

Orthorhombic: $Pmmm$, $Pmm2$ or $P222$

a 7.89, b 4.07, c 7.73 Å

Pinkish lilac; metallic; opaque.

In reflected light: pinkish lilac, distinct to moderate anisotropism, weak to distinct bireflectance, pleochroic from brownish pink to pinkish lilac. R_{max} and R_{min} : (44.1, 42.8%) 470 nm, (50.0, 49.5%) 546 nm, (54.6, 51.8%) 589 nm, (56.8, 55.6%) 650 nm.

2.283(10), 2.163(4), 2.030(2), 1.369(3), 1.218(2), 1.143(2).

The Pt-dominant analogue of taimyrite

IMA No. 95-050

$\text{Bi}_2\text{O}(\text{OH})\text{VO}_4$

Monoclinic: $P2_1/c$

a 6.973, b 7.539, c 10.881 Å, β 107.00°

Light brown; adamantine; transparent to translucent.

Biaxial (+), α 2.26, β 2.27, γ 2.30, $2V(\text{meas.})$ 65°, $2V(\text{calc.})$ 61°.

6.667(23), 6.102(22), 4.279(38), 3.267(100+), 3.150(62), 2.734(36), 2.549(21), 1.889(21).

The vanadium analogue of atelestite

IMA No. 95-051

$\text{Ca}_4(\text{Ca},\text{Sr},\text{K},\text{Ba})_3\text{Cu}_3\text{Al}_{12}\text{Si}_{12}\text{O}_{48}(\text{OH})_8\sim\text{H}_2\text{O}$

Cubic: $Fm\bar{3}m$

a 31.62 Å

Light blue; vitreous; transparent.

Isotropic: n 1.505.

18.34(100), 15.82(50), 9.69(5), 4.43(5), 3.87(5), 3.47(5).

A member of the zeolite group

IMA No. 95-052

$\text{KCr}_2[\text{AlSi}_3\text{O}_{10}](\text{OH},\text{F})_2$

Monoclinic: $C2/c$

a 5.32, b 9.07, c 20.20 Å, β 95.6°

Emerald green; vitreous; transparent.

Biaxial (-), α 1.619, β 1.669, γ 1.673, $2V(\text{meas.})$ 31°, $2V(\text{calc.})$ 31°.

9.94(6), 4.52(8), 2.60(10), 2.40(6), 2.15(6), 1.519(10).

A member of the mica group;
the Cr-dominant analogue of muscovite

IMA No. 95-053

$\text{SrLa}(\text{CO}_3)_2(\text{OH})\cdot\text{H}_2\text{O}$

Orthorhombic: $Pm\bar{c}n$

a 5.072, b 8.589, c 7.276 Å

Light yellow to yellowish brown; vitreous; transparent.

Biaxial (+), α 1.640, β 1.668 (calc.), γ 1.731, $2V(\text{meas.})$ 70°.

4.36(92), 3.738(88), 3.705(90), 2.955(100), 2.664(89), 2.358(87), 2.092(80).

The lanthanum-dominant analogue of ancylite-(Ce)

**NEW MINERALS RECENTLY APPROVED
BY THE
COMMISSION ON NEW MINERALS AND MINERAL NAMES
INTERNATIONAL MINERALOGICAL ASSOCIATION**

The information given here is provided by the Commission on New Minerals and Mineral Names, International Mineralogical Association (IMA), for comparative purposes and as a service to mineralogists working on new species. Each mineral is described in the following format:

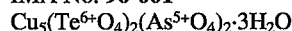
IMA Number	
Chemical formula	Any relationship to other minerals
Crystal system, space group unit-cell parameters	
Color, luster, diaphaneity	
Optical properties	
Strongest lines in the X-ray powder-diffraction pattern [<i>d</i> in Å(<i>l</i>)]	

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves. No other information will be released by the Commission.

Joseph A. Mandarino, Chairman Emeritus, and Joel D. Grice, Chairman
Commission on New Minerals and Mineral Names
International Mineralogical Association

1996 PROPOSALS

IMA No. 96-001



Triclinic: $P1$ or $P\bar{1}$

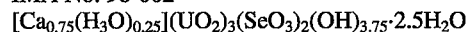
a 8.984, b 10.079, c 8.975 Å, α 102.68°, β 92.45°, γ 70.45°

Emerald green; vitreous to adamantine; transparent to translucent

Biaxial, indices of refraction calculated from reflectance measurements are 1.71–1.73

9.28(70), 4.65(70), 3.097(100), 3.018(60), 2.658(50), 2.468(50), 1.740(50)

IMA No. 96-002



Orthorhombic: $Pmn2_1$ or $Pmnm$

a 7.010, b 17.135, c 17.606 Å

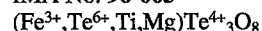
Lemon-yellow; pearly; translucent

Biaxial (–), α 1.54 calc., β 1.73, γ 1.75, $2V(\text{meas.})$ 33°

8.79(80), 8.56(40), 3.51(100), 3.24(40), 3.093(50), 3.032(100), 1.924(40)

The calcium-dominant analogue of **guilleminite**

IMA No. 96-003



Cubic: $Ia\bar{3}$

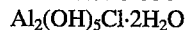
a 11.011 Å

Orange; adamantine; translucent

Isotropic, $n(\text{calc.}) = 2.17$

4.486(29), 3.175(100), 2.943(23), 2.749(37), 2.592(22), 1.944(44), 1.658(45)

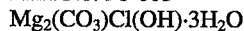
The Fe^{3+} -dominant analogue of **winstanleyite**

IMA No. **96-004**Cubic: *Im*3*m**a* 19.878 Å

Yellow-orange to yellow-brown; vitreous; transparent

Isotropic, *n* 1.53–1.55

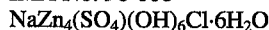
8.11(70), 7.03(50), 4.47(60), 3.23(70), 2.706(100), 2.446(80), 1.957(70)

IMA No. **96-005**Hexagonal (trigonal): *R*3*c* or *R*3̄*c**a* 23.163, *c* 7.221 Å

White; luster and diaphaneity unknown

Uniaxial, ω 1.510, ε 1.510

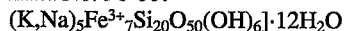
11.66(100), 3.396(17), 3.356(17), 3.264(21), 3.218(21), 3.000(41), 2.657(22)

IMA No. **96-006**Hexagonal (trigonal): *P*3̄*a* 8.359, *c* 13.059 Å

Colorless to white; pearly; translucent

Uniaxial (–), ω 1.5607, ε 1.5382

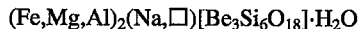
14.244(100), 6.501(23), 4.339(15), 3.258(14), 2.967(10)

IMA No. **96-007**Triclinic: *P*1̄*a* 14.86, *b* 20.54, *c* 5.29 Å, α 95.6°, β 92.3°, γ 94.4°

Pink-brownish; silky to earthy; translucent

Biaxial (+), α 1.523, β 1.525, γ 1.550, 2*V*(meas.) 30°, 2*V*(calc.) 32°

12.36(100), 11.60(40), 10.21(14), 3.411(37), 3.281(15), 2.896(12)

IMA No. **96-008**Hexagonal: *P*6/*mcc**a* 9.387, *c* 9.202 Å

Light blue; vitreous; transparent

Uniaxial (–), ω 1.625, ε 1.619

8.12(S), 4.00(M), 3.278(VS), 2.903(S), 2.553(MW), 1.752(MW)

The Fe³⁺-dominant analogue of berylIMA No. **96-009**Monoclinic: *P**n**a* 17.42, *b* 8.077, *c* 17.33 Å, β 121.48°

Colorless to white; vitreous; transparent to translucent

Biaxial (–), α 1.506, β 1.527, γ 1.532, 2*V*(meas.) 56°, 2*V*(calc.) 51°

8.10(10), 4.04(4), 3.56(2), 2.834(2), 2.535(2), 2.276(2)

IMA No. **96-010**Monoclinic: *A*2/*m**a* 7.184, *b* 14.289, *c* 5.006 Å, β 105.17°

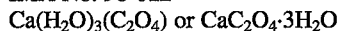
Black; metallic; opaque

In reflected light: greyish white, no bireflectance, nonpleochroic. *R*₁, *R*₂: 20.1, 20.8% (460 nm), 18.7,

19.3% (540 nm), 18.2, 18.9% (580 nm), 17.5, 18.1% (660 nm)

3.117(30), 2.846(80), 2.681(100), 2.029(30), 1.5825(50)

The Fe³⁺-dominant analogue of tomichite

IMA No. 96-012Triclinic: *P*

a 6.097, b 7.145, c 8.434 Å, α 76.54°, β 70.30°, γ 70.75°

Colorless; vitreous; transparent

Biaxial (-), α' 1.483, β 1.516(calc.), γ' 1.533, $2V(\text{meas.})$ 70°, $2V(\text{calc.})$ 70°

7.92(M), 5.52(VS), 5.26(M), 4.99(M), 3.642(M), 2.834(S), 2.758(M), 2.732(M)

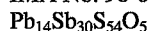
IMA No. 96-013Orthorhombic: *Pnmm* or *Pnn2*

a 15.908, b 16.274, c 6.903 Å

Pale yellow to white; vitreous; transparent

Biaxial (-), α 1.470, β 1.492, γ 1.504(calc.), $2V(\text{meas.})$ 73°

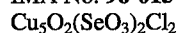
7.95(81), 5.91(100), 3.941(71), 3.451(67), 3.166(50), 2.894(41), 2.596(70)

IMA No. 96-014Monoclinic: *C2/m*

a 52.00, b 8.148, c 24.311 Å, β 104.09°

Bluish black; metallic; opaque

In reflected light: black with blue-red reflections, low anisotropism, low bireflectance, nonpleochroic.

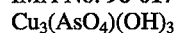
 R_1, R_2 : 40.03, 42.90% (470 nm), 36.46, 40.92% (546 nm), 35.65, 40.25% (589 nm), 32.40, 36.00% (650 nm)
4.04(m), 3.47(s), 3.44(m), 3.04(m), 2.96(s), 2.296(m)**IMA No. 96-015**Monoclinic: *P2₁/c*

a 6.045, b 13.778, c 5.579 Å, β 95.76°

Chestnut to dark brown; very strong, vitreous to adamantine; translucent

Biaxial (-), α 2.06, β 2.11, γ 2.15, $2V(\text{meas.})$ large, $2V(\text{calc.})$ 82°

6.88(68), 5.511(50), 2.990(100), 2.963(94), 2.566(67), 2.296(95)

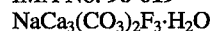
IMA No. 96-017Triclinic: *P1*

a 5.445, b 5.873, c 5.104 Å, α 114.95°, β 93.05°, γ 91.92°

Green-blue; vitreous; transparent

Biaxial (-), α 1.760, β 1.80, γ 1.83, $2V(\text{meas.})$ 77°, $2V(\text{calc.})$ 80°

4.613(100), 4.580(50), 3.390(60), 2.713(40), 2.543(40), 2.445(30)

A triclinic polymorph of **clinoclase****IMA No. 96-019**Hexagonal (trigonal): *P3₂*

a 6.718, c 15.050 Å

Colorless to white; vitreous; transparent to translucent

Uniaxial (+), ω 1.538, ϵ 1.563

5.809(30), 5.010(30), 3.358(30), 2.791(50), 2.508(40), 2.010(100), 1.939(40)

IMA No. 96-020Tetragonal: *P4₂/nmm*

a 12.627, c 12.595 Å

Apple green to emerald green; vitreous to adamantine; transparent

Anomalously biaxial (+), α , β , and $\gamma > 1.92$

8.95(20), 7.30(20), 3.99(30), 2.975(100), 2.752(30), 2.473(20), 1.716(20)

IMA No. 96-022 $(Ca,R)_5(PO_4)_3F$ $R = Sr, Na, REE$ Hexagonal: $P6_3$ a 9.485, c 7.000 Å

Pale yellow; vitreous; transparent

Uniaxial (-), ω 1.649, ϵ 1.637

3.498(45), 3.104(22), 2.838(100), 2.814(48), 2.740(53), 1.963(21), 1.865(31)

A polymorph of **fluorapatite****IMA No. 96-023** $(Na,REE)_{15}(Ca,REE)_6Mn_3Zr_3NbSi_{25}O_{76}F_2$ Hexagonal (trigonal): $R3m$ a 14.1686, c 30.0847 Å

Yellow-brown; vitreous; transparent

Uniaxial (-), ω 1.628, ϵ 1.623

11.362(43), 7.084(41), 5.681(30), 4.296(34), 3.382(37), 2.962(91), 2.840(100)

A manganese- and fluorine-rich member of the eudialyte group

IMA No. 96-024 $ScPO_4$ Tetragonal: $I4_1/amd$ a 6.589, c 5.806 Å

Pale pink; vitreous; transparent

Uniaxial (+), ω 1.790, ϵ 1.86

3.293(100), 2.464(8), 2.178(4), 2.055(4), 1.693(6), 1.647(6)

The scandium-dominant analogue of **xenotime-(Y)****IMA No. 96-025** $Na_3Ca_4Al_{11}Si_{85}O_{192} \cdot 60H_2O$ Orthorhombic: $Pnma$ a 20.223, b 20.052, c 13.491 Å

Colorless to milky-white; silky to vitreous; opaque to transparent

Biaxial (-), α 1.485, β 1.487, γ 1.488, $2V(\text{calc.})$ 70°

11.20(84), 9.98(35), 3.85(100), 3.75(98), 3.67(27), 3.00(32)

A member of the zeolite group

IMA No. 96-026 $\gamma\text{-Hg}_3\text{S}_2\text{Cl}_2$ Orthorhombic: $Ammm$, $A222$ or $A2mm$ ($Am2m$, $Amm2$) a 9.332, b 16.82, c 9.108 Å

Canary yellow; glassy; transparent

Biaxial (+), mean index of refraction 2.25, $2V(\text{meas.}) > 70^\circ$ In reflected light: white, anisotropism and bireflectance not observed, $R(\text{est.}) \approx 15\%$

3.65(90), 3.11(51), 2.83(36), 2.60(49), 2.58(100), 2.33(41), 2.11(31)

An orthorhombic polymorph of **corderoite****IMA No. 96-027** $NaCu_5O_2(\text{SeO}_3)_2\text{Cl}_3$ Orthorhombic: $Pbnm$ a 10.482, b 17.732, c 6.432 Å

Emerald-green; vitreous; transparent

Biaxial (-), α 1.845, β 1.968, γ 1.975, $2V(\text{meas.})$ 20°, $2V(\text{calc.})$ 31°

9.01(10), 8.84(60), 5.24(100), 3.251(40), 2.955(27), 2.626(25), 2.513(12)

IMA No. 96-028 $NaFe^{2+}_4(\text{PO}_4)_3$ Hexagonal (trigonal): $R\bar{3}$ a 14.97, c 41.66 Å

Very pale amber; waxy; transparent

Uniaxial (+), ω 1.72, ϵ 1.75

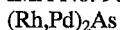
4.13(80), 3.47(50), 3.21(50), 3.01(90), 2.93(50), 2.85(50), 2.71(100), 2.57(50)

IMA No. **96-029**Monoclinic: $C2/m$, Cm or $C2$ a 14.767, b 5.574, c 15.079 Å, β 91.959°

White; vitreous; transparent

Biaxial (+), α 1.629, β 1.640, γ 1.654, $2V(\text{meas.})$ 82°, $2V(\text{calc.})$ 84°

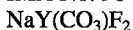
5.41(70), 5.19(100), 4.95(60), 4.31(70), 3.378(60), 2.162(40)

IMA No. **96-030**Orthorhombic: $Pnma$ or $Pn2_1a$ a 5.866, b 3.893, c 7.302 Å

Color not observed, metallic, opaque

In reflected light: brownish with a pale green tinge, anisotropism moderate-distinct from dark brown to pale greyish green, bireflectance weak, pleochroism brownish to greenish. $R_{\text{min.}}$, $R_{\text{max.}}$: 45.5, 46.3% (470 nm), 47.6, 48.4% (546 nm), 48.2, 49.5% (589 nm), 49.8, 51.2% (650 nm)

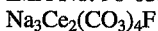
2.426(7), 2.348(4), 2.237(10), 2.067(8), 1.935(6), 1.860(5)

IMA No. **96-032**Orthorhombic: $Pmcn$ a 6.964, b 9.173, c 6.302 Å

Colorless to pale yellow; vitreous; transparent and translucent

Biaxial (-), α 1.457, β 1.543, γ 1.622, $2V(\text{meas.})$ 82°, $2V(\text{calc.})$ 83°

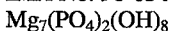
5.19(90), 3.477(100), 2.800(50), 2.087(50), 2.057(50), 1.966(50), 1.849(50), 1.763(50)

IMA No. **96-033**Hexagonal: $P6_3/mmc$ a 5.068, c 22.87 Å

Colorless to slightly beige; vitreous to somewhat pearly; transparent to translucent

Uniaxial (-), ω 1.728, ϵ 1.542

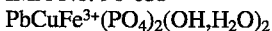
4.31(100), 3.169(70), 2.877(60), 2.534(70), 2.192(90B), 1.978(70)

IMA No. **96-034**The magnesium- and phosphate-dominant analogue of **allactite**Monoclinic: $P2_1/n$ a 5.250, b 11.647, c 9.655 Å, β 95.93°

Colorless; pearly; transparent

Biaxial (-), α 1.5945, β 1.6069, γ 1.6088, $2V(\text{meas.})$ 46°, $2V(\text{calc.})$ 43°

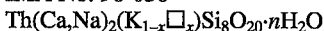
4.436(75b), 3.521(80), 3.145(70), 3.087(70), 2.905(100), 2.794(75), 2.199(80)

IMA No. **96-035**The phosphate-dominant analogue of **gartrellite**Triclinic: $P1$ or $P1$ a 5.320, b 5.528, c 7.434 Å, α 67.61°, β 69.68°, γ 70.65°

Green; vitreous to adamantine; transparent to translucent

Biaxial (+), α 1.90, β 1.93 (calc.), γ 2.00, $2V(\text{meas.})$ 70°

4.720(67), 4.502(61), 4.360(100), 3.250(70), 3.138(57), 2.885(89), 2.868(69)

IMA No. **96-036**The calcium-dominant analogue of **steacyite**Tetragonal: $P4/mcc$ a 7.592, b 7.592, c 14.824 Å

Apple-green to dark-green and brown; vitreous; transparent

Uniaxial (-), ω 1.611, ϵ 1.606

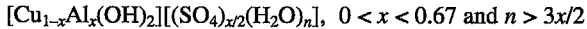
5.36(40), 5.31(70), 3.40(100), 3.33(65), 2.654(59), 2.231(50)

IMA No. **96-037**Cubic: $I\bar{4}3m$ a 15.470 Å

Pale greenish blue; vitreous; transparent

Isotropic, n 1.566

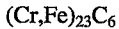
10.8(29), 7.73(34), 3.164(100), 2.827(28), 2.738(29), 2.582(37), 2.445(36)

IMA No. **96-038**The copper-dominant analogue of **carrboydite** and **glaucozerinite**Hexagonal (trigonal): $R\bar{3}m$ a 3.070, c 31.9 Å

Blue to pale blue; vitreous; translucent

Uniaxial (+), n_{min} 1.549, n_{max} 1.565

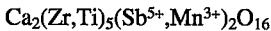
10.5(100), 5.26(17), 3.50(6), 2.60(5), 2.46(2), 2.23(2), 1.524(5b)

IMA No. **96-039**The chromium-dominant analogue of **haxonite**Cubic: $Fm\bar{3}m$ a 10.65 Å

Iron-grey; metallic; opaque

In reflected light: white. R : 46.5% (470 nm), 43.7% (546 nm), 43.2% (589 nm), 44.4% (660 nm)

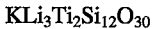
2.38(3), 2.17(5), 2.05(10)

IMA No. **96-040**The antimony-dominant analogue of **calzirtite**Tetragonal: $I4_1/acd$ a 15.199, c 10.181 Å

Bright red; adamantine; translucent

Uniaxial (+), ω 2.12, ϵ 2.16

3.45(40), 2.92(100), 2.539(60), 1.794(90), 1.535(80), 1.0353(40)

IMA No. **96-041**The titanium-dominant analogue of **brannockite**Hexagonal: $P6/mcc$ a 9.903, c 14.276 Å

White; vitreous; transparent

Uniaxial (-), ω 1.635, ϵ 1.630

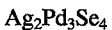
7.15(40), 4.29(50), 4.07(85), 3.57(80), 3.16(100), 2.895(95), 2.742(30)

IMA No. **96-043**The antimony-dominant analogue of **fleischerite**Hexagonal: $P6_322$ (with AsO_4 replacing one SO_4) a 8.939, c 11.102 Å

Colorless; adamantine; transparent

Uniaxial (+), ω 1.760, ϵ 1.801

6.35(44), 3.655(100), 3.481(80), 3.175(31), 2.675(62), 2.235(35)

IMA No. **96-044**Monoclinic: $P2_1/m$ or $P2_1$ a 6.350, b 10.387, c 5.683 Å, β 114.90°

Color unknown, only visible in polished section; metallic; opaque

In reflected light: buff to slightly grey-green buff; moderate anisotropism, rotation tints rose-brown, grey-green, pale bluish grey and dark steel-blue; bireflectance weak (air), moderate (oil); very weak pleochroism.

 R_1 , R_2 ; mR_1 , mR_2 : 39.7, 47.2; 26.2, 34.4% (470 nm), 43.1, 48.8; 29.3, 35.15% (546 nm), 44.3, 49.4; 30.4,

35.5% (589 nm), 44.4, 49.2; 31.0, 35.6% (650 nm)
2.868(50b), 2.742(100), 2.688(80), 2.367(50), 1.956(100), 1.829(30)

IMA No. 96-045

$\text{Pb}_{7.5}\text{B}_{0.5}(\text{OH})_{3.5}\text{O}_{4.5}\text{Cl}_4$ or $\text{Pb}_8\text{O}_4(\text{OH})_4\text{Cl}_4$

Monoclinic: $C2/c$

a 5.673, b 5.580, c 13.152 Å, β 90.47°

Pale yellow to reddish orange; vitreous, resinous; translucent

In reflected light: grey; internal reflections ubiquitous, amber to light yellow; anisotropism masked (if present) by the internal reflections; bireflectance weak, nonpleochroic. $R_1, R_2; {}^{\text{im}}R_1, {}^{\text{im}}R_2$: 15.2, 16.3; 4.07, 4.67% (470 nm), 14.2, 15.3; 3.59, 4.17% (546 nm), 13.9, 15.0; 3.44, 4.02% (589 nm), 13.7, 14.7; 3.37, 3.91% (650 nm)

6.581(37), 3.785(48), 3.267(35), 2.930(100), 2.825(43), 2.780(36), 2.182(37), 1.980(33)

IMA No. 96-047

$(\text{Fe,Cu})(\text{Rh,Ir,Pt})_2\text{S}_4$

The iron-dominant analogue of **cuprorhodsite**

Cubic: $Fd\bar{3}m$

a 9.89 Å

Black; metallic; opaque

In reflected light: white, isotropic. R : 41.4% (470 nm), 41.8% (546 nm), 41.8% (589 nm), 41.7% (650 nm)
5.72(7), 2.99(10), 2.471(8), 1.903(7), 1.750(9), 1.674(3), 1.009(3)

IMA No. 96-048

$\text{Cu}_9\text{O}_2(\text{SeO}_3)_4\text{Cl}_6$

Monoclinic: $I2$

a 14.110, b 6.27, c 12.997 Å, β 113.0°

Tobacco-green; strong vitreous; transparent

Biaxial (-), α 1.87, β 1.92, γ 1.94, $2V(\text{meas.})$ 66°, $2V(\text{calc.})$ 63°
11.29(63), 5.56(83), 3.450(100), 3.239(39), 2.714(33), 2.486(61)

IMA No. 96-049

$\text{CaMgNa}_6(\text{IO}_3)_6[(\text{Cr}_{0.84}\text{S}_{0.16})\text{O}_4]_2 \cdot 12\text{H}_2\text{O}$

Monoclinic: $C2/c$

a 23.645, b 10.918, c 15.768 Å, β 114.42°

Pale yellow to bright lemon yellow; vitreous; transparent to translucent

Biaxial (+), α 1.647, β 1.674, γ 1.704, $2V(\text{calc.})$ 88°
10.69(100), 6.36(50), 5.65(50), 3.590(70), 3.121(80), 3.051(80)

IMA No. 96-050

$\text{Cu}_2\text{CdGeS}_4$

The cadmium-dominant analogue of **briartite**

Tetragonal: $\bar{I}42m$

a 5.45, c 10.6 Å

Color unknown, only visible in polished section; metallic; opaque

In reflected light: grey with pale violet tint, very weak anisotropism, very weak bireflectance and very weak pleochroism. R and ${}^{\text{im}}R$: 24.42, 10.79% (460 nm), 23.29, 9.85% (540 nm), 23.04, 9.59% (580 nm), 23.46, 9.91% (660 nm)
3.10(100), 2.79(10), 1.92(80), 1.89(70), 1.64(60), 1.60(20)

IMA No. 96-051

$\text{Ca}_2\text{B}_2\text{O}_5 \cdot \text{H}_2\text{O}$

A polymorph of **sibirskite**

Monoclinic: $P2_1/m$

a 6.722, b 5.437, c 3.555 Å, β 93.00°

White; weak pearly; translucent

Biaxial (+), α 1.556, β 1.593, γ 1.663, $2V(\text{calc.})$ 75°
6.73(70), 3.354(30), 2.975(60), 2.855(20), 2.237(100), 1.776(20)

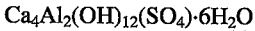
IMA No. 96-052Tetragonal: $\bar{I}4$

a 5.555, c 10.911 Å

Dark grey; metallic; opaque

In reflected light: greenish grey to light grey with greenish-brownish tint, moderate anisotropism with faded color effects form violet-blue to dark greenish blue, insignificant bireflectance, weakly pleochroic from yellowish olive-green to brownish olive. R_{max} : 26.0% (470 nm), 26.3% (546 nm), 25.6% (589 nm), 24.8% (650 nm)

3.17(10), 1.958(2.5), 1.941(8), 1.671(4), 1.646(3.5), 1.264(2.5)

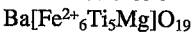
The mercury-dominant analogue of **černýite** and **stannite****IMA No. 96-053**Hexagonal (trigonal): $R\bar{3}$ or $R3$

a 5.76, c 53.66 Å

White; vitreous; transparent

Uniaxial (-), ω 1.504, ϵ 1.485

8.972(100), 4.476(70), 2.362(40), 2.190(40), 2.071(35)

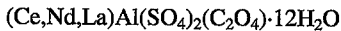
The sulfate-dominant rhombohedral analogue of **hydrocalumite****IMA No. 96-054**Hexagonal: $P6_3/mmc$

a 5.926, c 23.32 Å

Color unknown, only visible in polished section; metallic; opaque

In reflected light: light grey; very weak anisotropism, nearly isotropic; bireflectance very weak, but measurable; nonpleochroic. R_E , R_O ; ${}^{\text{im}}R_E$, ${}^{\text{im}}R_O$, R_{min} : 16.9, 17.3; 5.13, 5.37% (470 nm), 16.35, 16.8; 4.90, 5.19% (546 nm), 16.3, 16.9; 4.92, 5.29% (589 nm), 16.4, 17.1; 5.00, 5.42% (650 nm)

2.963(44), 2.795(90), 2.641(100), 2.437(46), 1.676(37), 1.634(47), 1.481(47)

The Fe^{2+} -dominant analogue of **hawthorneite****IMA No. 96-055**Monoclinic: $C2/c$

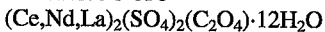
a 8.718, b 18.313, c 13.128 Å, β 93.90°

Very pale pink (incandescent light) and very pale blue (fluorescent light); vitreous; transparent

Biaxial (+), α 1.455, β 1.485, γ 1.528, $2V(\text{meas.})$ 85°, $2V(\text{calc.})$ 82°

7.9(100), 5.36(50), 5.01(40), 3.93(70), 3.74(20), 3.29(20), 3.07(20)

The cerium-dominant analogue of 96-057, but structurally different

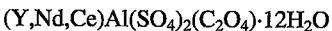
IMA No. 96-056Triclinic: $P\bar{1}$

a 6.007, b 8.368, c 9.189 Å, α 99.90°, β 105.55°, γ 107.71°

Pale pink (incandescent light), pale blue (fluorescent light), some cream-colored; vitreous; transparent

Biaxial (-), α 1.544, β 1.578, γ 1.602, $2V(\text{meas.})$ 65°, $2V(\text{calc.})$ 78°

8.52(70), 6.72(60), 5.48(100), 4.26(50), 3.84(60), 3.35(40), 2.744(40)

IMA No. 96-057Monoclinic: $P2/n$

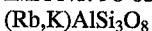
a 10.289, b 19.234, c 11.015 Å, β 108.50°

Colorless; vitreous; transparent

Biaxial (+), α 1.48, β 1.49, γ 1.55, $2V(\text{meas.})$ 7°, $2V(\text{calc.})$ 46°

9.3(100), 6.28(90), 5.20(40), 4.89(60), 4.63(30), 4.09(50), 3.700(30)

The yttrium-dominant analogue of 96-055, but structurally different

IMA No. 96-058Triclinic: $P\bar{1}$

a 8.81, b 13.01, c 7.18 Å, α 90.3°, β 115.7°, γ 88.2°

The rubidium-dominant analogue of **microcline**

Colorless; vitreous; transparent

Biaxial, indices of refraction slightly higher than host microcline

5.82, 5.77, 4.62, 3.88, 3.61, 3.60, 3.59, 2.94, 2.65, 2.63, 2.61, 2.56 (electron-diffraction data, no intensities)

IMA No. **96-059**

$\text{Fe}^{3+}\text{Mo}_2\text{O}_6(\text{OH})_3 \cdot \text{H}_2\text{O}$

Triclinic: $P\bar{1}$

a 5.878, b 7.536, c 9.436 Å, α 71.66°, β 83.43°, γ 72.85°

Green with a yellowish tinge; vitreous to earthy; transparent to opaque

Biaxial (-), α 1.91, β 2.03, γ 2.11, $2V(\text{meas.}) \sim 90^\circ$, $2V(\text{calc.}) 74^\circ$

5.620(70), 4.711(50), 4.095(70), 3.319(100), 3.232(90), 2.614(50), 1.956(50)

IMA No. **96-060**

$\text{CaMgSc}(\text{PO}_4)_2(\text{OH}) \cdot 4\text{H}_2\text{O}$

The scandium-dominant analogue of **overite** and **segelerite**

Orthorhombic: $Pbca$

a 15.03, b 18.95, c 7.59 Å

Colorless, light yellow to yellowish brown; vitreous; transparent

Biaxial (-), α 1.574, β 1.579, γ 1.582, $2V(\text{meas.}) \sim 50^\circ$, $2V(\text{calc.}) 75^\circ$

9.49(100), 4.75(17), 3.440(31), 2.942(27), 2.912(44), 2.890(35), 2.018(15)

IMA No. **96-062**

$(\text{Ti,Cr,Fe})[\text{O}_{2-x}(\text{OH})_x]$

Monoclinic: $P2_1/c$

a 7.688, b 4.5495, c 20.147 Å, β 92.27°

Black; metallic; translucent to opaque

Biaxial, mean n 2.47 (calc.). In reflected light: grey, with R lower than that of rutile, crichtonite, and srilankite and higher than that of pyrope

3.766(66), 2.835(100), 2.660(73), 1.6842(94), 1.6760(73), 1.6574(71)

IMA No. **96-063**

$\text{Na}_4\text{Zr}_2\text{Si}_{10}\text{O}_{26} \cdot 9\text{H}_2\text{O}$

The sodium-dominant analogue of **lemoynite** with additional H_2O

Monoclinic: $C2/m$

a 10.5150, b 16.2534, c 9.1029 Å, β 105.46°

Colorless to white; vitreous; transparent to translucent

Biaxial (-), α 1.533, β 1.559, γ 1.567, $2V(\text{meas.}) 63^\circ$, $2V(\text{calc.}) 57^\circ$

8.832(30), 8.135(100), 5.975(40), 3.974(35), 3.693(30), 3.564(40), 3.490(35), 2.804(30)

**NEW MINERALS RECENTLY APPROVED
BY THE
COMMISSION ON NEW MINERALS AND MINERAL NAMES
INTERNATIONAL MINERALOGICAL ASSOCIATION**

The information given here is provided by the Commission on New Minerals and Mineral Names, International Mineralogical Association (IMA), for comparative purposes and as a service to mineralogists working on new species. Each mineral is described in the following format:

IMA Number
Chemical formula (any relationship to other minerals)
Crystal system, space group
unit-cell parameters
Color; luster; diaphaneity
Optical properties
Strongest lines in the X-ray powder-diffraction pattern [*d* in Å(*I*)]

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves. No other information will be released by the Commission.

Joseph A. Mandarino, Chairman Emeritus and Joel D. Grice, Chairman
Commission on New Minerals and Mineral Names
International Mineralogical Association

1997 PROPOSALS

IMA No. **97-001**
(Bi,Pb)₂Fe(O,OH)₃PO₄ Chemically related to
paulkerrite
Monoclinic: *C2/m*
a 12.278, *b* 3.815, *c* 6.899 Å, β 111.14°
Black to dark brown; vitreous to adamantine; opaque to translucent
Biaxial (-), α 2.06, β 2.15(calc.), γ 2.19, 2*V*(meas.) 70°
5.726(54), 3.372(77), 3.322(37), 3.217(46), 3.011(100),
2.863(34), 2.750(62)

IMA No. **97-002**
Ca₂B₂SiO₇ The boron-dominant analogue of
gehlenite (melilite group)
Tetragonal: *P4₂m*
a 7.116, *c* 4.815 Å
Creamy-white; earthy; earthy
Probably uniaxial (-), *n* 1.67
3.479(40), 2.862(55), 2.654(100), 2.231(15), 2.129(20),
1.920(35), 1.644(20)

IMA No. **97-003**
NaK₂(Ti,Nb)₂Si₄O₁₂(O,OH)₂•2H₂O The Ti-dominant
analogue of **nenadkevichite**
Monoclinic: *C2/m*
a 14.39, *b* 13.900, *c* 7.825 Å, β 117.6°
Colorless; vitreous; transparent to translucent
Biaxial (+), α 1.667, β 1.677, γ 1.802, 2*V*(meas.) 32°, 2*V*(calc.) 33°
6.94(61), 6.39(43B), 3.186(100), 3.100(96), 2.600(28),
2.586(28), 2.489(24)

IMA No. **97-004**
AgSbS₂ A polymorph of **miargyrite**
Cubic: *Fm3m*
a 5.650 Å
Greyish black; metallic; opaque
In reflected light: grey. *R*: 34.5% (470 nm), 33.8%
(546 nm), 32.8% (589 nm), 28.7% (650 nm).
3.26(9), 2.83(10), 1.998(8), 1.703(6), 1.630(5), 1.296(2),
1.263(3)

IMA No. **97-005**
(UO₂)H(AsO₃)
Tetragonal: space group unknown

a 11.00, c 15.96 Å
 Yellow; dull; translucent
 Uniaxial (-), ω 1.84, ϵ 1.75
 5.58(8), 4.95(10), 4.40(6), 3.33(8), 3.03(6), 2.91(5)

IMA No. **97-007**
 $\text{Na}_3\text{SrCeMnSi}_6\text{O}_{17}$ The Mn²⁺-dominant analogue
 of **nordite-(Ce)**

Orthorhombic: *Pcca*
 a 14.449, b 5.187, c 19.849 Å
 Colorless, pale brownish, brown; vitreous; transparent
 Biaxial (-), α 1.623, β 1.636, γ 1.642, $2V(\text{meas.})$ 60°, $2V(\text{calc.})$ 68°
 7.22(38), 4.215(100), 3.326(67), 2.965(83), 2.875(55), 2.597(54), 2.443(35)

IMA No. **97-008**
 $\text{Na}_3\text{SrCeFeSi}_6\text{O}_{17}$ The Fe²⁺-dominant analogue
 of **nordite-(Ce)**

Orthorhombic: *Pcca*
 a 14.460, b 5.187, c 19.848 Å
 Colorless or light coffee color; vitreous; transparent
 Biaxial (-), α 1.623, β 1.636, γ 1.642, $2V(\text{meas.})$ 60°, $2V(\text{calc.})$ 68°
 7.22(41), 4.216(100), 3.325(67), 2.964(73), 2.879(62), 2.595(46), 2.444(31)

IMA No. **97-009**
 $\text{CaCu}_6[(\text{AsO}_4)_2(\text{AsO}_3\text{OH})(\text{OH})_6] \cdot 3\text{H}_2\text{O}$
 The calcium- and arsenate-dominant
 member of the **mixite** group

Hexagonal: *P6₃/m*
 a 13.571, c 5.880 Å
 Pale green; vitreous; transparent
 Uniaxial (+), ω 1.688, ϵ 1.765
 11.64(100), 4.431(41), 3.387(17), 3.254(22), 2.9347(42), 2.6932(29), 2.5624(30)

IMA No. **97-010**
 $\text{Pb}_4\text{As}_2\text{S}_7$
 Orthorhombic: *Pba2* or *Pbam*
 a 15.179, b 38.117, c 4.0428 Å
 Silvery lead grey; metallic; opaque
 In reflected light: white with a greenish tint, distinct anisotropism (dark grey to greenish grey, weak bireflectance, weak pleochroism. $R_{\text{min.}}$ & $R_{\text{max.}}$: 33.8, 34.0% (470 nm), 31.8, 31.9% (546 nm), 31.2, 31.3% (589 nm), 30.4, 30.4% (650 nm)
 4.462(40), 3.699(37), 3.392(100), 2.817(45), 2.735(31), 2.156(25), 2.150(22)

IMA No. **97-012**
 $\text{Ca}(\text{Al,Fe}^{2+},\text{Mg,Mn})_2(\text{AsO}_4)_2(\text{OH})_2$
 Monoclinic: *C2*
 a 8.9252, b 6.1427, c 7.352 Å, β 115.25°
 Light brownish to brownish pink, orange-brown; vitreous; transparent
 Biaxial (sign unknown), n 1.76 parallel to fiber, n 1.70

perpendicular to fiber
 4.914(58), 3.376(65), 3.164(100), 3.084(61), 2.945(72), 2.687(53), 2.522(84)

IMA No. **97-013**
 $\text{Ca}_8\text{Mg}(\text{SiO}_4)_4\text{Cl}_2$
 Cubic: *Fd $\bar{3}$*
 a 15.0850 Å
 Orange brown to amber; vitreous; transparent
 Isotropic, n 1.676
 2.901(40), 2.666(100), 2.549(30), 1.9637(30), 1.8845(30), 1.7774(30), 1.5400(50), 1.4585(30)

IMA No. **97-014**
 $\text{Mg}_2\text{Al}_3\text{B}_2\text{O}_9(\text{OH})$ Chemically and structurally
 related to **sinhalite**

Monoclinic: *P2₁/c*
 a 7.49, b 4.33, c 9.85 Å, β 110.7°
 Colorless; vitreous; transparent
 Biaxial (-), α 1.691, β 1.713, γ 1.730, $2V(\text{meas.})$ 80.0°, $2V(\text{calc.})$ 82°
 3.21(40), 2.61(40), 2.14(100), 2.102(60), 1.625(100), 1.607(40), 1.399(40)

IMA No. **97-015**
 $(\text{Na,Ca})_5\text{Ca}(\text{Ti,Nb})_5\text{Si}_{12}\text{O}_{34}(\text{OH,F})_8 \cdot 5\text{H}_2\text{O}$
 A Ca-dominant polymorph of **zorite**

Orthorhombic: *C22a*
 a 7.024, b 23.155, c 6.953 Å
 Pale brown, brown, orange-yellow; vitreous; transparent to translucent
 Biaxial (+), α 1.599, β 1.610, γ 1.696, $2V(\text{meas.})$ 38°, $2V(\text{calc.})$ 41°
 11.564(100), 6.932(90), 5.258(40), 4.446(40), 3.052(75), 2.977(70), 2.582(40)

IMA No. **97-017**
 Sb_2O_4 ($\text{Sb}^{3+}\text{Sb}^{5+}\text{O}_4$, β -phase) A monoclinic
 polymorph of **cervantite**

Monoclinic: *C2/c*
 a 12.061, b 4.836, c 5.383 Å, β 104.60°
 Colorless; vitreous; transparent
 Biaxial (sign unknown), α' 1.72, γ' 2.10
 3.244(VS), 2.920(M), 2.877(S), 1.619(M)

IMA No. **97-018**
 $\text{K}(\text{Ca,Mn,Na})_2(\text{K}_{2-x}\square_x)_2\text{Zn}_3\text{Si}_{12}\text{O}_{30}$ A member of
 the **milarite** group

Hexagonal: *P6/mcc*
 a 10.505, c 14.185 Å
 Colorless, white; vitreous; transparent to translucent
 Uniaxial (+), ω 1.561, ϵ 1.562
 7.11(35), 3.830(100), 3.345(60), 3.304(40), 2.940(50), 2.795(85), 2.627(35)

IMA No. **97-019**
 $\text{Zn}_4\text{Al}_2(\text{OH})_{12}(\text{CO}_3) \cdot 3\text{H}_2\text{O}$ The zinc-dominant
 member of the **manasseite** group

Hexagonal: $P6_3/mmc$ a 3.0725, c 15.1135 Å

White; vitreous; transparent

Optical properties could not be measured

7.51(vs), 3.794(m), 2.511(mw), 2.175(mw), 1.830(mw), 1.542(ms), 1.539(ms)

IMA No. 97-021

 $HgBi_2S_4$ Monoclinic: $C2/m$ a 14.164, b 4.053, c 13.967 Å, β 118.28°

Grey-black; metallic; opaque

In reflected light: creamy-white, distinct anisotropism, low birefractance, nonpleochroic. R_1 & R_2 : 35.7, 37.8% (470 nm), 35.4, 37.5% (546 nm), 34.9, 37.0% (589 nm), 33.9, 35.8% (650 nm) 3.86(m), 3.55(m), 3.05(S), 2.914(mS), 2.865(mS), 2.644(m), 1.913(m), 1.805(m)

IMA No. 97-022

 $(Cd,Ca,Mn)KCu_5(AsO_4)_4[As(OH)_2O_2](H_2O)_2$

The cadmium-dominant analogue of 97-023

Monoclinic: $P2_1/m$ a 9.8102, b 10.0424, c 9.9788 Å, β 101.686°

Electric blue; vitreous; transparent

Biaxial (-), α 1.720, β 1.749, γ 1.757, $2V$ (meas.) 50°, $2V$ (calc.) 55° 9.64(100), 4.46(40), 3.145(50), 3.048(40), 2.698(40)

IMA No. 97-023

 $(Ca,Cd,Mn)KCu_5(AsO_4)_4[As(OH)_2O_2](H_2O)_2$

The calcium-dominant analogue of 97-022

Monoclinic: $P2_1/m$ a 9.8102, b 10.0424, c 9.9788 Å, β 101.686°

Electric blue; vitreous; transparent

Biaxial (-), α 1.713, β 1.743, γ 1.749, $2V$ (meas.) 50°, $2V$ (calc.) 48° 9.64(100), 4.46(40), 3.145(50), 3.048(40), 2.698(40)

IMA No. 97-024

 $Cu_4Cd(SO_4)_2(OH)_6 \cdot 4H_2O$ The cadmium-dominant analogue of **campigliaite**Monoclinic: $P2_1/m$ a 5.543, b 21.995, c 6.079 Å, β 92.04°

Bluish green; vitreous; transparent

Biaxial (-), α 1.619, β 1.642, γ 1.661, $2V$ (meas.) 66°, $2V$ (calc.) 83° 11.02(90), 5.496(100), 5.322(25), 4.079(50), 3.437(30), 3.243(40), 2.470(30)

IMA No. 97-025

 $UO_2CO_3 \cdot H_2O$

Hexagonal: space group unknown

 a 15.79, c 23.93 Å

Canary yellow; silky; translucent

Uniaxial (+), ω 1.588, ϵ 1.612

7.86(47), 6.91(55), 6.56(77), 4.76(40), 4.34(36), 3.39(33), 3.056(100)

IMA No. 97-026

 $Ca_{19}(Al,Mg,Fe,Ti)_{13}(B,Al,\square)_5Si_{18}O_{68}(O,OH,F)_{10}$ The boron-dominant analogue of **vesuvianite**Tetragonal: $P4/nnc$ a 15.752, c 11.717 Å

Dark green; vitreous; translucent

Uniaxial (+), ω 1.721, ϵ 1.725

2.776(100), 2.617(61), 2.592(43), 2.491(61), 2.121(20), 1.660(26), 1.640(23)

IMA No. 97-027

 $Ca(Co,Fe,Ni)_2(AsO_4)_2(OH,H_2O)_2$ The cobalt-dominant analogue of **lotharmeyerite**Monoclinic: $C2/m$ a 9.024, b 6.230, c 7.421 Å, β 115.15°

Brown; vitreous; translucent

Biaxial (+), α 1.78, β 1.79, γ 1.85(calc.), $2V$ (meas.) 48° 4.955(38), 3.398(85), 3.188(28), 3.115(33), 2.972(100), 2.709(28), 2.545(34)

IMA No. 97-029

 $Rh_{17}S_{15}$ The rhodium- and sulfur-dominant analogue of **palladseite**Cubic: $Pm\bar{3}m$, $P\bar{4}3m$ or $P432$ a 10.024 Å

Color unknown; metallic; opaque

In reflected light: grey with slight bluish tint, isotropic. R : 38.6% (480 nm), 39.0% (540 nm), 39.1% (580 nm), 38.8% (660 nm) 3.33(2), 3.17(7), 3.02(9), 2.68(5), 2.24(9), 1.931(8), 1.774(10)

IMA No. 97-030

 $Rh_{12}As_7$ Hexagonal: $P6_3/m$ a 9.31, c 3.64 Å

Color unknown; metallic; opaque

In reflected light: brownish grey, weak anisotropism from grey to brownish grey, weak birefractance, nonpleochroic. $R_{min.}$ & $R_{max.}$: 44.5, 47.8% (480 nm), 44.7, 48.3% (540 nm), 46.4, 49.2% (580 nm), 48.6, 51.3% (660 nm) 2.33(4), 2.03(2), 1.852(9), 1.767(6), 1.755(10), 1.549(8)

IMA No. 97-032

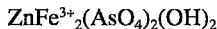
 $(Ca,Cu)_4Fe_6[(As,Si)O_4]_4(OH)_8 \cdot 18H_2O$ The Fe²⁺-dominant analogue of **walkilldellite**Hexagonal: $P6_3/mmc$, $P6_3mc$ or $P62c$ a 6.548, c 23.21 Å

Brown-yellow; vitreous to resinous; translucent

Uniaxial (-), ω 1.750, ϵ could not be determined

11.6(100), 5.670(80), 3.275(70), 2.850(10), 2.760(15), 2.547(10), 1.641(25)

IMA No. 97-034

Monoclinic: $P2_1/n$

$a 6.629, b 7.616, c 7.379 \text{ \AA}, \beta 91.79^\circ$

Dark green; adamantine; translucent

Biaxial (sign unknown), $n 1.94$; the mineral reacts with liquids of $n > 1.9$

3.385(100), 3.315(78), 2.939(47), 2.839(28), 2.381(29), 2.331(29), 1.652(32), 1.621(34)

IMA No. 97-035

 $(\text{K}, \text{Na})\text{Ca}_2\text{Fe}^{2+}\text{Fe}^{3+}_2[\text{Si}_5\text{Al}_3\text{O}_{22}](\text{OH})_2$ A member of the amphibole groupMonoclinic: $C2/m$

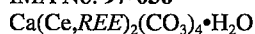
$a 9.94, b 18.08, c 5.38 \text{ \AA}, \beta 105.5^\circ$

Black; vitreous; transparent

Biaxial (-), $\alpha 1.696, \beta$ not determined, $\gamma 1.715, 2V(\text{meas.}) 45^\circ$

8.44(90), 3.405(25), 3.285(30), 3.145(100), 2.823(26), 2.722(52), 2.606(27), 2.579(25)

IMA No. 97-036

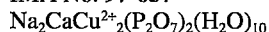
Triclinic: $P\bar{1}$

$a 6.397, b 6.389, c 12.383 \text{ \AA}, \alpha 96.58^\circ, \beta 100.85^\circ, \gamma 100.46^\circ$

Colorless to white; vitreous; translucent

Biaxial (-), $\alpha 1.635, \beta 1.725, \nu 1.750, 2V(\text{calc.}) 53^\circ$
5.901(59), 5.049(72), 4.695(37), 4.468(36), 4.006(110), 3.899(45), 3.125(39), 3.0051(448)

IMA No. 97-037

Orthorhombic: $Fdd2$

$a 11.938, b 32.854, c 11.017 \text{ \AA}$

Blue-green; vitreous; transparent

Biaxial (+), $\alpha 1.508, \beta 1.511, \gamma 1.517, 2V(\text{meas.}) 76.2^\circ, 2V(\text{calc.}) 71^\circ$

8.23(30), 6.52(100), 4.05(40), 3.255(40), 2.924(40), 2.807(25), 2.614(20)

IMA No. 97-041

 $\text{Na}_2\text{Zn}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$ The zinc-dominant analogue of **blödite**Monoclinic: $P2_1/a$

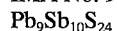
$a 11.077, b 8.249, c 5.532 \text{ \AA}, \beta 100.18^\circ$

Colorless; vitreous; transparent

Biaxial (-), $\alpha 1.507, \beta 1.512, \gamma 1.516$ (all for synthetic material)

4.550(58), 4.245(32), 3.325(25), 3.289(100), 3.262(35), 3.245(25), 2.631(27)

IMA No. 97-042

Triclinic: $P\bar{1}$

$a 24.789, b 8.26, c 21.787 \text{ \AA}, \alpha 90.53^\circ, \beta 99.58^\circ, \gamma 94.78^\circ$

Black; metallic; opaque

In reflected light: black, low anisotropism, low bireflectance, nonpleochroic. R_1 & R_2 : 38.95, 37.64% (470 nm), 42.35, 38.26% (546 nm), 41.67, 37.63% (589 nm), 37.43, 36.53% (650 nm)

3.47(vs), 3.35(ms), 3.24(ms), 2.986(s), 2.947(s), 2.229(ms)

IMA No. 97-043

Orthorhombic: $Pnma$

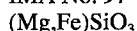
$a 8.8213, b 3.7725, c 14.0053 \text{ \AA}$

Greyish black; metallic; opaque

In reflected light: white, weak anisotropism, weak bireflectance, nonpleochroic. R_1 & R_2 : 33.9, 36.0% (470 nm), 31.3, 32.9% (546 nm), 30.0, 31.4% (589 nm), 28.8, 29.9% (650 nm)

4.128(100), 3.730(30), 3.1085(28), 2.8081(51), 2.7421(41), 2.6692(51), 1.9335(54)

IMA No. 97-044

A member of the **ilmenite** groupHexagonal (trigonal): $R\bar{3}$

$a 4.78, c 13.6 \text{ \AA}$

Colorless; vitreous; transparent

Uniaxial, no other data could be determined
3.509(61), 2.616(100), 2.366(52), 2.097(45), 1.755(45), 1.636(65), 1.366(50)

IMA No. 97-045

Monoclinic: $P2_1$ or $P2_1/m$

$a 7.5006, b 7.474, c 7.503 \text{ \AA}, \beta 90.847^\circ$

Pale buff-cream; somewhat greasy; transparent to translucent

Almost isotropic (birefringence = 0.0009), biaxial, $n 1.359, 2V(\text{meas.})$ up to 27°

4.33(100), 2.65(60), 2.25(70), 2.18(50), 2.158(40), 1.877(90)

IMA No. 97-047

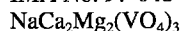
Monoclinic: $P2$ (pseudo-tetragonal)

$a 4.566, b 13.018, c 4.566 \text{ \AA}, \beta 90.15^\circ$

White to yellow; vitreous; translucent to transparent

Uniaxial (-), $\omega 1.540, \epsilon 1.40, 2V(\text{meas.}) 0-5^\circ$
12.97(10), 6.52(3), 4.57(3), 4.32(5), 3.223(3), 3.133(5), 2.016(4)

IMA No. 97-048

The magnesium-dominant analogue of **palenzonaite**Cubic: $Ia\bar{3}d$

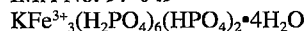
$a 12.427 \text{ \AA}$

Red; adamantine; transparent

Isotropic, $n 1.94$

3.108(44), 2.779(100), 2.652(20), 2.535(39), 1.723(26), 1.662(40)

IMA No. 97-049



Monoclinic: $C2/c$

a 16.95, b 9.59, c 17.57 Å, β 90.85°

White; vitreous; translucent

Biaxial (-), α 1.557, β 1.598, γ 1.602, $2V(\text{meas.})$ 32°, $2V(\text{calc.})$ 34°

8.83(10), 7.60(4), 3.75(10), 3.30(4), 3.23(5), 3.11(4), 3.02(9)

IMA No. **97-050**

$\text{BaMn}_9[(\text{V,As})\text{O}_4]_6(\text{OH})_2$

Cubic: $Pa\bar{3}$

a 12.845 Å

Dark red; adamantine; transparent

Isotropic, $n > 2.0$

3.01(87), 2.790(100), 2.608(100), 2.332(44), 2.134(53), 1.510(99), 1.0020(35)

IMA No. **97-051**

$\text{TlAg}_2(\text{As,Sb})_3\text{S}_6$

Orthorhombic: $Pnmb$ or $P2_1nb$

a 12.479, b 15.522, c 5.719 Å

Dark grey; metallic; opaque

In reflected light: pure white, extremely weak anisotropism, no birefractance, nonpleochroic. $R_{\text{min.}}$ & $R_{\text{max.}}$: 31.43, 33.43% (470 nm), 28.31, 30.52% (546 nm), 27.10, 29.11% (589 nm), 25.57, 27.44% (650 nm) 3.655(16), 3.363(50), 3.290(23), 3.210(26), 3.118(27), 2.822(100), 2.540(17), 2.070(15)

PROPOSALS FROM PREVIOUS YEARS
APPROVED IN 1997

IMA No. **93-029**

$\text{Na}_4\text{SrCeTiSi}_8\text{O}_{22}\text{F}\cdot 5\text{H}_2\text{O}$

Monoclinic: $P2/a$ (?)

a 23.88, b 14.40, c 7.238 Å, β 91.0°

Yellow, pink-yellow or cream; vitreous and silky; translucent

Biaxial (-), α 1.542, β 1.569, γ 1.571, $2V(\text{meas.})$ 28°, $2V(\text{calc.})$ 30°

12.36(100), 3.232(13), 3.190(29), 3.108(29), 3.087(21), 3.058(13), 2.708(12)

IMA No. **96-016**

$\text{Mg}_4\text{Cl}(\text{OH})_7\cdot 6\text{H}_2\text{O}$

Orthorhombic: $Pcmm$, $Pcm2_1$, or $Pc2m$

a 11.215, b 3.124, c 19.21 Å

Yellowish white; vitreous or pearly; translucent

Biaxial (-), α 1.532, $\beta \sim \gamma$ 1.562, $2V(\text{meas.}) \leq 5^\circ$

11.41(29), 9.78(46), 9.60(38), 4.25(20), 3.498(100)

IMA No. **96-018**

$\square(\text{LiAl}_2)\text{Al}_6(\text{BO}_3)_3(\text{Si}_6\text{O}_{18})(\text{OH})_4$

A member of
the tourmaline group

Hexagonal (trigonal): $R3m$

a 15.770, c 7.085 Å

Pink; vitreous; translucent

Uniaxial (-), ω 1.645, ϵ 1.624

4.181(58), 3.950(100), 3.434(52), 2.924(56), 2.552(93), 1.898(72)

IMA No. **96-061**

$\text{Fe}^{3+}\text{AsO}_4\cdot 2\text{H}_2\text{O}$

Hexagonal or trigonal
dimorph of **scorodite**

Hexagonal: $P-c-$ (extinction symbol)

a 8.9327, c 9.9391 Å

White to light yellow-brown; vitreous; translucent

Biaxial (sign unknown), ω and $\epsilon > 1.72$

4.973(61), 4.184(44), 4.076(100), 3.053(67), 2.806(68), 2.661(59), 2.520(54), 2.2891(44)

NEW MINERALS RECENTLY APPROVED IN 1998 BY THE
COMMISSION ON NEW MINERALS AND MINERAL NAMES
INTERNATIONAL MINERALOGICAL ASSOCIATION

The information given here is provided by the Commission on New Minerals and Mineral Names, I. M. A. for comparative purposes and as a service to mineralogists working on new species.

Each mineral is described in the following format:

IMA No. (any relationship to other minerals)
Chemical Formula
Crystal system, space group
unit cell parameters
Colour; lustre; diaphaneity.
Optical properties.
Strongest lines in the X-ray powder diffraction pattern.

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION

J. D. Grice¹, Chairman and G. Ferraris², Vice-Chairman, CNMMN IMA

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1998 PROPOSALS

IMA No. 98-001
Cu₃(AsO₄)₂·4H₂O New structure type
Orthorhombic: *Pnma*
a 5.6906, *b* 17.061, *c* 9.732 Å
Bottle green; vitreous; transparent
Biaxial (–), α 1.745, β 1.755, γ 1.760, *2V*(meas) 71°,
2V(calc) 70°
8.52(100), 3.721(60), 3.221(90), 3.102(40), 2.817(35),
2.795(35), 2.350(25)

IMA No. 98-002
Ca₃Ge(OH)₆(SO₄)(CO₃)·12H₂O
A member of the ettringite group; structure
Hexagonal: *P6₃/m*
a 11.056, *c* 10.629 Å
White; vitreous; transparent
Uniaxial (–), ω 1.509, ϵ 1.479
9.57(vs), 5.53(s), 3.83(s), 3.56(ms), 3.44(m), 2.74(ms),
2.53(m)

IMA No. 98-003
(Ca,Fe³⁺)₂Cu₅(Bi,Cu)(PO₄)₄(H₂O,OH,Cl)₁₃
The Bi-P-dominant analogue of rechselsdorffite
Monoclinic: *C2/m*
a 14.200, *b* 13.832, *c* 14.971 Å, β 102.08°
Honey-brown; resinous; translucent
Biaxial (–), α 1.718, β 1.748, γ 1.748, *2V*(calc) 0°
14.57(100), 6.95(40), 6.28(40), 3.469(30b), 3.104(30),
2.816(40), 2.506(30), 2.452(30)

IMA No. 98-004
Pb₃₂As₄₀S₉₂
A member of the rathite (sartorite) group
Monoclinic: *P2₁*
a 8.368, *b* 115.75, *c* 7.903 Å, β 90.11°
Lead-gray; metallic; opaque
In reflected light: deep red, anisotropic. *R*_{min} & *R*_{max}:
37.9, 41.8% (470 nm), 36.5, 40.8% (546 nm), 35.0,
39.7% (589 nm), 32.7, 37.7% (650 nm)
3.663(70), 3.216(48), 2.978(100), 2.872(48),
2.735(60), 2.713(50), 2.339(65)

- IMA No. 98-006
 $\text{MnPO}_4 \cdot \text{H}_2\text{O}$ Related to the kieserite group
 Monoclinic: $C2/c$
 a 6.914, b 7.468, c 7.364 Å, β 112.29°
 Dark brown to dark greenish black; adamantine;
 translucent
 Biaxial α 1.75, β 1.79, γ >1.79
 4.856(12), 4.633(15), 3.503(100), 3.271(10),
 2.957(10), 2.516(19), 2.104(12)
- IMA No. 98-007
 $(, \text{Na})_1\text{Ca}_2(\text{Mn}^{2+}, \text{Mg}, \text{Fe}^{2+})_2(\text{Fe}^{3+}, \text{Mg}, \text{Al})_2$
 $\text{Mn}_2^{2+}(\text{PO}_4)_6(\text{H}_2\text{O})_2$
 Isostructural with wicksite and grischunite; structure
 Orthorhombic: $Pcab$
 a 12.559, b 12.834, c 11.714 Å
 Very dark brown to black; vitreous; transparent
 Biaxial (–), α 1.729, β 1.738, γ 1.741, $2V(\text{meas})$ 54°,
 $2V(\text{calc})$ 60°
 6.419(31), 3.006(67), 2.927(78), 2.856(31), 2.814(35),
 2.768(100), 2.110(33)
- IMA No. 98-009
 $\text{Cu}_3\text{O}[(\text{Mo}, \text{S})\text{O}_4\text{SO}_4]$
 Unique combination of elements; structure
 Orthorhombic: $Pnma$
 a 7.420, b 6.741, c 13.548 Å
 Olive-green; vitreous; transparent
 Average refractive index 1.925 (calculated from
 reflectance)
 3.391(60), 3.342(60), 3.077(100), 2.542 (60),
 2.500(60), 2.275(60)
- IMA No. 98-010
 $\text{Ca}_4\text{Al}_6\text{Si}_6\text{O}_{24}(\text{SO}_4)$
 A member of the scapolite group; structure
 Tetragonal: $I4/m$
 a 12.182, c 7.604 Å
 Colourless to slightly yellow; subvitreous; transparent
 Uniaxial (–), ω 1.585, ϵ 1.553
 3.83(20), 3.46(100), 3.08(40), 3.05(15), 2.70(15)
- IMA No. 98-012
 $\text{Cu}_3(\text{OH})_2(\text{As}_2\text{O}_7)$ Related to olivenite; structure
 Orthorhombic: $Pmma$
 a 8.3212, b 2.9377, c 4.6644 Å
 Dark pistachio green; vitreous to adamantine;
 translucent
 Biaxial (+), α 1.81, β 1.82, γ 1.86, $2V(\text{meas})$ 57°,
 $2V(\text{calc})$ 54°
 3.104(100), 2.486(70), 2.400(25), 1.672(30),
 1.596(25), 1.330(25)
- IMA No. 98-013
 $\text{Cu}_4\text{Al}_3(\text{OH})_{14}\text{F}_3 \cdot 2\text{H}_2\text{O}$ New structure type
 Monoclinic: $C2/m$
 a 12.346, b 2.907, c 10.369 Å, β 97.90°
 Bright blue; vitreous; translucent
- Biaxial (+), α 1.585, β 1.615, γ 1.648, $2V(\text{calc})$ 89°
 10.29(80), 5.589(90), 4.232(100), 2.828(90),
 2.362(100), 2.006(100), 1.871(80)
- IMA No. 98-014
 $\text{Pb}(\text{Zn}, \text{Fe}, \text{Cu})_2(\text{AsO}_4)_2(\text{OH}, \text{H}_2\text{O})_2$
 The Zn-dominant analogue of gartrellite; structure
 Triclinic: ? $t\bar{f}$ ="PS2B42"> $P\bar{1}$
 a 5.550, b 5.620, c 7.621 Å, α 68.59, β 69.17, γ
 69.51°
 Green-yellow; vitreous; transparent to translucent
 Biaxial (–), α 1.91, β 1.94 (calc), γ 1.97, $2V(\text{meas})$ 87°
 4.731(74), 4.669(86), 3.283(89), 3.252(91),
 2.999(100), 2.894(74), 2.880(70)
- IMA No. 98-015
 $\text{Pb}(\text{Co}, \text{Ni}, \text{Zn})_2(\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O}$
 The Co-dominant analogue of helmutwinklerite;
 structure
 Triclinic: $P\bar{1}$
 a 11.216, b 10.604, c 7.618 Å, α 100.10, β 110.26,
 γ 98.87°
 Red to red-brown; vitreous; translucent
 Biaxial (+), α 1.85(calc), β 1.87, γ 1.90, $2V(\text{meas})$ 85°
 4.670(97), 3.256(100), 3.170(29), 3.072(56),
 2.890(40), 2.760(37), 2.568(46)
- IMA No. 98-017
 $\text{Mg}(\text{H}_2\text{O})_6[\text{Sb}(\text{OH})_6]_2$
 The Mg-dominant analogue of bottinoite; structure
 Trigonal: $P3$
 a 16.114, c 9.863 Å
 Colourless; vitreous; transparent
 Uniaxial (–), ω 1.570, ϵ 1.569
 4.946(50), 4.636(100), 4.217(20), 3.392(70),
 2.595(20), 2.356(40), 2.103(20)
- IMA No. 98-018
 $(\text{Na}, \text{Ca}, \text{Bi})_2\text{Ta}_2\text{O}_6\text{F}$
 A member of the microlite group; structure
 Cubic: $Fd\bar{3}m$
 a 10.4451 Å
 Green; adamantine; transparent
 Isotropic, η > 2.0, 2.03(calc)
 6.023(31), 3.148(33), 3.015(100), 2.610(27),
 1.846(59), 1.574(47), 1.198(23)
- IMA No. 98-019
 $\text{Na}_{3-x}(\text{Ti}, \text{Nb})_2[\text{Si}_4\text{O}_{12}](\text{OH}, \text{O})_2 \cdot 3-4\text{H}_2\text{O}$
 The Ti-dominant analogue of nenadkevichite;
 structure
 Orthorhombic: $Pbam$
 a 7.349, b 14.164, c 7.130 Å
 Colourless; vitreous; transparent
 Biaxial (+), α 1.646, β 1.654, γ 1.763, $2V(\text{meas})$ 30°,
 $2V(\text{calc})$ 32°
 7.09(72), 6.53(85), 3.262(100), 3.180(52), 2.553(56),
 2.075(57), 1.735(50)

NEW 1998 MINERALS

- IMA No. 98-023
(Ni,Fe)₃P
The Ni-dominant analogue of schreibersite
Tetragonal: $I\bar{4}$
 a 8.99, c 4.396 Å
White with pinkish yellow-tint; metallic; opaque
In reflected light: weak anisotropy in oil, in yellowish-pinkish colours. R_{\min} & R_{\max} : 42.3, 43.9% (460 nm), 45.7, 47.5% (540 nm), 47.6, 49.1% (580 nm), 50.3, 51.7% (640 nm)
2.17(10), 2.13(5), 2.08(5), 1.955(7)
- IMA No. 98-024
(Fe³⁺, Zn)₁₂(As³⁺, Si)₈O₃₀ New structure type
Hexagonal: $P6_3mc$
 a 12.771, c 5.051 Å
Brownish black; vitreous; transparent
Uniaxial (+), $\omega \sim 1.99$, $\varepsilon \sim 2.08$
6.37(80), 3.221(100), 2.531(40), 2.420(70), 1.788(40), 1.672(50), 1.507(50)
- IMA No. 98-025
NaCa₂Al₂(AsO₄)[AsO₃(OH)](OH)₂F₄(H₂O) New structure type
Monoclinic: $P2_1/m$
 a 9.687, b 10.7379, c 5.5523 Å, β 105.32°
Pale blue-green; vitreous; transparent to translucent
Biaxial (–), α 1.580, β 1.588, γ 1.593, $2V(\text{meas})$ 74°, $2V(\text{calc})$ 76°
5.364(80), 4.796(80), 3.801(80), 3.527(90), 2.966(100), 2.700(90), 2.246(60)
- IMA No. 98-026
[Zn_{1-x}Al_x(OH)₂][(SO₄)_{x/2}(H₂O)_n] $x = 0.33$, $n \approx 0.96$
A member of the hydrotalcite group; polytype 1T
Trigonal: $P\bar{3}$
 a 3.063, c 8.91 Å
Pale blue; waxy; translucent
Uniaxial, $\eta(\text{max})$ 1.558
8.81(100), 4.406(2.5), 2.654(4), 2.545(5)
- [Zn_{1-x}Al_x(OH)₂][(SO₄)_{x/2}(H₂O)_n] $x = 0.32-0.50$, $n = 0.59$ Polytype 3R
Trigonal: $R\bar{3}m$
 a 3.065, c 25.42 Å
Pale bluish to bluish-white; waxy; translucent
Uniaxial, ω 1.5636
8.50(100), 4.248(33), 2.600(5), 2.354(4)
- IMA No. 98-027
(Al,Mg,Fe)₁₆(Al,Si,Be)₁₂O₄₀
A member of the sapphirine group
Monoclinic: $P2_1/c$
 a 9.9000, b 14.369, c 11.2537 Å, β 125.53°
Very dark green; vitreous; transparent
Biaxial (–), α 1.725, β 1.740, γ 1.741, $2V(\text{meas})$ 34°, $2V(\text{calc})$ 29°
2.985(38), 2.834(30), 2.826(45), 2.566(36), 2.445(100), 2.439(44), 2.340(43)
- IMA No. 98-028
Fe²⁺Ti(Ta,Nb)₂O₈ A member of the wodginite group
Monoclinic: $C2/c$
 a 9.402, b 11.384, c 5.075 Å, β 90.33°
Very dark brown to black; opaque; submetallic
In reflected light: creamy white, very abundant internal reflections, anisotropic, moderate pleochroism. R_{\min} & R_{\max} : 18.2, 18.7% (470nm), 18.1, 19.1% (546nm), 16.9, 17.9% (589nm), 15.6, 16.4% (650nm)
3.626(70), 2.963(100), 2.939(90), 2.484(45), 1.759(45), 1.715(50), 1.711(45)
- IMA No. 98-030
Ca(HCOO)₂ β -calcium formate
Tetragonal: $P4_12_12$
 a 6.770, c 9.463 Å
White, light-blue; vitreous; transparent
Uniaxial (+), ω 1.553, ε 1.573
5.54(90), 3.40(100), 3.19(60), 2.859(80), 2.196(70), 2.046(50), 1.947(60)
- IMA No. 98-031
(MoO₂)₂As₂O₅·3H₂O New structure type
Monoclinic: $P2_1/c$
 a 7.0516, b 12.0908, c 12.2190 Å, β 101.268°
Green to grey-green; vitreous, translucent
Biaxial (+), α 1.757, β 1.778, γ 2.04, $2V(\text{calc})$ 35°
6.92(26), 6.05(100), 3.457(16), 3.325(59), 2.624(15), 2.593(12), 2.264(19)
- IMA No. 98-032
Cu₁₀(AsO₄)₄(SO₄)(OH)₆·8H₂O Structure
Monoclinic: $C2/c$
 a 21.778, b 12.317, c 10.716 Å, β 92.81°
Green with a bluish tint; vitreous; transparent
Biaxial (–), α 1.590, β 1.740, γ 1.744, $2V(\text{meas})$ 18°, $2V(\text{calc})$ 17°
10.8(100), 5.43(50), 4.90(30), 3.625(50), 3.090(40), 2.675(40), 2.630(60)
- IMA No. 98-033
Zn₂AlSb(OH)₁₂ Related to cualstibite; structure
Trigonal: $P312$
 a 5.327, c 9.792 Å
Colourless; vitreous; transparent
Optical properties could not be measured
4.897(100), 4.615(35), 4.180(57), 3.366(18), 2.667(31), 2.342(88), 1.887(10)
- IMA No. 98-034
SrAl₂Si₂O₇(OH)₂·H₂O
A member of the lawsonite group
Orthorhombic: $Cmcm$
 a 6.031, b 8.945, c 13.219 Å
Blue; vitreous; transparent
Biaxial (+), α 1.664, β 1.674, γ 1.688, $2V(\text{calc})$ 81°
4.68(s), 4.26(vs), 3.31(vs), 2.75(vs), 2.68(vvs), 2.63(s), 2.50(s)

- IMA No. 98-035
 $\text{Pb}_{10}(\text{SO}_4)_7\text{Cl}_4 \cdot \text{H}_2\text{O}$
 Related to the nadorite and kombatite groups; structure
 Triclinic: $P\bar{1}$
 a 8.796, b 10.768, c 13.096 Å, α 68.87, β 86.52, γ 75.79°
 Venetian pink; vitreous; translucent
 In reflected light: colourless or pale pink, anisotropic.
 R_{\min} & R_{\max} : 14.3, 14.6% (470nm), 13.6, 13.9% (546nm), 13.4, 13.75% (589nm), 13.3, 13.55% (650nm)
 6.573(4), 3.768(4), 3.286(9), 2.955(9), 2.911(10), 2.793(8)
- IMA No. 98-036
 $\text{Pb}_4^{2+}(\text{S}^{6+}\text{O}_3\text{S}^{2-})_2\text{O}_2(\text{OH})_2$ or $\text{Pb}_4(\text{S}_2\text{O}_3)_2\text{O}_2(\text{OH})_2$
 New structure type
 Triclinic: $P\bar{1}$
 a 7.455, b 6.496, c 11.207 Å, α 114.33, β 89.65, γ 88.69°
 Beige-cream to colourless; vitreous to pearly; opaque to transparent
 In reflected light: light grey with yellow-brown internal reflections, bireflectant and slightly pleochroic.
 10.13(100), 5.93(50), 4.401(35), 3.414(100), 3.198(80), 2.889(35), 2.805(35), 2.622(40)
- IMA No. 98-037
 $(\text{Mg}_2\text{Al})\text{Al}_6(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_4$
 A member of the tourmaline group; structure
 Triclinic: $R3m$
 a 15.884, c 7.178 Å
 Bluish grey; dull; transparent
 Uniaxial (–), ω 1.650, ϵ 1.624
 6.366(6), 4.211(9), 3.969(10), 3.470(6), 2.949(7), 2.567(10), 2.037(5)
- IMA No. 98-038
 $\text{Pb}_3\text{Cl}_4(\text{SeO}_3) \cdot \text{H}_2\text{O}$ Structure
 Triclinic: $P\bar{1}$
 a 8.115, b 8.433, c 9.242 Å, α 62.52, β 71.87, γ 75.01°
 Colourless to white; vitreous to silky, diaphaneity not given
 η 1.96, birefringent
 3.548(m), 3.258(s), 3.188(s), 2.728(m), 2.365(s), 2.298(m)
- IMA No. 98-039
 $\text{Sr}_2\text{Fe}(\text{Fe},\text{Mg})_2\text{Al}_4(\text{PO}_4)_4(\text{OH})_{10}$ New structure type
 Triclinic: $P\bar{1}$
 a 5.455, b 9.118, c 9.769 Å, α 108.48, β 91.62, γ 97.38°
 Pale blue to dark-yellow green; vitreous; transparent to translucent
 Biaxial: α 1.660, γ 1.684
- 4.473(47), 3.596(75), 3.470(45), 3.215(100), 3.132(75), 3.016(54), 2.878(43), 2.811(60)
- IMA No. 98-042
 $\text{Na}_{12}\text{Sr}_3\text{Ca}_6\text{Fe}_3\text{WZr}_3(\text{Si}_{25}\text{O}_{73})(\text{O},\text{OH Cl})_5 \cdot (\text{H}_2\text{O})$
 A member of the eudialyte group; structure
 Triclinic: $R3m$
 a 14.2958, c 30.084 Å
 Orange-red; vitreous; transparent to translucent
 Uniaxial (–): ω 1.6279, ϵ 1.6254
 See X-ray powder data for IMA No. 98-043
- IMA No. 98-043
 $\text{Na}_{12}\text{Sr}_3\text{Ca}_6\text{Mn}_3\text{WZr}_3(\text{Si}_{25}\text{O}_{73})(\text{O},\text{OH Cl})_5 \cdot (\text{H}_2\text{O})$
 A member of the eudialyte group
 Triclinic: $R3m$
 a 14.282, c 30.12 Å
 Orange; vitreous; transparent to translucent
 Uniaxial (–): ω 1.629, ϵ 1.626
 11.50(90), 9.535(70), 6.452(50), 6.072(50), 5.735(50), 3.406(50), 3.213(50), 3.167(50), 2.980(100), 2.856(80)
- IMA No. 98-044
 $\text{PbMn}_2^{3+}(\text{VO}_4)_2(\text{OH})_2$
 A member of the tsumcorite group; structure
 Monoclinic: $C2/m$
 a 9.275, b 6.284, c 7.682 Å, β 117.97(4)°
 Dark brown to black; vitreous to adamantine; translucent to opaque
 In reflected light: light grey to light brownish grey, strong anisotropism (dark metallic blue to light purplish brown-grey), distinct bireflectance, slight pleochroism. R_{\min} & R_{\max} : 15.8, 19.2% (470 nm), 14.8, 17.8% (546 nm), 14.4, 17.3% (589 nm), 14.1, 16.8% (650 nm)
 4.695(34), 3.388(95), 3.270(100), 2.946(51), 2.850(49), 2.491(93), 1.869(35), 1.697(83), 1.6378(31)
- IMA No. 98-045
 $\text{Pb}_6^{2+}\text{Sb}_3^{3+}\text{S}_{14}^{2-}\text{S}_2^{1-}\text{S}^0$ Structure
 Orthorhombic: $P2_122_1$
 a 5.328, b 4.0400, c 23.054 Å
 Black; metallic; opaque
 Reflectance data could not be obtained
 3.724(ms), 3.559(m), 3.427(s), 3.232(m), 3.047(ms), 2.952(m), 2.844(ms), 2.779(ms), 2.753(ms), 2.422(m)
- IMA No. 98-046
 $\text{NaNa}_2(\text{Mg}_3\text{Fe}^{3+}\text{Ti}^{4+})\text{Si}_8\text{O}_{22}\text{O}_2$
 A member of the amphibole group; structure
 Monoclinic: $C2/m$
 a 9.795, b 17.949, c 5.290 Å, β 104.19(2)°
 Pink; vitreous; transparent
 Biaxial (–), α 1.643, β 1.657, γ 1.670, $2V(\text{meas})$ 81°, $2V(\text{calc})$ 87°

NEW 1998 MINERALS

- 8.414(100), 4.467(50), 3.390(60), 3.117(50),
2.705(70), 2.531(50)
- IMA No. 98-047
Ba(V⁴⁺OPO₄)₂·4H₂O
The Ba-dominant analogue of sincosite
Tetragonal: *P4/n* or *P4/nmm*
a 9.031, *c* 12.755 Å
Pale green; vitreous; transparent
Uniaxial (–), ω 1.721, ε 1.715
5.722(100), 4.519(40), 3.548(30b), 3.192(60),
3.101(40), 2.858(50), 2.794(50), 2.375(70),
2.022(50)
- IMA No. 98-048
BaV³⁺(PO₄)₂(OH,H₂O)₆
A member of the crandallite group
Trigonal: *R3m*, *R3m* or *R32*
a 7.258, *c* 17.361 Å
Black; adamantine to semimetallic; opaque
Uniaxial (–), ω 1.858, ε 1.817
5.90(9), 3.627(4), 3.073(10), 2.301(4), 1.971(5),
1.814(4)
- IMA No. 98-049
YbPO₄ A member of the xenotime group
Tetragonal: *I4₁/amd*
a 6.866, *c* 6.004 Å
Colourless to slightly yellow or brown; vitreous;
transparent
Uniaxial (+), ω 1.717, ε 1.802
4.515(7), 3.437(10), 2.730(3), 2.556(8), 2.138(3),
1.760(5)
- IMA No. 98-054
Cu(OH)Cl
Monoclinic: *P2₁/a*
a 5.552, *b* 6.668, *c* 6.124(2) Å, β 115.00(3)°
Yellowish-green to olive-green; vitreous; transparent
to translucent
Probably biaxial, η > 1.8
5.553(100), 2.785(14), 2.516(18), 2.241(27),
1.996(12), 1.851(21), 1.869(16)
- IMA No. 98-055
Sr₄ZrTi₄Si₄O₂₂
The Sr-Zr-dominant analogue of perrierite
Monoclinic: *P2₁/a*
a 13.97, *b* 5.675, *c* 11.98 Å, β 114.26(8)°
Dark brown; adamantine; diaphaneity not given
Optical properties could not be measured
4.15(m), 3.20(m), 3.12(s), 3.05(vvs), 2.99(vs), 2.84(s),
2.78(m), 2.74(s), 2.51(m), 2.30(m), 1.967(m)
- IMA No. 98-056
NaN₂Mg₄Fe³⁺(Si₈O₂₂)(F,OH)₂
A member of the amphibole group
Monoclinic: *C2/m*
a 9.81, *b* 18.05, *c* 5.29 Å, β 103.9(2)°
- Grey; vitreous; transparent to translucent
Biaxial (–), α 1.618, β 1.629, γ 1.633, 2*V*(meas) 54°,
2*V*(calc) 61.8°
8.42(34), 3.264(23), 3.129(100), 2.804(28), 2.716(10),
2.708(10), 1.895(10), 1.654(10)
- IMA No. 98-057
(Ba,K,Pb)₄(Y,Ca)₂Si₈(B,Si)₄O₂₈F
The Y-dominant analogue of hyalotekite; structure
Triclinic: *I1*
a 11.181, *b* 10.850, *c* 10.252 Å, α 90.64, β 90.05, γ
89.97°
Light pink to white; vitreous; translucent
Biaxial (+), α 1.637, β 1.628, γ 1.624, 2*V*(meas) 69°,
2*V*(calc) 67°
7.79(65), 3.773(100), 3.742(70), 3.493(56), 2.936(50),
2.921(37), 2.912(42), 2.564(35)
- IMA No. 98-058
K₂(Mn,Fe)Ti₄[Si₄O₁₂]₂(OH)₄·5H₂O
A member of the labuntsovite group; structure
Monoclinic: *C2/m*
a 14.369, *b* 13.906, *c* 7.812 Å, β 117.09°
Yellow; vitreous; transparent
Biaxial (+), α 1.683, β, 1.687, γ 1.775, 2*V*(calc) 25°
7.00(9), 6.33(8), 4.86(7), 3.17(10), 3.08(5), 2.58(4),
2.47(4), 1.551(4)
- IMA No. 98-059
(Bi,U,Ca,Pb)_{1+x}(Nb,Ta)₂O₆(OH)·*n*H₂O
A member of the pyrochlore group
Metamict, Cubic after heating: *Fd3m*
a 10.41 Å
Dark greenish-brown to brown; vitreous; translucent
Isotropic, η 2.10
5.98(4), 2.967(10), 2.614(7), 1.848(9), 1.569(9),
1.500(4), 1.195(8), 1.145(5)
- IMA No. 98-060
PbBi₄S₇
Orthorhombic: *Bbmm*
a 13.18, *b* 37.4, *c* 4.05(3) Å
Silver grey; metallic; opaque
In reflected light: white, distinct anisotropism (without
colour effects), very weak bireflectance, nonpleo-
chroic. R_{min} & R_{max}: 35.8, 40.2% (460 nm), 35.3,
40.6% (540 nm), 35.0, 40.6% (580 nm), 34.8,
40.1% (640 nm)
3.80(10), 3.58(3), 3.40(2), 3.30(3), 2.95(4b), 2.92(2),
2.81(2), 2.34(4b), 1.917(2b)
- IMA No. 98-061
Na(LiNa)(Fe³⁺Mg₂Li)Si₈O₂₂(OH)₂
A member of the amphibole group; structure
Monoclinic: *C2/m*
a 9.536, *b* 17.789, *c* 5.277 Å, β 102.53°
Green; vitreous; translucent
Biaxial (+), α 1.694, β 1.698, γ 1.702, 2*V*(meas) 83°,
2*V*(calc) 85°

8.25(24), 4.45(22), 3.396(28), 3.057(100), 2.749(54),
2.699(60), 1.920(20), 1.639(44), 1.396(23)

IMA No. 98-062

(Zn,Mn)(Mn²⁺,Mg,Fe,³⁺,Al)₁₄(As³⁺O₃)
(As⁵⁺O₄)₂(OH)₂₃ New structure type
Monoclinic: *Cc*
a 14.236, *b* 8.206, *c* 24.225 Å, β 93.52°
Red-brown to orange-brown; resinous to submetallic;
opaque
Biaxial (–), α 1.723, β 1.744, γ 1.750, 2*V*(meas) 44°,
2*V*(calc) 56°
12.07(100), 6.05(100), 4.12(30), 9.04(90), 3.148(30),
3.030(70), 2.411(40), 1.552(70)

IMA No. 98-064

Na₁₅Ca₃Mn₃Fe₃Zr₃Nb(Si₂₅O₇₃)(O,OH,H₂O)₃(OH,Cl)₂
A member of the eudialyte group; structure
Trigonal: *R3*
a 14.192, *c* 29.983 Å
Yellowish brown; vitreous; transparent to translucent
Uniaxial (–), ω 1.6450, ε 1.6406
11.35(44), 7.10(33), 6.02(36), 5.68(31), 4.29(36),
3.389(43), 3.199(31), 3.150(35), 3.013(30),
2.964(100), 2.844(89)

IMA No. 98-065

Mg₉[Si₄O₁₆](OH)₂
A member of the humite group; structure
Monoclinic: *P2₁/b* (unique axis *a*)
a 4.7480, *b* 10.2730, *c* 13.6894 Å, α 100.72°
Yellow-orange; vitreous, transparent
Biaxial (+), α 1.631, β 1.641, γ 1.664, 2*V*(meas) 70°,
2*V*(calc) 68°
5.05(70), 4.46(52), 3.35(64), 2.772(91), 2.748(50),
2.551(80), 2.516(93), 2.365(50), 2.269(100),
2.259(95), 1.747(79), 1.485(51)

IMA No. 98-066

CaMg(VO₄,AsO₄)(OH)
A member of the descloizite group; structure
Orthorhombic: *P2₁2₁2₁*
a 7.501, *b* 9.010, *c* 5.941 Å

Orange to orange-brown; adamantine; transparent
Biaxial, α 1.797, β 1.805-1.815, γ 1.828
4.50(72), 4.14(32), 3.170(100), 2.972(20), 2.785(30),
2.639(27), 2.596(21), 2.523(30), 1.733(20),
1.614(41)

IMA No. 98-067

Cu[AlAsO₅] New structure type
Monoclinic: *P2₁/c*
a 7.314, *b* 10.223, *c* 5.576 Å, β 99.79°
Light green; vitreous; translucent
Biaxial(–), α 1.672, β 1.718, γ 1.722, 2*V*(calc) 32°
7.20(100), 4.84(9), 4.33(23), 3.604(10), 3.125(20),
2.656(6), 2.458(8)

IMA No. 98-069

K₂MnV₄O₁₂ New structure type
Monoclinic: *P2₁/m*
a 8.173, *b* 9.243, *c* 8.640 Å, β 109.70°
Reddish brown; adamantine; translucent
Biaxial, α 1.925 β 1.960, γ > 1.988, 2*V*(meas) 82°
6.86(25), 5.91(27), 5.51(32), 3.957(25), 3.701(55),
3.336(100), 3.118(50), 3.000(36), 2.878(64),
2.752(68), 1.968(28), 1.860(28)

Proposals from Previous Years Approved in 1998

IMA No. 97-033

(Mn,Fe,Mg)Al₂(PO₄)₂(OH)₂·8H₂O
Polymorph of mangangordonite
Triclinic: *P1̄*
a 7.0102, *b* 10.2050, *c* 10.5040(7) Å, α 71.82, β
89.62, γ 69.90(1)°
Colourless to beige; vitreous; translucent to trans-
parent
Biaxial (–), α 1.5665, β 1.5740, γ 1.5815, 2*V*(meas.)
94.7°, 2*V*(calc.) 90.6°
9.92(85), 6.54(100), 5.80(55), 4.746(85), 4.577(35),
3.885(30), 3.001(70), 2.900(30), 2.773(35)

[Manuscript received 10 March 1999]

NEW MINERALS APPROVED IN 1999 BY THE COMMISSION ON NEW MINERALS AND MINERAL NAMES, INTERNATIONAL MINERALOGICAL ASSOCIATION

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The information given here is provided by the Commission on New Minerals and Mineral Names (CNMMN), International Mineralogical Association (IMA) for comparative purposes and as a service to mineralogists working on new species. Each mineral is described in the following format:

IMA Number
Chemical Formula (any relationship to other minerals; structure analysis)
Crystal system, space group
unit-cell parameters
Color; luster; diaphaneity
Optical properties
Strongest lines in the X-ray powder diffraction pattern [*d* in Å(*I*)]

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves. No other information will be released by the Commission.

1999 PROPOSALS

IMA No. 99-002

(Mg, Mn²⁺)₂(Sb_{0.5}Mn³⁺_{0.5})O₄

Related to
the spinel group

Trigonal: $R\bar{3}$ or $R3$

a 16.196, *c* 14.948 Å

Dark red; subadamantine; translucent

In reflected light: grey, internal reflections orange-red, anisotropy weak. *R*: 10.4% (470 nm), 10.0% (546 nm), 9.9% (589 nm), 9.8% (650 nm)
4.24(28), 3.052(33), 2.608(100), 2.162(28), 1.665(30), 1.527(39)

IMA No. 99-003

Hg¹⁺₃(CO₃)(OH)•2H₂O Polymorph of peterbaylissite;
new structure-type

Monoclinic: $P2_1/c$

a 6.760, *b* 9.580, *c* 10.931 Å, β 105.53°

Pale greenish yellow; vitreous; transparent (before irradiation by X-rays)

7.09(70), 5.40(30), 5.32(40), 4.62(90), 2.831(100), 2.767(100), 2.391(40)

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** Vice-Chairman, CNMMN. *E-mail address*: ferraris@dsmp.unito.it

IMA No. **99-005**Na₂Mg₅(PO₄)₄•7H₂OProbably Na-analogue
of rimkorolite; structureMonoclinic: *P*₂₁/*c**a* 8.324, *b* 12.926, *c* 17.519 Å, β 102.03(1)°

Colorless, yellowish, greenish; vitreous; transparent

Biaxial (+), α 1.538, β 1.540, γ 1.543, 2*V*(meas.) 70°,
2*V*(calc.) 78.6°10.31(33), 8.56(100), 3.496(23), 3.314(23), 3.020(28),
2.849(33), 2.675(25)IMA No. **99-006**Na₃(La,Ce,Ca)₃(CO₃)₅ La-analogue of remondite-(Ce)Monoclinic: *P*₂₁*a* 10.49, *b* 6.417, *c* 10.50(1) Å, β 119.8(1)°

Bright orange-yellow; vitreous; translucent

Biaxial (-), α 1.615, β 1.619, γ 1.622, 2*V*(meas.) 80°,
2*V*(calc.) 82°5.28(5), 3.70(7), 3.036(9), 2.623(10), 2.143(8),
2.041(6), 1.939(6)IMA No. **99-007**Ca(H₂AsO₄)₂

New structure-type for minerals

Triclinic: *P*₁*a* 8.5485, *b* 7.6973, *c* 5.7198 Å, α 92.59, β 109.87, γ
109.92°

White or colorless; vitreous; translucent

Biaxial, α 1.602, γ 1.658

3.974(72), 3.700(60), 3.558(100), 3.101(82), 3.041(62),
2.666(52), 2.173(48)IMA No. **99-008**Ca(Ni,Fe,Co)₂(AsO₄)₂(OH,H₂O)₂Isotypy with
tsumcorite; structureMonoclinic: *C*₂/*m**a* 9.005, *b* 6.205, *c* 7.411 Å, β 115.31°Brown to yellow; vitreous; small fragments are trans-
parentBiaxial (+), α 1.80(calc.), β 1.81, γ 1.87, 2*V*(meas.) 40°,
strong pleochroism4.938(34), 3.393(83), 3.182(87), 2.962(100), 2.703(72),
2.538(78), 1.697(57)IMA No. **99-009**BaFe²⁺₂Fe³⁺₂(PO₄)₃(OH)₃Fe²⁺-analogue
of perloffite; structureMonoclinic: *P*₂₁/*m**a* 9.199, *b* 12.359, *c* 5.004 Å, β 100.19°

Greenish black; vitreous; opaque

Biaxial (-), α 1.817, β 1.829, γ 1.837, 2*V*(meas.) ~80-
85°, 2*V*(calc.) 78.0°, pleochroism9.1(3), 5.11(2), 4.573(4), 3.159(10), 3.091(4), 2.983(5),
2.749(5)IMA No. **99-010**Cu₂(NO₃)(OH)₃Dimorph of gerhardtite;
new structure-typeMonoclinic: *P*₂₁*a* 5.596, *b* 6.079, *c* 6.925 Å, β 94.67°

Dark emerald green; vitreous; transparent

Biaxial (+), α 1.700, β 1.715, γ 1.738, 2*V*(meas.) 81°,
2*V*(calc.) 79°, pleochroism6.91(100), 3.457(90), 2.669(80), 2.462(80), 2.250(50),
2.154(40), 2.078(50)IMA No. **99-011**(Ca,K,Ba,Na)₃₋₄Mn₂₄(Si,Al)₄₀(O,OH)₁₁₂•21H₂O

Ganophyllite group

Monoclinic: *P*₂₁/*a**a* 16.64, *b* 27.11, *c* 25.35 Å, β 98.74°

Colorless to pale yellowish brown; vitreous to pearly

Biaxial (-), β 1.61, 2*V*(meas.) < 15°12.6(vvs), 3.46(m), 3.13(s), 2.84(s), 2.69(vs), 2.60(s),
2.46(s)IMA No. **99-012**Ba₄(Mn,Fe,Al)₄O₃(OH)₃(Si₄O₁₂)[Si₂O₃(OH)₄]Cl

New structure-type

Tetragonal: *I*₄/*mmm**a* 14.215, *c* 6.126 Å

Deep green; vitreous; transparent

Uniaxial (+), ε 1.765, ω 1.745, pleochroic

10.15(m), 5.63(m), 4.417(m), 3.319(s), 3.011(vs),
2.619(s), 2.577(m)IMA No. **99-013**

FeTiP

Anti-PbCl₂ structureOrthorhombic: *Pnma**a* 6.007, *b* 3.602, *c* 6.897 Å

Cream white; metallic; opaque

2.307(47), 2.301(100), 2.188(88), 2.147(31), 1.938(45),
1.923(34), 1.801(45) calculated patternIMA No. **99-014**(Cs,K)Al₄Be₄(B,Be)₁₂O₂₈

Cs-analogue of rhodizite

Cubic: *P*₄₃*m**a* 7.3205 Å

Colorless to white to yellow; vitreous; transparent

Isotropic, *n* 1.6933.28(35), 2.990(100), 2.441(50), 2.208(30), 2.113(70),
1.957(35), 1.776(40)IMA No. **99-015**BaSi₂O₅•4H₂O

Double-chain silicate; structure

Orthorhombic: *Pnma**a* 5.0453, *b* 9.044, *c* 18.366 Å

Colorless to white; vitreous to pearly; transparent

Biaxial (+), α 1.537, β 1.538, γ 1.541, 2*V*(meas.) 59.2°,
2*V*(calc.) 60.1°9.19(30), 5.068(100), 4.054(85), 2.974(45), 2.706(60),
2.327(40), 2.257(75)

IMA No. 99-016Ba(Ti₇Fe²⁺)O₁₆ Hollandite group; structureTetragonal: *I4/m**a* 10.219, *c* 2.963 Å

Black; adamantine; opaque

In reflected light: grey. *R*: 16% (470 nm), 15% (546 nm), 16% (589 nm), 16% (650 nm)

3.231(41), 3.231(100), 2.486(55), 2.235(57), 1.901(38), 1.598(39), 1.405(34) calculated pattern

IMA No. 99-017Na₂(□,Na,Mn)Zr[Si₆O₁₂(OH,O)₆] Lovozerite group; structureMonoclinic: *Cm**a* 10.589, *b* 10.217, *c* 7.355 Å, β 92.91°

Dark cherry-red to dark reddish brown; vitreous; transparent

Biaxial (–), α 1.546, β 1.574, γ 1.575, 2*V*(meas.) <10°, 2*V*(calc.) 21°

7.37(44), 5.29(100), 3.674(32), 3.329(74), 3.238(100), 2.981(39), 2.553(37)

IMA No. 99-018Ca_{0.2}(H₂O)₂CrS₂ Close to schöllhorniteTrigonal: *Rm*, *R3m* or *R32**a* 3.326, *c* 33.29 Å

Coal-black; submetallic; opaque

In reflected light: grey. *R*_{max} and *R*_{min}: 15.8–14.5% (460 nm), 17.6–15.7% (540 nm), 18.2–17.2% (580 nm), 18.6–16.6% (640 nm)

11.1(100) 5.56(10) 3.700(4) 2.719(5) 2.464(4) 2.180(49)

IMA No. 99-019(Sb,As)₂MoO₆ New structure-typeMonoclinic: *C2/c**a* 18.076, *b* 5.920, *c* 5.083 Å, β 96.97°

White; vitreous and silky; translucent

Biaxial, *n* (calc.) 2.15

5.622(65), 3.376(39), 3.104(61), 2.990(100), 2.960(100), 2.104(42), 1.962(32)

IMA No. 99-020NaY(CO₃)₂•6H₂O New structure-typeTriclinic: *P1**a* 6.2592, *b* 13.0838, *c* 13.2271 Å, α 91.13, β 103.55, γ 90.19°

Colorless to white; vitreous, sometimes pearly; translucent to transparent

Biaxial (+), α 1.480, β 1.498, γ 1.571, 2*V*(meas.) 53°, 2*V*(calc.) 55°

12.81(100), 6.45(70), 4.456(60), 4.291(60), 3.267(25), 2.869(30), 2.571(60)

IMA No. 99-021Bi³⁺₂₄Cr⁶⁺₈O₅₇(OH)₆(H₂O)₃ New structure-typeHexagonal: *P31c**a* 15.067, *c* 15.293 Å

Yellow to dirty yellow-brown; resinous; transparent

In reflected light: grey; internal reflections, yellow. *R*_{min} and *R*_{max}: 17.9–18.6% (470 nm), 16.45–17.0% (546 nm), 16.0–16.5% (589 nm), 15.7–16.2% (650 nm) 7.65(50), 3.812(40), 3.382(100), 2.681(70), 2.175(40), 2.106(40), 1.701(50)**IMA No. 99-022**(Cu,Ca,Fe)₁₀Bi(AsO₄)₄(OH)₁₁•2H₂O Chemically related to mixiteTetragonal: *P4₂/nmn**a* 9.961, *c* 29.19 Å

Olive green to grass green; resinous to dull; translucent

Uniaxial (–), ω 1.785, ε 1.705, pleochroism 14.6(100), 7.04(50), 6.34(70), 5.07(50), 3.518(40), 3.494(40), 3.146(60), 2.535(50)

IMA No. 99-023Cu₂HgSe₂ Possibly related to Ag₂HgS₂Monoclinic: *P2₁/n**a* 7.492, *b* 4.177, *c* 7.239 Å, β 114.20(5)°

Dark grey; metallic; opaque

In reflected light: white. *R*_{min} and *R*_{max}: 15.15–22.0% (470 nm), 13.3–20.15% (546 nm), 12.7–19.8% (589 nm), 12.3–19.25% (650 nm)

3.991(70), 3.576(50), 3.534(50), 3.414(50), 2.730(100), 2.223(70), 2.072(50)

IMA No. 99-024KCrMg(Si₄O₁₀)(OH)₂ Cr-analogue of celadonite; structureMonoclinic: *C2**a* 5.267, *b* 9.101, *c* 10.162 Å, β 100.67°

Emerald-green to dark green; vitreous to dull silky; transparent

Biaxial (–), α 1.605, β 1.648, γ 1.654, 2*V*(meas.) 12°, 2*V*(calc.) 40°, pleochroism 4.54(93), 4.36(40), 3.638(64), 3.097(51), 2.588(100), 2.583(36), 2.409(87)**IMA No. 99-025**Fe²⁺Al₃(BO₃)(SiO₄)O₂ Fe²⁺-analogue of grandidierite; structureOrthorhombic: *Pbnm**a* 10.363, *b* 11.129, *c* 5.769 Å

Blue; vitreous; transparent

Biaxial (–), α 1.631, β 1.654, γ 1.656, 2*V*(meas.) 31.5°, 2*V*(calc.) 32.5°

5.57(m), 5.21(vs), 5.05(vvs), 3.73(m), 3.51(m), 2.97(s), 2.90(m), 2.79(s), 2.18(s)

IMA No. **99-026**BaFe₃Al₂Si₂O₁₀(OH)₂Fe²⁺-analogue of
kinoshitalite; structureMonoclinic: *C2/m**a* 5.389, *b* 9.337, *c* 10.054 Å, β 100.53°

Dark green; vitreous; translucent

Biaxial (-), β 1.680, 2*V*(meas.) 20°2.662(100), 2.640(100), 2.181(40), 2.170(40),
1.659(25), 1.554(30), 1.547(30), 1.529(25)IMA No. **99-027**Bi(Co,Ni)₂(AsO₄)₂(OH,H₂O)₂Tsumcorite
group; structureMonoclinic: *C2/m**a* 9.005, *b* 6.211, *c* 7.440 Å, β 115.19°

Brown; subadamantine; transparent

Biaxial (+), α 1.93(calc.), β 1.95, γ 1.98, 2*V*(meas.) 75°
4.589(61), 4.418(33), 3.193(100), 2.971(92), 2.820(61),
2.702(57), 2.528(42), 2.498(62), 1.869(37)IMA No. **99-028**Bi(Ni,Co)₂(AsO₄)₂(OH,H₂O)₂Tsumcorite
group; structureMonoclinic: *C2/m**a* 8.995, *b* 6.207, *c* 7.462 Å, β 115.00°

Olive-green to brown; subadamantine; translucent

Biaxial (-), α 1.94(calc.), β 1.95, γ 1.97, 2*V*(meas.) 77°
4.586(40), 3.196(100), 2.980(72), 2.821(44), 2.507(47),
1.702(57)IMA No. **99-029**Pb(Co,Fe)₂(AsO₄)₂(OH,H₂O)₂Tsumcorite
group; structureMonoclinic: *C2/m**a* 9.097, *b* 6.313, *c* 7.555 Å, β 115.08°

Brown to red-brown; subadamantine; transparent

Biaxial (+), α 1.92(calc.), β 1.94, γ 1.98, 2*V*(meas.) 77°
4.656(87), 4.462(96), 3.243(100), 3.010(58), 2.868(50),
2.733(47), 2.550(40)IMA No. **99-030**Ca(Cu,Zn)(Fe,Zn)(AsO₄)₂(OH,H₂O)₂Tsumcorite
groupTriclinic: *P1̄**a* 5.457, *b* 5.539, *c* 7.399 Å, α 68.43, β 68.90, γ 69.44°

Yellow; vitreous to subadamantine; transparent

Biaxial (+), α 1.83, β 1.834(calc.), γ 1.89, 2*V*(meas.)
30°4.953(22), 3.416(100), 3.186(40), 2.927(64), 2.832(26),
2.700(30), 2.533(30), 2.468(25)IMA No. **99-031**Na₆(Mn,Fe²⁺)Al₄Si₈O₂₆Mn-analogue of
naujakasite; structureMonoclinic: *C2/m**a* 15.033, *b* 8.001, *c* 10.478 Å, β 113.51°

Blue; vitreous; transparent

Biaxial (-), α 1.539, β 1.551, γ 1.554, 2*V*(meas.) 54°,
2*V*(calc.) 53°3.995(65), 3.623(92), 3.552(56), 3.485(58), 3.450(31),
3.362(33), 3.120(30), 3.068(100), 2.797(30), 2.613(39)IMA No. **99-032**K₂NaMn₇(Nb,Zr)₂Si₈O₂₆(OH)₅Astrophyllite
group; structureTriclinic: *P1̄**a* 5.4303, *b* 11.924, *c* 11.747 Å, α 112.927, β 94.750,
γ 103.175°

Beige to brown; vitreous; transparent

Biaxial (+), α 1.718, β 1.733, γ 1.750(calc.), 2*V*(meas.)
87°10.71(100), 4.405(20), 3.536(50), 3.294(20), 2.783(40),
2.677(30), 2.587(40), 2.503(20)IMA No. **99-034**PbCr³⁺₂(CO₃)₂(OH)₄•H₂O Cr-analogue of dundasite
Orthorhombic: *Pbnm*, *Pbmm* or *Pbn2₁**a* 9.079, *b* 16.321, *c* 5.786 Å

Pale grey to pinkish violet; earthy to pearly; translucent

Biaxial (-), α 1.704, β 1.802, γ 1.842, 2*V*(calc.) 62°
7.94(10), 4.686(5b), 4.373(3), 3.633(7), 3.279(4),
2.690(4), 2.405(3), 2.101(3b), 1.781(3)IMA No. **99-035**SiO₂Polymorphic relation with
quartz; structureMonoclinic: *I2/a**a* 8.758, *b* 4.876, *c* 10.715 Å, β 90.08°

Grey; dull; transparent

n (mean) 1.5264.43(9), 3.391(58), 3.335(100), 3.117(13), 1.830(11),
1.370(10)IMA No. **99-036**Na(Mn³⁺,Fe³⁺)(PO₄)(OH)•2H₂OMonoclinic: *P2₁/n**a* 5.3757, *b* 19.955, *c* 5.3750 Å, β 108.915°

Dark brown to black; vitreous; translucent

9.43(10), 4.977(6), 4.102(3), 3.344(7), 2.663(8),
2.537(4)IMA No. **99-039**(K,Na,Ca)(Al₇Si₁₇O₄₈)•22H₂OK-analogue of
gmelinite; structureHexagonal: *P6₃/mmc**a* 13.696, *c* 10.203 Å

Colorless; vitreous; transparent

Uniaxial (-), ε 1.472, ω 1.477

11.9(80), 7.8(50), 5.16(70), 4.11(100), 3.27(70),
2.971(80), 2.852(80), 2.709(100), 2.085(50), 1.817(80)

IMA No. **99-040**

$\text{Sr}[\text{Al}_2\text{Si}_4\text{O}_{12}] \cdot 6\text{H}_2\text{O}$ Sr-analogue of chabazite
 Trigonal: *Rm*
 a 13.715, c 15.09 Å
 Colorless; vitreous; transparent
 Uniaxial (+), ε 1.503, ω 1.507
 9.38(8), 5.55(6), 4.34(7), 2.92(10), 2.50(5), 1.697(7)

IMA No. **99-041**

$\text{Na}_2\text{Zr}(\text{Si}_4\text{O}_{11}) \cdot 2\text{H}_2\text{O}$ Zr-analogue of
 penkvilksite-1M; structure
 Monoclinic: *P2₁/c*
 a 9.144, b 8.818, c 7.537 Å, β 113.22°
 Colorless; vitreous; translucent to transparent
 Biaxial (–), α 1.570, β 1.588, γ 1.594, $2V(\text{meas.})$ 60°, $2V(\text{calc.})$ 60°
 8.40(10), 5.38(9), 4.00(8), 3.401(9), 2.902(9), 2.772(7),
 2.691(9), 2.190(7)

IMA No. **99-042**

$\text{Cu}_2\text{Pb}_6\text{Bi}_8\text{S}_{19}$ Structure related to junonite
 Monoclinic: *C2/m*
 a 27.6367, b 4.0499, c 20.7409 Å, β 131.258°
 Grey; metallic; opaque
 In reflected light: white. R_{\min} and R_{\max} : 41.7–43.7% (470 nm), 40.4–41.9% (546 nm), 39.7–41.1% (589 nm), 39.2–40.3% (650 nm)
 3.777(s), 3.507(s), 3.382(s), 2.918(s), 2.096(s), 2.062(s),
 2.031(s), 1.744(s)

IMA No. **99-043**

$\text{NiBi}^{3+}\text{As}^{5+}\text{O}_5$ New structure-type
 Triclinic: *P $\bar{1}$*
 a 6.7127, b 6.8293, c 5.2345 Å, α 107.625, β 95.409,
 γ 111.158°
 Orange- to gold-brown; adamantine; transparent
 In reflected light: grey. R_{\min} and R_{\max} : 12.8–13.1% (470 nm), 12.4–12.6% (546 nm), 12.2–12.5% (589 nm), 12.0–12.4% (650 nm)
 5.94(100), 3.233(100), 3.067(60), 3.047(50), 2.116(50),
 2.095(40), 1.659(40)

IMA No. **99-045**

$\text{Na}_4(\text{UO}_2)(\text{CO}_3)_3$
 Triclinic: *P1* or *P $\bar{1}$*
 a 9.280, b 9.295, c 12.864 Å, α 90.293, β 91.124, γ
 119.548°
 Pale yellow to beige; diaphaneity not given; opaque
 $n(\text{calc.})$ 1.583
 8.022(84), 5.080(58), 5.024(61), 4.967(65), 4.639(100),
 4.019(45), 3.221(55), 2.618(60)

IMA No. **99-046**

$\text{Na}_{15}\text{Ca}_6\text{Fe}_3\text{Zr}_3\text{NbSi}_{25}\text{O}_{73}(\text{O},\text{OH},\text{H}_2\text{O})_3\text{Cl}_2$
 Fe-analogue of kentbrooksitite; structure
 Trigonal: *R3m*
 a 14.2099, c 30.067 Å

Reddish brown to red; vitreous; transparent
 Uniaxial (–), ε 1.622, ω 1.619
 7.104(38), 5.694(50), 4.300(43), 3.955(31), 3.391(51),
 3.207(31), 3.155(31), 2.968(100), 2.847(98)

IMA No. **99-047**

As A polymorph of As
 Orthorhombic: *Pmn2₁* or *P2₁nm*
 a 3.633, b 10.196, c 10.314 Å
 Lead grey; metallic; opaque
 In reflected light: white with greenish blue tint, anisotropic dark brown to dark greenish grey. R_{\min} and R_{\max} : 45.7–50.8% (470 nm), 44.0–49.6% (546 nm), 42.7–48.5% (589 nm), 41.9–46.8% (650 nm)
 5.17(100), 4.60(24), 3.259(58), 2.840(27), 2.580(22),
 2.299(23), 1.794(26)

IMA No. **99-048**

$\text{KFe}^{2+}_3\text{AlSi}_3\text{O}_{10}\text{F}_2$ F-analogue of annite;
 structure
 Monoclinic: *C2/m*
 a 5.370, b 9.289, c 10.154 Å, β 100.49°
 Iron black; submetallic; translucent
 Biaxial (–), α 1.596, β 1.648, γ 1.648, $2V(\text{meas.})$ ~0°, $2V(\text{calc.})$ 0°
 10.09(100), 5.02(13), 3.336(56), 3.160(10), 2.933(10),
 2.649(10), 2.507(10), 2.004(10), 1.671(10)

IMA No. **99-049**

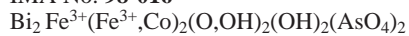
AgSbS_2 Polymorphic relationship with
 miargyrite and cuboargyrite; structure
 Triclinic: *P $\bar{1}$*
 a 7.766, b 8.322, c 8.814 Å, α 100.62, β 104.03, γ
 90.22(2)°
 Iron black to greyish black; metallic; opaque
 In reflected light: white with red internal reflections, anisotropic white through dark blue to brown. R_{\min} and R_{\max} : 31.3–39.6% (470 nm), 29.2–37.3% (546 nm), 27.8–36.1% (589 nm), 26.2–33.0% (650 nm)

IMA No. **99-050**

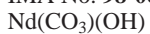
$\text{NaMg}_3\text{V}_6(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_4$ Tourmaline
 group; structure
 Trigonal: *R3m*
 a 16.12, c 7.39 Å
 Dark green to black; pitch like; translucent to opaque
 Uniaxial (–), ω 1.786, ε 1.729
 6.54(9), 4.04(8), 3.57(7), 3.04(9), 2.62(10), 2.07(9)

IMA No. **99-051**

NbBO_4 Nb-analogue of behierite; structure
 Tetragonal: *I4₁/amd*
 a 6.206(5), c 5.487 Å
 Greyish pink; vitreous; transparent
 Uniaxial (+), n 2.30
 4.115(100), 3.110(84), 2.481(36), 2.328(49), 1.939(29),
 1.598(42) calculated pattern

IMA No. **98-016**Triclinic: $P\bar{1}$
 a 4.551, b 6.146, c 9.002 Å, α 95.41, β 99.28, γ 92.89°

Brown; adamantine; translucent to transparent

 Biaxial (–), α 2.02, β (calc.) 2.08, γ 2.12, $2V(\text{meas.})$ 65°
 8.864(35), 3.772(90), 3.539(100), 3.495(73), 2.913(73),
 2.797(51), 2.674(43)
IMA No. **98-063**

Ancylite group; structure

Orthorhombic: $Pm\bar{c}n$
 a 4.981, b 8.524, c 7.259 Å

Pale pinkish purple to white; vitreous; transparent

Biaxial, α 1.698, γ 1.780
 5.52(70), 4.30(72), 4.26(84), 3.68(84), 3.34(100),
 2.93(89), 2.65(72), 2.34(88), 1.892(78)

**NEW MINERALS APPROVED IN 2000 BY THE COMMISSION ON NEW MINERALS
AND MINERAL NAMES, INTERNATIONAL MINERALOGICAL ASSOCIATION**

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The information given here is provided by the Commission on New Minerals and Mineral Names (CNMMN), International Mineralogical Association (IMA), for comparative purposes and as a service to mineralogists working on new species. Each mineral is described in the following format:

IMA Number
Chemical Formula (any relationship to other minerals; structure analysis)
Crystal system, space group
unit-cell parameters
Color; luster; diaphaneity
Optical properties
Strongest lines in the X-ray powder-diffraction pattern [*d* in Å(*l*)]

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves. No other information will be released by the Commission.

2000 PROPOSALS		IMA No. 2000-002
IMA No. 2000-001		NaCu ₄ (AsO ₄) ₃
Cu ₂ Fe ³⁺ (As ⁵⁺ O ₄)(As ³⁺ O ₂)(OH) ₂ •H ₂ O	New structure-type	Alluaudite–wylleite group structure determined
Orthorhombic: <i>Pnma</i>		Monoclinic: <i>C2/c</i>
<i>a</i> 9.553, <i>b</i> 13.099, <i>c</i> 8.0640 Å		<i>a</i> 12.051, <i>b</i> 12.434, <i>c</i> 7.2662 Å, β 117.94°
Pistachio green; vitreous; transparent		Dark-blue; strong vitreous; translucent
Biaxial (–), α 1.80(5), β 1.84(5), γ 1.86(5), 2 <i>V</i> (meas.) = 65(5)°, 2 <i>V</i> (calc.) = 69(3)°		Biaxial (–), α 1.76, β 1.92, γ 1.96, 2 <i>V</i> (calc.) 49.5°
6.88(25), 6.161(90), 3.861(20), 3.231(40), 3.080(100), 2.700(25), 2.211(25)		6.22(13), 3.60(21), 3.43(100), 3.21(35), 2.791(24), 2.696(18), 2.683(30)

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IMA No. **2000-003**

$\text{Ba}_3[(\text{Si},\text{Al})_4\text{O}_8]\text{OCl}[\text{Cl},(\text{H}_2\text{O})]_4$ Cymrite-like structure determined

Hexagonal: $P6_3mc$

a 5.243, c 29.859 Å

Light-blue grey; vitreous; translucent

Uniaxial (-), ω 1.642, ϵ 1.594

14.67(100), 3.883(100), 3.357(50), 2.988(60), 2.887(50), 2.616(70)

IMA No. **2000-004**

$\text{Bi}(\text{OH})\text{SO}_4 \cdot \text{H}_2\text{O}$ Second natural bismuth sulfate

Monoclinic: $P2_1/n$

a 6.0118, b 13.3355, c 6.4854 Å, β 112.91°

Light beige to light grey; vitreous; translucent

n 1.78

5.453(42), 5.193(32), 5.115(37), 4.260(100), 3.335(42), 3.113(36), 2.915(22)

IMA No. **2000-005**

$\text{Ca}_2\text{Mn}_3\text{O}_2(\text{AsO}_4)_2(\text{CO}_3) \cdot 3\text{H}_2\text{O}$ Mitridatite type

Monoclinic: Cm

a 11.253, b 19.628, c 8.932 Å, β 100.05°

Dark red-brown to black; vitreous; translucent

Biaxial (-), α 1.757, $\beta \approx \gamma > 1.80$, $\Delta_{\beta,\gamma} = 0.004$, $2V(\text{meas.}) \sim 32^\circ$

8.796(100), 5.654(31), 2.934(76), 2.886(23), 2.816(24), 2.769(39), 2.201(57)

IMA No. **2000-006**

$\text{Mg}(\text{HCO}_2)_2 \cdot 2\text{H}_2\text{O}$ Second natural formate

Monoclinic: $P2_1/c$

a 8.64, b 7.15, c 9.38 Å, β 98.0°

White; vitreous; translucent

Biaxial (+), α 1.465, β 1.486, γ 1.516, $2V(\text{calc.})$ 81(5)°
4.90(9), 4.64(8), 4.30(7), 3.68(8), 3.40(10), 3.05(4), 2.87(4)

IMA No. **2000-007**

$(\text{Mn},\text{Mg})_{25.5}[(\text{V},\text{As})\text{O}_4]_3(\text{SiO}_4)_3\text{O}_5(\text{OH})_{20}$ Similar to mcgovernite structure determined

Trigonal: $R\bar{3}c$

a 8.259, c 204 Å

Bright yellow to orange; vitreous; transparent

Uniaxial (-), n 1.787

4.13(70), 3.46(60), 3.26(80), 2.86(100), 2.38(60), 2.35(50), 1.559(90)

IMA No. **2000-008**

KBSi_2O_6 Similar to Li-A(BW) zeolite structure determined

Orthorhombic: $P2_12_12_1$

a 9.9630, b 10.4348, c 4.7044 Å

Colorless; vitreous; transparent

Biaxial (-), α 1.561, β 1.563, γ 1.564, $2V(\text{meas.})$ 51°, $2V(\text{calc.})$ 70°
3.944(5), 3.495(8), 3.282(10), 3.149(4), 2.704(4), 2.293(4)

IMA No. **2000-009**

NaBSiO_4 Similar to kalsilite and beryllonite structure determined

Hexagonal: $P6_3$

a 13.8964, c 7.7001 Å

White, colorless in thin fragments; vitreous; transparent or slightly turbid

Uniaxial (-), ω 1.591, ϵ 1.582

3.86(6), 3.61(6), 2.780(10), 2.320(7), 2.216(9), 1.928(5), 1.721(7)

IMA No. **2000-010**

$(\text{Na},\text{H}_3\text{O})_{15}(\text{Ca},\text{Mn},\text{REE})_6\text{Fe}^{3+}_2\text{Zr}_3(\square,\text{Zr})(\square,\text{Si})\text{Si}_{24}\text{O}_{66}(\text{O},\text{OH})_6\text{Cl} \cdot n\text{H}_2\text{O}$ ($2 < n < 3$) Eudialyte group

Trigonal: $R3m$

a 14.167, c 30.081 Å

Yellow; vitreous; transparent

Uniaxial (+), ω 1.612, ϵ 1.615

6.41(41), 4.30(91), 3.521(57), 3.205(44), 2.963(92), 2.841(100), 2.588(37)

IMA No. **2000-011**

$\text{KCaCu}_5(\text{AsO}_4)_4[\text{As}(\text{OH})_2\text{O}_2]_2 \cdot \text{H}_2\text{O}$ Polymorph of calcioandryobertsite structure determined

Orthorhombic: $Pnma$

a 19.576, b 10.0536, c 9.921 Å

Intense blue; vitreous; transparent

Biaxial (-), α 1.715, β 1.730, γ 1.735, $2V(\text{meas.})$ 55°, $2V(\text{calc.})$ 60°

7.064(70), 6.642(60), 4.810(70), 4.469(90), 3.950(60), 3.105(100), 2.748(90)

IMA No. **2000-012**

$\text{Bi}_2\text{Fe}^{3+}(\text{Co},\text{Fe}^{3+})(\text{O},\text{OH})_2(\text{OH})_2(\text{AsO}_4)_2$ Co-dominant analogue of neustädteite structure determined

Triclinic: $P\bar{1}$

a 9.156, b 6.148, c 9.338 Å, α 83.24, β 70.56, γ 86.91°

Brown; adamantine; transparent to translucent

Biaxial (-), α 2.02, β 2.09(calc.), γ 2.12, $2V(\text{meas.})$ 65°
8.757(55), 3.752(100), 3.552(55), 3.507(44), 2.901(96), 2.750(39), 2.667(72)

IMA No. 2000-014Pd₃Pb₂S₂Related to parkerite, Ni₃Bi₂S₂Monoclinic: *C2/m**a* 11.673, *b* 8.323, *c* 8.419 Å, β 135.38°

Cream with a brownish tint (in reflected light in air); opaque; metallic

In reflected light (air): brownish; internal reflections not observed, anisotropy weak. *R*_{min} and *R*_{max}: 45.2–46.1% (460 nm), 46.3–47.2% (540 nm), 47.4–48.5% (580 nm), 49.3–49.8% (640 nm)
5.953(6), 4.144(10), 3.379(4), 2.917(9), 2.413(8), 2.365(7), 2.082(5)**IMA No. 2000-015**Na₃Sr(La,Ce)FeSi₆O₁₇

Nordite group

Orthorhombic: *Pcca**a* 14.440, *b* 5.191, *c* 19.86 Å

Colorless, pale brownish; vitreous; transparent

Biaxial (–), α 1.624, β 1.637, γ 1.644, 2*V*(meas.) 60°, 2*V*(calc.) 72°

7.20(40), 4.21(100), 3.323(82), 2.964(88), 2.873(99), 2.595(58), 2.442(44)

IMA No. 2000-016(Ti,Fe,Mg,Mn)_{1-x}Ti₂O₅

Pseudobrookite group

Orthorhombic: *Pban**a* 9.765, *b* 3.732, *c* 9.957 Å

Dark grey

In reflected light (air): blue–grey, no internal reflections, anisotropic. *R*_{min} and *R*_{max}: 11.5–11.1% (460 nm), 10.3–10.3% (540 nm), 10.1–10.2% (580 nm), 10.3–10.4% (640 nm)
3.47(7), 2.75(10), 1.965(3), 1.871(9), 1.727(9), 1.548(3)**IMA No. 2000-017**Na₁₁Ca₉(Fe³⁺,Fe²⁺)₂Zr₃Nb[Si₂₅O₇₃](OH,H₂O,Cl,O)₅

Eudialyte group

Trigonal: *R3m**a* 14.255, *c* 30.170 Å

Dark brown to brownish black; vitreous; translucent

Uniaxial (–), ω 1.616, ε 1.620

6.43(39), 4.31(69), 3.218(56), 3.036(42), 2.977(81), 2.854(100), 2.602(44)

IMA No. 2000-018VOSO₄(H₂O)₅Polymorph of minasragrite
structure determinedOrthorhombic: *Pmn2₁**a* 7.246, *b* 9.333, *c* 6.210 Å

Bright blue to pale blue; vitreous

Biaxial(–), α 1.529, β 1.534, γ 1.534, 2*V*(meas.) 2°, 2*V*(calc.) 0°

4.70(100), 3.734(20), 3.322(50), 2.865(40), 2.602(30), 2.363(20), 2.030(20)

IMA No. 2000-019Cu₅(UO₂)₆(SO₄)₃(OH)₁₆•14H₂OSecond natural
uranyl sulfateTriclinic: *P1* or *P1̄**a* 13.754, *b* 9.866, *c* 8.595 Å, α 103.84, β 90.12, γ 106.75°

Grey olive; opaque

Biaxial (+), α 1.725, β 1.730, γ 1.787, 2*V*(calc.) 33.8°
9.13(100), 7.09(26), 5.511(22), 4.566(80), 3.443(17), 3.367(15), 3.046(26)**IMA No. 2000-020**Fe₄[AsO₃OH]₅[AsO₂(OH)₂]₂•20 H₂O

Orthorhombic

a 10.676, *b* 19.027, *c* 10.012 Å

White-beige; aggregates are earthy; opaque

n 1.615 (calc.)

9.50(100), 9.31(85), 6.81(24), 5.45(23), 4.221(35), 3.586(39), 3.302(24)

IMA No. 2000-021Ca₃(Si,Fe³⁺,Al)[SO₄][B(OH)₄](OH,O)₆•12H₂O

Ettringite group

Trigonal (pseudo-hexagonal): *P31c* (by analogy)*a* 11.14, *c* 20.99 Å

Light grey with violet shade; vitreous, earthy in aggregates; translucent

Uniaxial (+), ω 1.523, ε 1.532

9.70(8), 3.85(6), 3.040(8), 2.736(6), 2.596(10), 2.374(6), 2.121(9)

IMA No. 2000-022Ca₂Mn²⁺Fe³⁺Si₄O₁₂(OH)(H₂O)₂Four-membered
silicate rings

structure determined

Triclinic: *P1̄**a* 9.960, *b* 13.875, *c* 6.562 Å, α 133.19, β 101.50, γ 66.27°

Dark brown (clusters), light brown (thinner crystals); vitreous

Biaxial (–), α 1.667, β 1.679, γ 1.690, 2*V*(meas.) 89°, 2*V*(calc.) 87°

9.07(100), 8.24(90), 5.00(30), 3.192(30), 3.126(70), 3.095(70), 2.781(60)

IMA No. 2000-023Ba₆Fe³⁺Si₈O₂₃(CO₃)₂Cl₃•H₂O

Unique structure

Trigonal: *P3m1**a* 10.740, *c* 7.0950 Å

Jet black to a dirty grey-brown; vitreous to adamantine; opaque to translucent

Uniaxial (–), ω 1.723, ε 1.711

3.892(100), 3.148(40), 2.820(90), 2.685(80), 2.208(40), 2.136(40), 1.705(35)

IMA No. **2000-024**Na₂BeSi₄O₁₀•4H₂OFour-membered and
eight-membered silicate rings
structure determinedOrthorhombic: *P*₂*1*₂*1*₂*a* 9.722, *b* 10.142, *c* 12.030 Å

Colorless, whitish; vitreous; transparent

Biaxial (+), α 1.499, β 1.507, γ 1.511, 2*V*(meas.) 65°,
2*V*(calc.) 70°6.11(80), 5.97(100), 5.07(35), 3.46(45), 3.09(70),
3.06(50), 2.988(60)IMA No. **2000-025**(Sr,Ca)₂Na[Al₅Si₅O₂₀]•7H₂OThomsonite-series
zeolite
structure determinedOrthorhombic: *P**c**m**a* 13.050, *b* 13.123, *c* 13.241 Å

Colorless; vitreous; transparent

Biaxial (+), α 1.528, β 1.532, γ 1.540, 2*V*(meas.) 62°,
2*V*(calc.) 71°6.63(7), 4.66(8), 3.49(9), 3.19(8), 2.960(10), 2.860(10),
2.691(10)IMA No. **2000-026**(Mn,Li)₄(Ta,Sn)₄(Ta,Nb)₈O₃₂

Wodginite group

Monoclinic: *C**2*/*c**a* 9.5104, *b* 11.5196, *c* 5.1179 Å, β 91.221(48)°

Reddish brown; vitreous; translucent

n > 2.03.644(46), 2.976(100), 2.966(95), 2.465(36), 1.767(17),
1.715(23), 1.455(18)IMA No. **2000-027**Sr₄Ti₄Si₄O₂₂

Perrierite group

Monoclinic: *P*₂*1*/*a* (pseudo-*C*₂/*m*) structure determined
a 13.848, *b* 5.626, *c* 11.878 Å, β 114.19°

Grey with a blue tint; adamantine; transparent

Pale green with a yellow tint in thin section

3.62(60), 3.16(70), 3.09(95), 3.01(90), 2.96 (95),
2.71(100), 2.17(90)IMA No. **2000-028**Na₂₇K₈Ca₁₂Fe₃Zr₆Si₅₂O₁₄₄(O,OH,H₂O)₆Cl₂ Eudialyte
groupTrigonal: *R**3m**a* 14.249, *c* 60.969 Å

Pink; vitreous; transparent

Uniaxial (+), ω 1.598, ε 1.600

6.48(47), 4.345(81), 3.565(41), 3.249(57), 2.987(100),
2.861(70), 2.695(40)IMA No. **2000-029**Cu₅Cl₂(OH)₈(H₂O)₂Similar to atacamite
structure determinedMonoclinic: *C*₂/*m**a* 10.301, *b* 6.758, *c* 8.835 Å, β 111.53°

Pale blue; vitreous; transparent

Biaxial (-), α 1.724, β 1.745, γ 1.750, 2*V*(meas.) 33°,
2*V*(calc.) 52°8.20(100), 5.52(100), 5.03(40), 2.883(80), 2.693(40),
2.263(40), 2.188(50), 1.767(40)IMA No. **2000-030**CaMg₃(Al₅Mg)(Si₆O₁₈)(BO₃)₃(OH)₃(OH) Tourmaline
groupTrigonal: *R**3m**a* 15.954, *c* 7.214 Å

Orange; vitreous; transparent

Uniaxial (-), ω 1.646, ε 1.624

6.38(50), 4.981(50), 4.596(50), 4.234(90), 3.978(100),
3.491(70), 2.969(80), 2.582(90)IMA No. **2000-031**K₂Mn(Nb,Ti)₄(Si₄O₁₂)₂(OH)₄•6H₂O Labuntsovite
groupMonoclinic: *C*₂/*m**a* 14.551, *b* 14.001, *c* 15.702 Å, β 117.6°

Brown to pink; vitreous; translucent

Biaxial (+), α 1.683, β 1.692, γ 1.775, 2*V*(meas.) 40°,
2*V*(calc.) 38°6.99(100), 6.43(25), 4.936(28), 3.227(89), 3.123(68),
2.607(25), 2.520(29)IMA No. **2000-032**Mg₃(PO₄)₂•22H₂O-1A2

Synthetic equivalent

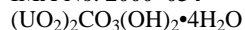
Triclinic: *P* $\bar{1}$ *a* 6.932, *b* 6.925, *c* 16.154 Å, α 82.21, β 89.70, γ
119.51°

Colorless; vitreous; transparent

Biaxial (-), α 1.459, β 1.470, γ 1.470, 2*V*(meas.) 25°,
2*V*(calc.) 0°7.98(100), 5.32(63), 3.19(45), 2.896(33), 2.867(30),
2.728(32), 2.658(37)IMA No. **2000-033**(Ba,Na,K)(Al,Mg)₂(Si,Al)₄O₁₀(OH)₂ Mica groupMonoclinic: *C*₂/*c**a* 5.2068, *b* 9.027, *c* 19.963 Å, β 95.87°

Light grey to silver; glassy; transparent

Biaxial (-), α(calc.) 1.600, β 1.619, γ 1.622, 2*V*(meas.)
43°4.471(22), 4.302(21), 3.879(26), 3.730(27), 3.487(23),
2.596(46), 2.566(100), 1.504(63)

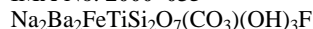
IMA No. 2000-034

Unique composition

Monoclinic: $P2_1/c$

a 4.1425, b 14.098, c 18.374 Å, β 103.62°

Canary yellow; vitreous; transparent

Biaxial (-), α 1.583, β 1.669, γ 1.712, $2V(\text{calc.})$ 67.4°
8.95(65), 7.54(63), 4.546(96), 4.262(60), 3.463(62),
3.322(100), 3.029(85), 2.273(62)**IMA No. 2000-035**

Unique structure

Triclinic: $P1$

a 5.399, b 7.016, c 16.254 Å, α 102.44, β 93.18, γ 90.10°

Yellowish brown; vitreous or pearly; translucent

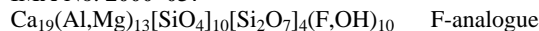
Biaxial (+), α 1.671, β 1.694, γ 1.734, $2V(\text{meas.})$ 71°, $2V(\text{calc.})$ 76°
3.910(44), 3.186(100), 3.055(38), 2.797(29), 2.738(62),
2.695(32), 2.677(29)**IMA No. 2000-036**

Isostructural with nolanite

Hexagonal: $P6_3/mmc$, $P6_3mc$ or $P\bar{6}2c$

a 5.9899, c 9.353 Å

Black; submetallic; opaque

In reflected light: grey with no internal reflections, anisotropy moderate. R_{\min} and R_{\max} : 12.21–13.62% (460 nm), 11.78–12.92% (540 nm), 11.67–12.67% (580 nm), 11.39–12.25% (640 nm)
3.474(34), 2.994(43), 2.673(44), 2.522(100), 1.517(33),
1.497(54)**IMA No. 2000-037**F-analogue
of vesuvianite
structure determinedTetragonal: $P4/nnc$

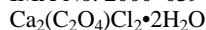
a 15.510, c 11.779 Å

Colorless to silky white; vitreous; transparent

Uniaxial (-), ω 1.702, ϵ 1.699
3.465(30), 3.040(30), 2.945(35), 2.743(90), 2.589(50),
2.453(100)**IMA No. 2000-038**Isostructural with rhodarsenide
structure determinedOrthorhombic: $Pnma$

a 5.748, b 3.548, c 6.661 Å

Light straw-yellow; metallic; opaque

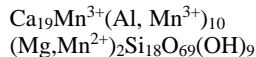
In reflected light: creamy with no internal reflections, anisotropy distinct. R_{\min} and R_{\max} : 36.8–46.7% (460 nm), 39.2–48.2% (540 nm), 40.7–49.6% (580 nm), 43.0–51.9% (640 nm)
2.238(100), 2.120(80), 2.073(70), 1.884(50), 1.843(40),
1.788(40), 1.774(40), 1.758(40)**IMA No. 2000-039**

New structure-type

Monoclinic: $I2/m$

a 6.933, b 7.372, c 7.446 Å, β 94.5°

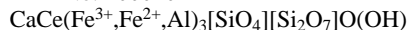
Colorless; vitreous; transparent

Biaxial (-), α 1.565, β 1.645, γ 1.725, $2V(\text{meas.})$ 88°, $2V(\text{calc.})$ 86°
5.24(60), 3.670(30), 2.945(100), 2.905(50), 2.619(50),
2.516(40), 2.339(30), 2.323(30)**IMA No. 2000-040**Mn-dominant analogue
of vesuvianite
structuredeterminedTetragonal: $P4/n$ or $P4nc$

(or both)

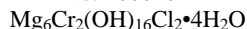
a 15.575, c 11.824 Å

Deep maroon-red; vitreous; transparent

Uniaxial (-), ω 1.731, ϵ 1.719
2.956(100), 2.756(87), 2.756(94), 2.753(60), 2.604(67),
2.598(66), 2.598(62)**IMA No. 2000-041** Fe^{3+} -analogue of allanite-(Ce)
structure determinedMonoclinic: $P2_1/m$

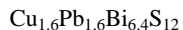
a 8.962, b 5.836, c 10.182 Å, β 115.02°

Black; vitreous to resinous; opaque to translucent

Biaxial (-), α 1.825, β 1.855, γ 1.880, $2V(\text{calc.})$ 48.2°
3.54(70), 2.93(100), 2.715(80), 2.637(70), 2.155(80),
1.908(70), 1.651(90)**IMA No. 2000-042**Hydrotalcite group
structure determinedTrigonal: $R\bar{3}m$

a 3.103, c 24.111 Å

Magenta to purple; vitreous to waxy; transparent

Uniaxial (-), ω 1.555, ϵ 1.535
8.04(100), 4.020(48), 2.624(3), 2.349(5), 2.007(6)**IMA No. 2000-044**Bismuthinite–aikinite derivative
structure determinedOrthorhombic: $Pmc2_1$

a 4.007, b 44.81, c 11.513 Å

Grey; metallic; opaque

In reflected light: greyish white with no internal reflections, anisotropy distinct. R_{\min} and R_{\max} : 39.15–48.36% (470 nm), 38.26–47.65% (546 nm), 37.23–47.14% (589 nm), 36.55–45.71% (650 nm)
3.631(99), 3.586(55), 3.552(85), 3.156(59), 3.136(95),
2.836(100)

IMA No. **2000-046**

(Na,H₃O,K,Sr,Ba)₂(Ti,Nb)₂
[Si₄O₁₂](OH,O)₂•3H₂O Labuntsovite group
structure determined

Monoclinic: *Cm*

a 14.604, *b* 14.274, *c* 7.933 Å, β 117.40°

Colorless, white, light brown; vitreous; transparent to translucent

Biaxial (+), α 1.658, β 1.668, γ 1.770, 2*V*(meas.) 25°, 2*V*(calc.) 36°

7.01(44), 6.46(100), 4.991(28), 3.954(30), 3.236(98), 3.179(33), 3.160(38)

IMA No. **2000-047**

Mg(V⁵⁺₂O₆)•7H₂O Structural relationships
to munirite and rossite

Monoclinic: *C2/c*

a 38.954, *b* 7.2010, *c* 16.3465 Å, β 97.602°

Light golden-brown; vitreous; translucent

Biaxial (–), α 1.612, β 1.674, γ 1.710, 2*V*(meas.) 78°, 2*V*(calc.) 73°

9.70(100), 8.12(60), 5.84(100), 4.061(50), 3.139(90), 2.920(60), 2.707(50)

IMA No. **2000-048**

K₆Fe₂₄S₂₆(Cl,S) Cl-dominant analogue of bartonite
structure determined

Tetragonal: *I4/mmm*

a 10.3810, *c* 20.614 Å

Black-brown; submetallic; opaque

In reflected light: yellowish-brown with no internal reflections, no anisotropy. R: 10.2% (460 nm), 13.1% (540 nm), 14.8% (580 nm), 17.1% (640 nm)

9.25(33), 5.97(65), 3.121(45), 2.986(100), 2.380(38), 2.374(57), 1.834(51), 1.830(82)

IMA No. **2000-049**

NaCa₂Mg₅(Si₇Al)O₂₂F₂ Amphibole group
structure determined

Monoclinic: *C2/m*

a 9.8471, *b* 18.0171, *c* 5.2681 Å, β 104.845°

Intense yellow; vitreous to resinous; transparent

Biaxial (–), α 1.606, β 1.617, γ 1.625, 2*V*(calc.) 80.4°

8.40(57), 3.271(48), 3.125(100), 2.938(17), 2.807(33), 2.703(25), 1.894(18)

IMA No. **2000-050**

KCdCu₇O₂(SeO₃)₂Cl₉ Similarity to ilinskite
structure determined

Hexagonal: *P6₃/mmc*

a 8.7805, *c* 15.521 Å

Dark red; vitreous to metalloid; opaque to translucent

No optical measurements possible, *n* (calc.) 1.804

7.78(100), 6.82(50), 4.391(80), 3.814(80), 3.066(70), 2.582(50), 2.501(60), 2.190(50)

IMA No. **2000-051**

Ca₂ScSn(Si₂O₇)(Si₂O₆OH) Unique structure

Triclinic: *C1*

a 10.028, *b* 8.408, *c* 13.339 Å, α 90.01, β 109.10, γ 90.00°

Colorless to white; vitreous; transparent to translucent

n 1.74

5.18(53), 3.146(100), 3.089(63), 2.901(19), 2.595(34), 2.142(17)

IMA No. **2000-D**

Ba₂Na(La,Ce)₂Fe²⁺Ti₂Si₈O₂₆(OH,O,F)•H₂O Joaquinite
group

Orthorhombic: probably *Ccmm*

a 10.539, *b* 9.680, *c* 22.345 Å

Brown; silky; transparent

Biaxial (+), α 1.754, β 1.760, γ 1.797, 2*V*(meas.) 40°, 2*V*(calc.) 45°

5.58(67), 3.00(9), 2.95(17), 2.91(10), 2.80(100), 2.232(8), 1.596(13)

PROPOSALS APPROVED IN PREVIOUS YEARS

IMA No. **1999-033**

(Ca,Y)₃Al[PO₃OH,CO₃](CO₃)(OH)₆•12H₂O Ettringite
group

Hexagonal: *P6₃* structure determined

a 10.828, *c* 10.516 Å

Colorless to white; vitreous; transparent

Uniaxial (–), ω 1.532, ε 1.503

9.38(100), 4.59(70), 3.77(50), 3.36(55), 2.491(80), 2.143(65)

IMA No. **1998-011**

(Fe²⁺,Fe³⁺,Mg)₁₁(PO₄)₂O₂(OH)₁₆•4H₂O New
structure-type

Monoclinic: *P2₁/n*

a 16.950, *b* 11.650, *c* 6.2660 Å, β 90.000°

Dark green; vitreous; translucent

Biaxial (–), α 1.722, β 1.730, γ 1.737, 2*V*(meas.) > 50, 2*V*(calc.) 86°

9.61(53), 6.87(77), 5.83(89), 4.805(100), 3.787(62), 3.533(84), 2.868(66)

IMA No. **1998-029**

(Ce,REE,Ca)₄(Mg,Fe²⁺) Cr-dominant analogue
(Cr,Fe³⁺)₂(Ti,Nb)₂Si₄O₂₂ of chevkinite-(Ce)
structure determined

Monoclinic: *C2/m*

a 13.397, *b* 5.697, *c* 11.041 Å, β 100.53°

Black; resinous; translucent in thin fragments

In reflected light: grey with weak brown internal reflections, no anisotropy. R: 11.2% (470 nm), 10.9% (546 nm), 10.7% (589 nm), 10.3% (650 nm)

5.44(40), 3.62(35), 3.18(50), 3.15(40), 3.12(35), 2.849(40), 2.715(100), 2.160(45)

IMA No. **1998-050**

$\text{Na}_4\text{K}_4[\text{Ba}_2(\text{H}_2\text{O},\text{OH})_2]$ Labuntsovite group
 $\text{Mg}[\text{Ti}_8(\text{Si}_4\text{O}_{12})_4(\text{O},\text{OH})_8]\cdot 8\text{H}_2\text{O}$ structure determined

Monoclinic: $C2/m$

a 14.292, b 13.750, c 7.792 Å, β 117.03°

Colorless, yellowish, pink or light orange; vitreous; translucent or transparent

Biaxial (+), α 1.688, β 1.692, γ 1.802, $2V(\text{meas.})$ 37°, $2V(\text{calc.})$ 36°

6.94(51), 3.175(100), 3.093(57), 3.083(55), 3.024(51), 2.576(48)

IMA No. **1998-051**

$\text{Na}_4\text{K}_4[\text{Ba}_2(\text{H}_2\text{O},\text{OH})_2]\text{Fe}[\text{Ti}_8(\text{Si}_4\text{O}_{12})_4(\text{O},\text{OH})_8]\cdot 8\text{H}_2\text{O}$
 Labuntsovite group
 structure determined

Monoclinic: $C2/m$

a 14.249, b 13.791, c 7.777 Å, β 116.82°

Orange; vitreous; translucent or transparent

Biaxial (+), α 1.686, β 1.696, γ 1.835, $2V(\text{meas.})$ 32°, $2V(\text{calc.})$ 32°

6.95(56), 6.35(34), 3.169(100), 3.100(53), 3.032(53), 2.585(58)

IMA No. **1998-052**

$\text{Na}_2\text{K}_2\text{Ba}_{1-x}\text{Ti}_4(\text{Si}_4\text{O}_{12})_2(\text{O},\text{OH})_4\cdot 5\text{H}_2\text{O}$ Labuntsovite group
 structure determined

Monoclinic: $C2/m$

a 14.216, b 13.755, c 7.767 Å, β 116.7°

Bright orange to reddish orange; vitreous; transparent

Biaxial (+), α 1.683, β 1.690, γ 1.820, $2V(\text{meas.})$ 37°, $2V(\text{calc.})$ 28°

6.93(26), 6.31(28), 3.16(100), 3.09(24), 3.02(25), 2.577(25)

IMA No. **1997-016**

$\text{MnNa}_3\text{P}_3\text{O}_{10}\cdot 12\text{H}_2\text{O}$

Monoclinic: $P2_1/n$

a 14.71, b 9.33, c 15.13 Å, β 89.8°

Colorless; vitreous; transparent

Biaxial (-), α 1.453, γ 1.459, $2V$ and β not measured
 10.50(75), 7.36(100), 3.316(60), 3.162(50), 2.889(60), 2.391(48)

IMA No. **1988-047**

$\text{Bi}_{8-x}(\text{Se},\text{Te},\text{S})_{7+x}$ Tetradymite group

Trigonal: $P\bar{3}m1$, $P3m1$, $P321$

a 4.292, c 87.18 Å

Steel-grey; metallic; opaque

In reflected light: light yellow, no internal reflections, anisotropy moderate. R_{min} and R_{max} : 49.9–52.9% (470 nm), 50.6–54.5% (546 nm), 51.0–54.6% (589 nm), 51.2–54.7% (650 nm)

7.35(27), 4.604(80), 3.354(18), 3.131(100), 2.291(29), 2.146(19), 2.112(18), 1.9377(43)

New minerals approved in 2001 by the Commission on New Minerals and Mineral Names International Mineralogical Association

JOEL D. GRICE* (Chairman, CNMMN) and GIOVANNI FERRARIS** (Vice-Chairman, CNMMN)

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The information given here is provided by the Commission on New Minerals and Mineral Names, I. M. A. for comparative purposes and as a service to mineralogists working on new species.

Each mineral is described in the following format:

IMA No.
Chemical formula (any relationship to other minerals; structure analysis)
Crystal system: space group
Unit-cell parameters
Colour; lustre; diaphaneity
Optical properties
Strongest lines in the X-ray powder diffraction pattern

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

No other information will be released by the Commission.

2001 Proposals

IMA No. 2001-001

SmPO₄ Monazite group; structure determined

Monoclinic: $P2_1/n$

a 6.725, b 6.936, c 6.448 Å, β 104.02°

Yellowish; vitreous to greasy

Biaxial (+), α 1.768, β 1.771, γ 1.808, $2V$ (meas.) 29°,
 $2V$ (calc.) 32°

5.19(40), 4.65(50), 4.16(80), 3.492(40), 3.264(70),
3.065(100), 2.857(90)

IMA No. 2001-002

Cu₁₇Bi₁₇S₃₅ Related to cuprobismutite

Monoclinic: $C2/m$ (15)

a 35.054, b 3.91123, c 43.192 Å, β 96.713°

Lead grey; metallic; opaque

In reflected light (oil with $N_D=1.515$): dark brown; internal reflectance: not observed; weakly anisotropic. R_{\min} and R_{\max} : 40.6–42 % (460 nm), 41.1–43 % (540 nm), 41.1–43.15 % (580 nm), 40.9–43.4 % (640 nm)

5.36(40), 4.08(50), 3.904(37), 3.585(34), 3.120(40), 3.104
(68), 2.759(53), 2.752(44), 1.956(100)

IMA No. 2001-004

CaCu₆[(PO₄)₂(PO₃OH)(OH)₆]·3H₂O Mixite group

Hexagonal: $P6_3/m$

a 13.284, c 5.902 Å

Olive green; vitreous; translucent to transparent

Uniaxial (+), ω 1.674, $\epsilon > 1.739$ (~1.75)

11.51(100), 4.35(88), 4.14(46), 3.837(38), 3.321(44),
2.888(53), 2.877(37)

IMA No. 2001-005

PdSe₂ New structure-type

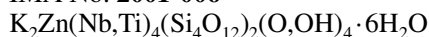
Monoclinic: $C2/m$

a 6.659, b 4.124, c 4.438 Å, β 92.76°

Black; metallic; opaque

In reflected light (air): white; internal reflectance: none; moderate anisotropy. R_{\min} and R_{\max} : 47.7–51.8 % (460 nm), 48.8–53.0 % (540 nm), 48.5–55.0 % (580 nm), 48.7–56.9 % (640 nm)

4.42(30), 3.496(30), 2.718(100), 2.063(20), 1.955(50),
1.896(50), 1.815(20)

IMA No. 2001-006

Labuntsovite group; structure determined

Monoclinic: $C2/m$

a 14.535, b 13.927, c 15.665 Å, β 117.6°

Pink, pinkish-brown, white; vitreous; translucent

Biaxial (+), α 1.683, β 1.688, γ 1.785, $2V(\text{meas.})$ 45°, $2V(\text{calc.})$ 27°

6.96(100), 6.43(24), 4.92(30), 3.222(84), 3.114(66), 2.514(30), 1.430(22)

IMA No. 2001-007

Labuntsovite group; structure determined

Monoclinic: $C2/m$

a 14.410, b 13.880, c 15.587 Å, β 117.53°

Orange to reddish-orange; vitreous; translucent

Biaxial (+), α 1.687, β 1.689, γ 1.805, $2V(\text{meas.})$ 22°, $2V(\text{calc.})$ 16°

6.96(100), 6.43(24), 4.92(30), 3.222(84), 3.114(66), 2.514(30), 1.430(22)

IMA No. 2001-008

Close to kalsilite; structure determined

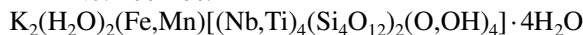
Hexagonal: $P6_3$

a 18.106, c 8.462 Å

Colourless; vitreous; transparent

Uniaxial (-), ω 1.538, ϵ 1.531

3.18(50), 3.091(100), 2.612(70), 1.674(50), 1.585(50), 1.516(50), 1.240(60)

IMA No. 2001-009

Labuntsovite group; structure determined

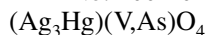
Monoclinic: $C2/m$

a 14.529, b 13.943, c 7.837 Å, β 117.61°

Pale yellow, yellow, orange yellow; vitreous to waxy; translucent, rarely transparent

Biaxial (+): α 1.6676, β 1.7001, γ 1.794, $2V(\text{meas.})$ 58.5°, $2V(\text{calc.})$ 63.71°

6.92(80), 6.42(50), 4.94(70), 3.225(100), 3.114(80), 3.069(20), 2.512(50)

IMA No. 2001-010

New structure-type

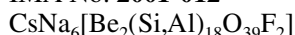
Tetragonal: $I\bar{4}$

a 7.727, c 4.648 Å

Red, brownish red; adamantine; translucent

Uniaxial (+), $\omega \sim 2.3$, $\epsilon \sim 2.5$

5.45(25), 2.772(100), 2.735(100), 2.324(30), 2.254(20), 1.728(15), 1.683(15)

IMA No. 2001-012

Related to leifite; structure determined

Trigonal: $P3$

a 14.3770, c 4.8786 Å

White; vitreous; transparent

Uniaxial (+), ω 1.526, ϵ 1.531

6.23(35), 4.15(50), 3.456(40), 3.382(75), 3.162(100), 3.113(36), 2.465(30)

IMA No. 2001-013

Scheelite structure

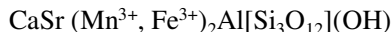
Tetragonal: $I4_1/a$

a 4.738, c 10.506 Å

White; adamantine; translucent

Indices $\gg 1.64$, maximum birefringence roughly 0.015

4.30(40), 3.29(40), 2.81(100), 2.065(50), 1.805(30), 1.755(60), 1.55(45), 1.437(50)

IMA No. 2001-014

Epidote group; structure determined

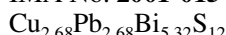
Monoclinic: $P2_1/m$

a 8.900, b 5.700, c 10.350 Å, β 114.50°

Deep red; vitreous; transparent

Biaxial (+), average refractive index $\eta = 1.825$

3.513(50), 2.936(100), 2.854(40), 2.703(80), 2.586(80), 2.415(30), 2.182(80)

IMA No. 2001-015

Derivative of bismuthinite; structure determined

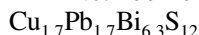
Orthorhombic: $Pmc2_1$

a 4.0285, b 44.986, c 11.599 Å

Tin white; metallic; opaque

In reflected light (air): white; internal reflectance: none; moderate anisotropy. R_{\min} and R_{\max} : 39.52–46.88 % (460 nm), 39.26–48.06 % (540 nm), 39.02–48.34 % (580 nm), 38.51–47.35 % (640 nm)

4.04(49), 3.656(100), 3.605(49), 3.567(81), 3.174(71), 3.152(78), 2.852(95)

IMA No. 2001-016

Derivative of bismuthinite; structure determined

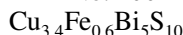
Orthorhombic: $Pm\bar{c}n$

a 4.0070, b 55.998, c 11.512 Å

Tin white; metallic; opaque

In reflected light (air): white; internal reflectance: none; distinct anisotropy. R_{\min} and R_{\max} : 38.32–48.16 % (460 nm), 37.42–48.56 % (540 nm), 36.93–48.09 % (580 nm), 36.20–46.69 % (640 nm)

4.01(56), 3.63(100), 3.58(55), 3.55(85), 3.155(57), 3.136(92), 2.836(93), 2.560(41)

IMA No. 2001-017

Cuprobismutite series; structure determined

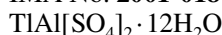
Monoclinic: $C2/m$

a 17.512, b 3.9103, c 12.869 Å, β 108.57°

Grey; metallic; opaque

In reflected light (air): greyish white; internal reflectance: none; moderate anisotropy. R_{\min} and R_{\max} : 33.48–40.29 % (460 nm), 33.90–41.06 % (540 nm), 34.15–41.28 % (580 nm), 34.26–41.42 % (640 nm)

6.03(42), 3.596(68), 3.239(34), 3.213(44), 3.128(100), 3.071(70), 2.683(48)

IMA No. 2001-018Cubic: $Pa\bar{3}$

a 12.212 Å
Light yellow to white; vitreous; transparent
Isotropic; η 1.495
7.03(54), 6.11(27), 4.31(100), 3.676(22), 3.524(24),
2.801(70), 2.731(35)

IMA No. **2001-019**
[Ca₃(REE)]₄(REE)₂Al□₂[Si₄B₄O₂₂](OH,F)₂
Hellandite group; structure determined

Monoclinic: $P2/a$
 a 19.068, b 4.745, c 10.289 Å, β 111.18°
Pale-brown; vitreous; transparent
Biaxial (-); cf. 2001-020
3.238(50), 2.916(35), 2.855(56), 2.652(100), 2.635(73),
1.905(49), 1.901(41)

IMA No. **2001-020**
Ca₄(Ca,Ce)₂AlBe₂[Si₄B₄O₂₂](O)₂
Hellandite group; structure determined

Monoclinic: $P2/a$
 a 19.032, b 4.746, c 10.248 Å, β 110.97°
Brownish; vitreous; transparent
Biaxial (-), α 1.680(5), β 1.694(2), γ 1.708(5), 2V(meas.)
~90°, 2V(calc.) 89.3°
3.238(39), 3.080(41), 2.916(41), 2.855(48), 2.644(100),
2.635(80), 1.905(46)

IMA No. **2001-021**
Ca₄[(Th,U)(REE)]₂Al□₂[Si₄B₄O₂₂](OH,F)₂
Hellandite group; structure determined

Monoclinic: $P2/a$
 a 19.059, b 4.729, c 10.291 Å, β 111.33°
Pale-brown; vitreous; transparent
Biaxial (-), cf. 2001-020
4.729(72), 3.454(79), 3.089(86), 2.846(100), 2.653(80),
2.648(79), 2.634(84)

IMA No. **2001-022**
Pb₂Fe³⁺(VO₄)₂(OH) Mn-free brackebuschite
Monoclinic: $P2_1/m$

a 7.66, b 6.12, c 8.93 Å, β 112.0°
Red-orange to red-brown; vitreous or adamantine; translucent to transparent
Refractive index > 2.1
4.89(43), 4.17(34), 3.253(100), 3.062(25), 2.989(48),
2.755(48), 2.450(20)

IMA No. **2001-023**
(Ca,K,Na,Sr,Ba)₄₈[(Ti,Nb,Fe,Mn)₁₂(OH)₁₂Si₄₈O₁₄₄]
(F,OH,Cl)₁₄ Close to astrophyllite

Monoclinic: P^*/c unique axis
 a 14.069, b 24.937, c 44.31 Å, β 95.02°
Light-brown, yellow; silky; semitransparent
Biaxial (-), α 1.631, β 1.641, γ 1.647, 2V(calc.) 75°
12.33(51), 6.199(42), 3.127(65), 3.110(52), 2.990(59),
2.940(45), 2.835(100)

IMA No. **2001-024**
CaV₃O₇
Orthorhombic: $Pnam$

a 10.42, b 5.28, c 10.34 Å
Pale olive green; vitreous; transparent
 η ~2
5.16(m), 3.45(w), 3.00(s), 2.88(w), 1.85(m)

IMA No. **2001-026**
Ca(Mn³⁺,Mg,□)₂(AsO₄)₂(OH,H₂O)₂
Tsumcorite group; structure determined

Monoclinic: $C2/m$
 a 9.043, b 6.2314, c 7.3889 Å, β 116.392°
Brown-red to dark reddish orange; vitreous; transparent
Biaxial (+), α 1.785, β 1.814, γ 1.854, 2V(meas.) ~85°,
2V(calc.) 82°
4.93(80), 3.182(100), 2.927(70), 2.822(70), 2.718(80),
2.555(100), 2.134(70)

IMA No. **2001-027**
(Y,REE)₄Cu(CO₃)₄Cl(OH)₅·2H₂O
Monoclinic: $P2$, Pm , or $P2_1/m$

a 8.899, b 22.77, c 8.589 Å, β 120.06°
Intense royal blue turquoise-blue; pearly on cleavages;
transparent
Biaxial (-), α 1.608, β ~ γ 1.638°
22.78(30), 7.46(30), 7.09(50), 6.24(100), 4.22(30),
3.530(40), 3.336(30)

IMA No. **2001-028**
(Na,Ca,K)₂Ca(Nb,Ti)₄(Si₄O₁₂)₂(O,OH)₄·7H₂O
Labuntsovite group; structure refined

Monoclinic: $C2/m$
 a 14.641, b 14.214, c 7.9148 Å, β 117.36°
White; vitreous; translucent
Biaxial (+), α 1.656, β 1.662, γ 1.755, 2V(meas.) 30°,
2V(calc.) 29.7°
7.10(73), 7.03(100), 6.48(45), 5.00(74), 3.253(38),
3.171(56), 3.150(38)

IMA No. **2001-029**
Cu(CH₃COO)₂·H₂O Structure determined
Monoclinic: $C2/c$

a 13.162, b 8.555, c 13.850 Å, β 117.08°
Bluish green; vitreous; transparent
Biaxial (+), α 1.533, β 1.541, γ 1.554, 2V(meas.) 85°,
2V(calc.) 76°
6.92(100), 6.18(14), 5.87(9), 5.38(10), 3.592(11),
3.532(28), 2.278(10)

IMA No. **2001-030**
CaCu(CH₃COO)₄·6H₂O
Tetragonal: $I4/m$

a 11.155, c 16.236 Å
Deep sky blue; vitreous; translucent
Uniaxial (+), ω 1.439, ϵ 1.482
9.30(6), 8.13(8), 7.90(100), 5.59(15), 3.530(20), 3.042(3),
2.497(4)

IMA No. **2001-031**
Pb₂Al(PO₄)(VO₄)(OH)
Brackebuschite group; structure determined

Monoclinic: $P2_1/m$
 a 7.734, b 5.814, c 8.69 Å, β 112°

Bright-yellow; vitreous; translucent

Biaxial (–), α 1.99, β 2.03, γ 2.06, 2V(meas.) large, 2V(calc.) 80°
4.68(80), 3.57(50), 3.21(100), 2.91(80), 2.71(70), 2.27(40), 2.05(50)

IMA No. **2001-032**

$\text{NaLi}_2(\text{Fe}^{3+}\text{Mg}_2\text{Li})\text{Si}_8\text{O}_{22}(\text{OH})_2$

Amphibole group; structure determined

Monoclinic: *C2/m*

a 9.501, *b* 17.866, *c* 5.292 Å, β 102.17°

Black; vitreous; translucent

Biaxial (–), α 1.695, β 1.700, γ 1.702, 2V(meas.) 125°, 2V(calc.) 116°
8.25(29), 4.47(22), 3.050(100), 2.747(31), 2.711(37), 1.642(39), 1.394(32)

IMA No. **2001-033**

$(\text{Cu},\text{Ag})\text{Pb}_{10}\text{Sb}_{12}\text{S}_{27}(\text{Cl},\text{S})_{0.6}\text{O}$

Zinkenite group; structure determined

Monoclinic: *C2/m*

a 55.824, *b* 4.0892, *c* 24.128 Å, β 113.14°

Black; metallic; opaque

In reflected light (air): R (polarisation direction perpendicular to the elongation of the measured crystal): 38.6 % (460 nm), 37.4 % (540 nm), 37.0 % (580 nm), 35.3 % (640 nm)
4.01(25), 3.423(100), 2.779(22), 2.274(32), 2.225(43), 2.142(21), 2.081(23)

IMA No. **2001-034**

$(\text{Pb},\text{Sr})(\text{Y},\text{Mn})\text{Fe}_2(\text{Ti},\text{Fe})_{18}\text{O}_{38}$

Crichtonite group; structure determined

Trigonal: *R* $\bar{3}$

a 10.411, *c* 20.97 Å

Black; metallic; opaque

In reflected light (air): black; internal reflectance: none; very weak anisotropy; R: 19.2 % (470 nm), 17.9 % (546 nm), 17.6 % (589 nm), 17.4 % (650 nm)
3.002(100), 2.892(70), 2.852(50), 2.258(70), 2.147(50), 1.809(60), 1.606(95)

IMA No. **2001-035**

$\text{Hg}^{2+}\text{Hg}^{1+}_{10}\text{O}_4\text{I}_2(\text{Cl}_{1.16}\text{Br}_{0.84})_{\Sigma 2}$

New structure-type

Triclinic: *A* 1

a 7.0147, *b* 11.8508, *c* 12.5985 Å, α 115.583, β 82.575, γ 100.619°

Very dark red to black; vitreous to adamantine to submetallic; opaque to translucent

In reflected light (air): bluish white; internal reflectance: deep red to purplish red; moderate anisotropy. R_{\min} and R_{\max} : 27.40–29.85 % (460 nm), 24.60–27.70 % (540 nm), 23.10–25.90 % (580 nm), 21.80–24.00 % (640 nm)
6.52(30), 5.28(50), 3.143(90), 3.005(70), 2.885(100), 2.675(90), 2.508(40)

IMA No. **2001-036**

$(\text{K},\text{Na})\text{Ca}_2(\text{Mg},\text{Fe}^{2+})_4\text{Al}(\text{Si}_6\text{Al}_2\text{O}_{22})(\text{Cl},\text{OH})_2$

Amphibole group

Monoclinic: *C2/m*

a 9.843, *b* 18.130, *c* 5.362 Å, β 105.5°

Black; vitreous; opaque

Biaxial (–), α 1.675, β 1.687, γ 1.690, 2V(meas.) 65°, 2V(calc.) 53°
8.42(80), 3.12(30), 2.951(30), 2.714(100), 2.562(70), 1.444(30)

IMA No. **2001-037**

$\text{K}_2\text{Zn}(\text{Ti},\text{Nb})_4(\text{Si}_4\text{O}_{12})_2(\text{OH},\text{O})_4 \cdot 6\text{--}8\text{H}_2\text{O}$

Labuntsovite group; structure determined

Monoclinic: *Cm*

a 14.43, *b* 13.898, *c* 7.797 Å, β 117.4°

Colourless, white, greyish, pale-pink, light-brown; vitreous; transparent to translucent

Biaxial (+), α 1.680, β 1.688, γ 1.785, 2V(meas.) 25°, 2V(calc.) 33°
6.97(100), 3.20(90), 3.10(80), 2.59(40), 2.48(50), 1.734(40), 1.695(40), 1.422(60)

IMA No. **2001-038**

$\text{CaK}_2\text{Mn}(\text{Ti},\text{Nb})_4(\text{Si}_4\text{O}_{12})_2(\text{O},\text{OH})_4 \cdot 5\text{H}_2\text{O}$

Labuntsovite group; structure determined

Monoclinic: *Cm*

a 14.30, *b* 13.889, *c* 7.760 Å, β 117.51°

Pale yellowish-pink; vitreous; transparent

Biaxial (+), α 1.688, β 1.700, γ 1.805, 2V(meas.) 35°, 2V(calc.) 39°
7.0(70b), 6.33(50), 3.22(90), 3.05(100), 2.57(50), 2.48(60), 1.520(30), 1.428(30)

IMA No. **2001-039**

$\text{NaFe}^{2+}_6\text{Al}_3(\text{SO}_4)_2(\text{OH})_{18}(\text{H}_2\text{O})_{12}$

Halotrichite group; structure determined

Trigonal: *R* $\bar{3}$

a 9.347, *c* 33.000 Å

Green; dull; transparent

Uniaxial (–), ω 1.560(1), ϵ not measurable
10.98(100), 5.54(60), 4.31(20), 3.67(50), 2.624(25), 2.425(30), 2.176(20), 1.932(30)

IMA No. **2001-040**

$\text{VO}(\text{SO}_4)(\text{H}_2\text{O})_5$

Polymorph of minasragrite; Structure determined

Triclinic: *P* 1

a 7.533, *b* 7.792, *c* 7.818 Å, α 78.96, β 71.86, γ 65.41°

Pale blue; vitreous; transparent

Biaxial (+), α 1.548, β 1.555, γ 1.574, 2V(meas.) 86°, 2V(calc.) 63°
7.05(80), 6.62(100), 5.314(30), 4.12(80), 3.71(80), 3.21(70), 2.934(50), 2.555(30)

IMA No. **2001-041**

$\text{Na}_{15}\text{Sr}_{12}\text{Zr}_{14}\text{Si}_{42}\text{B}_6\text{O}_{138}(\text{OH})_6 \cdot 12\text{H}_2\text{O}$

Benitoite group; structure determined

Hexagonal: *P6₃cm*

a 19.720, *c* 7.9148 Å

Grey, pale green, and brown; vitreous; translucent

Uniaxial (+), ω 1.627, ϵ 1.645
9.87(23), 6.46(38), 5.43(33), 3.96(51), 3.76(49), 3.30(23), 3.13(70), 2.752(100)

IMA No. **2001-042**

(La,Ce,Ca)₉(Mg,Fe³⁺)(SiO₄)₆[SiO₃(OH)](OH)₃
 La-dominant analogue of cerite-(Ce); structure determined
 Trigonal: *R3c*
 a 10.7493, c 38.318 Å
 Light-yellow to pinkish-brown; vitreous; translucent
 Uniaxial (+), ϵ 1.820, ω 1.810
 3.47(40), 3.31(38), 2.958(100), 2.833(37), 2.689(34),
 1.949(34)

IMA No. **2001-043**

Na₂KMn₂LiV₂Si₈O₂₄
 Isostructural with neptunite; structure determined
 Monoclinic: *Cc* or *C2/c*
 a 16.450, b 12.492, c 9.995 Å, β 115.32°
 Yellow green; vitreous; translucent
 Biaxial (+), α 1.686, β (calc) 1.694, γ 1.720, 2V 60°
 9.58(84), 4.52(85), 3.52(63), 3.19(100), 2.94(90), 2.90(66),
 2.49(93)

IMA No. **2001-044**

Ca₂Be₄(Fe²⁺,Mn)₅(PO₄)₆(OH)₄·6H₂O
 Fe-dominant analogue of roscherite; structure determined
 Monoclinic: *C2/c*
 a 15.903, b 11.885, c 6.677 Å, β 94.68°
 Dark olive green; vitreous; transparent
 Biaxial (-), α 1.624, β 1.634, γ 1.638, 2V(meas.) 80°,
 2V(calc.) 64°
 9.48(100), 5.94(80), 4.82(60), 3.96(90), 3.07(60),
 2.982(70), 2.783(80), 2.638(70)

IMA No. **2001-045**

KMn₃(AlSi₃)₄O₁₀(OH,F)₂
 Mn-dominant analogue of phlogopite; structure determined
 Monoclinic: *C2/m*
 a 5.3791, b 9.319, c 0.2918 Å, β 100.18°
 Dark reddish brown; pearly to vitreous; transparent
 Biaxial (-), α 1.592, β ~ γ 1.635, 2V very small
 10.09(100), 3.43(33), 3.38(51), 2.646(96), 2.458(46),
 2.194(36)

IMA No. **2001-048**

(Fe,Mg,Zn,Al)₆Al₁₄(Ti,Fe)₂O₃₀(OH)₂
 Högbomite group; structure determined
 Hexagonal: *6₃mc*
 a 5.734, c 18.389 Å
 Chestnut brown; adamantine; translucent
 Uniaxial (-), ω 1.852, ϵ 1.827
 2.948(32), 2.860(53), 2.603(88), 2.427(100), 2.053(34),
 1.475(44), 1.430(56)

IMA No. **2001-049**

KNa₂Mg₂Fe³⁺₂LiSi₈O₂₂(OH)₂
 Amphibole group; structure determined
 Monoclinic: *C2/m*
 a 9.922, b 17.987, c 5.286 Å, β 104.07°
 Reddish brown; vitreous; translucent
 Biaxial (+), α 1.672, β 1.680, γ 1.692, 2V(calc) 79°
 8.48(67), 4.50(89), 3.40(46), 3.28(45), 3.16(72), 2.83(49),
 2.74(44), 2.71(41), 2.53(100), 2.34(38)

IMA No. **2001-050**

(Ca,REE)₄(Al,Mg,Fe)₄[Si₂O₇][SiO₄]₃(O,F,OH)₃
 Related to epidote; structure determined
 Monoclinic: *P2₁/a*
 a 17.770, b 5.651, c 17.458 Å, β 116.18°
 Colourless; vitreous; transparent to translucent
 Biaxial; η_{calc} 1.807
 15.67(87), 7.97(27), 4.61(33), 3.49(50), 2.967(100),
 2.826(44), 2.740(32), 2.610(56)

IMA No. **2001-051**

Ca₁₆(Mg,Li,□)₂[B₁₃O₁₇(OH)₁₂]₄Cl₆·28H₂O
 Structure determined
 Orthorhombic: *Pba2*
 a 15.52, b 22.74, c 8.761 Å
 Colourless to white; vitreous; transparent to translucent
 Biaxial (+), α 1.516, β 1.532, γ 1.554, 2V(meas.) 82°,
 2V(calc.) 82.0°
 12.82(100), 7.78(80), 6.80(20), 6.32(40), 5.65(30),
 4.14(20), 3.17(30), 2.570(30), 2.413(20)

IMA No. **2001-052**

CoFe³⁺₂(AsO₄)₂(OH)₂·4H₂O
 Co-dominant analogue of arthurite; structure determined
 Monoclinic: *P2₁/c*
 a 10.27, b 9.72, c 5.545 Å, β = 94.46°
 Straw yellow to dark brown; vitreous to silky; translucent
 Biaxial (+), α 1.741, β 1.762, γ 1.797, 2V(calc.) 76.8°
 10.2(95), 7.04(100), 4.81(65), 4.51(20), 4.24(60), 3.05(20),
 2.89(25), 2.87(55)

IMA No. **2001-053**

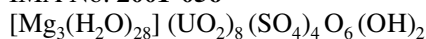
(Fe,Mg)S Fe-dominant analogue of niningerite
 Cubic: *Fm3m*
 a 5.17 Å
 Grey in reflected light; opaque
 2.985(8), 2.585(100), 1.828(60), 1.492(15), 1.292(7),
 1.156(13), 1.055(10)

IMA No. **2001-054**

CaFe³⁺₂(AsO₄)₂(OH)₂
 Ca-dominant analogue of carminite; structure determined
 Orthorhombic: *Cccm*
 a 16.461, b 7.434, c 12.131 Å
 Dark red to lighter red-orange; vitreous; translucent
 In reflected light: light bluish grey with internal reflections,
 anisotropy absent. R_{min} and R_{max} : 10.12–10.71 % (460
 nm), 9.53–10.07 % (540 nm), 9.30–9.98 % (580 nm),
 8.99–9.66 % (640 nm)
 4.87(90), 3.47(50), 3.39(60), 3.26(40), 3.17(100), 3.02(50),
 2.988(50), 2.919(70), 2.696(40), 2.503(90)

IMA No. **2001-055**

CaSrAl₃(Si₂O₇)(SiO₄)O(OH)
 Epidote group; structure determined
 Monoclinic: *P2₁/m*
 a 8.890, b 5.5878, c 10.211 Å, β 115.12°
 Pale grey; vitreous; transparent
 Biaxial; η ~1.725
 5.05(23), 3.22(25), 2.90(100), 2.79(48), 2.70(26), 2.60(24),
 2.11(24)

IMA No. **2001-056**

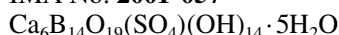
Zippelite group; structure determined

Triclinic: $P\bar{1}$
 a 10.815, b 11.249, c 13.851 Å, α 66.224, β 72.412, γ 69.95°

Yellow-orange; vitreous; transparent

Biaxial; η 1.735-1.750

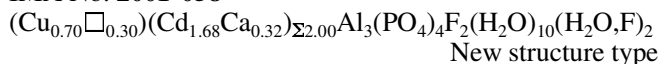
9.46(100), 8.63(20), 6.46(20), 6.33(20), 4.73(80), 3.44(80), 3.39(70), 3.16(20), 3.11(20), 3.08(20), 2.88(30)

IMA No. **2001-057**Monoclinic (pseudo-hexagonal): $P2/m$, $P2$, or Pm
 a 14.10, b 19.53, c 14.05 Å, β 120.39°

White; vitreous; transparent

Biaxial (-), α 1.532, β 1.537, γ 1.540, $2V(\text{meas.})$ 75°, $2V(\text{calc.})$ 75°

12.2(100), 4.42(40), 3.45(50), 3.04(60), 2.911(40), 2.720(70), 2.108(40), 1.992(50)

IMA No. **2001-058**

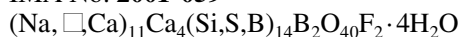
New structure type

Triclinic: $P\bar{1}$
 a 6.787, b 9.082, c 10.113(2) Å, α 101.40, β 104.27, γ 102.51°

Pale blue to blue-grey; vitreous to glassy; transparent to translucent

Biaxial (+), α 1.570, β 1.573, γ 1.578, $2V(\text{meas.})$ 30°, $2V(\text{calc.})$ 75.7°

9.43(100), 4.73(30), 3.70(30), 3.17(30), 3.01(30), 2.896(30), 2.820(50)

IMA No. **2001-059**

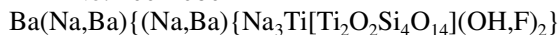
Reyerite group; structure determined

Triclinic: $P\bar{1}$
 a 9.5437, b 14.0268, c 9.5349 Å, α 71.057, β 119.788, γ 105.846°

Colourless to purple; vitreous; transparent

Biaxial (-), α 1.529, β 1.549, γ 1.551, $2V(\text{meas.})$ 38°, $2V(\text{calc.})$ 35°

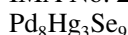
13.18(100), 6.58(43), 3.29(34), 2.968(37), 2.908(27), 1.794(20)

IMA No. **2001-060**

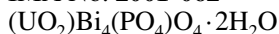
Lamprophyllite group; structure determined

Monoclinic: $P2/m$
 a 19.741, b 7.105, c 5.408 Å, β 96.67°

Brown to yellowish brown; vitreous; translucent

Biaxial (+), α 1.750, β 1.755 (calc.), γ 1.799, $2V(\text{meas.})$ 40°
9.87(96), 3.75(65), 3.45(90), 3.28(78), 3.04(41), 2.797(100), 2.610(43)IMA No. **2001-061**Orthorhombic: $Pmmn$, $P2_1mn$ or $Pm2_1n$
 a 7.219, b 16.782, c 6.467 Å

Buff to beige (reflected light); metallic; opaque

In reflected light (air): buff to beige; internal reflections not observed, anisotropy moderate. R_{min} and R_{max} :
46.2–50.8 % (460 nm), 49.3–53.1 % (540 nm), 49.9–53.2 % (580 nm), 49.3–52.9 % (640 nm)
4.82(40), 4.37(40), 2.797(60), 2.743(100), 2.325(40), 2.116(40), 2.091(100)IMA No. **2001-062**

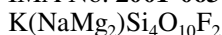
P-analogue of walpurgite

Triclinic: $P\bar{1}$
 a 7.060, b 10.238, c 5.464 Å, α 101.22, β 109.93, γ 87.93°

Brownish grey; vitreous to adamantine; translucent

Biaxial, $\eta \sim 1.9$

10.06(100), 3.35(43), 3.25(72), 3.12(86), 3.08(95), 3.00(52), 2.726(42)

IMA No. **2001-063**

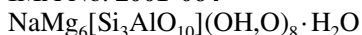
Mica group; structure determined

Monoclinic: $C2/m$
 a 5.269, b 9.071, c 10.178 Å, β 100.03°

Colourless to pale grey; pearly to vitreous; transparent to translucent

Biaxial (-), α 1.526, β 1.553, γ 1.553, $2V(\text{meas.})$ 5°, $2V(\text{calc.})$ 0°

10.0(70), 3.36(90), 2.59(90), 2.41(100), 1.665(80), 1.522(100)

IMA No. **2001-064**

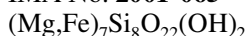
Structure determined

Triclinic: $C1$ (No.1)
 a 5.354, b 9.263, c 14.653 Å, α 89.860, β 96.844, γ 90.030°

Colourless; vitreous; transparent

Biaxial (+), α 1.569, β 1.569, γ 1.571, $2V(\text{meas.})$ 17°, $2V(\text{calc.})$ 0°

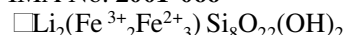
7.27(30), 4.63(30), 2.992(40), 2.597(60), 2.556(100), 2.457(50), 1.544(100)

IMA No. **2001-065**

Amphibole group; structure determined

Orthorhombic: $Pnmn$
 a 9.3553, b 17.9308, c 5.3117 Å

White; vitreous; translucent

Biaxial (-), α 1.593, β (calc.) 1.609, γ 1.615, $2V(\text{meas.})$ 64°
8.32(71), 3.66(100), 3.27(49), 3.08(81), 2.84(96), 2.56(49), 2.51(57)IMA No. **2001-066**

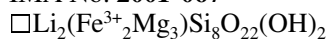
Amphibole group; structure determined

Monoclinic: $C2/m$
 a 9.462, b 17.898, c 5.302 Å, β 101.88°

Black; vitreous; translucent

Biaxial, no other optical properties given

8.23(40), 3.04(47), 2.718(100), 2.491(51), 1.584(19), 1.389(27)

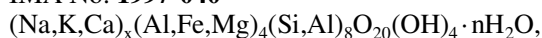
IMA No. **2001-067**

Amphibole group; structure determined

Monoclinic: $C2/m$ a 9.535, b 17.876, c 5.234 Å, β 102.54°

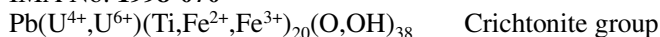
Black; vitreous; translucent

Biaxial, no other optical properties given

8.27(15), 3.41(18), 3.06(36), 2.710(100), 2.501(68),
1.581(19), 1.399(20)**Proposals from previous years approved in 2001**IMA No. **1997-040** $x = 0.35$, $n = 3.54$
Pyrophyllite groupPseudo monoclinic: Pseudo $2/m$ a 5.2, b 9.1, c 24.4 Å

Grey to yellowish grey; dull; transparent

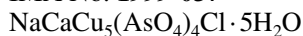
No optical properties obtainable

22.3(48), 11.0(100), 7.32(2), 5.48(7), 4.47(3), 3.17(33),
2.01(4)IMA No. **1998-070**

Crichtonite group

Trigonal: R a 10.576, c 21.324 Å

Black; sub-metallic; opaque

In reflected light (air): light grey; internal reflections not observed, isotropic. R: 18.4 % (460 nm), 17.5 % (540 nm),
17.4 % (580 nm), 17.4 % (640 nm)6.86(30), 5.16(30), 3.41(60), 3.23(25), 3.06(30), 2.993(30),
2.891(60), 2.858(40), 2.248(35)IMA No. **1999-037**Tetragonal: $P4_122$ or $P4_322$ a 10.0156, c 36.691 Å

Dark blue; vitreous; translucent

Uniaxial (-), ω 1.749, ϵ 1.647

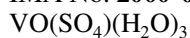
9.18(100), 4.59(40), 4.17(11), 3.06(18), 2.610(6)

IMA No. **2000-013**

Chlorite group

Pseudo-monoclinic: pseudo $C2/m$ a 5.121, b 8.856, c 14.073 Å, β 96.95°

Light pinkish grey; greasy; opaque

Biaxial: α 1.574, β 1.580, γ 1.591, $2V(\text{calc.})$ 72°14.1(10), 7.05(50), 4.71(70), 3.51(100), 2.807(20),
2.304(16), 1.946(17)IMA No. **2000-045**

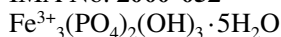
Structure determined

Monoclinic: $P2_1/m$ a 7.3940, b 7.4111, c 12.0597 Å, β 106.55°

Pale to bright blue; vitreous; transparent

Biaxial (+), α 1.555, β 1.561, γ 1.574, $2V(\text{meas.})$ 72°,
 $2V(\text{calc.})$ 69°

5.79(100), 5.41(37), 4.57(20), 3.88(48), 3.498(90)

IMA No. **2000-052**

Amorphous

Light brown to brown; vitreous; translucent

 η 1.695

New minerals approved in 2002 and nomenclature modifications approved 1998–2002 by the Commission on New Minerals and Mineral Names, International Mineralogical Association

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The information given here is provided by the Commission on New Minerals and Mineral Names, I. M. A. for comparative purposes and as a service to mineralogists working on new species.

Each mineral is described in the following format:

IMA No.

Chemical Formula (any relationship to other minerals; structure analysis)

Crystal system, space group

unit-cell parameters

Color; luster; diaphaneity

Optical properties

Strongest lines in the X-ray powder diffraction pattern

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves. No other information will be released by the commission.

2002 PROPOSALS

IMA No. 2002-001

(Ce,La,Nd,Ba)(Fe³⁺,Al)₃[(As,Al)O₄]₂(OH)₆

Fe-dominant analogue of

arsenoflorentcite-(Ce)

Trigonal: $R\bar{3}m$

a 7.260, c 16.77 Å

Light-green to brownish; resinous; transparent

Uniaxial(-), mean refractive index = 1.97

5.906(25), 3.636(40), 3.052(100), 2.792(30),

2.239(35), 1.817(35)

IMA No. 2002-002

(□,K)₁(Mg,Fe²⁺)₃Fe₂³⁺[Si₁₂O₃₀] Milarite group;

structure determined

Hexagonal: $P6/mcc$

a 10.050, c 14.338 Å

Deep blue to yellowish-green; vitreous; trans-

lucent

Uniaxial (-), ω 1.589, ϵ 1.586

8.70(97), 7.17(100), 5.535(96), 5.026(61),

4.352(53), 3.207(85)

IMA No. 2002-003

NaSrKZn(Ti,Nb)₄(Si₄O₁₂)₂(O,OH)₄·7H₂O

Labuntsovite group;

structure determined

Monoclinic: Cm

a 14.495, b 13.945, c 7.838 Å, β 117.75°

White, pale-brown; vitreous; translucent to transparent

Biaxial (+), α 1.680, β 1.687, γ 1.787,

2V(meas.) 25°, 2V(calc.) 31°

6.96(100), 3.21(80), 3.11(90), 2.60(35),

2.50(40), 1.74(30), 1.70(40)

IMA No. 2002-004

CoSO₄·H₂O Kieserite group

Monoclinic: $C2/c$

a 6.980, b 7.588, c 7.639 Å, β 118.65°

Pink; powdery; transparent

Biaxial (+), $n \sim 1.65$ (calc.)

4.83(33), 3.405(100), 3.339(34), 3.291(32),

3.062(56), 2.567(30), 2.513(49)

IMA No. 2002-005

(K,Ba,Na)₂(Ti,Nb)₂(Si₄O₁₂)(OH,O)₂·3H₂O

Labuntsovite group; structure determined

Monoclinic: Cm

a 14.327, b 13.802, c 7.783 Å, β 116.95°

Light brown, white, and colorless; vitreous; transparent

Biaxial (+), α 1.689, β 1.700, γ 1.775,

2V(meas.) 35°, 2V(calc.) 43°

6.87(100), 4.85(50), 3.95(50), 3.20(60),

3.05(80), 3.00(60), 2.56(90)

IMA No. 2002-006

(Ba,Na,K)_{2-x}(Ti,Nb)₂(Si₄O₁₂)(OH,O)₂·4H₂O

Labuntsovite group; structure determined

Monoclinic: $C2/m$

a 14.551, b 14.001, c 15.702 Å, β 117.58°

Brown; vitreous; transparent

Biaxial (+), α 1.667, β 1.674, γ 1.770,

2V(meas.) 30°, 2V(calc.) 31°

7.11(100), 4.08(80), 3.95(100), 3.24(90),

3.11(80), 2.403(80), 1.914(90)

IMA No. 2002-007

NaK₃Fe(Ti,Nb)₄(Si₄O₁₂)(O,OH)₄·6H₂O

Labuntsovite group; structure determined

Monoclinic: Cm

a 14.450, b 13.910, c 7.836 Å, β 117.42°

Pale-brown; vitreous; translucent to transparent

Biaxial (+), α 1.677, β 1.684, γ 1.790,

2V(meas.) 25°, 2V(calc.) 30°

6.93(100), 4.93(80), 3.21(100), 3.11(90),

2.62(60), 2.49(50), 1.687(40)

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NOTE: new mineral proposals should be sent to the new Chairman:

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1081 HV Amsterdam, The Netherlands

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- IMA No. **2002-008**
 $\text{Na}_2\text{H}(\text{PO}_4)\cdot 8\text{H}_2\text{O}$ New structure type
 Orthorhombic: *Ibca*
 a 11.488, b 11.647, c 16.435 Å
 Colorless; vitreous to resinous; transparent
 Biaxial (-), α 1.443, β 1.457, γ 1.458,
 2V(meas.) 29°, 2V(calc.) 30°
 5.78(40), 4.90(43), 4.73(62), 3.75(81),
 2.876(77), 2.782(100), 2.744(74)
- IMA No. **2002-010**
 $\text{NaNa}_2(\text{Al}_2\text{Mg}_3)(\text{Si}_4\text{Al})\text{O}_{22}(\text{F},\text{OH})_2$ Amphibole
 group; structure determined
 Monoclinic: *C2/m*
 a 9.666, b 17.799, c 5.311 Å, β 104.10°
 Bluish-grey; luster not given; translucent
 Biaxial (-), α 1.633, β 1.624, γ 1.626, 2V me-
 dium; calculated from chemical composition
 8.31(64), 4.45(26), 3.38(42), 3.079(58),
 2.691(100), 2.571(32), 2.532(47)
- IMA No. **2002-011**
 $\text{GaO}(\text{OH})$ Isostructural with goethite
 Orthorhombic: *Pbmm*
 a 4.512, b 9.772, c 2.967 Å
 Pale greenish yellow to beige; pearly;
 translucent
 Biaxial, $n(\text{calc.})$ 1.96.
 4.09(100), 2.632(33), 2.530(22), 2.404(100),
 1.690(26), 1.538(21)
- IMA No. **2002-012**
 $\text{Na}_2(\text{Na},\text{Ca})_i\text{Ca}_j(\text{Mn},\text{Ca})_2\text{Zr}_2\text{Ti}_2(\text{Si}_2\text{O}_7)_4(\text{O},\text{F})_4\text{F}_4$
 Rosenbuschite group;
 structure determined
 Triclinic: *P\bar{1}*
 a 10.032, b 11.333, c 7.202 Å, α 90.19, β
 100.33, γ 111.55°
 Colorless to pale shade of brown; vitreous;
 transparent
 Biaxial (+), α 1.684, β 1.695, γ 1.718,
 2V(meas.) 73°, 2V(calc.) 70°
 3.951(30), 3.028(60), 2.908(100), 2.600(80),
 1.868(60), 1.670(50)
- IMA No. **2002-013**
 $\text{Ba}_3\text{NaCe}(\text{PO}_4)_3(\text{F},\text{Cl})$ Ba-dominant analogue
 of belovite-(Ce); structure determined
 Trigonal: *P\bar{3}*
 a 9.909, c 7.402 Å
 Light rose; vitreous; translucent
 Uniaxial (-), ω 1.694, ϵ 1.669
 4.078(40), 3.693(40), 2.969(100), 2.867(60),
 1.965(80), 1.863(60)
- IMA No. **2002-014**
 $\text{Pb}_3[(\text{UO}_2)_6\text{O}_8(\text{OH})_2](\text{H}_2\text{O})_x$; $x \sim 3$ New struc-
 ture type
- Monoclinic: *C2/c*
 a 28.355, b 11.990, c 13.998 Å, β 104.248°
 Bright orange; vitreous; transparent
 Biaxial, n_{min} 1.807, n_{max} 1.891
 6.92(60), 6.02(30), 3.46(80), 3.10(100),
 2.74(30), 2.01(30), 1.918(60)
- IMA No. **2002-015**
 $\text{BaBe}_2\text{Si}_2\text{O}_7$ Dimorphous with barylite; struc-
 ture determined
 Monoclinic: *Pm*
 a 11.637, b 4.918, c 4.668 Å, β 89.80°
 Colorless; vitreous; transparent
 Biaxial (+), α 1.698, β 1.700, γ 1.705,
 2V(meas.) 70°, 2V(calc.) 65°
 3.39(84), 3.25(45), 3.04(40), 2.926(55),
 2.458(100), 2.335(48), 2.076(38)
- IMA No. **2002-016**
 $\text{CaFe}^{2+}\text{Fe}^{3+}(\text{Mn},\text{Fe}^{2+})(\text{Si}_2\text{O}_7)\text{O}(\text{OH})$ Mn-
 dominant analogue of ilvaite
 Monoclinic: *P2_1/a*
 a 13.0246, b 8.8511, c 5.8485 Å, β 90.17°
 Black; vitreous; opaque
 In reflected light (in air): grey to bluish grey;
 internal reflections: red; anisotropy: strong in
 blue-greyish. R_{min} and R_{max} : 8.3–10% (460
 nm), 7.5–9.8% (540 nm), 7–9.7% (580 nm),
 6.1–9.5% (640 nm)
 2.875(85), 2.848(90), 2.718(100), 2.687(70),
 2.180(48), 2.111(47), 1.475(48)
- IMA No. **2002-017**
 $\text{MnV}_2\text{O}_6\cdot 4\text{H}_2\text{O}$ New structure type
 Monoclinic: *C2/c*
 a 13.171, b 10.128, c 6.983 Å, β 111.57°
 Carmine red; adamantine; transparent
 Biaxial, n_{min} 1.797, n_{max} 1.856
 7.82(100), 5.69(20), 5.06(20), 4.51(30),
 3.91(30), 3.029(70)
- IMA No. **2002-018**
 $(\text{Mg},\text{Fe})(\text{Ta},\text{Nb})_2\text{O}_6$ Columbite-tantalite group
 Orthorhombic: *Pbca*
 a 14.355, b 5.735, c 5.058 Å
 Black; semi-metallic to metallic; opaque
 Light-grey; internal reflections (in air): brown-
 ish-red; anisotropism: weak; birefractance:
 very weak.
 R_{min} and R_{max} : 13.97–12.82% (460 nm), 13.33–
 13.20% (540 nm), 14.25–13.94% (580 nm),
 15.61–15.31% (640 nm)
 3.67(60), 2.96(100), 1.774(60), 1.728(70),
 1.462(90), 1.196(60), 1.105(60)
- IMA No. **2002-019**
 $\text{Ba}_2(\text{La},\text{Th},\text{Ce})(\text{CO}_3)_3\text{F}$ La-dominant analogue
 of kukharenkoite-(Ce);
- structure determined
 Monoclinic: *P2_1/m*
 a 13.396, b 5.111, c 6.672 Å, β 106.63°
 Pale leek-green, colorless, white; vitreous;
 transparent to translucent
 Biaxial (-), α 1.581, β 1.715, γ 1.715,
 2V(meas.) 5°, 2V(calc.) 0°
 4.01(100), 3.27(100), 2.54(50), 2.38(20),
 2.14(80), 1.998(80), 1.636(20)
- IMA No. **2002-020**
 $(\text{Ca},\text{K},\text{Na})_{2-x}(\text{Ti},\text{Nb})_2(\text{Si}_4\text{O}_{12})(\text{OH},\text{O})_2\cdot 4\text{H}_2\text{O}$
 Labuntsovite group; structure determined
 Monoclinic: *C2/m*
 a 14.484, b 14.191, c 7.907 Å, β 117.26°
 White, pale brownish; vitreous; transparent
 Biaxial (+), α 1.666, β 1.676, γ 1.780,
 2V(meas.) 30°, 2V(calc.) 36°
 7.02(60), 6.38(40), 3.53(45), 3.16(100),
 2.62(45), 2.51(85), 1.718(50)
- IMA No. **2002-021**
 $(\text{Na},\text{K},\text{Ca})_{48}\text{Si}_{36}\text{Al}_{36}\text{O}_{144}[(\text{SO}_4)_8\text{Cl}_2]\cdot 3\text{H}_2\text{O}$
 Cancrinite-sodalite group;
 structure discussed
 Hexagonal or trigonal: *P\bar{6}2c* or *P31c*
 a 12.880, b 31.761 Å
 Colorless; vitreous; transparent
 Uniaxial (+), ϵ 1.497, ω 1.495
 4.20(42), 3.725(100), 3.513(80), 3.296(35),
 3.089(40), 2.555(35), 2.150(40)
- IMA No. **2002-022**
 $\text{Hg}^{1+}\text{Hg}^{2+}\text{OI}$ Related to terlinguaite; new struc-
 ture type
 Monoclinic: *C2/c*
 a 17.580, b 6.979, c 6.693 Å, β 101.71°
 Dark grey-black; metallic; opaque
 Calculated index of refraction: 2.35–2.38
 8.55(70), 3.275(100), 2.993(80), 2.873(80),
 2.404(50), 1.878(50)
- IMA No. **2002-023**
 $\text{Ce}_2\text{Si}_2\text{O}_7$ Isostructural with $\text{Ln}_2\text{Si}_2\text{O}_7$
 Tetragonal: *P4_1*
 a 6.781, c 24.689 Å
 White to colorless; resinous; transparent
 Uniaxial (+), ω 1.840, ϵ 1.846
 3.27(31), 3.14(27), 3.12(24), 3.08(100),
 3.011(18), 2.846(22), 2.034(19)
- IMA No. **2002-024**
 $(\text{Cu}_{4.7}\text{Ag}_{3.3})_{28}\text{GeS}_6$ Argentinian variety of α -
 Cu_8GeS_6
 Cubic: *F\bar{4}3m*
 a 10.201 Å
 Iron-black; vitreous to metallic; opaque
 In reflected light (air): pale rose-brownish;

- internal reflections: no;
 R_{\min} and R_{\max} : 29.4% (460 nm), 23.6% (560 nm), 26.0% (580 nm), 25.3% (640 nm)
 5.90(30), 3.07(60), 2.943(100), 1.962(50), 1.805(70)
- IMA No. 2002-025**
 $\text{Ce}_3\text{CaMg}_2\text{Al}_2\text{Si}_5\text{O}_{19}(\text{OH})_2\text{F}$ Related to epidote group; structure determined
 Monoclinic: $P2_1/m$
 a 8.939, b 5.706, c 15.855 Å, β 94.58
 Dark brown; vitreous
 Biaxial (+), α 1.781, β 1.792(calc.), γ 1.810, $2V(\text{meas.})$ 75°, $2V(\text{calc.})$ 78°
 4.64(10), 3.50(20), 2.979(100), 2.847(10), 2.682(13), 2.622(19), 2.185(15)
- IMA No. 2002-026**
 $(\text{Na}, \text{Ca})_6(\text{Ca}, \text{Na})_3\text{Si}_{16}\text{O}_{38}(\text{F}, \text{OH})_2 \cdot 3\text{H}_2\text{O}$
 Reyerite group; structure determined
 Triclinic: $P\bar{1}$
 a 9.613, b 12.115, c 9.589 Å, α 92.95, β 119.81, γ 96.62°
 Colorless; pearly
 Biaxial (-), α 1.522, β 1.528, γ 1.529, $2V(\text{meas.})$ 48°, $2V(\text{calc.})$ 44°
 11.99(100), 5.97(85), 3.97(40), 2.967(50), 2.888(100), 1.820(50)
- IMA No. 2002-027**
 $\text{BaB}_2\text{Si}_2\text{O}_8$ Ba-dominant analogue of danburite; structure determined
 Orthorhombic: $Pnma$
 a 8.141, b 8.176, c 9.038 Å
 White; vitreous; transparent
 Biaxial (-), α 1.649, β 1.656, γ 1.656, $2V(\text{meas.})$ 5°, $2V(\text{calc.})$ 0°
 6.07(60), 4.86(30), 3.62(100), 3.39(60), 2.83(50), 2.481(40), 2.021(70)
- IMA No. 2002-028**
 $\text{Ca}_{0.3}(\text{Fe}^{2+}, \text{Mg}, \text{Fe}^{3+})_3(\text{Si}, \text{Al})_4\text{O}_{10}(\text{OH})_2 \cdot 4\text{H}_2\text{O}$
 Smectite group
 Monoclinic: probably C -cell
 a 5.363, b 9.306, c 14.64 Å, β 94.98°
 Dark-green, brownish-green; vitreous, translucent
 Biaxial (-), α 1.448 (calc.), β 1.641, γ 1.642; $2V(\text{meas.})$ 5°, $2V(\text{calc.})$ 7.5°
 7.37(90), 4.72(90), 3.80(80), 3.03(100), 2.585(90), 2.429(90), 1.549(90)
- IMA No. 2002-029**
 $\text{Na}_6\text{MnTi}_4\text{Si}_8\text{O}_{28} \cdot 4\text{H}_2\text{O}$ Mn-dominant analogue of kukisvumite
 Orthorhombic: $Pccn$
 a 29.05, b 8.612, c 5.220 Å
 Colorless; vitreous; transparent
- Biaxial (-), α (calc.) 1.657, β 1.744, γ 1.792, $2V(\text{meas.})$ 70°, $2V(\text{calc.})$ 70°
 14.47(100), 6.43(20), 4.83(10), 3.025(40), 2.881(20)
- IMA No. 2002-030**
 $\text{Mg}_2(\text{BO}_3)\text{F}$ Isostructural with $\text{Mg}_2(\text{BO}_3)\text{F}$; structure determined
 Orthorhombic: $Pna2_1$
 a 20.490, b 4.571, c 11.890 Å
 Colorless; vitreous; transparent
 Biaxial (+), α 1.609, β 1.620, γ 1.642, $2V(\text{meas.})$ 65°, $2V(\text{calc.})$ 71°
 2.743(77), 2.474(49), 2.414(46), 2.241(100), 2.234(49), 1.708(92), 1.705(44)
- IMA No. 2002-031**
 $\text{Na}_3\text{K}(\text{Y}, \text{REE})[\text{Si}_6\text{O}_{15}]$ K and REE analogue of $\text{Na}_3\text{Y}[\text{Si}_6\text{O}_{15}]$; structure determined
 Orthorhombic: $Ibmm$
 a 10.623, b 14.970, c 8.552 Å
 White; vitreous; transparent
 Biaxial (+), α 1.555, β 1.558, γ 1.566, $2V(\text{meas.})$ 64°, $2V(\text{calc.})$ 63°
 5.32(35), 4.98(100), 3.45(50), 3.26(85), 3.05(75), 2.753(42), 2.490(45)
- IMA No. 2002-033**
 $\text{Na}_{1.2}(\text{Ti}, \text{Fe}^{3+})_4(\text{Si}_7\text{Al})\text{O}_{22}(\text{OH})_4(\text{H}_2\text{O})$ Related to vinogradovite; structure determined
 Triclinic: $P1$
 a 5.2533, b 8.7411, c 12.9480 Å, α 70.47, β 78.47, γ 89.93°
 White; vitreous; translucent to transparent
 Biaxial (-), α 1.707, β 1.741, γ 1.755, $2V(\text{meas.})$ 64°, $2V(\text{calc.})$ 64°
 11.9(58), 5.98(35), 5.88(65), 4.35(38), 3.182(100), 3.085(29), 2.735(21)
- IMA No. 2002-034**
 $\text{CdSO}_4 \cdot 4\text{H}_2\text{O}$ Rozenite group
 Monoclinic: $P2_1/n$
 a 6.5859, b 14.329, c 8.5712 Å, β 91.51°
 Colorless to light blue; vitreous, transparent
 Uniaxial (-), α 1.430, β 1.454, γ 1.470, $2V(\text{meas.})$ ~70°, $2V(\text{calc.})$ 77.3°
 5.98(85), 4.84(70), 3.146(85), 2.967(85), 2.708(75), 2.654(100)
- IMA No. 2002-035**
 $(\square, \text{Cu}^{2+}, \text{V}^{3+})_8\text{Al}_8(\text{PO}_4)_8\text{F}_8(\text{H}_2\text{O})_{23}$
 New structure type
 Orthorhombic: $Pnmm$
 a 12.123, b 18.999, c 4.961 Å
 Pale green to turquoise; vitreous; translucent
 Biaxial (-), α 1.540, β 1.548, γ 1.553, $2V(\text{meas.})$ 76°, $2V(\text{calc.})$ 76°
- 9.54(80), 6.08(100), 5.62(90), 3.430(40), 2.983(60), 2.661(40)
- IMA No. 2002-036**
 $(\text{Ba}, \text{Ca})_2\text{Al}_3(\text{Si}, \text{Al})_4\text{O}_{10}(\text{CO}_3)(\text{OH})_6 \cdot n\text{H}_2\text{O}$
 Surite series
 Monoclinic: $C2/m$, $C2$ or Cm
 a 5.176, b 8.989, c 16.166 Å, β 96.44°
 White with light-greenish tint; pearly; translucent
 Biaxial (-), α 1.580, β 1.625, γ 1.625, $2V(\text{meas.})$ 0–10°, $2V(\text{calc.})$ 0°
 4.49(90), 3.68(60), 2.585(100), 2.230(90), 2.069(80), 1.692(60)
- IMA No. 2002-037**
 $(\text{Ca}, \text{Na})(\text{Ba}, \text{K})(\text{Fe}^{2+}, \text{Mn})_4\text{Ti}_2(\text{Si}_4\text{O}_{14})\text{O}_2(\text{F}, \text{OH}, \text{O})$ Bafertsite series; structure determined
 Monoclinic: $C2$
 a 10.723, b 13.826, c 20.791 Å, β 95.00°
 Brownish red; vitreous; transparent to translucent
 Biaxial (-), α 1.790(calc.), β 1.858, γ 1.888, $2V(\text{meas.})$ 65°
 10.39(20), 3.454(100), 3.186(15), 2.862(15), 2.592(70), 2.074(40), 1.728(15)
- IMA No. 2002-038**
 $\text{Mg}_2(\text{Al}_{1-2x}\text{Mg}_x\text{Sn}_x)(\text{BO}_3)_2$ Hulsite group; structure determined
 Monoclinic: $P2/m$
 a 5.3344, b 3.0300, c 10.506 Å, β 94.46°
 Brown to blue-green in transmitted light; luster not observed; transparent
 Biaxial (+), α' 1.78, γ' 1.805, $2V(\text{meas.})$ 33°, $2V(\text{calc.})$ 39°
 10.47(29), 5.24(49), 4.90(32), 2.618(50), 2.532(100), 2.318(30), 2.001(54), 1.515(28)
- IMA No. 2002-039**
 $\text{Hg}_4^+\text{Al}(\text{PO}_4)_{1.74}(\text{OH})_{1.78}$ New structure type
 Monoclinic: $C2/c$
 a 17.022, b 9.074, c 7.015 Å, β 101.20°
 Colorless to white; vitreous; transparent to translucent
 Biaxial (+), $n(\text{calc.})$ 1.94
 8.33(100), 4.74(50), 2.979(80), 2.952(50), 2.784(80), 2.660(75)
- IMA No. 2002-041**
 $\text{KPb}_{1.5}\text{ZnCu}_6\text{O}_2(\text{SeO}_3)_2\text{Cl}_{10}$ New structure type
 Orthorhombic: $Pnmm$
 α 9.132, b 19.415, c 13.213 Å
 Olive green; vitreous, transparent
 Biaxial (-), no refractive indices given
 8.26(70), 7.63(60), 4.11(90), 3.660(100), 2.996(40), 2.887(50), 2.642(40)

- IMA No. **2002-043**
 $\text{Na}_2(\text{Ba,K})_6\text{Ce}_2\text{Fe}^{2+}\text{Ti}_3\text{Si}_{12}\text{O}_{36}(\text{OH})_3(\text{OH,H}_2\text{O})_9$
 New structure type
 Trigonal: $R\bar{3}$
 a 10.713, c 60.67 Å
 Yellowish orange; vitreous; transparent
 Uniaxial (+), ω 1.705, ϵ 1.708
 10.12(27), 3.236(100), 3.094(21), 2.654(38),
 2.642(44), 2.234(19), 2.026(61)
- IMA No. **2002-047**
 $\text{Zn}_2\text{Te}_3\text{O}_8$ Related to spiroffite
 Monoclinic: $C2/c$
 a 12.676, b 5.198, c 11.781 Å, β 99.6(1)°
 Grey; vitreous; translucent.
 In reflected light (air): grey; internal reflections not observed, anisotropy weak. R_{\min} and R_{\max} : 6.7–7.3% (460 nm), 7.4–7.8% (540 nm) 4.76(w), 3.240(w), 2.928(m), 2.820(w), 2.155(w), 1.985(w), 1.599(w)
- IMA No. **2002-048**
 $\text{K}(\square,\text{Na})_2(\text{Mn,Fe,Mg})_2(\text{Be,Al})_3[\text{Si}_{12}\text{O}_{30}]$
 Milarite group; structure determined
 Hexagonal: $P6/mcc$
 a 9.997, c 14.090 Å
 Yellow to orange; vitreous; transparent
 Uniaxial (-), ω 1.560, ϵ 1.559
 7.05(40), 5.00(40), 4.08(80), 3.187(90),
 2.882(100), 2.732(50), 1.826(40)
- IMA No. **2002-049**
 $(\text{Mn}^{2+},\text{Ca})(\text{Ce,REE})\text{AlMn}^{3+}\text{Mn}^{2+}\text{Si}_2\text{O}_7\text{SiO}_4$
 O(OH) Epidote group; structure determined
 Monoclinic: $P2_1/m$
 a 8.901, b 5.738, c 10.068 Å, β 113.425°
 Dark brown; vitreous to adamantine; transparent
 Biaxial (+), $\alpha > 1.74$, $2V(\text{meas.})$ 81°
 3.51(37), 2.896(100), 2.713(34), 2.707(43),
 2.622(58), 2.591(32), 2.185(31)
- IMA No. **2002-050**
 $\text{Ca}_4\text{AlSi}(\text{SO}_4)\text{F}_{13}\cdot 12\text{H}_2\text{O}$ Related to chukrovite-(Ce)
 Cubic: $Fd\bar{3}$
 a 16.722 Å
 White to yellowish; vitreous; transparent
 Isotropic; $n(\text{calc.})$ 1.430
 9.63(100), 5.91(46), 5.04(27), 4.17(19),
 3.219(32), 2.235(28), 2.178(33)
- IMA No. **2002-051**
 $(\text{Na,K})\text{Ca}_2(\text{Mg}_3\text{Al}_2)\text{Si}_3\text{Al}_3\text{O}_{22}(\text{OH})_2$ Amphibole group; structure determined
 Monoclinic: $C2/m$
 a 9.905, b 18.00, c 5.322 Å, β 105.47°
 Brownish black; vitreous; translucent
- Biaxial (+), α 1.674, β (calc.) 1.683, γ 1.694,
 $2V(\text{meas.})$ 85°
 8.47(70), 3.38(60), 3.13(70), 2.70(100),
 2.59(70), 2.57(100), 2.16(60), 1.447(60)
- IMA No. **2002-052**
 $\text{K}[(\text{Al,Zn})_2(\text{As,Si})_2\text{O}_8]$ Feldspar group; structure determined
 Monoclinic: $C2/c$
 a 13.416, b 13.370, c 8.772 Å, β 100.067°
 Colorless; vitreous; transparent
 Biaxial (-), α 1.532, β 1.535, γ 1.537,
 $2V(\text{meas.})$ 60°; $2V(\text{calc.})$ 78°
 4.33(70), 3.90(70), 3.364(100), 3.300(50),
 3.066(40), 2.981(60), 2.646(40)
- IMA No. **2002-053**
 $\text{Ti}_6\text{Ag}_3\text{Cu}_6\text{As}_9\text{S}_{21}$ Related to imhofite; structure determined
 Triclinic: $P1\bar{1}bar$
 a 12.138, b 12.196, c 15.944 Å, α 78.537, β
 84.715, γ 60.470°
 Black; metallic; translucent
 In reflected light (air): white; internal reflections frequent, anisotropy weak. R : 30.7% (460 nm), 29.4% (540 nm), 28.2% (580 nm), 26.8% (640 nm)
 15.63(100), 3.531(80), 3.263(50), 3.143(90),
 2.978(60), 2.911(70), 2.520(60)
- IMA No. **2002-054**
 $\text{La}(\text{CO}_3)(\text{OH})$ Ancylite group
 Orthorhombic: $Pm\bar{c}n$
 a 4.986, b 8.513, c 7.227 Å
 Pale pinkish purple to white; vitreous; diaphaneity not given
 No optical data
 4.31(100), 3.69(72), 2.93(57), 2.64(30),
 2.49(29), 2.33(50), 2.06(48), 1.994(35)
- IMA No. **2002-055**
 $\text{Na}_2\text{Sr}_3\text{Ca}_6\text{Fe}_3\text{Zr}_3\text{NbSi}_{25}\text{O}_{73}(\text{O,OH,H}_2\text{O})_3\text{Cl}_2$
 Eudialyte group; structure determined
 Trigonal: $R3m$
 a 14.286, c 29.99 Å
 Clove brown to yellowish brown; vitreous; transparent
 Uniaxial (-); ω 1.649, ϵ 1.638
 11.49(50), 9.51(90), 3.43(90), 3.19(80),
 2.98(100), 2.86(100)
- IMA No. **2002-056**
 $(\text{Na},\square)_{12}(\text{Na,Ce})_3\text{Ca}_6\text{Mn}_3\text{Zr}_3\text{Nb}(\text{Si}_{25}\text{O}_{73})$
 $(\text{OH})_3(\text{CO}_3)\cdot\text{H}_2\text{O}$ Eudialyte group; structure determined
 Trigonal: $R3m$
 a 14.239, c 30.039 Å
 Yellow; vitreous; transparent
- Uniaxial (-); ω 1.645, ϵ 1.635
 6.39(25), 4.30(24), 3.204(38), 3.155(35),
 3.019(34), 2.970(83), 2.849(100), 2.134(23)
- IMA No. **2002-057**
 $(\text{Na},\square)_{12}(\text{Ce,Na})_3\text{Ca}_6\text{Mn}_3\text{Zr}_3\text{Nb}(\text{Si}_{25}\text{O}_{73})$
 $(\text{OH})_3(\text{CO}_3)\cdot\text{H}_2\text{O}$ Eudialyte group; structure determined
 Trigonal: $R3m$
 α 14.248, c 30.076 Å
 Cream; vitreous; transparent
 Uniaxial(-); ω 1.648, ϵ 1.637
 4.32(51), 3.975(37), 3.536(33), 3.220(100),
 3.166(56), 2.979(95), 2.857(88)
- IMA No. **2002-058**
 $\text{Cu}_4\text{AgPb}_2\text{Bi}_9\text{S}_{18}$ Related to makovickyite; structure determined
 Monoclinic: $C2/m$
 a 13.396, b 4.013, c 29.93 Å, β 100.07°
 Grey; metallic; opaque
 In reflected light (air): greyish white; internal reflections not observed, anisotropy moderate. R_{\min} and R_{\max} : 42.3–48.5% (460 nm), 41.1–47.1% (540 nm), 40.0–46.0% (580 nm), 39.8–45.2% (640 nm)
 3.645(56), 3.486(40), 3.478(100), 3.345(32),
 2.964(33), 2.885(29), 2.842(95), 2.282(31)
- IMA No. **2002-059**
 $(\text{Ni,Co,Cu})_{30}(\text{As}_2\text{O}_7)_{15}$ New structure type
 Monoclinic: $C2$
 a 33.256, b 8.482 Å, c 14.191 Å, β 104.145°
 Dark violet-red to dark brownish red; vitreous; translucent
 In reflected light (air): dark grey; internal reflections orange, anisotropy not obvious. R : 9.63% (460 nm), 9.33% (540 nm), 9.27% (580 nm), 9.33% (640 nm)
 4.23(30), 3.118(100), 3.005(60), 2.567(50),
 1.637(50), 1.507(30)
- IMA No. **2002-060**
 $\text{Cu}_2\text{Pd}_3\text{Se}_4$ Chrisstanleyite series; structure determined
 Monoclinic: $P2_1/c$
 a 5.672, b 9.910, c 6.264 Å, β 115.40(2)°
 Silvery grey; metallic; opaque
 In reflected light (air): buff to grey-green; internal reflections not observed, anisotropy moderate. R_{\min} and R_{\max} : 40.4–48.4% (460 nm), 44.2–50.7% (540 nm), 44.7–50.6% (580 nm), 45.1–50.6% (640 nm)
 2.776(22), 2.759(23), 2.676(100), 2.630(64),
 2.508(31), 2.269(27)
- IMA No. **2002-061**
 $\text{Na}(\text{H}_3\text{O})(\text{UO}_2)_3(\text{SeO}_3)_2\text{O}_2\cdot 4\text{H}_2\text{O}$ Related to

haynesite; structure determined
 Monoclinic: $P11m$
 a 6.9806, b 17.249, c 7.6460 Å, β 90.039°
 Yellow; vitreous; transparent
 Biaxial (-), α 1.597, β 1.770, γ 1.775,
 $2V$ (meas.) 20°, $2V$ (calc.) 18°
 8.63(43), 7.67(100), 7.02(33), 3.85(40),
 3.107(77), 2.874(53), 1.411(30)

IMA No. 2002-062

$Cu_2HgPb_{23}Sb_{27}S_{65.5}$ New structure type
 Monoclinic: $C2$ or $C2/m$
 a 43.113, b 4.059, c 37.874 Å, β 117.35°
 Black; metallic, opaque
 In reflected light (air): white; internal reflections red, anisotropy distinct. R: 39.0% (460 nm), 36.4% (540 nm), 35.2% (580 nm), 33.4% (640 nm)
 3.84(31), 3.402(100), 3.369(74), 2.815(70),
 2.756(36), 2.251(31), 2.116(31), 1.955(30)

IMA No. 2002-063

$(Ni,Zn)Al_4(VO_3)_2(OH)_{12}(H_2O)_{2.5}$ Ni-dominant analogue of alvanite; structure determined
 Monoclinic: $P2_1/n$
 a 17.8098, b 5.1228, c 8.8665 Å, β 92.141°
 Colorless to white, light green to light blue; vitreous; diaphaneity not given
 Biaxial (-), α 1.653, β 1.680, γ 1.706,
 $2V$ (meas.) 86°, $2V$ (calc.) 88°
 8.89(100), 7.83(100), 3.266(50), 1.970(80),
 1.904(70), 1.605(50), 1.481(80)

IMA No. 2002-064

$(K,Na,\square)(Mn^{2+},Fe^{2+},Li)_2(Al,Si)_4Si_4O_{12}(OH)_4(F,OH)_4$ Carpholite group
 Orthorhombic: $Ccca$
 a 13.715, b 20.302, c 5.138 Å
 White to straw-yellow; silky; diaphaneity not given
 Biaxial (-), α 1.578, β 1.592, γ 1.598,
 $2V$ (meas.) 57°, $2V$ (calc.) 66°
 5.70(100), 3.819(80), 3.43(80), 3.048(90),
 2.744(80), 2.613(100), 2.050(80), 1.467(80)

IMA No. 2002-065

$(Na,K,Sr)_{35}Ca_{12}Fe_3Zr_6TiSi_{51}O_{144}(O,OH,H_2O)_3Cl_3$
 Eudialyte group; structure determined
 Trigonal: $R3$
 a 14.239, c 60.733 Å
 Pink; vitreous; transparent
 Uniaxial (+), ω 1.597, ϵ 1.601
 6.45(33), 5.70(34), 4.32(68), 3.55(39),
 3.230(44), 3.049(36), 2.977(100), 2.853(88)

IMA No. 2002-066

$(H_3O)_8(Na,K,Sr)_5Ca_6Zr_3Si_{26}O_{66}(OH)_9Cl$

Eudialyte group; structure determined
 Trigonal: $R3$
 a 14.078, c 31.24 Å
 Pink; vitreous; translucent
 Uniaxial (+), ω 1.569, ϵ 1.571
 11.43 (39), 10.50(44), 7.06(42), 6.63(43),
 4.39(100), 3.624(41), 2.987(100), 2.850(79)

IMA No. 2002-067

$Na_{15}Ca_3Fe_3(Na,Zr)_3Zr_3(Si,Nb)(Si_{25}O_{73})(OH,H_2O)_3(Cl,OH)$ Eudialyte group; structure determined
 Trigonal: $R3$
 a 14.229, c 30.019 Å
 Red; vitreous; transparent
 Uniaxial (+), ω 1.608, ϵ 1.611
 11.48(33), 5.72(35), 4.31(66), 4.09(37),
 3.209(58), 3.023(40), 2.974(86), 2.853(100)

PROPOSALS FROM PREVIOUS YEARS APPROVED IN 2002

IMA No. 2000-010

$(Na,H_3O)_{15}(Ca,Mn,REE)_6Fe_3^+Zr_3(\square,Zr)(\square,Si)Si_{24}O_{66}(O,OH)_6Cl \cdot nH_2O$ Eudialyte group; structure determined
 Trigonal: $R3m$
 a 14.167, c 30.081 Å
 Yellow; vitreous; translucent
 Uniaxial (+), ω 1.612, ϵ 1.615
 6.41(41), 4.30(91), 3.521(57), 3.205(44),
 2.963(92), 2.841(100), 2.588(37)

IMA No. 2000-028

$Na_{27}K_8Ca_{12}Fe_3Zr_6Si_{52}O_{144}(OH,O)_6Cl_2$
 Eudialyte group; structure determined
 Trigonal: $R3m$
 a 14.249, c 60.969 Å
 Pink; vitreous; transparent
 Uniaxial (+), ω 1.598, ϵ 1.600
 6.48(47), 4.34(81), 3.565(41), 3.249(57),
 2.987(100), 2.861(73), 2.695(40)

IMA No. 2001-069

$Na(Na_{1.0-1.5}Li_{0.5-1.0})_2(Fe_3^+Mg_2Li)Si_8O_{22}(OH)_2$
 Amphibole group; structure determined
 Monoclinic: $C2/m$
 a 9.712, b 17.851, c 5.297 Å, β 103.63(2)°
 Bluish black; vitreous; translucent
 No optical data could be given
 3.392(33), 3.098(37), 2.701(100), 2.576(14),
 2.524(100), 2.157(20), 1.646(20), 1.581(15)

IMA No. 2001-070

$Ca_3(PO_4)$ Related to whitlockite
 Trigonal: $R3m$
 a 5.258, c 18.727 Å
 White to yellowish grey; vitreous; diaphaneity not given

Uniaxial (+), ω 1.706, ϵ 1.701
 2.891(80), 2.628(100), 2.214(20), 2.078(12),
 2.047(16), 1.945(47), 1.730(25)

NOMENCLATURE MODIFICATIONS 1998-2002

IMA Code 98-D – Monsmedite **discredited** = voltaite.

IMA Code 98-E – Arsenobismite **discredited** = mixture of preisingerite, minor atelestite and minor beudantite/signinite

IMA Code 99-A – Platynite **discredited** = mixture of laitakarite and selenianite galena.

IMA Code 99-B – Peprossiite-(Ce) **redefined** as $(Ce,La)(Al_3O)_{23}B_4O_{10}$.

IMA Code 00-A – **Redefinition** (the new name is the second one): vuoriyarvite = vuoriyarvite-K; kuzmenkoite = kuzmenkoite-Mn; lemmleinite = lemmleinite-K; labuntsovite of Semenov & Burova (1955) = labuntsovite-Mn; labuntsovite of Milton et al. (1958) = paralabuntsovite-Mg.

IMA Code 00-B – Kurgantaite **revalidated**.

IMA Code 00-C – Baiyuneboite-(Ce) **discredited** = cordylite-(Ce).

IMA Code 00-D – Nomenclature of joaquinite group **redefined** to conform with the Levinson system. The members of the group are: joaquinite(Ce), orthojoaquinite-(Ce), orthojoaquinite-(La), strontiojoaquinite, strontio-orthojoaquinite, bario-orthojoaquinite, byelorussite-(Ce).

IMA Code 00-E. Destinezite **redefined** as triclinic $Fe_2(PO_4)(SO_4)(OH) \cdot 6H_2O$.

IMA Code 00-F – **Redefinition** (the new name is the second one): hellandite = hellandite-(Y); tadjikite = tadjikite-(Ce).

IMA Code 00-G – Neotype approved and magnesium-zippeite **redefined** as monoclinic

$Mg(UO_2)_2(SO_4)(OH)_4 \cdot 1.5H_2O$

IMA Code 01-A – **Redefinition** (the new name is the second one): högbomite-8H = magnesiohögbomite-2N2S; högbomite-10T = magnesiohögbomite-2N3S; högbomite-24R = magnesiohögbomite-6N6S; zincohögbomite-8H = zincohögbomite-2N2S; zincohögbomite-16H = zincohögbomite-2N6S; nigerite-6T = ferronigerite-2N1S; nigerite-24R = ferronigerite-6N6S; pengzhizhongite-6T = magnesionigerite-2N1S; pengzhizhongite-24R = magnesionigerite-6N6S; taaffeite = magnesiotaafeite-2N'2S; musgravite = magnesiotaafeite-6N'3S; pehrmanite = ferrotaafeite-6N'3S;

IMA Code 01-B - Duhamelite **discredited** = mottramite.

IMA Code 02-A - Tripulhyite is **redefined** as $FeSbO_4$ and squawcreekite of Ford et al. (1991) is **discredited**.

IMA Code 02-B - Arhbarite is **redefined** as triclinic $Cu_2Mg(AsO_4)(OH)_3$.

IMA Code 02-D - The mineral name mahlmoodite is **corrected** in mahlmoodite.

Name change approved – “magnocolumbite” is now magnesiocolumbite

New minerals approved in 2003 and nomenclature modifications approved in 2003 by the Commission on New Minerals and Mineral Names, International Mineralogical Association

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The information given here is provided by the Commission on New Minerals and Mineral Names, I.M.A., for comparative purposes and as a service to mineralogists working on new species.

Each mineral is described in the following format:

- IMA No.
- Chemical Formula
- Any relationship to other minerals
- Structure analysis
- Crystal system, space group
- Unit-cell parameters
- Colour; lustre; diaphaneity
- Optical properties
- Strongest lines in the X-ray powder diffraction pattern

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves. No other information will be released by the commission.

2003 PROPOSALS

IMA No. **2003-001**

$(\text{Ba,Ca,K,Na,Sr})_5\text{Al}_9\text{Si}_{27}\text{O}_{72}\cdot 22\text{H}_2\text{O}$

Ba-dominant analogue of heulandite

Structure determined

Monoclinic: $C2/m$

a 17.738, b 17.856, c 7.419 Å, β 116.55°

Colourless to white, rarely very pale yellowish white; vitreous, pearly; translucent to transparent

Biaxial (+), α 1.5056, β 1.5064, γ 1.5150, $2V(\text{meas.})$ 38°, $2V(\text{calc.})$ 34.1°

7.94(66), 5.12 (59), 4.65(66), 3.978(97), 3.181(56), 2.973(100), 2.807(65)

IMA No. **2003-002**

$\text{Na}(\text{Ba,Sr,Na,REE})\text{PO}_4$

Ba-dominant analogue of olgite

Structure determined

Trigonal: $P3$

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a 5.549, c 7.032(2) Å

Light-green; vitreous; transparent

Uniaxial (–), ω 1.628, ϵ 1.623

7.04(22), 3.964(60), 2.839(100), 2.774(100), 2.344(20), 1.984(40), 1.611(26)

IMA No. **2003-003**

$\text{Ba}_2\text{Zn}(\text{Ti},\text{Nb})_4(\text{Si}_4\text{O}_{12})_2(\text{O},\text{OH})_4 \cdot 7\text{H}_2\text{O}$

Labuntsovite group, kuzmenkoite subgroup

Structure determined

Monoclinic: Cm

a 14.381, b 13.889, c 7.793(2) Å, β 117.52°

Pale brown (light coffee-coloured); vitreous; transparent

Biaxial (+), α 1.683, β 1.692, γ 1.795, $2V(\text{meas.})$ 30°, $2V(\text{calc.})$ 34.5°

6.95(37), 6.39(10), 4.91(6), 3.194(100), 3.101(22), 3.050(8), 2.906(6)

IMA No. **2003-004**

$(\text{Cu},\text{Fe})(\text{Re},\text{Mo})_4\text{S}_8$

Cubic: $F\bar{4}3m$

a 9.563 Å

Black; metallic; opaque

In reflected light: bluish-green, no internal reflections, isotropic. $R(\text{air})$: 38.2 (470 nm), 37.9 (546 nm), 37.4 (589 nm), 36.6 (650 nm)

5.53(100), 2.885(90), 2.389(90), 2.194(70), 1.952(60), 1.841(90), 1.690(80)

IMA No. **2003-005**

$\text{Ca}_2(\text{Zn},\text{Mg})[\text{PO}_4]_2 \cdot 2\text{H}_2\text{O}$

Zn-dominant analogue of collinsite

Structure determined

Triclinic: $P\bar{1}$

a 5.736, b 6.767, c 5.462 Å, α 97.41, β 108.59, γ 107.19°

Colourless, grey with greenish or bluish tint in aggregates and larger crystals; vitreous in crystals and silky in aggregates; transparent

Biaxial (+), α 1.6348, β 1.6495, γ 1.6686, $2V_z(\text{calc.})$ 83.4°

6.24(34), 3.230(22), 3.130(37), 3.038(40), 2.690(100), 1.668(22)

IMA No. **2003-006**

$\text{BaV}^{4+}_2\text{V}^{3+}_{12}\text{Si}_2\text{O}_{27}$

New structure type

Trigonal: $P\bar{3}$

a 7.6014, c 9.2195 Å

Steel-grey to black; submetallic to dull; opaque

In reflected light: grey with weak brownish tint; no internal reflections; weak birefractance, pleochroism and anisotropy. R_{min} and R_{max} (air): 15.9-16.8 (470 nm), 16.0-17.3 (546 nm), 15.9-17.4 (589 nm), 16.1-17.7 (650 nm)

9.22(53), 3.100(70), 2.785(100), 2.679(62), 2.402(48), 2.190(97), 1.934(75)

IMA No. **2003-007**

$(\text{Ca},\text{Fe},\text{Th})(\text{REE},\text{Ca})(\text{Al},\text{Cr},\text{Ti})_2(\text{Mg},\text{Fe},\text{Al})\text{Si}_3\text{O}_{12}(\text{OH},\text{F})$ with $\text{La} > \text{Ce}$

Epidote group

Structure determined

Monoclinic: $P2_1/m$

a 8.9616, b 5.7265, c 10.2353 Å, β 115.193°

Black, very dark brown; vitreous; opaque

Biaxial (+), α 1.7395, β 1.7434, γ 1.7495, $2V_\gamma$ (meas.) 77.0°, $2V_\gamma$ (calc.) 77.5°
3.53(49), 2.926(100), 2.860(53), 2.714(41), 2.699(44), 2.623(38), 2.553(51)

IMA No. **2003-008**

(Na,Sr,K,Ca)₇(Ti,Nb)₈[Si₄O₁₂]₄(O,OH)₈· n H₂O $n \sim 8$

Labuntsovite group

Structure determined

Monoclinic: $C2/m$

a 14.596, b 14.249, c 15.852 Å, β 117.27(10)°

Colourless; vitreous; transparent

Biaxial (+), α 1.657, β 1.666, γ 1.765, $2V$ (meas.) 19-31°, $2V$ (calc.) 35°
7.09(100), 3.24(90), 3.15(80), 3.11(80), 2.54(70), 2.491(70)

IMA No. **2003-009**

U⁶⁺_{2-x}Ti(O_{8-x}OH_{4x})[(H₂O)₃Ca_x]

New structure type

Trigonal: $P3$

a 10.824, c 7.549 Å

Canary-yellow to orange-yellow; vitreous; translucent

Uniaxial (+), ω 1.815, ϵ 1.910

4.60(100), 2.90(80), 1.87(30), 1.747(30), 1.211(30)

IMA No. **2003-010**

CuZn(PO₄)OH

Zn-dominant analogue of libethenite

Structure determined

Orthorhombic: $Pnmm$

a 8.3263, b 8.2601, c 5.8771 Å

Bright-green with a bluish tint; vitreous; translucent

Biaxial (-), α 1.660, β 1.705, γ 1.715

5.87(39), 4.79(100), 3.699(22), 2.935(33), 2.632(47), 2.405(19), 2.304(18)

IMA No. **2003-011**

(Cd,Pb)Bi₂S₄

Pavonite homologous series

Structure determined

Monoclinic: $C2/m$

a 13.096, b 4.004, c 14.717 Å, β 115.602(5)°

Dark grey (reddish); metallic; opaque

In reflected light: white, no internal reflections, distinct birefractance, strong anisotropy

R_{\min} and R_{\max} (air): 29.6-36.4 (470 nm), 32.4-38.8 (546 nm), 31.8-38.2 (589 nm), 31.4-37.7 (650 nm)

3.689(97), 3.648(84), 3.508(81), 3.109(38), 2.935(100), 2.804(93), 2.338(43)

IMA No. **2003-012**

Cu₂[BO(OH)₂](OH)₃

New structure type

Orthorhombic: *Pnma*

a 9.455, *b* 5.866, *c* 8.668 Å

Blue; vitreous; translucent

Biaxial (–), α 1.627, β 1.699, γ 1.769, 2*V*(calc.) 86°

4.73(100), 3.941(90), 3.192(40), 2.545(45), 2.489(50), 1.838(40), 1.712(40)

IMA No. **2003-013**

Na₁₂(Mn,Sr,REE)₃Ca₆Fe²⁺₃Zr₃NbSi₂₅O₇₆Cl₂·H₂O

Eudialyte group

Structure determined

Trigonal: *R3m*

a 14.262, *c* 29.949 Å

Yellow-green (different shades); vitreous; transparent or translucent

Uniaxial (–), ω 1.639, ϵ 1.631

6.42(54), 4.30(62), 3.202(100), 3.155(71), 2.975(98), 2.857(94), 2.591(54)

IMA No. **2003-014**

Fe₂Si

Cubic: *Pm3m*

a 2.831 Å

No macroscopic data (grains up to 35 μm)

In reflected light: yellowish-white, isotropic. R: 47.1 (470 nm), 48.8 (546 nm), 50.0 (589 nm), 50.9 (650 nm)

2.831, 2.000, 1.631, 1.415, 1.267, 1.157, 1.000 (no intensities given)

IMA No. **2003-015**

(K,Na)₂(Mn,Fe)(Nb,Ti)₄(Si₄O₁₂)₂(O,OH)₄·6H₂O

Labuntsovite group

Structure determined

Monoclinic: *C2/m*

a 14.563, *b* 13.961, *c* 7.851(2) Å, β 117.62°

Orange-yellow to brownish ; vitreous; translucent to transparent

Biaxial (+), α 1.670, β 1.685, γ 1.775(5), 2*V*(meas.) 52°, 2*V*(calc.) 46°

6.96(100), 6.40(20), 4.94(80), 3.22(90), 3.10(80), 2.510(40)

IMA No. **2003-016**

(Hg₂)²⁺₁₀O₆I₃(Br_{1.6}Cl_{1.4})_{Σ3.0}[(CO₃)_{0.8}S²⁻_{0.2}]_{Σ1.0}

Structure determined

Triclinic: *P1̄*

a 9.344, *b* 10.653, *c* 18.265 Å, α 93.262, β 90.548, γ 115.422°

Silvery grey to black to dark red-black; adamantine to metallic; translucent to opaque

In reflected light: grey; abundant, orange-red to blood-red internal reflections; no birefractance, no pleochroism; moderate to strong anisotropy. R_{min} and R_{max} (air): 28.6-29.5 (470 nm), 26.2-27.1 (546 nm), 24.6-25.7 (589 nm), 22.8-24.0 (650 nm)

7.64(60), 4.20(80), 3.296(50), 3.132(90), 2.894(100), 2.722(80), 2.629(50)

IMA No. **2003-017**

(REE,Ca)₄(Fe³⁺,Ti,Fe²⁺,□)(Ti,Fe³⁺,Fe²⁺,Nb)₄Si₄O₂₂

Fe-dominant analogue of polyakovite-(Ce)

Structure determined

Monoclinic: $C2/m$

a 13.385, b 5.742, c 11.059 Å, β 100.60°

Black or brown-black; submetallic pitchy; opaque

Biaxial (-), α 1.937, β not determined, γ 1.970

In reflected light: grey; yellowish-grey internal reflections; weak birefractance and pleochroism; strong anisotropy. R_{\min} and R_{\max} (air): 12.5-14.6 (470 nm), 12.1-14.4 (546 nm), 12.1-14.3 (589 nm), 11.2-13.7 (650 nm)

4.89(35), 3.490(40), 3.189(80), 3.004(40), 2.874(40), 2.760(40), 2.722(100)

IMA No. **2003-018**

$\text{Na}_{5.5}\text{Mn}_{0.25}\text{ZrSi}_6\text{O}_{16}(\text{OH})_2$

Lovozerite group

Structure determined

Monoclinic: $C2/m$

a 10.693, b 10.299, c 7.373(4) Å, β 91.91°

Dark cherry-coloured; vitreous; transparent

Biaxial (-), some grains are uniaxial (-); α 1.585, $\beta \approx \gamma$ 1.589, $2V(\text{meas.}) < 5^\circ$, $2V(\text{calc.}) -0^\circ$
7.40(36), 5.31(51), 3.690(43), 3.342(84), 3.270(92), 2.652(100), 2.580(91), 1.849(39)

IMA No. **2003-019**

$\text{Na}_6\text{Sr}_{12}\text{Ba}_2\text{Zr}_{13}\text{Si}_{39}\text{B}_4\text{O}_{123}(\text{OH})_6 \cdot 20\text{H}_2\text{O}$

Related to benitoite

Structure determined

Hexagonal: $P6_3cm$

a 26.509, c 9.975 Å

Colourless to grey; vitreous; translucent

Uniaxial (+), ω 1.640, ϵ 1.663

5.76(40), 3.924(30), 3.761(90), 3.310(25), 3.150(50), 2.760(100), 1.991(70)

IMA No. **2003-020**

Cu_6GeWS_8

Hexagonal: $P6_3/mmc$, $P\bar{6}2c$ or $P6_3mc$

a 7.523, c 12.384 Å

Grey; metallic; opaque

In reflected light: greyish white with a distinct brownish tint; red internal reflections; no pleochroism, weak birefractance; weak anisotropy. R_{\min} and R_{\max} (air): 24.5-25.2 (470 nm), 24.1-24.5 (546 nm), 24.5-25.1 (589 nm), 23.4-23.7 (650 nm)

6.18(40), 5.78(100), 3.153(40), 2.887(40), 2.417(40), 1.971(50), 1.881(80), 1.744(50)

IMA No. **2003-021**

$\text{Cu}_2\text{Mg}_2(\text{Mg,Cu})(\text{OH})_4(\text{H}_2\text{O})_4(\text{AsO}_4)_2$

Isotypic with akrochordite

Structure determined

Monoclinic: $P2_1/c$

a 5.475, b 16.865, c 6.915 Å, β 99.80°

Blue; vitreous; transparent

Biaxial (-), α 1.664, β 1.691, γ 1.695, $2V(\text{meas.}) 31^\circ$, $2V(\text{calc.}) 42^\circ$

8.42(100), 4.32(21), 4.21(64), 3.016(12), 2.907(10), 2.809(7)

IMA No. **2003-022**

$\text{Cs}(\text{Be}_2\text{Li})\text{Al}_2\text{Si}_6\text{O}_{18}$

Beryl group

Structure determined

Hexagonal: $R3c$

a 15.946, c 27.803 Å

Raspberry red to pink; vitreous; translucent to transparent

Uniaxial (-), ω 1.616, ϵ 1.608

3.271(100), 3.027(41), 3.019(29), 2.871(52), 2.229(12), 2.215(14), 1.636(14)

IMA No. **2003-024**

$(\text{Zr},\text{Mn})_2(\text{Zr},\text{Ti})(\text{Mn},\text{Na})(\text{Na},\text{Ca})_4(\text{Si}_2\text{O}_7)_2(\text{O},\text{F})_4$

Seidozerite group

Structure determined

Monoclinic: $P2/c$

a 5.6082, b 7.1387, c 18.575 Å, β 102.60°

Yellowish brown to dark brown; vitreous; translucent

Biaxial, birefringence on (001) is 0.041: α 1.694, γ_1 1.735, $2V > 90^\circ$

3.949(15), 3.027(68), 2.898(100), 2.613(26), 2.459(24), 1.853(24), 1.786(14), 1.650(14)

IMA No. **2003-025**

$\text{Th}_{0.5}(\text{UO}_2)_2\text{Si}_5\text{O}_{13}\cdot 3\text{H}_2\text{O}$

Isostructural with weeksite

Orthorhombic: $Cmmb$

a 14.1676, b 14.1935, c 35.754 Å

Yellow; waxy to silky; transparent to translucent

Biaxial (-), α 1.620, β 1.627, γ 1.629, $2V(\text{meas.})$ 40°, $2V(\text{calc.})$ 56.1°

7.06(100), 5.56(59), 4.58(47), 3.528(86), 3.287(57), 3.188(73), 2.981(46), 2.904(78)

IMA No. **2003-026**

$(\text{Cu},\square)_6(\text{Pb},\text{Bi})\text{Se}_4$

Structure determined

Monoclinic: $P2_1/m$

a 9.5341, b 4.1004, c 10.2546 Å, β 100.066°

Black; metallic; opaque

In reflected light: grey, no internal reflections, no pleochroism, very weak bireflectance, very weak anisotropism. R_{\min} and R_{\max} (air): 36.6-38.1 (470 nm), 36.45-38.1 (546 nm), 36.6-38.3 (589 nm), 36.6-38.5 (650 nm)

3.189(100), 3.132(100), 2.601(70), 2.505(50), 2.151(60), 2.058(80), 1.909(50)

IMA No. **2003-027**

$\text{Pb}_{21}\text{SnAs}_{11}\text{Bi}_{11}\text{S}_{50}\text{Cl}_8\text{Se}$

Structure determined

Orthorhombic: $F2mm$

a 45.824, b 8.368, c 53.990 Å

Silvery grey; metallic; opaque

In reflected light: white, no internal reflections, no pleochroism, no bireflectance, weak anisotropism. R (air): 34.25 (470 nm), 32.95 (546 nm), 32.60 (589 nm), 31.05 (650 nm)

3.34(80), 3.17(60), 2.85(80), 2.69(80), 2.17(60), 2.10(70), 2.07(100), 2.04(50)

IMA No. **2003-028**

(La,Ce)OF

Structure determined

Cubic: *Fm3m*

a 5.628 Å

Light yellow; powdery; translucent

Isotropic, *n* = 1.85

3.252(100), 2.815(26), 1.991(56), 1.6969(39)

IMA No. **2003-029**

Mn(C₂O₄)·2H₂O

Mn analogue of humboldtine (oxalate)

Monoclinic: *C2/c*

a 11.955, *b* 5.632, *c* 9.967 Å, β 128.34°

White to greyish white; vitreous; transparent

Biaxial (–), α 1.424, β 1.550, γ 1.65, 2*V*(meas.) 80°, 2*V*(calc.) 77°

4.85(26), 4.80(100), 4.70(84), 3.91(23), 3.62(22), 2.996(58)

IMA No. **2003-030**

CeCu₆(AsO₄)₃(OH)₆·3H₂O

Mixite group

Hexagonal: *P6₃/m*

a 13.59, *c* 5.89 Å

Green to yellowish green; vitreous, in part silky; translucent to transparent

Uniaxial (+), ω 1.725, ε 1.810

11.88(10), 4.47(8), 3.56(8), 2.95(8), 2.70(5), 2.57(5), 2.46(9)

IMA No. **2003-032**

Tl(Cl,Br)

Sal ammoniac group

Structure determined

Cubic: *Pm3m*

a 3.8756 Å

Grey-brown; resinous to greasy; translucent

Isotropic, *n* (calc.) 2.015

3.887(80), 2.745(100), 2.237(55), 1.937(50), 1.733(45), 1.583(70)

IMA No. **2003-033**

NaFe³⁺₂(Mg,Mn)(AsO₄)₃·H₂O

Alluaudite group

Structure determined

Monoclinic: *C2/c*

a 12.181, *b* 12.807, *c* 6.6391 Å, β 112.441°

Brown to brown-black; adamantine; translucent

Biaxial (–), α 1.870, β 1.897, γ 1.900, 2*V*(meas.) 35°, 2*V*(calc.) 36.5°

6.40(20), 5.63(20), 3.575(30), 3.202(40), 2.917(35), 2.768(100), 2.611(40)

IMA No. **2003-034**

Cs₄Na₂Zr₃(Si₁₈O₄₅)(H₂O)₂

Phyllosilicate

New structure type
Monoclinic: $C2/c$
 a 26.3511, b 7.5464, c 22.9769, β 107.237°
Colourless; vitreous; transparent
Biaxial (–), α 1.585, β 1.598, γ 1.603, 2V(calc.) 63°
6.32(50), 3.65(50), 3.35(100), 3.14(90), 2.82(50), 2.62(70)

IMA No. **2003-035**
 $SrB_2Si_2O_8$
Sr-dominant analogue of danburite
Structure determined
Orthorhombic: $Pnma$
 a 8.155, b 7.919, c 8.921 Å
Colourless; vitreous; transparent
Biaxial (–), α 1.597, β 1.627, γ 1.632, 2V (meas.) 43°, 2V(calc.) 44°
5.94(60), 3.62(100), 3.51(90), 3.31(80), 3.01(60), 2.786(90), 2.706(60), 1.982(70)

IMA No. **2003-036**
 $Ba_2Mn(VO_4)_2(OH)$
Mn-dominant analogue of gamagarite
Monoclinic: $P2_1/m$
 a 9.10, b 6.13, c 7.89, β 112.2°
Black-red; vitreous; translucent
Biaxial, n (calc.) 2.03
3.46(26), 3.31(100), 3.00(16), 2.90(19), 2.80(62), 2.71(40), 2.16(18)

IMA No. **2003-037**
 $Ce_2Fe^{2+}[Si_2O_7](CO_3)$
New structure type
Monoclinic: $P2_1/c$
 a 6.512, b 6.744, c 18.94(4) Å, β 111.90°
Brown; vitreous; translucent
Biaxial (–), α 1.785, β 1.810, γ 1.820, 2V (meas.) 66°, 2V(calc.) 64°
4.41(4), 3.61(4), 3.30(5), 2.92(10), 2.65(5), 2.23(5)

IMA No. **2003-039**
 $Pb_2(Pb,Sb)_2S_8[Te,Au]_2$
Nagyágite-buckhornite homologous series
Monoclinic: $P2_1/m$
 a 4.361, b 6.618, c 20.858 Å, β 92.71°
Dark silver-grey; metallic; opaque
In reflected light: grey colour, very low bireflectance and pleochroism, distinct anisotropy.
R(air): 38.4-40.3 (471 nm), 38.1-40.1 (548 nm), 37.5-39.4 (587 nm), 35.9-38.0 (652 nm)
6.93(38), 4.80(52), 4.10(40), 3.56(100), 3.47(58), 3.31(40), 2.99(50), 2.98(30), 2.56(41)

IMA No. **2003-040**
 $(Mg,Cu)SO_4 \cdot 7H_2O$
Melanterite group
Structure determined
Monoclinic: $P2_1/c$

a 14.166, b 6.534, c 10.838 Å, β 105.922°

Blue; vitreous; transparent

Biaxial (+), α 1.462, β 1.465, γ 1.469, 2V(meas.) 79.8°, 2V(calc.) 82°

4.85(100), 4.79(14), 4.44(16), 3.779(38), 3.663(15), 3.254(15), 3.078(14), 2.721(14)

IMA No. **2003-041**

$\text{Cu}_3\text{Zn}(\text{OH})_6\text{Cl}_2$

Related to paratacamite

Structure determined

Trigonal: $R\bar{3}m$

a 6.834, c 14.075 Å

Dark-green to blue-green; vitreous; transparent

Uniaxial (-), ω 1.825, ϵ 1.815

5.47(55), 4.70(14), 2.899(11), 2.764(100), 2.730(13), 2.266(36), 1.820(13), 1.709(18)

IMA No. **2003-042**

CdIn_2S_4

Linnaeite group

Cubic: $Fd\bar{3}m$

a 10.81 Å

Black; adamantine; translucent

In reflected light: grey colour, isotropic, brown-red internal reflections. R(air): 23.9 (470 nm), 21.6 (546 nm), 20.8 (589 nm), 20.2 (650 nm)

3.87(4), 3.27(10), 2.70(6), 2.07(8), 1.91(9), 1.41(6), 1.246(7), 1.107(9), 1.045(8)

IMA No. **2003-043**

$\text{KNa}_2\text{Fe}^{2+}_4\text{Fe}^{3+}_4\text{Si}_8\text{O}_{22}(\text{OH})_2$

Amphibole group

Structure determined

Monoclinic: $C2/m$

a 10.002 b 18.054 c 5.319(1) Å, β 103.90(3)°

Black or dark blue-green; vitreous; translucent to transparent

Biaxial (-), α 1.683, β 1.692, γ 1.699, 2V(meas.) > 60°, 2V(calc.) 82°

9.02(28), 8.53(100), 3.419(12), 3.303(23), 3.184(40), 2.847(17), 2.725(10)

IMA No. **2003-044**

$\text{BaNa}\{(\text{Na},\text{Ti})_4[(\text{Ti},\text{Nb})_2(\text{OH},\text{O})_3\text{Si}_4\text{O}_{14}](\text{OH},\text{F})_2\}\cdot 3\text{H}_2\text{O}$

Heterophyllosilicate

Structure determined

Monoclinic: $I11b$

a 5.552, b 7.179, c 50.94(1) Å, γ 91.10°

Creamy or pale yellow; silky; semi-transparent

Biaxial (+), α 1.668, β 1.679, γ 1.710, 2V(meas.) 63°, 2V(calc.) 63°

25.50(100), 12.68(14), 8.48(72), 5.11(11), 3.44(14), 3.17(74), 2.763(20), 2.110(14)

IMA No. **2003-046**

$(\text{U},\text{Th})(\text{Ca},\text{Na})_2(\text{K}_{1-x}\square_x)\text{Si}_8\text{O}_{20}\cdot\text{H}_2\text{O}$

Steacyite group

Structure determined

Tetragonal: $P4/mcc$

a 7.6506, c 14.9318 Å
Dark-green; vitreous; transparent
Uniaxial (-), ω 1.615, ϵ 1.610
5.34(23), 5.28(38), 3.37(100), 3.31(59), 2.640(64), 2.515(21), 2.161(45), 2.016(29), 1.644(30)

IMA No. **2003-047**
 $\text{Ca}_3(\text{Al,Mn}^{3+})_2(\text{SiO}_4)_2(\text{OH})_4$
Garnet group
Structure determined
Tetragonal: $I4_1/acd$
 a 12.337, c 11.930 Å
Brownish yellow; vitreous; transparent
Uniaxial (+), ω 1.718, ϵ 1.746
3.08(44), 2.978(45), 2.757(55), 2.743(100), 2.685(54), 2.501(47), 1.614(56)

IMA No. **2003-048**
 $\text{KMg}(\text{PO}_4) \cdot 6\text{H}_2\text{O}$
Schertelite-struvite group
Structure determined
Orthorhombic: $Pmn2_1$
 a 6.892, b 6.166, c 11.139 Å
Colourless; vitreous; transparent
Biaxial (+), α 1.490(2), β 1.493(2), γ not determined, $2V_z$ (meas.) large
4.26(100), 4.14(80), 3.27(90), 2.905(50), 2.699(50), 2.650(70), 1.954(50)

IMA No. **2003-049**
 CuPd
CsCl structure
Cubic: $Pm\bar{3}m$
 a 3.0014 Å
Steel-grey with a bronze tint; metallic; opaque
In reflected light: creamy to bright white, isotropic, no internal reflections. $R(\text{air})$: 58.7 (470 nm), 62.6 (546 nm), 64.1 (589 nm), 65.3 (650 nm)
2.122(100), 1.500 (30), 1.225(70), 1.061(40), 0.9491(50), 0.8021(60)

IMA No. **2003-050**
 $\text{NaCa}_2(\text{Mg}_3\text{Fe}^{2+}\text{Al})_5(\text{Si}_6\text{Al}_2)_8\text{O}_{22}\text{F}_2$
Amphibole group
Structure determined
Monoclinic: $C2/m$
 a 9.8771, b 18.041, c 5.3092 Å, β 105.133°
Black; vitreous; transparent to translucent in very thin fragments
Biaxial (+), α 1.634, β 1.642, γ 1.654, $2V(\text{meas.})$ 68°, $2V(\text{calc.})$ 79°
8.42(100), 3.28(20), 3.21(84), 3.00(13), 2.825(54), 2.379(17), 2.347(15), 1.443(15)

IMA No. **2003-051**
 $\text{Bi}_7\text{O}_4(\text{MoO}_4)_2(\text{AsO}_4)_3$
New structure type
Orthorhombic: $Pnca$
 a 5.303, b 16.169, c 23.980 Å

Yellow; adamantine; transparent

Biaxial (-), α 2.22, β 2.255, γ 2.26, 2V(meas.) 42°, 2V(calc.) 41°

3.41(37), 2.996(69), 2.963(48), 2.688(100), 2.001(28), 1.887(13), 1.657(14)

IMA No. **2003-052**

$\text{Fe}^{3+}\text{Ge}^{4+}_3\text{O}_7(\text{OH})$

Orthorhombic: P^{***}

a 8.302, b 9.718, c 4.527 Å

Dirty brown-green; vitreous; opaque in aggregates, transparent in crystals

Biaxial (+), with at least two indices of refraction greater than 1.8, 2V(meas.) large

4.11(40), 3.68(100), 3.12(60), 2.921(100), 2.512(40), 2.403(90), 1.646(80), 1.624(50)

IMA No. **2003-053**

YTaO_4

Dimorphous with formanite

Structure determined

Monoclinic: $P2/a$

a 5.262, b 5.451, c 5.110 Å, β 95.12°

Amber brown to brown; vitreous to adamantine; translucent

R(air): 13.8-14.1 (470 nm), 13.6-13.8 (546 nm), 13.6-13.9 (589 nm), 13.7-14.0 (650 nm)

3.13(100), 2.95(94), 2.73(26), 2.62(23), 1.890(29), 1.862(29), 1.614(20)

IMA No. **2003-055**

$\text{Mn}^{2+}\text{V}^{3+}\text{Al}(\text{Si}_2\text{O}_6)(\text{OH})_4$

Carpholite group

Structure determined

Orthorhombic: $Ccca$

a 13.830, b 20.681, c 5.188 Å

Pale straw-yellow to brown; vitreous to silky; transparent

Biaxial (+), α 1.684, β 1.691 (calc.), γ 1.700, 2V (meas.) 85°

5.75(100), 5.15(18), 4.72(14), 3.46(15), 3.08(22), 2.641(26)

IMA No. **2003-056**

PdSbSe

Ullmannite group

Structure determined

Cubic: $P2_1/3$

a 6.3181 Å

Silver-grey; metallic; opaque

In reflected light: white, isotropic, no internal reflections. R(air): 48.6 (470 nm), 47.5 (546 nm), 47.6 (589 nm), 49.0 (650 nm)

3.16(53), 2.825(100), 2.579(81), 2.233(32), 1.905(98), 1.752(27), 1.688(25), 1.379(18)

IMA No. **2003-057**

$(\text{Fe}^{2+}, \text{Mg})_6\text{Fe}^{3+}_2(\text{OH})_{18} \cdot 4\text{H}_2\text{O}$

Meixnerite group

Structure determined

Trigonal: $R\bar{3}m$

a 3.125, c ~ 22.5 Å

Bluish-grey; earthy

No optical data

7.97(100), 3.97(32), 2.692(34), 2.027(19), 1.595(9), 1.563(10)

IMA No. **2003-058**

$\text{Na}_8\text{Al}_8\text{Si}_{28}\text{O}_{72}\cdot 30\text{H}_2\text{O}$

Zeolite group

Structure determined

Hexagonal: $P6_3/mmc$

a 18.235, c 7.636 Å

Colourless, white; vitreous; transparent

Uniaxial (+), ω 1.471, ϵ 1.472

9.08(100), 6.86(70), 5.95(70), 4.68(40), 3.79(80), 3.51(40), 3.15(70)

IMA No. **2003-059**

$\text{WO}_3\cdot 0.5\text{H}_2\text{O}$

Related to ferritungstite

Cubic: $Fd\bar{3}m$

a 10.203 Å

White; vitreous; translucent

Isotropic, n 2.240

5.88(100), 3.08(62), 2.944(78), 2.551(12), 1.964(17), 1.804(23), 1.725(14), 1.538(14)

IMA No. **2003-060**

$\text{Sr}_3\text{Al}_{3.5}\text{Si}_{3.5}\text{O}_{10}(\text{OH},\text{O})_8\text{Cl}_2\cdot \text{H}_2\text{O}$

New structure type

Monoclinic: $P2/m$, $P2$ or Pm

a 5.893, b 7.262, c 10.288 Å, β 97.23°

White; silky; translucent

Biaxial (+), α 1.639, β 1.648, γ 1.665, 2V (meas.) 75°, 2V (calc.) 72.7°

10.13(100), 3.23(80), 2.96(100), 2.90(100), 2.505(100), 2.182(80), 2.104(60), 1.855(70)

IMA No. **2003-061**

$\text{NaNa}_2(\text{Mg}_2\text{Mn}^{3+}\text{LiTi}^{4+})\text{Si}_8\text{O}_{22}\text{O}_2$

Amphibole group

Structure determined

Monoclinic: $C2/m$

a 9.808, b 17.840, c 5.2848 Å, β 104.653°

Pink-red; vitreous; transparent

Biaxial (+), α 1.688, β 1.692, γ 1.721. 2V (meas.) 49°, 2V (calc.) 41°

4.45(6), 3.38(7), 3.13(8), 2.697(10), 2.542(9), 2.154(7), 1.434(7)

IMA No. **2003-062**

$\text{Na}(\text{CaMn})_{\Sigma 22}\text{Mg}_5(\text{Si}_7\text{Al})\text{O}_{22}(\text{OH})_2$

Amphibole group

Structure determined

Monoclinic: $C2/m$

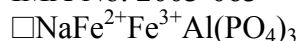
a 9.795, b 18.047, c 5.287 Å, β 104.28°

Very pale pinkish-brown; vitreous; translucent

Biaxial (-), α 1.620, β 1.632, γ 1.642, 2V (calc.) 84°

10.53(50), 3.39(59), 3.27(48), 3.12(61), 2.948(47), 2.720(46), 2.711(100), 2.594(49)

IMA No. **2003-063**



Wyllieite group

Structure determined

Monoclinic: $P2_1/n$

a 11.838, b 12.347, c 6.2973 Å, β 114.353°

Dark-green to bronze; resinous; transparent

Biaxial (–), α 1.730, β 1.758, γ 1.775, 2V (meas.) 82°, 2V (calc.) 75°

8.10(30), 6.17(50), 5.38(40), 4.05(45), 3.45(65), 3.01(40), 2.693(75), 2.677(100)

IMA No. **2003-064**



Higher homologue of miharaite

Structure determined

Monoclinic: $P2_1/n$

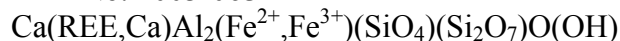
a 4.0329, b 12.734, c 14.639 Å, β 90.103°

Grey; metallic; opaque

In reflected light: yellowish-brownish, moderate bireflectance, distinct anisotropy, no internal reflections. R(air): 40.2-45.7 (470 nm), 39.3-44.5 (546 nm), 38.9-44.1 (589 nm), 38.6-44.1 (650 nm)

3.67(100), 3.66(64), 3.41(60), 3.319(62), 3.317(62), 3.111(69), 3.022(72), 3.017(72)

IMA No. **2003-065**



Epidote group

Structure determined

Monoclinic: $P2_1/m$

a 8.914, b 5.726, c 10.132 Å, β 114.87°

Black; vitreous; transparent to translucent

Biaxial, α' 1.755, β 1.760, γ' 1.765, 2V not determined

7.93(15), 3.51(20), 2.901(100), 2.860(40), 2.692(60), 2.611(50), 2.283(15), 2.174(25)

IMA No. **2003-066**



Amphibole group

Structure determined

Monoclinic: $C2/m$

a 9.704, b 17.990, c 5.297 Å, β 103.51°

Straw-yellow; vitreous; translucent

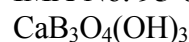
Mean index of refraction (n) 1.665 (calc.)

8.36(76), 3.40(62), 3.26(34), 3.10(66), 2.714(100), 2.591(35), 2.522(61), 2.166(36)

Exceptionally, the name of this new mineral is published here, on request of the author (Roberta Oberti of Pavia, Italy). Similar amphibole material has been previously described as 'tirodite', but this name was discredited in the 1997 paper on amphibole nomenclature, the new name being '(alkali-bearing) manganocummingtonite'. The new name 'parvowinchite' has already been attributed in the Leake *et al.* (2003) amphibole paper (Canadian Mineralogist, 41, 1355-1362) to the specimen described by Oberti and Ghose (1993, European Journal of Mineralogy, 5, 1153-1160). Because further characterization of the available material is not possible, no further report will be published.

OLDER PROPOSALS

IMA No. **95-020c**



New structure type

Monoclinic: $P2_1/a$

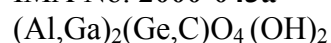
a 8.386, b 8.142, c 7.249 Å, β 98.33°

White to colourless; vitreous; translucent to transparent

Biaxial (+), α 1.573, β 1.586, γ 1.626, 2V(meas.) 60°, 2V(calc.) 61°

4.32(57), 3.39(100), 3.13(50), 2.93(23), 2.606(25), 2.360(17), 2.287(19), 1.849(25)

IMA No. **2000-043a**



Isotypic with topaz

Structure determined

Orthorhombic: $Pnma$

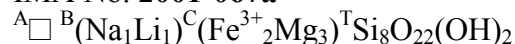
a 9.1111, b 8.5276, c 4.8064 Å

Beige to white; greasy; translucent

Biaxial, $n(\text{calc.}) = 1.757$

3.811(78), 3.315(48), 3.016(100), 2.464(24), 2.417(27), 2.247(38), 1.398(29)

IMA No. **2001-067a**



Amphibole group

Structure determined

Monoclinic: $C2/m$

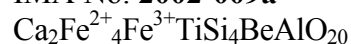
a 9.535, b 17.876, c 5.234 Å, β 102.54°

Black; vitreous; translucent

Biaxial, no other optical properties given

8.27(15), 3.408(18), 3.058(36), 2.710(100), 2.501(68), 1.581(19), 1.399(20)

IMA No. **2002-009a**



Aenigmatite group

Structure determined

Triclinic: $P\bar{1}$

a 10.3549, b 10.7508, c 8.8732 Å, α 105.707, β 96.227, γ 124.861°

Black; vitreous; opaque.

Biaxial (sign not known), α 1.799, β -, γ 1.86, 2V not known

8.00(57), 4.78(29), 3.12(32), 2.924(69), 2.676(77), 2.530(100), 2.410(28), 2.075(39)

OTHER NOMENCLATURE DECISIONS

IMA No. **03-A**

It has been approved that the general CNMMN advocacy of Schaller modifiers (Hey & Gottardi, Can. Mineral. 18 [1980], 261-262; Nickel & Mandarino, Can. Mineral. 25 [1987], 353-377) is to be dropped. When it is desired to indicate the presence of subordinate chemical components in a mineral, Schaller modifiers may be used in unambiguous cases, namely those

in which the element has two, and only two, valence states. In the more general case, adjectival modifiers such as "-bearing" or "-rich" should be used, together with the specified element(s), and with the numerical oxidation state, if required, *e.g.*, "Mn⁽²⁺⁾-rich", "V(III)-deficient", "Mg-bearing", *etc.*

IMA No. **03-B**

Spodiosite discredited: Spodiosite is a mixture of fluorapatite, calcite and serpentine.

IMA No. **03-C**

Naming polytypes of wagnerite: The known polytypes of wagnerite, ideally Mg₂(PO₄)F, are named wagnerite-*Ma2bc* (space group *P2₁/c*), wagnerite-*Ma5bc* (space group *Ia*), wagnerite-*Ma7bc* (space group *P2₁*) and wagnerite-*Ma9bc* (space group *Ia*). Polytypes of zwieselite and triplite can be written in analogy with those of wagnerite.

Magniotriplite discredited: Magniotriplite and wagnerite are polytypes, not polymorphs, of one another. The name wagnerite has priority (1821 vs. 1951 for magniotriplite), therefore the species and name *magniotriplite* is discredited.

Nomenclature of a mineral group

Amphiboles: additions and revisions to the International Mineralogical Association's amphibole nomenclature.

See *Can. Mineral.* 41 (2003), 1355-1362, *Eur. J. Mineral.* 16 (2004), 191-196, and other journals, and also on the CNMMN website (www.geo.vu.nl/~ima-cnmmn).

IMA No. **2003-058**

Mazzite renamed mazzite-Mg: the approval of IMA No. 2003-058 as a new mineral automatically implies that the name of the existing mazzite is changed to mazzite-Mg, and that these two minerals form the new mazzite series within the zeolites.

Withdrawal of an approved mineral

Prassoite: the mineral prassoite, Rh₃S₄, was approved as mineral 70-041 by the CNMMN in March 1971. The author, Kingston, published some data in his Ph.D. thesis in 1977. These data were summarized by Cabri in 1981, but he stated that the true formula might be Rh₁₇S₁₅. Augé found the same mineral as Kingston in 1988, with the formula Rh₃S₄ (*Can. Mineral.* 26, 177-192), and this paper was mentioned by Jambor in 1989 (*Am. Mineral.* 74, 1220).

Britvin *et al.* proposed the mineral miassite (97-029) to the CNMMN with the formula Rh₁₇S₁₅. This mineral was approved in October 1997, but the name was suspended because of possible problems with prassoite. The authors were asked to contact Kingston. They tried to do so, but to no avail.

After having heard from Britvin *et al.* that Kingston did not reply to any search, the suspension on the name miassite was lifted, but the CNMMN chairman then made a mistake (probably by not having access to the 1971 archives). In his Memorandum of July 1999, Joel Grice wrote: 'Prassoite' was never approved by the CNMMN, and no type material can be found. It is apparent that the authors of miassite have done everything possible to establish or refute the existence of this dubious mineral and the name 'prassoite' is to be discouraged from further usage. In his letter to Britvin *et al.*, lifting the suspension, Joel Grice wrote: I would ask you to make it clear in your publication that all attempts were made to find the type material for a formal discreditation of prassoite but none existed.

Britvin *et al.* published their miassite in *ZVMO* 130(2), 41-44 (2001), stating in the paper that prassoite was never approved by the CNMMN, this of course on the authority of Joel Grice.

The paper was abstracted by Jambor (Am. Mineral. 87, p. 1511), with the correction that prassoite had indeed been approved by the CNMMN back in 1971.

Later, it became apparent that the type material of prassoite was present in the British Museum (on the same specimen as the type material for kingstonite), but the letters of Britvin *et al.* to Kingston were never forwarded to the curator of the British Museum.

We have meanwhile the strange fact that there are at least ten papers using the name prassoite (the most recent one in Can. Mineral. 40 (2002), 1127-1146), but only a single paper on miassite! Moreover, the name 'prassoite' has never been officially discredited or withdrawn. In view of the delay in the (incomplete) publication of the inadequately described prassoite and the uncertainties about its composition, the name 'prassoite' is withdrawn for the time being in favour of miassite. Unambiguous evidence for the existence of Rh_3S_4 as a mineral might reinstate the name prassoite.

Recommendations on CNMMN procedures

On request and proposal of Donald Peacor the following recommendations on CNMMN procedures have been approved in 1999/2000, but never published until now:

- Mineral status should be accorded to those materials occurring in sub-micrometer-sized crystallites only if they are of sufficient total volume or concentration to be detected by at least one commonly used laboratory technique.
- CNMMN criteria for approval of mineral species status should be viewed as flexible guidelines.

**NEW MINERALS APPROVED IN 2004
NOMENCLATURE MODIFICATIONS APPROVED IN 2004
BY THE
COMMISSION ON NEW MINERALS AND MINERAL NAMES
INTERNATIONAL MINERALOGICAL ASSOCIATION**

Ernst A.J. Burke* (Chairman, CNMMN) and Giovanni Ferraris** (Vice-Chairman, CNMMN)

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The information given here is provided by the Commission on New Minerals and Mineral Names, I.M.A., for comparative purposes and as a service to mineralogists working on new species.

Each mineral is described in the following format:

IMA number

Type locality

Corresponding author

Chemical formula

Relationship to other minerals

Crystal system, Space group, Structure determined, yes or no

Unit-cell parameters

Interplanar spacing (Å) and intensity of the strongest lines in the X-ray powder-diffraction pattern

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

This list is also available on the CNMMN website:

<http://sheba.geo.vu.nl/~ima-cnmmn/minerals2004.pdf>

NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION

2004 PROPOSALS

IMA No. **2004-001**

Little Patsy pegmatite, Jefferson Co., Colorado, USA

William B. Simmons

$[(\text{REE}+\text{Y}),\text{U},\text{Th},\text{Ca},\text{Fe},\dots](\text{Nb},\text{Ta},\text{Ti})\text{O}_4$ with Yb as dominant REE

Yb-dominant analogue of samarskite

Monoclinic: $P2/c$

a 5.687 b 9.918, c 5.201 Å, β 93.18° (for heated material)

3.664(21), 3.086(25), 2.981(100), 1.895(12), 1.865(20), 1.769(15), 1.746(12), 1.587(20)

IMA No. **2004-002**

Tastyg spodumene deposit, Tuva, Siberia, Russia

Roberta Oberti

$\text{NaLi}_2(\text{Mg}_2\text{Al}_2\text{Li})_{\Sigma 5}\text{Si}_8\text{O}_{22}\text{F}_2$

Amphibole group

Monoclinic: $C2/m$; Structure determined

a 9.357, b 17.580, c 5.267 Å, β 102.37°

8.11(56), 4.39(54), 3.371(43), 3.002(66), 2.869(26), 2.675(100)

IMA No. **2004-003**

Findlay Gulch, Saguache Co., Colorado, USA

Luca Bindi

$\text{Ag}_3\text{HgPbSbTe}_5$

Strong similarities with petrovicite

Orthorhombic: $Pna2_1$ or $Pnam$ (probably)

a 16.495, b 14.762, c 4.506 Å

3.65(60), 3.60(40), 3.26(50), 3.17(60), 3.01(100), 2.754(60), 2.316(45), 2.137(50), 1.806(55)

IMA No. **2004-004**

Tahara, Hirukawa-mura, Ena-gun, Gifu Prefecture, Japan

Satoshi Matsubara

$\text{Ce}_2\text{Be}_2(\text{SiO}_4)_2(\text{OH})_2$

Gadolinite group

Monoclinic: $P2_1/a$

a 9.8973, b 7.6282, c 4.7505 Å, β 90.416°

6.06(42), 3.74(37), 3.44(34), 3.13(86), 2.85(100), 2.56(46), 2.21(33), 1.976(30)

IMA No. **2004-005**

Palitra pegmatite, Lovozero, Kola Peninsula, Russia

Igor V. Pekov

CsFe_2S_3

Cs-dominant analogue of rasvumite and picotpaulite

Orthorhombic: $Cmcm$

a 9.477, b 11.245, c 5.485 Å

4.69(30), 4.28(20), 2.981(100), 2.723(40), 2.003(30), 1.910(60), 1.785(30), 1.565(40)

IMA No. **2004-006**

ca. 7.5 km southwest of Wolf Mountain, Thunder Bay District, Ontario, Canada

Anton R. Chakhmouradian

$(\text{Ca},\text{Na})_5[(\text{P},\text{S})\text{O}_4]_3(\text{OH},\text{Cl})$

Apatite group

Monoclinic: $P2_1/b$

a 9.445, b 18.853, c 6.8783 Å, γ 120.00°

2.817(66), 2.781(41), 2.724(79), 2.630(24), 2.267(100), 1.945(39), 1.841(58), 1.784(70)

IMA No. **2004-007**

Mesamax Northwest deposit, Cape Smith, Ungava region, Canada

Louis J. Cabri

Pd_2Sb

Orthorhombic: $Cmc2_1$

a 3.3906, b 17.5551, c 6.957 Å

2.407(34), 2.303(35), 2.245(100), 2.057(52), 2.001(40), 1.367(35), 1.284(42), 1.212(50)

IMA No. **2004-008**

Eveslogchorr Mountain, Khibiny massif, Kola Peninsula, Russia

Igor V. Pekov



Labuntsovite group

Monoclinic: *Cm*; Structure determined

a 14.490, *b* 14.23, *c* 7.881 Å, β 117.28°

7.10(90), 6.45(50), 5.01(40), 3.230(100), 3.135(80), 2.510(80), 1.728(50), 1.570(45)

IMA No. **2004-009**

Dora-Maira massif, Vallone di Gilba, Val Varaita, Piemonte, Italy

Christian Chopin



Triplite-triploidite group

Monoclinic: *P2₁/c*

a 9.646, *b* 12.7314, *c* 11.980 Å, β 108.38°

3.292(50), 3.117(66), 2.984(100), 2.851(80), 2.752(28), 2.710(19), 2.484(14)

IMA No. **2004-010**

Shergotty SNC meteorite

Charles T. Prewitt



Polymorphous with quartz

Orthorhombic: *Pbcn* or *Pb2n*; Structure determined

a 4.097, *b* 5.0462, *c* 4.4946 Å

3.181(72), 2.596(100), 1.970(25), 1.938(64), 1.514(31), 1.499(44), 1.288(19), 1.265(15)

IMA No. **2004-011**

Kumdy-Kul, Kokchetav, Kazakhstan

Shyh-Lung Hwang



Feldspar group

Hexagonal: probably *P6/mmm*

a 5.27, *c* 7.82 Å

7.82, 4.56, 3.94, 2.97, 2.63, 2.50, 2.26, 1.80

IMA No. **2004-012**

Dara-i-Pioz glacier, Tajikistan

Leonid A. Pautov



Mica group

Monoclinic: *C2/m*, *C2* or *Cm*

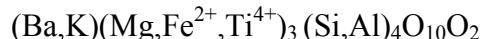
a 5.182, *b* 9.005, *c* 10.692 Å, β 99.82°

3.897(49), 3.682(80), 3.418(65), 3.174(100), 2.980(41), 2.634(79), 2.582(66), 2.107(94)

IMA No. **2004-013**

Fernando-do-Noronha Island, Brazil

Frank C. Hawthorne



Mica group

Monoclinic: $C2/m$; Structure determined

a 5.3516, b 9.2817, c 10.0475 Å, β 100.337°

3.646(7), 3.383(6), 3.130(7), 2.902(5), 2.637(10), 2.435(5), 2.172(9), 1.988(5)

IMA No. **2004-014**

Le Coreux, Ardennes, Belgium

Werner Schreyer

$\text{La}_3\text{Mn}^{2+}_3\text{Cu}^{2+}(\text{Mn}^{3+}, \text{Fe}^{3+}, \text{Mn}^{4+})_{26}(\text{Si}_2\text{O}_7)_6\text{O}_{30}$

New structure type determined

Trigonal: $P3_1$

a 11.525, c 33.347 Å

11.116(18) 5.446(31), 3.1873(19), 2.7789(40), 2.7232(100), 2.3702(29), 1.6887(28),

1.6635(40)

IMA No. **2004-015**

Central Pyrenees, France

Christian Chopin

$(\text{Mn}^{2+}, \text{Ca})(\text{REE})\text{V}^{3+}\text{AlMn}^{2+}(\text{Si}_2\text{O}_7)(\text{SiO}_4)\text{O}(\text{OH})$, with Ce as dominant REE

Epidote group

Monoclinic: $P2_1/m$; Structure determined

a 8.856, b 5.729, c 10.038 Å, β 113.088°

3.5004, 2.8891, 2.8645, 2.7114, 2.7023, 2.6124, 2.5916

IMA No. **2004-016**

Silver Gill mine, Cumbria, United Kingdom

Joseph J. Pluth

$\text{Cu}_6(\text{OH})_{10}(\text{SO}_4)\cdot\text{H}_2\text{O}$

Langite group

Monoclinic: $P2_1/c$; Structure determined

a 3.155, b 10.441, c 19.436 Å, β 90.089°

9.72(90), 7.11(100), 4.60(30), 4.068(20), 2.880(30), 2.318(50), 2.000(15), 1.941(15)

IMA No. **2004-017**

Dara-i-Pioz glacier, Tajikistan

Leonid A. Pautov

$\text{CsKNaCa}_2\text{TiO}[\text{Si}_7\text{O}_{18}(\text{OH})]$

Cs-dominant analogue of tinaksite

Triclinic: $P\bar{1}$; Structure determined

a 10.4191, b 12.2408, c 7.0569 Å, α 90.857, β 99.193, γ 91.895°

4.08(13), 3.33(11), 3.25(16), 3.14(21), 3.06(100), 2.959(20), 2.038(17)

IMA No. **2004-018**

Mariposa mine, Texas, USA

Andrew C. Roberts

$\text{Hg}^{2+}_3\text{O}_2\text{Cl}_2$

Oxyhalide with Hg

Orthorhombic: $Imam$, $Imcm$, $Ima2$, or $I2cm$

a 6.737, b 25.528, c 5.533 Å

5.413(30), 4.063(80), 3.201(50), 3.023(50), 2.983(60), 2.858(30), 2.765(50), 2.518(100)

IMA No. **2004-019**

Qaqarssuk complex, Greenland

Joel D. Grice

Ba(Ce,REE)(CO₃)₂F

Polymorph of huanghoite-(Ce)

Trigonal: *P3*; Structure determined

a 7.2097, *c* 18.187 Å

4.552(43), 3.674(32), 3.539(41), 3.351(100), 3.096(40), 2.571(35), 2.109(39), 2.080(60)

IMA No. **2004-020**

Mesamax Northwest deposit, Québec, Canada

Louis J. Cabri

Pd₄Sb₃

Pd-dominant analogue of genkinite

Tetragonal: *P4*₁*2*₁*2*, *P4*₁*2*₂, *P4*₃*2*₁*2*, *P4*₂*2*₁*2*, or *P4*₂*2*₂

a 7.7388, *c* 24.145 Å

3.0077(90), 2.2633(100), 2.1471(30), 1.9404(60), 1.2465(30), 1.2002(30), 0.9221(30)

IMA No. **2004-021**

Kovdor massif, Kola Peninsula, Russia

Victor N. Yakovenchuk

Co₃(PO₄)₂·8H₂O

Vivianite group

Monoclinic: *C2/m*

a 10.034, *b* 13.341, *c* 4.670 Å, β 105.02°

6.67(10), 4.85(4), 3.84(4), 3.195(6), 2.948(7), 2.691(7), 2.521(6), 2.408(6)

IMA No. **2004-022**

Horní Halže, Krušné Hory Mts., Czech Republic

Jiří Sejkora

Pb₂(UO₂)₁₁(BiO)₈(PO₄)₅(OH)₁₉·6H₂O

P-dominant analogue of asselbornite

Cubic: *Im3m*, *I432*, *Im3* or *I23*

a 15.5728 Å

5.513(53), 4.499(48), 4.163(100), 3.671(77), 3.484(31), 3.179(99), 2.596(54), 1.9776(30)

IMA No. **2004-023**

Kara-Oba deposit, Kazakhstan

Leonid A. Pautov

Ca₃(Nd,Y)Al₂(SO₄)F₁₃·12H₂O

Nd-dominant analogue of chukhrovite

Cubic: *Fd3*

a 16.759 Å

9.7(10), 5.92(7), 4.20(4), 3.22(8), 2.555(7), 2.240(5), 2.180(6), 1.827(5)

IMA No. **2004-024**

Kara-Tangi deposit, Kyrgyzstan

Leonid A. Pautov

ZnAl₄(SO₄)(OH)₁₂·3H₂O

Zn-dominant analogue of chalcoalumite

Monoclinic: $P2_1/n$

a 10.246, b 8.873, c 17.22 Å, β 96.41°

8.60(100), 7.93(70), 4.83(80), 4.27(100), 2.516(70), 2.292(80), 1.998(95), 1.896(65)

IMA No. **2004-025**

Tolbachik volcano, Kamchatka Peninsula, Russia

Sergey V. Krivovichev

$\text{Cu}^+\text{Cu}^{2+}_5\text{PbO}_2(\text{SeO}_3)_2\text{Cl}_5$

New structure type determined

Monoclinic: $C2/m$

a 18.468, b 6.1475, c 15.314 Å, β 119.284°

3.86(80), 3.55(80), 3.08(100), 2.504(20), 1.710(30), 1.543(50), 1.448(30), 1.348(40)

IMA No. **2004-026**

Poudrette Quarry, Mont Saint-Hilaire, Rouville County, Quebec, Canada

Joel D. Grice

$\text{Na}_{12}(\text{Ce,REE,Sr})_3\text{Ca}_6\text{Mn}_3\text{Zr}_3\text{W}(\text{Si}_{25}\text{O}_{73})(\text{OH})_3(\text{CO}_3)\cdot\text{H}_2\text{O}$

Eudialyte group

Trigonal: $R3m$; Structure determined

a 14.249, c 30.06 Å

11.308(95), 9.460(81), 3.547(36), 3.395(38), 3.363(32), 3.167(75), 2.968(100), 2.849(81)

IMA No. **2004-028**

Mina Challacollo, Chile

Jochen Schlüter

KPb_2Cl_5

New structure type determined

Monoclinic: $P2_1/c$

a 8.864, b 7.932, c 12.491 Å, β 90.153°

8.8547(39), 5.3350(14), 3.9614(31), 3.6859(100), 3.6093(13), 2.6691(42), 2.5483(18)

IMA No. **2004-029**

La Creusaz, Valais, Switzerland, and Radium Ridge, South Australia

Joël Brugger

$(\text{Ce,Nd,Ca})[(\text{UO}_2)_3\text{O}(\text{OH})(\text{PO}_4)_2]\cdot 6\text{H}_2\text{O}$

Related to phosphuranyllite group

Monoclinic: $P2_1/c$

a 9.295, b 15.53, c 13.718 Å, β 112.39°

7.76(100), 5.77(60), 4.42(30), 4.37(30), 3.87(60), 3.43(70), 3.14(80), 2.038(40)

IMA No. **2004-030**

Greenbushes, Western Australia

Roberta Oberti

$\square\text{Li}_2(\text{Fe}^{2+}_3\text{Al}_2)_{\Sigma 5}(\text{Si}_8\text{O}_{22})(\text{OH})_2$

Amphibole group

Orthorhombic: $Pnma$; Structure determined

a 18.287, b 17.680, c 5.278 Å

8.11(100), 4.42(26), 3.62(13), 3.00(48), 2.797(17), 2.648(14), 2.536(11)

IMA No. **2004-031**

Nagybörzsöny ore deposit, Börzsöny Mountains, Hungary
Werner Paar



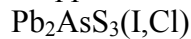
Monoclinic: $F2/m$, $F2$ or Fm

a 18.329, b 4.108, c 13.974 Å, β 100.90°

9.002(40), 6.876(30), 6.046(20), 3.460(30), 3.382(40), 2.959(100), 2.101(50), 2.086(50)

IMA No. **2004-032**

Mutnovsky volcano, Kamchatka Peninsula, Russia
Filippo Vurro



Orthorhombic: $Pnma$; Structure determined

a 11.543, b 6.6764, c 9.359 Å

4.690(32), 4.370(67), 3.340(73), 3.190(100), 2.715(61), 2.648(66), 2.539(31), 1.894(30)

IMA No. **2004-033**

Koashva Mountain, Khibiny massif, Kola Peninsula, Russia
Igor Pekov



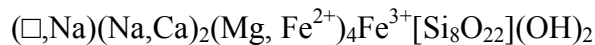
Orthorhombic: $Pmmm$

a 5.147, b 7.289, c 5.889 Å

5.12(40), 4.21(40), 3.69(30), 3.104(100), 2.727(50), 2.292(50), 1.897(70), 1.828(50)

IMA No. **2004-034**

Ilmen Mountain Ridge, South Ural, Russia
Alfred G. Bazhenov



Amphibole group

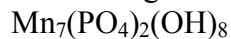
Monoclinic: $C2/m$

a 9.811, b 18.014, c 5.295 Å, β 104.10°

8.42(100), 3.391(10), 3.268(13), 3.116(60), 2.800(10), 2.711(20)

IMA No. **2004-035**

Iron Monarch quarry, Iron Knob, South Australia
Allan Pring



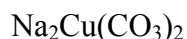
Monoclinic: $P2_1/c$; Structure determined

a 11.364, b 5.570, c 10.455 Å, β 96.61°

4.436(70), 3.621(100), 3.069(50), 2.941(40), 2.890(20), 2.842(20), 2.780(35), 2.718(20)

IMA No. **2004-036**

Mina Santa Rosa, Iquique, Chile
Jochen Schlüter



Monoclinic: $P2_1/a$

a 6.171, b 8.171, c 5.645 Å, β 116.23°

5.06(66), 4.57(57), 4.30(37), 4.26(75), 2.666(100), 2.619(65), 2.450(33), 2.390(25)

IMA No. **2004-037**

Mány coal deposit, Tatabánya, Hungary

István E. Sajó

$\text{CaAl}_2(\text{CO}_3)_2(\text{OH})_4 \cdot \text{H}_2\text{O}$

Dresserite group

Orthorhombic: *Pnma*

a 15.564, *b* 5.591, *c* 9.112 Å

7.86(87), 7.78(62), 5.92(100), 4.37(86), 2.957(48), 2.946(44), 2.569(17), 1.902(26)

IMA No. **2004-038**

Krásno near Horní Slavkov, Bohemia, Czech Republic

Jiří Sejkora

$\text{Cu}_{13}(\text{AsO}_4)_6(\text{AsO}_3\text{OH})_4 \cdot 23\text{H}_2\text{O}$

Triclinic: $P\bar{1}$; Structure determined

a 6.408, *b* 14.491, *c* 16.505 Å, α 102.87, β 101.32, γ 97.13°

15.70(3), 11.98(100), 6.99(3), 5.99(6), 3.448(5), 2.967(5), 2.895(3), 2.400(4)

IMA No. **2004-040**

Iron Mine, Kovdor massif, Kola Peninsula, Russia

Nikita V. Chukanov

$\text{Na}_9(\text{Ca},\text{Na})_6\text{Ca}_6\text{Fe}_2\text{Zr}_3\text{Si}_{25}\text{O}_{72}(\text{CO}_3)(\text{OH})_4$

Eudialyte group

Trigonal: $R3m$; Structure determined

a 14.232, *c* 30.210 Å

4.31(64), 3.213(100), 3.163(44), 3.027(65), 2.977(91), 2.859(79), 2.703(46), 2.595(45)

IMA No. **2004-041**

Linópolis, Divino das Laranjeiras, Minas Gerais State, Brazil

Nikita V. Chukanov

$\text{Ca}_2\text{Fe}^{2+}\text{Mg}_2\text{Fe}^{2+}_2\text{Be}_4(\text{PO}_4)_6(\text{OH})_4 \cdot 6\text{H}_2\text{O}$

Related to roscherite

Triclinic: $P\bar{1}$; Structure determined

a 6.668, *b* 9.879, *c* 9.883 Å, α 73.53, β 85.60, γ 86.93°

9.47(41), 5.92(100), 3.31(34), 3.17(53), 2.784(86), 2.639(30), 2.225(26), 2.202(32)

IMA No. **2004-043**

Farnese, Viterbo province, Latium, Italy

Giancarlo Della Ventura

$(\text{Na}_{37}\text{K}_9\text{Ca}_{10})_{\Sigma 56}(\text{Si}_{42}\text{Al}_{42})_{\Sigma 84}\text{O}_{168}(\text{SO}_4)_{12} \cdot 6\text{H}_2\text{O}$

Cancrinite-sodalite group

Hexagonal: $P6_3/m$; Structure determined

a 12.8784, *c* 37.0078 Å

5.404(20), 3.862(23), 3.722(100), 3.668(26), 3.485(65), 3.119(36), 2.648(32), 2.149(34)

IMA No. **2004-044**

Fianel Alp, Ferrera valley, Graubünden, Switzerland

Joël Brugger

$\text{Na}(\text{Mn},\text{Mg},\text{Zn})_9[\text{VSi}_9\text{O}_{28}(\text{OH})](\text{OH})_3$

Related to saneroite

Triclinic: $P\bar{1}$; Structure determined

a 9.831, b 10.107, c 13.855 Å, α 86.222, β 73.383, γ 71.987°
8.68(50), 7.91(70), 4.83(30), 3.94(30), 3.22(40), 3.09(80), 2.92(40), 2.71(100)

IMA No. **2004-045**

Arnold mine, Fowler, St. Lawrence Co., New York, USA

Roberta Oberti



Amphibole group

Monoclinic: $C2/m$; Structure determined

a 9.7807, b 18.0548, c 5.2928 Å, β 104.19°

9.027(54), 8.395(62), 3.395(62), 3.269(56), 3.113(80), 2.950(51), 2.713(100), 2.531(59)

IMA No. **2004-046**

Skaergaard Intrusion, Greenland

Andy McDonald



Tetragonal: $I4/mmm$

a 3.715, c 14.651 Å

3.657(60), 2.138(100), 1.8604(70), 1.8337(40), 1.3049(60), 1.1188(55), 1.0655(30),
0.8459(25)

IMA No. **2004-047**

Buraco do Ouro gold mine, Cavalcante, Goiás State, Brazil.

Nilson F. Botelho



Gersdorffite group

Cubic: $Pa\bar{3}$

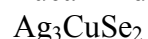
a 6.089 Å

3.027(75), 2.725(65), 2.478(65), 1.838(100), 1.077(80), 0.988(70), 0.929(90), 0.918(70)

IMA No. **2004-048**

Skrikerum, Sweden

Luca Bindi



Tetragonal: $I4_1/amd$

a 8.939, c 11.844 Å

4.47(60), 2.891(85), 2.813(80), 2.552(50), 2.473(75), 2.426(100), 2.162(70), 2.034(60)

IMA No. **2004-049**

Kasagu-mura, Gifa Prefecture, Japan

Yasuyuki Banno



Mica group

Monoclinic: $C2/m$; Structure determined

a 5.291, b 9.16, c 10.12 Å, β 105.1°

9.77(100), 4.59(25), 3.26(50), 2.61(100), 2.55(25), 2.45(20), 2.19(20)

Triclinic: $C\bar{1}$; Structure determined

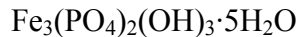
a 5.289, b 9.16, c 9.892 Å, α 94.45, β 97.74, γ 90.0°

9.73(80), 4.57(40), 3.26(40), 2.62(100), 2.55(30), 2.43(25), 2.19(25), 2.17(25)

IMA No. **2004-050**

Grube Mark near Essershausen, Taunus, Hesse, Germany

Uwe Kolitsch



Wavellite group

Monoclinic: $P2_1/n$; Structure determined

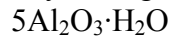
a 9.777, b 7.358, c 17.830 Å, β 92.19°

8.90(100), 8.41(60), 5.870(50), 4.873(30), 3.600(50), 3.357(40), 3.231(80), 2.177(20)

IMA No. **2004-051**

Kulet Kol region, Kokchetav massif, Kazakhstan

Shyh-Lung Hwang



Hexagonal: $P6_3mc$; Structure determined

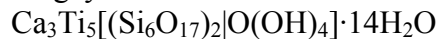
a 5.58, c 8.86 Å

4.839, 4.423, 4.231, 2.783, 2.530, 2.361, 1.673, 1.435, 1.417

IMA No. **2004-052**

Chivruai river valley, Lovozero massif, Kola Peninsula, Russia

Sergey V. Krivovichev



Zorite group

Orthorhombic: $Cmmm$; Structure determined

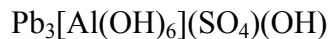
a 7.17, b 22.98, c 6.94 Å

11.6(10), 6.91(9), 5.23(5), 3.41(5), 3.35(5), 3.04(8), 2.97(4), 2.58(5)

IMA No. **2004-053**

Mt. Lepkhe-Nelm, Lovozero massif, Kola Peninsula, Russia

Victor N. Yakovenchuk



New structure type determined

Trigonal: $R3c$

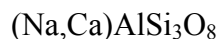
a 7.693, c 31.57 Å

3.58(10), 3.10(6), 2.591(9), 2.216(5), 2.048(7), 1.893(5), 1.859(4), 1.704(8)

IMA No. **2004-054**

Sixiangkou L6 chondrite

Ahmed El Goresy



Feldspar group

Tetragonal: $I4/m$

a 9.263, c 2.706 Å

6.55(66), 4.63(60), 2.931(100), 2.265(35), 2.032(85), 1.737(37), 1.543(33), 1.450(42)

OLDER PROPOSALS

IMA No. **2003-031a**

Aitern-Süd, Black Forest, Germany

Kurt Walenta



Mixite group

Hexagonal: $P6_3/m$

a 13.77, c 5.94 Å

12.01(10), 4.51(6), 3.60(8), 3.31(5), 2.98(6), 2.74(5), 2.61(5), 2.49(7), 1.817(5)

IMA No. **99-004a**

Kudriavy volcano, Iturup Island, Kuriles, Russia

Ilya V. Chaplygin

ReS₂

Triclinic: $P\bar{1}$; Structure determined

a 6.470, b 6.368, c 6.401 Å, α 105.0, β 91.59, γ 118.90°

2.7834(10), 2.764(10), 2.733(10), 2.642(8), 2.404(8), 2.371(9), 2.1035(8), 2.0914(9)

IMA No. **2003-045a**

Heftetjern pegmatite, southern Norway

Frank C. Hawthorne

(Sc,Ca)₂KBe₃Si₁₂O₃₀

Milarite group

Hexagonal: $P6/mmc$; Structure determined

a 10.097, c 13.991 Å

7.012(4), 5.044(5), 4.097(7), 3.504(5), 3.229(10), 2.880(8), 1.836(4), 1.751(4)

IMA No. **2002-042a**

Aris intrusion, Namibia

Fernando Cámara

Na₃La[Si₆O₁₅]·2H₂O

La-dominant analogue of sazhinite

Orthorhombic: $Pmm2$; Structure determined

a 7.415, b 15.515, c 7.164 Å

7.42(59), 6.50(48), 5.36(60), 5.26(68), 3.411(100), 3.345(45), 3.252(83), 3.226(45)

NOMENCLATURE OF A MINERAL GROUP

Application and status of the amphibole nomenclature: discrimination between approved amphiboles and named amphiboles

New root names for amphibole species can only be proposed when new heterovalent substitutions (= substitutions not mentioned in the 1997 and 2003/4 amphibole reports) have been observed in natural material; such material consists of a new amphibole species, and **it must be submitted to the CNMMN with its new root or trivial name, and it should fulfil the requirements asked for all new mineral species**. If approved, these new amphiboles receive *A* status in IMA listings.

New amphibole names originating from new homovalent substitutions are always formed by use of an appropriate prefix to an existing root or trivial name, according to the schemes of the 1997 and 2003/4 reports. **The status of such new amphibole names will depend on their authors: they will have the choice to submit the new amphibole to the CNMMN for approval, or not.**

This will lead to two categories of amphibole species:

Approved amphiboles

An amphibole is considered as an approved species and receives *A* status in the IMA listing if it has been submitted to, and approved by the CNMMN, according to the usual rules applied to all new mineral species. New root names need CNMMN approval.

Named amphiboles

Those researchers who have not enough data to prepare a regular new-mineral proposal, or just are not willing to submit a proposal for whatever reason, may give a name to their amphibole according to the 1997 and 2003/4 amphibole nomenclature schemes and publish it. These amphibole names, however, will not receive *A* status and will not be included in the official IMA listings, because the material to which such a name was applied has not been investigated according to the rules for a new species. **Authors not seeking approval run the risk that other researchers will submit their own material for species approval with the same name.**

A proper order for the use of prefixes in amphibole names

The approved ordering scheme does not split any of the 'end-member' names, as listed in 1997 & 2003/04 amphibole reports, nor any of the names that appear in the nomenclature figures. It is not possible to implement any scheme of prefix order based on systematically increasing or decreasing elements according to valencies, or of M1, M2, M3 & M4 order, without splitting the existing 'end-member' names. So the approved scheme is:

1. Any magnesio or ferro prefixes come immediately in front of the root name.
2. Alumino, ferri, ferric, mangani or chromio prefixes come next in front.
[More than one together is not known].
3. The very first (*i.e.*, at the front) prefix is proto, parvo or magno.
4. Next after (3) come any anions, chloro, or fluoro.
5. Finally any remaining prefixes come after (4) and before (2) being in alphabetical order.

Prefixes are hyphenated except that the prefix immediately before the root name is joined to the root name without a hyphen, unless two vowels would then come together or it would be unclear (see 1997 amphibole report).

The decisions on named amphiboles and the order of prefixes in amphibole names have been published by Burke & Leake [Canadian Mineralogist, 42 (2004), 1881-1883; American Mineralogist, 90 (2005), 516-517].

MONTHLY ANNOUNCEMENT OF NEW MINERALS ON THE CNMMN WEBSITE

After approval of a new mineral by the CNMMN, the following data will be published one month after the approval date of the CNMMN website:

- IMA number
- Type locality
- Corresponding author
- Chemical formula
- Relationship to other minerals
- Crystal system, Space group, Unit-cell parameters
- Structure determined, yes or no
- Strongest lines in the X-ray powder-diffraction pattern

DISCREDITATION

The approval of proposal 2004-002 implies the official discreditation of clinoholmquistite, as holotype material from the latter mineral was used for the description of the former, new mineral. Clinoholmquistite is now only a theoretical name in the amphibole nomenclature system.

RENAMED MINERAL

IMA No. 04-A: cesium kupletskite is renamed as kupletskite-(Cs).

NEW MINERALS APPROVED IN 2005
NOMENCLATURE MODIFICATIONS APPROVED IN 2005
BY THE
COMMISSION ON NEW MINERALS AND MINERAL NAMES
INTERNATIONAL MINERALOGICAL ASSOCIATION

Ernst A.J. Burke* (Chairman, CNMMN) and Giovanni Ferraris** (Vice-Chairman, CNMMN)

*Faculteit der Aard- en Levenswetenschappen, Vrije Universiteit Amsterdam,
De Boelelaan 1085, 1081 HV Amsterdam, Netherlands — ernst.burke@falw.vu.nl

**Dipartimento di Scienze Mineralogiche e Petrologiche, Università di Torino,
Via Valperga Caluso 35, I-10125 Torino, Italy — giovanni.ferraris@unito.it

The information given here is provided by the Commission on New Minerals and Mineral Names, I.M.A., for comparative purposes and as a service to mineralogists working on new species.

Each mineral is described in the following format:

IMA number

Type locality

Corresponding author

Chemical formula

Relationship to other minerals

Crystal system, Space group; Structure determined, yes or no

Unit-cell parameters

Strongest lines in the X-ray powder-diffraction pattern: $d(\text{Å})$, (Intensity)

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

This list is also available on the CNMMN website:

<http://sheba.geo.vu.nl/~ima-cnmmn/minerals2005.pdf>

NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION

2005 PROPOSALS

IMA No. **2005-002**

Uroi hill, Hunedoara district, Romania

Hans-Peter Bojar

$(\text{Na,K})\text{Ca}_2(\text{Mg,Fe}^{3+},\text{Ti})_5(\text{Si,Al})_8\text{O}_{22}\text{F}_2$

Amphibole group

Monoclinic: $C2/m$; structure determined

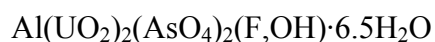
a 9.872, b 18.007, c 5.314 Å, β 105.37°

9.007(27), 8.421(61), 3.376(44), 3.271(61), 3.124(100), 2.931(35), 2.805(28), 2.700(54)

IMA No. **2005-003**

Bota-Burum, Kazakhstan

Nikita V. Chukanov



Related to threadgoldite

Monoclinic: $P2/m$, $P2$ or Pm

a 19.99, b 9.79, c 19.62 Å, β 110.7°

9.34(100), 9.14(100), 4.93(18), 4.87(20), 4.76(27), 4.69(17), 3.55(15), 2.281(13)

IMA No. **2005-004**

Tolbachik volcano, Kamchatka Peninsula, Russia

Sergey V. Krivovichev

$\text{VO}(\text{SO}_4)$

New structure type

Orthorhombic: $Pnma$; structure determined

a 7.389, b 6.274, c 7.079 Å

5.11(27), 4.70(18), 3.54(31), 3.28(100), 3.14(73), 2.845(18), 2.237(17), 2.209(17)

IMA No. **2005-005a**

Prairie Lake, Thunder bay district, Ontario, Canada

Anton R. Chakhmouradian

$\text{Na}_2\text{Ca}_4(\text{Nb},\text{Zr})_2(\text{Si}_2\text{O}_7)_2(\text{O},\text{F})_4$

Cuspidine group

Monoclinic: $P2_1$; structure determined

a 10.845, b 10.226, c 7.272 Å, β 109.33°

3.64(m), 3.23(m), 3.04(s), 2.98(s), 2.85(s), 2.48(m), 2.42(m), 2.02(s)

IMA No. **2005-006**

Greenwood iron mine, Harriman State Park, Tuxedo, Orange County, New York, USA

Marian V. Lupulescu

$\text{KCa}_2(\text{Fe}^{2+}_2\text{Mg}_2\text{Fe}^{3+})_{\Sigma 5}(\text{Si}_6\text{Al}_2)_{\Sigma 8}\text{O}_{22}\text{F}_2$

Amphibole group

Monoclinic: $C2/m$; structure determined

a 9.9480, b 18.1777, c 5.3302 Å, β 105.140°

8.499(100), 3.401(11), 3.299(32), 3.151(76), 2.830(53), 2.722(23), 2.402(17), 1.661(10)

IMA No. **2005-007**

Dashkesan Co-Fe deposit, Minor Caucasus, Azerbaijan

Igor V. Pekov

$\text{KCa}_2(\text{Fe}^{2+}_3\text{MgFe}^{3+})_{\Sigma 5}(\text{Si}_6\text{Al}_2)_{\Sigma 8}\text{O}_{22}\text{Cl}_2$

Amphibole group

Monoclinic: $C2/m$; structure determined

a 9.964, b 18.31, c 5.351 Å, β 105.0°

8.53(100), 3.32(11), 3.16(51), 2.981(12), 2.839(18), 2.749(23), 2.191(10)

IMA No. **2005-008**

Vetralla, Viterbo Province, Latium, Italy

Athos Callegari

$(\text{Ca}_8\text{REE}_2)_{\Sigma 10}(\text{Al}_{0.5}\text{Fe}^{3+}_{0.5})_{\Sigma 1}(\square,\text{Be})_2\text{Si}_6\text{B}_8\text{O}_{36}(\text{OH},\text{F})_2$

Hellandite group

Monoclinic: $P2/a$; structure determined

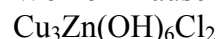
a 28.097, b 4.777, c 10.236 Å, β 96.81°

3.33(40), 3.20(31), 3.01(34), 2.90(45), 2.78(43), 2.65(100), 1.91(48), 1.74(28)

IMA No. **2005-009**

Sounion mine #19, Lavrion, Attica, Greece

Werner Krause



Polymorphous with herbertsmithite

Trigonal: $P\bar{3}m1$; structure determined

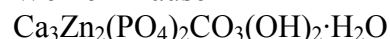
a 6.300, c 5.733 Å

5.73(100), 2.865(11), 2.761(12), 2.730(39), 2.464(81), 1.976(32), 1.576(17), 1.519(10)

IMA No. **2005-010**

Skorpion zinc deposit, Namibia

Werner Krause



New structure type

Monoclinic: $C2/c$; structure determined

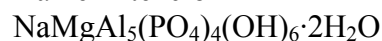
a 19.045, b 9.320, c 6.525 Å, β 92.73°

9.501(53), 5.328(30), 3.170(100), 3.063(42), 3.014(54), 2.788(67), 2.582(21), 2.260(21)

IMA No. **2005-011**

Gentil mine, Mendes Pimentel County, Minas Gerais, Brazil

Daniel Atencio



Dufrénite group

Monoclinic: $C2/c$; structure determined

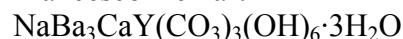
a 25.075, b 5.0470, c 13.4370 Å, β 110.97°

11.75(86), 6.58(100), 4.02(50), 3.297(25), 3.109(60), 2.670(49), 1.941(34), 1.543(37)

IMA No. **2005-012a**

Fabi quarry, near Lanzada, Valmalenco, Sondrio, Lombardy, Italy

Francesco Demartin



Donnayite group

Triclinic: $P1$; structure determined

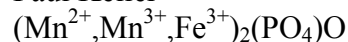
a 9.1526, b 9.1574, c 13.7953 Å, α 109.43, β 109.33, γ 60.00°

6.394(36), 4.312(48), 3.187(28), 3.114(100), 2.641(27), 2.614(35), 2.032(29), 2.013(27)

IMA No. **2005-013**

Helikon II pegmatite, Karibib, Namibia

Paul Keller



Triplite/triploidite groups

Monoclinic: $I2/a$; structure determined

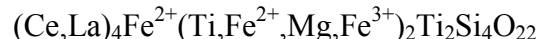
a 11.888, b 6.409, c 9.804 Å, β 106.17°

3.600(4), 3.209(6), 3.077(8), 2.819(10), 2.184(4), 2.082(5), 1.787(5), 1.495(5)

IMA No. **2005-014**

Bayun Obo iron mine, Inner Mongolia, China

Xu Jinsha



Chevkinite group

Monoclinic: $P2_1/a$ (pseudo- $C2/m$); structure determined

a 13.4656, b 5.7356, c 11.0977 Å, β 100.636°

3.342(39), 3.198(68), 3.162(46), 3.095(39), 2.8702(52), 2.7524(100), 2.7263(98), 2.5460(54)

IMA No. **2005-015a**

Zhelezny mine, Kovdor carbonatite massif, Kola Peninsula, Russia

Sergey V. Britvin

$[Mg_{18}Al_6(OH)_4][Sr_2(CO_3,PO_4)_9(H_2O,H_3O)_{11}]$

Layered double hydroxide

Trigonal: space group not determined

a 16.055, c 25.66 Å

8.52(10), 6.41(6), 5.13(3), 4.27(6), 3.665(9), 3.547(9), 3.081(6), 2.513(1)

IMA No. **2005-016**

Carrière de la Flèche, near Bertrix, Ardennes, Belgium

Frédéric Hatert

$Ca_2(Al,Fe^{2+},Mg)Al_2(SiO_4)(Si_2O_7)(OH,O)_2 \cdot H_2O$

Pumpellyite group

Monoclinic: $A2/m$; structure determined

a 8.818, b 5.898, c 19.126 Å, β 97.26°

8.735(35), 4.371(65), 3.787(80), 3.040(70), 2.912(95), 2.895(100), 2.731(40), 2.191(45)

IMA No. **2005-017**

Indarch meteorite, Shusha, Nagorno-Karabakh, Azerbaijan

Sergey N. Britvin

$(Fe,Zn)S$

Sphalerite group

Cubic: $F 43m$

a 5.426 Å

3.130(100), 2.714(10), 1.919(50), 1.634(40), 1.246(30), 1.107(30), 1.045(30)

IMA No. **2005-018**

Gambatesa mine, Val Graveglia, Genova, Italy

Maria Franca Brigatti

$Ca_2(V^{3+},Fe^{3+},Mg)(V^{3+},Al)_2(Si,Al)_3(O,OH)_{14}$

Pumpellyite group

Monoclinic: $C2/m$; structure determined

a 19.2889, b 6.0444, c 8.8783 Å, β 97.328°

4.739(34), 3.817(70), 2.930(100), 2.756(34), 2.551(62), 2.548(65), 2.367(51), 1.612(57)

IMA No. **2005-019**

Mt. Alluaiv, Lovozero alkaline massif, Kola Peninsula, Russia

Alexander P. Khomyakov

$Na_{30}(Ca,Na,Ce,Sr)_{12}(Na,Mn,Fe,Ti)_6Zr_3Ti_3MnSi_{51}O_{144}(OH,H_2O,Cl)_9$

Eudialyte group

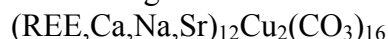
Trigonal: $R3m$; structure determined

a 14.153, c 60.72 Å

7.11(40), 4.31(50), 2.964(100), 2.839(90), 2.675(30), 2.159(60), 1.770(60), 1.362(50)

IMA No. **2005-020**

Paratoo copper mine, near Yunta, Olary Province, South Australia, Australia
Allan Pring



Orthorhombic: $P222$ or $P222_1$

a 10.0862, b 12.8088, c 7.2360 Å

5.04(53), 4.80(49), 3.96(43), 3.48(43), 2.94(100), 2.93(52), 2.53(52), 1.97(56)

IMA No. **2005-021a**

Mangazeiskoye silver ore deposit, Eastern Yakutia, Siberia, Russia

Gennady N. Gamyarin



Aluminite group

Triclinic: $P1$ or $P\bar{1}$

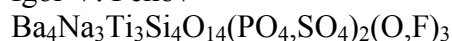
a 8.286, b 9.385, c 11.35 Å, α 96.1, β 98.9, γ 96.6°

8.14(19), 7.59(49), 7.16(46), 4.520(13), 4.258(100), 4.060(48), 3.912(43), 3.795(12)

IMA No. **2005-022**

Mica Mine, Kovdor alkaline-ultramafic complex, Kola Peninsula, Russia

Igor V. Pekov



Bafertisite series

Triclinic: $P1$ or $P\bar{1}$

a 5.38, b 7.10, c 14.76 Å, α 99.00, β 94.94, γ 90.14°

14.5(100), 3.455(40), 3.382(35), 2.921(35), 2.810(40), 2.683(90), 2.133(80), 2.059(40)

IMA No. **2005-023**

Jacupiranga mine, Cajati County, São Paulo, Brazil.

Daniel Atencio



Cubic: $Im\bar{3}$; structure determined

a 13.017 Å

9.183(100), 4.592(12), 4.136(11), 3.256(16), 3.070(13), 2.923(11), 2.655(13), 1.741(21)

IMA No. **2005-024**

Pirquitas mining district, Puna Region, Rinconada Department, Jujuy Province, Argentina

Werner Paar



Franckeite solid-solution series

Two monoclinic sub-cells:

Q layer: a 5.839, b 5.862, c 17.324 Å, β 94.073°

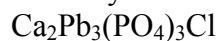
H layer: a 6.278, b 3.660, c 17.347 Å, β 91.416°

4.27(61), 3.426(72), 3.345(87), 3.122(78), 3.009(71), 2.966(94), 2.883(100), 2.065(51)

IMA No. **2005-026**

Capitana mine, Copiapó, Atacama Province, Chile

Anthony R. Kampf



Apatite group

Hexagonal: $P6_3/m$; structure determined

a 9.857, c 7.130 Å
8.538(20), 4.054(60), 3.565(30), 2.942(100), 2.882(30), 2.139(35), 1.918(25), 1.890(25)

IMA No. **2005-027**

Acapulcoite achondrite 'Northwest Africa 1054'

Vanni Moggi-Cecchi

(Ni,Fe)₄P

New structure type

Cubic: $P2_13$; structure determined

a 6.025 Å

2.694(15), 2.005(100), 1.906(60), 1.816(20), 1.420(10), 1.348(10), 1.182(15), 1.119(15)

IMA No. **2005-028**

Kirovskii apatite mine, Kukisvumchorr, Khibiny alkaline massif, Kola Peninsula, Russia

Igor V. Pekov

$K_3Na_2Mn_5Si_{12}(O,OH)_{36} \cdot 2H_2O$

Related to ganophyllite- and stilpnomelane-group minerals

Monoclinic: $P2_1/m$ or $P2_1$

a 12.55, b 5.721, c 26.86 Å, β 114.04°

12.28 (100), 4.31(81), 3.555(62), 2.840(90), 2.634(88), 2.366(76), 1.669(64), 1.614(56)

IMA No. **2005-029**

Pegmatite #61, Karnasurt, Lovozero, Kola Peninsula, Russia

Igor V. Pekov

$K_2Ca(Nb,Ti)_4(Si_4O_{12})_2(O,OH)_4 \cdot 6H_2O$

Labuntsovite group

Monoclinic: $C2/m$; structure determined

a 14.6365, b 14.2049, c 7.8919 Å, β 117.467°

7.100 (100), 6.999(88), 6.476(38), 4.985(78), 3.252(42), 3.246(43), 3.167(46), 3.140(36)

IMA No. **2005-030**

De-Mix quarry, Mont Saint-Hilaire, Québec, Canada

Igor V. Pekov

$(K,Na)_2Na(Nb,Ti)_4(Si_4O_{12})_2(OH,O)_4 \cdot 5H_2O$

Labuntsovite group

Monoclinic: $C2/m$; structure determined

a 14.626, b 14.160, c 7.910 Å, β 117.43°

7.102(29), 7.044(54), 6.510(42), 4.995(44), 3.252(51), 3.249(100), 3.163(24), 3.148(28)

IMA No. **2005-031**

Umbozero mine, Alluaiv, Lovozero, Kola Peninsula, Russia

Giovanni Ferraris

$(Na,Sr)_3(Fe^{3+},Mg)_{10}[Ti_2Si_{12}O_{37}](O,OH)_9 \cdot 8H_2O$

Related to nafertisite

Monoclinic: $P2/n$ (?)

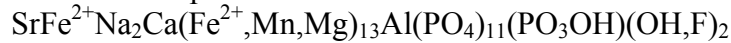
a 16.47, b 5.303, c 24.39 Å, β 93.5°

14.1(20), 13.3(30), 12.1(100), 4.38(10), 2.968(8), 2.923(8), 2.692(12), 2.631(13)

IMA No. **2005-032**

Horrköping, Värmland, Sweden

Christian Chopin



Arrojadite group

Monoclinic: *Cc*; structure determined

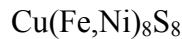
a 16.3992, *b* 9.9400, *c* 24.4434 Å, β 105.489°

3.3784(26), 3.1925(41), 3.0093(100), 2.8202(24), 2.8050(28), 2.7383(28), 2.6854(70), 2.5291(23)

IMA No. **2005-033**

Horoman, Samani-cho, Urakawa-gun, Japan

A. Kitazake



Pentlandite group

Tetragonal: *P4₂/mnm*

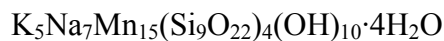
a 10.566, *c* 9.749 Å

3.061(74), 2.975(32), 2.641(33), 2.072(100), 1.962(38), 1.954(42), 1.804(83), 1.791(85)

IMA No. **2005-035**

Mt. Kukisvumchorr, Kola Peninsula, Russia

Victor N. Yakovenchuk



Modulated manganese phyllosilicate

Monoclinic: *C2/m*; structure determined

a 17.3335, *b* 23.5390, *c* 13.4895 Å, β 115.069°

12.9(9), 11.7(10), 3.021(9), 2.805(5), 2.608(8), 2.352(6), 1.668(6), 1.659(6)

IMA No. **2005-036**

Felbertal scheelite deposit, Salzburg Province, Austria

Dan Topa



Pavonite homologous series

Monoclinic: *C2/m*; structure determined

a 13.380, *b* 4.0007, *c* 31.083 Å, β 93.064°

3.6066(57), 3.4574(100), 3.4357(37), 3.3401(34), 2.9526(29), 2.8742(33), 2.8335(99), 2.2558(29)

IMA No. **2005-037**

Sparone, Val di Locana, Piedmont, Italy

Marco Pasero



Ardennite group

Orthorhombic: *Pnmm*

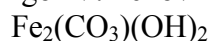
a 8.760, *b* 5.838, *c* 18.56 Å

2.948(90), 2.609(100), 2.329(38), 2.271(37), 2.033(55), 1.585(75), 1.525(39), 1.477(45)

IMA No. **2005-039**

Dronino meteorite, Kasimov District, Ryazan Oblast, Russia

Igor V. Pekov



Malachite group

Monoclinic: $P2_1/m$ or $P2_1$
 a 9.639, b 12.226, c 6.492 Å, β 96.06°
6.13(40), 5.15(60), 3.73(80), 2.798(95), 2.645(100), 2.361(40), 2.171(40), 1.733(50)

IMA No. **2005-040**

Johnston Fjord, Stornes Peninsula, Prydz Bay, East Antarctica

Edward S. Grew

$(Y, Ca)Na_6(Ca, Na)_8(Mg, Fe)_{43}(PO_4)_{36}$

Fillowite group

Trigonal: $R\bar{3}$; structure determined

a 14.9628, c 42.756 Å

3.67(40), 3.52(40), 3.18(10), 2.94(60), 2.73(100), 2.62(10), 2.47(30), 1.84(40)

IMA No. **2005-042**

Bou Azzer, Anti-Atlas, Morocco

Joël Brugger

$(Mg, \square)_{11}Bi_6(Fe, Cr)_{14}(AsO_4, CrO_4)_{14}[AsO_3(H_2O)]_4O_{12}(OH)_4(H_2O)_{86}$

New structure type

Monoclinic: $P2_1/n$; structure determined

a 13.6322, b 30.469, c 18.4671 Å, β 91.134°

15.78(60), 12.45(70), 11.79(100), 10.98(80), 10.16(80), 7.900(80), 3.414(40), 3.153(40)

IMA No. **2005-043**

Bota-Burum uranium deposit, Kazakhstan

Nikita V. Chukanov

$(NH_4, H_3O)_2(UO_2)_2(AsO_4, PO_4)_2 \cdot 6H_2O$

Meta-autunite group

Tetragonal: $P4/mmm$

a 7.19, c 9.15 Å

9.27(100), 4.58(25), 3.86(20), 2.80(13), 2.28(20), 2.076(6), 1.823(8), 1.713(7)

IMA No. **2005-044**

Aghbar mine near Bou Azzer, Anti-Atlas, Morocco

Nicolas Meisser

$MgAl_2(AsO_4)_2(OH)_2 \cdot 8H_2O$

Laueite group

Triclinic: $P\bar{1}$; structure determined

a 5.436, b 7.075, c 10.500 Å, α 97.701, β 102.021, γ 110.295°

9.9 (100), 6.4(90), 4.90(80), 4.08(50), 3.314(40), 3.198(60), 2.885(60), 2.622(60)

IMA No. **2005-045**

Kunratice near Šluknov, Northern Bohemia, Czech Republic

František Laufek

Ni_2SbTe_2

Nickeline group

Hexagonal: $P6_3/mmc$; structure determined

a 3.9090, c 15.6820 Å

3.3848(13), 2.8421(81), 2.0704(16), 1.9556(100), 1.6114(23), 1.4218(7), 1.2437(20), 1.1290(14)

IMA No. **2005-046a**

Tolbachik volcano, Kamchatka Peninsula, Russia

Nikita V. Chukanov



Monoclinic: $P2/m$ or $P2_1/m$

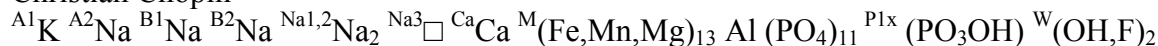
a 24.34, b 5.878, c 11.626 Å, β 86.7°

11.63(100), 5.88(20), 5.80(27), 5.73(17), 5.12(12), 3.052(15), 2.518(19), 2.321(17)

IMA No. **2005-047**

Rapid Creek, Yukon Territory, Canada

Christian Chopin



Arrojadite group

Monoclinic: Cc ; structure determined

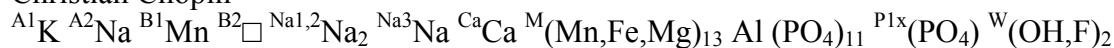
a 16.5520, b 10.0529, c 24.6477 Å, β 106.509°

5.86(29), 5.03(28), 3.009(34), 3.050(100), 2.798(25), 2.793(28), 2.777(24), 2.698(71)

IMA No. **2005-048**

Branchville, Fairfield Co., Connecticut, USA

Christian Chopin



Arrojadite group

Monoclinic: Cc ; structure determined

a 16.6900, b 10.1013, c 24.8752(13) Å, β 105.616°

5.97(27), 3.245(33), 3.063(100), 2.868(27), 2.788(27), 2.779(29), 2.730(89), 2.570(27)

IMA No. **2005-049**

Grube Vereinigung, near Eisenbach, Taunus, Hesse, Germany

Uwe Kolitsch



Dimorphous with kintoreite

Triclinic: $P \bar{1}$; structure determined

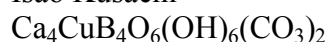
a 5.307, b 7.209, c 7.349 Å, α 87.75, β 86.36, γ 71.42°

6.84(64), 4.85(100), 4.17(26), 3.667(47), 3.547(57), 3.417(52), 3.022(51), 2.834(45)

IMA No. **2005-050**

Fuka mine, Fuka, Bitchu-cho, Takahashi City, Okayama Prefecture, Japan

Isao Kusachi



Cu-dominant analogue of borcarite

Monoclinic: $C2/m$

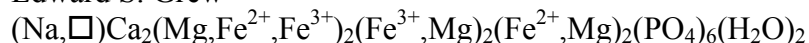
a 17.794, b 8.381, c 4.4494 Å, β 102.42°

7.57(100), 2.899(44), 2.727(68), 2.671(84), 2.272(48), 2.201(28), 1.887(52), 1.698(34)

IMA No. **2005-051**

Johnston Fjord, Stornes Peninsula, Larsemann Hills, Prydz Bay, East Antarctica

Edward S. Grew



Wicksite group

Orthorhombic: $Pbca$; structure determined

a 12.4899, b 11.6264, c 12.7825 Å
6.40(5), 3.497(40), 3.000(80), 2.895(80), 2.735(100), 2.545(10), 2.091(30)

IMA No. **2005-053**

Jáchymov Ag-Bi-Co-Ni-U deposit, Krušné hory Mts., western Bohemia, Czech Republic

Jiří Sejkora



Zn-dominant analogue of lindackerite

Triclinic: $P\bar{1}$; structure determined

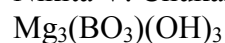
a 6.3948, b 8.0024, c 10.3557 Å, α 85.488, β 79.354, γ 84.673°

10.185(100), 7.974(12), 3.987(13), 3.637(15), 3.395(37), 3.238(15), 2.910(12), 2.668(16)

IMA No. **2005-054**

Titoskoe deposit, Chersky range, basin of the river Dogdo, Sakha Republic (Yakutia), Russia

Nikita V. Chukanov



OH-dominant analogue of fluoborite

Hexagonal: $P6_3/m$

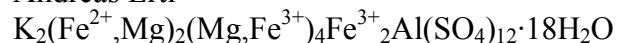
a 8.912, c 3.112 Å

7.69(52), 4.45(82), 2.916(42), 2.573(65), 2.551(49), 2.422(100), 2.141(44), 2.128(60)

IMA No. **2005-055**

Madeni Zakh, Iran

Andreas Ertl



Voltaite group

Tetragonal: $I4_1/acd$; structure determined

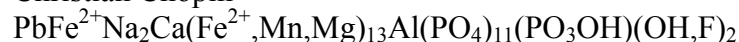
a 19.2080, c 27.2158 Å

5.543(28), 3.396(100), 3.136(21), 3.038(39), 2.848(31), 2.534(21), 2.078(29), 1.601(21)

IMA No. **2005-056**

Sapucaia pegmatite, Galileia, Minas Gerais, Brazil

Christian Chopin



Arrojadite group

Monoclinic: Cc ; structure determined

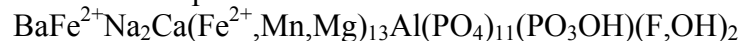
a 16.4304, b 9.9745, c 24.5869 Å, β 105.485°

3.208(43), 3.019(100), 2.829(35), 2.820(33), 2.750(29), 2.698(55), 2.694(32), 2.538(30)

IMA No. **2005-058a**

Sidi-bou-Kricha, Marrakech province, Morocco

Christian Chopin



Arrojadite group

Monoclinic: Cc ; structure determined

a 16.4970, b 10.0176, c 24.6359 Å, β 105.649°

3.400(31), 3.211(47), 3.032(100), 2.841(34), 2.759(33), 2.706(39), 2.703(68), 2.543(38)

IMA No. **2005-061a**

Sapucaia mine, Minas Gerais, Brazil

Daniel Atencio



Roscherite group

Monoclinic: $C2/c$

a 15.92, b 11.91, c 6.61 Å, β 96.4°

9.485(44), 5.943(100), 4.816(65), 3.169(44), 3.117(25), 3.065(22), 2.777(41), 2.643(42)

OLDER PROPOSALS

IMA No. **2002-032a**

Novodneprovskoe deposit, Kazakhstan

Galiya K. Bekenova

AuPb_3

Tetragonal: $I\bar{4} 2m$

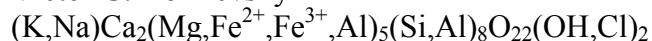
a 11.954, c 5.890 Å

2.792(2), 2.668(1), 2.423(1), 2.342(10), 1.8705(2), 1.5825(3), 1.4705(2), 1.3890(1)

IMA No. **2004-027b**

Lake Bolshoi Ishkul, Ilmen Mountains, Ilmen Nature Reserve, South Urals, Russia

Victor G. Korinevsky



Amphibole group

Monoclinic: $C2/m$

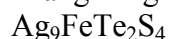
a 9.958, b 18.037, c 5.346 Å, β 105.498°

8.500(60), 3.385(41), 3.282(42), 3.135(100), 2.941(22), 2.720(45), 2.359(35), 2.168(29)

IMA No. **2004-042a**

Bunan deposit, Shandong Province, People's Republic of China

Xiang-Ping Gu



Orthorhombic: space group unknown

a 12.769, b 14.814, c 16.233 Å

6.726(69), 6.416(39), 5.951(33), 3.265(100), 2.981(24), 2.188(71), 2.123(31), 1.949(33)

NOMENCLATURE MODIFICATIONS

IMA No. **05-B**

The name of the mineral noélbensonite has been modified in noelbensonite.

IMA No. **05-D**

A new nomenclature scheme has been approved for minerals of the arrojadite group, this will be published by the authors: Christian Chopin, Fernando Cámara and Roberta Oberti.

Minerals of this group will have root names (arrojadite or dickinsonite), followed by suffixes.

The species name sigimundite is replaced by the name arrojadite-(BaFe).

IMA No. **05-E**

Species and name natromontebbrasite are discredited because natromontebbrasite is a mixture of OH-rich amblygonite with lacroixite and subordinate wardite.

NULLIFIED CNMMN DECISION

Proposal 2004-051, hydrous alumina, was approved by the CNMMN (see publications 'Minerals approved in 2004). Several CNMMN members had asked, however, for a re-examination of akdalaite (69-002) which was approved as the first natural hydrous alumina. The authors of 2004-051 obtained holotype material of akdalaite from the Fersman museum in Moscow, and the re-examination showed that akdalaite and the material for 2004-051 are identical. The previously refined unit cell of akdalaite is incorrect, so that akdalaite and 2004-051 are actually the same mineral species. The name 'akdalaite' has priority; the fact that akdalaite was given a wrong space group does not necessitate a formal redefinition of this mineral. The re-examination and 2004-051 should be published as "New data and a new occurrence of akdalaite". The approval decision of the CNMMN on 2004-051 is consequently nullified.

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Type locality

Corresponding author

Chemical formula

Relationship to other minerals

Crystal system, Space group; Structure determined, yes or no

Unit-cell parameters

Strongest lines in the X-ray powder-diffraction pattern

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NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION

PROPOSALS APPROVED IN APRIL 2006

IMA No. 2006-001

Tolbachik volcano, Kamchatka Peninsula, Russia

Sergey V. Krivovichev

$\text{Cu}_5\text{O}_2(\text{SeO}_3)_2\text{Cl}_2$

Dimorphous with georgbokiite

Monoclinic: $P2_1/c$; structure determined

a 5.3982, b 8.0543, c 11.128 Å, β 99.258°

3.22(90), 3.01(100), 2.61(80), 2.270(70), 2.117(60), 1.953(40), 1.482(40), 1.406(40)

IMA No. 2006-002

Mt. Kukisvumchorr, Kola Peninsula, Russia

Sergey V. Krivovichev

$\text{K}_3\text{NaCaY}_2(\text{Si}_{12}\text{O}_{30})\cdot 4\text{H}_2\text{O}$

New structure type

Orthorhombic: $Pcca$; structure determined

a 14.972, b 14.137, c 14.594 Å

7.00(4), 6.57(6), 5.25(3), 4.20(5), 3.337(10), 3.248(9), 3.101(4), 3.014(8)

IMA No. **2006-003**

Kaidun meteorite (South Yemen)

Michael E. Zolensky

FeCrP

Cr-dominant analogue of florenskyite

Orthorhombic: *Pnma*

a 5.833, *b* 3.569, *c* 6.658 Å

2.258(46), 2.247(100), 2.139(81), 2.074(31), 1.885(34), 1.866(31), 1.785(43), 1.298(22)

IMA No. **2006-004**

Brattnevet Peninsula, Larsemann Hills, Prydz Bay, East Antarctica

Edward S. Grew

(Mg,Fe)₃(PO₄)₂

Mg-dominant analogue of sarcopside

Monoclinic: *P2₁/c*; structure determined

a 5.9305, *b* 4.7583, *c* 10.2566 Å, β 90.663°

5.92(42), 4.31(29), 3.84(100), 3.48(37), 2.97(25), 2.77(46), 2.51(59), 2.44(40)

IMA No. **2006-005**

Hundholmen, Tysfjord, Nordland, north Norway

Gunnar Raade

(Y,REE,Ca,Na)₁₅(Al,Fe³⁺)Ca_xAs³⁺_{1-x}(Si,As⁵⁺)Si₆B₃(O,F)₄₈

Vicanite group

Trigonal: *R3m*; structure determined

a 10.675, *c* 27.02 Å

4.38(33), 3.114(43), 3.095(29), 2.972(100), 2.947(76), 2.924(66), 2.681(36), 1.978(37)

IMA No. **2006-006**

Augustinovka iron meteorite, Ekaterinoslav (now Dnepropetrovsk), Ukraine

Sergey N. Britvin

Na₄Fe₇(PO₄)₆

Fillowite group

Triclinic: *P1̄* or *P1*

a 9.643, *b* 9.633, *c* 17.645 Å, α 88.26, β 88.16, γ 64.83°

5.12(2), 3.034(10), 2.888(2), 2.715(8), 2.585(3), 2.405(2), 1.870(2), 1.769(2)

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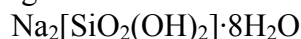
NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION

PROPOSALS APPROVED IN MAY 2006

IMA No. 2006-007

Karnasurt mine, Mountain Kedykverpakhk, Lovozero massif, Kola Peninsula, Russia.

Igor V. Pekov



New structure type

Orthorhombic: *Ibca*; structure determined

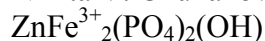
a 11.7119, *b* 16.973, *c* 11.5652 Å

5.001(30), 4.788(42), 3.847(89), 2.932(42), 2.832(35), 2.800(97), 2.774(100), 2.035(20)

IMA No. 2006-008

Silver Coin mine, Valmy, Edna Mountains, Humboldt Co., Nevada, USA

Nikita V. Chukanov



Lipscombite group

Tetragonal: *P4*₃*2*₁*2* or *P4*₁*2*₁*2*

a 7.242, *c* 13.125 Å

4.79(80), 3.326(100), 3.21(60), 2.602(45), 2.299(40), 2.049(40), 1.663(45), 1.605(50)

IMA No. **2006-009**

Mina Santa Rosa, Iquique, Northern Chile

Jochen Schlüter

$\text{Na}_2\text{CaPb}_3(\text{CO}_3)_5$

Burbankite group

Hexagonal: $P6_3mc$; structure determined

a 10.5564, c 6.6446 Å

3.769(100), 3.323(43), 3.066(51), 2.688(50), 2.640(65), 2.161(50), 2.066(34), 1.993(44)

IMA No. **2006-010**

Mountain Kukisvumchorr, Khibiny massif, Kola peninsula, Russia.

Igor V. Pekov

$(\text{Ca,REE})_5[(\text{Si,P})\text{O}_4]_3\text{F}$

Britholite group

Hexagonal: $P6_3/m$; structure determined

a 9.554, c 7.006 Å

3.51(45), 3.15(70), 2.85(100), 2.78(60), 1.965(25), 1.931(20), 1.236(25), 1.122(30)

IMA No. **2006-011**

Biancavilla, Catania, Mt. Etna, Sicily, Italy

Antonio Gianfagna

$\text{KMg}_3(\text{AlSi}_3)\text{O}_{10}\text{F}_2$

Mica group

Monoclinic (1M polytype): $C2/m$; structure determined

a 5.3094, b 9.1933, c 10.1437 Å, β 100.062°

9.990(8), 3.369(10), 3.324(10), 3.121(8), 2.610(8), 2.426(8), 1.663(8), 1.532(8)

IMA No. **2006-012**

Srednyaya Padma U-V deposit, southern Karelia, Russia

Andrey A. Chernikov

PdCuBiS_3

Lapieite group

Orthorhombic: $Pmmm$

a 7.541, b 6.482, c 11.522 Å

3.77(1), 3.24(4), 2.88(8), 2.52(6), 2.44(1), 1.900(10), 1.715(2), 1.672(1)

05-F: DIVISION OF, AND NOMENCLATURE IN THE SYSTEM

2REEPO₄ – CaTh(PO₄)₂ – 2ThSiO₄

a) - The current six-fold division (Bowie & Horne 1953) is discredited and the tripartite division (Nickel 1992) of the system $2\text{REEPO}_4 - \text{CaTh}(\text{PO}_4)_2 - 2\text{ThSiO}_4$ is accepted; in this system, the species huttonite, monazite-(Ce), -(La), -(Nd) and -(Sm) represent members dominated by ThSiO_4 , CePO_4 , LaPO_4 , NdPO_4 , and SmPO_4 , respectively.

b) The name *brabantite* is discredited and to the members dominated by $\text{CaTh}(\text{PO}_4)_2$ in the system $2\text{REEPO}_4 - \text{CaTh}(\text{PO}_4)_2 - 2\text{ThSiO}_4$ the name *cheralite* is applied.

RECOMMENDED NOMENCLATURE OF EPIDOTE-GROUP MINERALS

The CNMMN has approved a new nomenclature scheme for epidote-group minerals. The full report will be published by the authors (Armbruster *et al.*) in European Journal of Mineralogy. Here follow the main decisions with (shortened) tables of nomenclature.

Epidote-group minerals are monoclinic in symmetry and have topology consistent with space group $P2_1/m$ and the general formula $A_2M_3[T_2O_7][TO_4](O,F)(OH,O)$. Zoisite is an orthorhombic polymorph of clinozoisite $Ca_2Al_3[Si_2O_7][SiO_4]O(OH)$ and is thus not considered a member of the epidote-group. Epidote-group minerals are divided into three subgroups. (1) Members of the **clinozoisite subgroup** are derived from the mineral clinozoisite $Ca_2Al_3[Si_2O_7][SiO_4]O(OH)$ by homovalent substitutions only. The key cation- and anion-sites are $A1 = M^{2+}$, $A2 = M^{2+}$, $M1 = M^{3+}$, $M2 = M^{3+}$, $M3 = M^{3+}$, $O4 = O^{2-}$, $O10 = (OH)^-$. In other words, the dominant valence as listed above must be maintained. (2) Members of the **allanite subgroup** are REE-rich minerals typified by the eponymous mineral “allanite”. This subgroup may be derived from clinozoisite by homovalent substitutions and **one** coupled heterovalent substitution of the type $A_2(REE)^{3+} + M_3M^{2+} \rightarrow A_2Ca^{2+} + M_3M^{3+}$. Thus the valences on the key sites are: $A1 = M^{2+}$, $A2 = M^{3+}$, $M1 = M^{3+}$, $M2 = M^{3+}$, $M3 = M^{2+}$, $O4 = O^{2-}$, $O10 = (OH)^-$. (3) Members of the **dollaseite subgroup** are REE-rich minerals typified by the eponymous mineral “dollaseite”. This subgroup may be derived from clinozoisite by homovalent substitutions and **two** coupled heterovalent substitutions of the type $A_2(REE)^{3+} + M_3M^{2+} \rightarrow A_2Ca^{2+} + M_3M^{3+}$ and $M_1M^{2+} + O_4F^- \rightarrow M_1M^{3+} + O_4O^{2-}$. Thus the valences on the key sites are: $A1 = M^{2+}$, $A2 = M^{3+}$, $M1 = M^{2+}$, $M2 = M^{3+}$, $M3 = M^{2+}$, $O4 = F^-$, $O10 = (OH)^-$.

The key cation-sites M3 and A1 (and, in principle, M2) determine the root name. In both clinozoisite and allanite subgroups no prefix is added to the root name if $M1 = Al$. The prefixes ferri, mangani, chromo, and vanado indicate dominant Fe^{3+} , Mn^{3+} , Cr^{3+} , and V^{3+} on M1, respectively. In the dollaseite subgroup no prefix is added to the root name if $M1 = Mg$. Otherwise a proper prefix must be attached; the prefixes ferro and mangano indicate dominant Fe^{2+} and Mn^{2+} at M1, respectively. The dominant cation on A2 (other than Ca) is treated according to the *Extended Levinson* suffix designation. This simple nomenclature requires renaming of a number of approved species, see the 3 Tables below.

Table 1. Available in Eur. J. Mineral. (final publication).

Table 2. Clinozoisite subgroup: accepted mineral species (in bold)

Name	Old name	A1	A2	M1	M2	M3	O4	O10
Clinozoisite		Ca	Ca	Al	Al	Al	O	OH
Clinozoisite-(Sr)*	<i>Niigataite</i>	Ca	Sr	Al	Al	Al	O	OH
Epidote		Ca	Ca	Al	Al	Fe^{3+}	O	OH
Epidote-(Pb)*	<i>Hancockite</i>	Ca	Pb	Al	Al	Fe^{3+}	O	OH
Mukhinite		Ca	Ca	Al	Al	V^{3+}	O	OH
Piemontite		Ca	Ca	Al	Al	Mn^{3+}	O	OH
Piemontite-(Sr)*	<i>Strontio Piemontite</i>	Ca	Sr	Al	Al	Mn^{3+}	O	OH
Manganipiemontite-(Sr)*	<i>Tweddillite</i>	Ca	Sr	Mn^{3+}	Al	Mn^{3+}	O	OH

Notes: * recommended new mineral names for accepted species

Table 3. Allanite subgroup: accepted mineral species (in bold)

Name	Old name	A1	A2	M1	M2	M3	O4	O10
Allanite-(Ce), -(La), -(Y)		Ca	(REE) ³⁺	Al	Al	Fe ²⁺	O	OH
Ferriallanite-(Ce)		Ca	(REE) ³⁺	Fe ³⁺	Al	Fe ²⁺	O	OH
Dissakisite-(Ce),-(La)		Ca	(REE) ³⁺	Al	Al	Mg	O	OH
Manganiandrosite-(La)*, -(Ce)▪	<i>androsite</i>	Mn ²⁺	(REE) ³⁺	Mn ³⁺	Al	Mn ²⁺	O	OH
Vanadoandrosite-(Ce)▪		Mn ²⁺	(REE) ³⁺	V ³⁺	Al	Mn ²⁺	O	OH

Notes: * recommended new mineral names for accepted species; ▪ approved by CNMMN but not yet published.

Table 4. Dollaseite subgroup: accepted mineral species (in bold)

Name	A1	A2	M1	M2	M3	O4	O10
Dollaseite-(Ce)	Ca	Ce ³⁺	Mg	Al	Mg	F	OH
Khristovite-(Ce)	Ca	Ce ³⁺	Mg	Al	Mn ²⁺	F	OH

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PROPOSALS APPROVED IN JUNE 2006

IMA No. 2006-013

Miessijoki River, Lemmenjoki area, Inari commune, Lapland, Finland

Kari K. Kojonen

$\text{Pd}_{11}\text{Te}_2\text{Se}_2$

Isomertieite group

Cubic: $Fd\bar{3}m$

a 12.448 Å

2.543(20), 2.395(80), 2.197(100), 2.072(20), 1.875(25), 1.555(25), 1.305(25), 1.271(30)

IMA No. 2006-014

Qinglong Sb-deposit, Qinglong County, Guizhou Province, People's Republic of China

Jiří Sejkora

$\text{Na}_3(\text{Sb}_2\text{O}_3)_3(\text{SbS}_3)\cdot 3\text{H}_2\text{O}$

Na-dominant analogue of cetineite

Hexagonal: $P6_3$

a 14.1758, c 5.5712 Å

12.29(60), 4.64(51), 4.13(52), 3.406(57), 2.991(77), 2.906(100), 2.679(51), 1.4842(51)

IMA No. 2006-015

Buca della Vena deposit, Tuscany, Italy

Yves Moëlo

$\text{Hg}_3\text{Pb}_{16}\text{Sb}_{18}\text{S}_{46}$

Sulphosalt

Monoclinic: $C 2/m$; structure determined

a 48.32, b 4.117, c 24.056 Å, β 118.84°

4.02(33), 3.480(64), 3.418(88), 3.106(31), 2.994(100), 2.922(41), 2.056(52), 1.764(41)

IMA No. 2006-016

Kudryavy volcano, Iturup Island, Kurile Islands, Russia

Marina A. Yudovskaya

$\text{Pb}_2\text{SnInBiS}_7$

Cylindrite family

Triclinic: $P\bar{1}$; structure determined: two subcells

Pseudo-tetragonal subcell: a 23.4, b 5.77, c 5.83 Å, α 89.1, β 89.9, γ 91.5°

Pseudo-hexagonal subcell: a 23.6, b 3.6, c 6.2 Å, α 91, β 92, γ 90°

5.90(36), 3.90(100), 3.84(71), 3.166(26), 2.921(33), 2.902(16), 2.329(15),
2.186(18)

OLDER PROPOSAL

IMA No. 2005-060

Great Australia deposit, Cloncurry, Queensland, Australia

Peter A. Williams

$(\text{Cu},\text{VO})\text{Al}_2(\text{PO}_4)_2(\text{F},\text{OH})_2 \cdot 4.5\text{-}5\text{H}_2\text{O}$

New structure type

Monoclinic: $P2_1/c$; structure determined

a 4.9573, b 12.1824, c 18.9749 Å, β 90.933°

9.515(67), 6.101(100), 5.621(91), 4.753(17), 3.976(21), 3.338(21), 3.163(17), 3.047(13)

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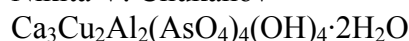
NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION

PROPOSALS APPROVED IN JULY 2006

IMA No. 2006-017

Christiana mine No. 132, Kamareza, Lavrion District, Attikí Prefecture, Greece

Nikita V. Chukanov



Orthorhombic: *Pban*, *Pbam* or *Pba2*

a 10.01, *b* 8.199, *c* 22.78 Å

22.8(100), 11.36(60), 5.01(90), 3.38(50), 2.780(70), 2.682(30), 2.503(50), 2.292(20)

IMA No. 2006-018

Uranium deposit Menzenschwand, Southern Black Forest, Baden-Württemberg, Germany

Kurt Walenta



Vanmeersscheite-althupite group

Orthorhombic: *P2₁mn*

a 17.36, *b* 16.96, *c* 7.02 Å

12.21(8), 8.56(10), 6.07(8), 5.42(7), 4.25(8), 3.86(5), 3.33(7), 3.11(6)

OLDER PROPOSAL

IMA No. **2001-003b**

Grube Silberbrünnle, Haigerach Valley near Gengenbach, Central Black Forest, Germany

Kurt Walenta

$\text{KFe}_3(\text{H}_2\text{PO}_4)_2(\text{HPO}_4)_4 \cdot 6\text{H}_2\text{O}$ or $\text{KFe}_3\text{H}_8(\text{PO}_4)_6 \cdot 6\text{H}_2\text{O}$

Hexagonal: $P6_3mc$

a 9.12, c 16.84 Å

7.89(4), 7.16(10), 4.57(7), 3.57(5), 3.23(6), 3.09(8), 2.87(4), 2.81(5)

NEW MINERALS APPROVED IN 2006
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PROPOSALS APPROVED IN AUGUST 2006

IMA No. 2006-020

Monte Cavalluccio, Campagnano municipality, Roma province, Latium region, Italy

Nikita V. Chukanov

$\text{Na}_5\text{K}_{1.5}\text{Ca}(\text{Si}_6\text{Al}_6\text{O}_{24})(\text{SO}_4)(\text{OH})_{0.5}\cdot\text{H}_2\text{O}$

Cancrinite group

Trigonal: $P31c$; structure determined

a 12.892, c 21.340 Å

11.3(70), 4.85(90), 4.03(60), 3.76(80), 3.68(70), 3.33(100), 2.795(60), 2.694(70)

IMA No. 2006-021

Kirov mine, Mount Kukisvumchorr, Khibina alkaline massif, Kola Peninsula, Russia

Giovanni Ferraris

$(\text{Ba},\text{Na})_2\{(\text{Na},\text{Ti},\text{Mn})_4[(\text{Ti},\text{Nb})_2(\text{OH})_3\text{Si}_4\text{O}_{14}](\text{OH},\text{O},\text{F})_2\}\cdot 3\text{H}_2\text{O}$

Bafertisite series

Polytype 1M: Monoclinic, $P2/m$; structure determined

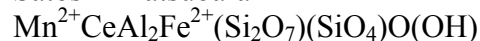
a 5.37, b 7.00, c 24.05 Å, β 91.1°

Polytype 2M: Monoclinic, $A2/m$; structure determined
 a 5.38, b 7.04, c 48.10 Å, β 91.1°
24.06(100), 7.05(9), 5.95(97), 3.95(6), 2.828(16), 2.712(19), 2.155(13)

IMA No. **2006-022**

Marutoku quarry, Shodoshima Island in Seto Inland Sea, Kagawa Prefecture, Japan

Satoshi Matsubara



Epidote group

Monoclinic: $P2_1/m$; structure determined

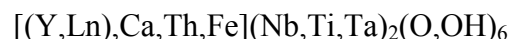
a 8.865, b 5.717, c 10.060 Å, β 114.520°

9.23(24), 8.03(26), 3.53(54), 2.92(100), 2.87(23), 2.71(43), 2.62(39), 2.14(19)

IMA No. **2003-038a**

Bear Lake Diggings, Bancroft area, Ontario, Canada

Vladimir Bermanec



Aeschynite group

Orthorhombic: $Pbnm$

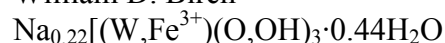
a 5.279, b 10.966, c 7.443 Å

3.079(20), 3.009(100), 2.970(36), 2.931(69), 2.783(12), 2.636(12), 1.863(14), 1.580(16)

IMA No. **2005-034a**

Pittong, 6 km west of Linton, 35 km west of Ballarat, Victoria, Australia

William D. Birch



New structure type

Hexagonal: $P\bar{6}m2$; structure determined

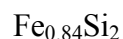
a 7.286, c 50.49 Å

5.956(52), 3.306(62), 3.153(100), 3.111(91), 2.450(59), 1.823(76), 1.578(64), 1.192(44)

IMA No. **2005-052a**

Luobusa mine, Qusong County, Tibet Autonomous Region, People's Republic of China

Li Guowu



Orthorhombic: $Cmca$; structure determined

a 9.874, b 7.784, c 7.829 Å

3.06(80), 2.849(20), 2.402(25), 1.977(40), 1.889(60), 1.865(40), 1.844(100), 1.750(15)

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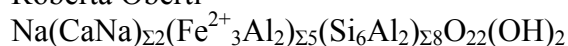
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PROPOSALS APPROVED IN SEPTEMBER 2006

IMA No. 2006-023

Liset, near Selje, Møre og Romsdal County, Vestlandet, Norway

Roberta Oberti



Amphibole group

Monoclinic: $C2/m$; structure determined

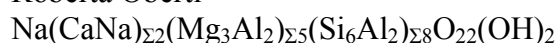
a 9.7489, b 17.9377, c 5.3233 Å, β 104.539°

8.352(100), 3.386(39), 3.098(68), 2.703(92), 2.586(48), 2.546(56), 2.322(40), 2.156(33)

IMA No. 2006-024

Liset, near Selje, Møre og Romsdal County, Vestlandet, Norway

Roberta Oberti



Amphibole group

Monoclinic: $C2/m$; structure determined

a 9.7899, b 17.8991, c 5.3192 Å, β 104.900°

8.381(92), 3.374(56), 3.104(69), 2.934(41), 2.697(100), 2.580(53), 2.552(60), 2.325(41)

IMA No. **2006-025**

Jianchang, Su-Lu coesite-eclogite province, China

Roberta Oberti



Amphibole group

Monoclinic: *C2/m*; structure determined

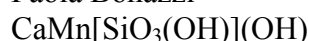
a 9.7414, *b* 17.9095, *c* 5.3335 Å, β 104.672°

8.340(82), 3.384(47), 3.094(67), 2.700(100), 2.583(54), 2.551(64), 2.321(39), 2.153(35)

IMA No. **2006-026**

N'Chwaning II mine, Kalahari field, Republic of South Africa

Paola Bonazzi



Mn-dominant analogue of poldervaartite

Orthorhombic: *Pbca*; structure determined

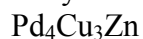
a 9.249, *b* 9.076, *c* 10.342 Å

4.14(60), 4.10(30), 3.19(100), 2.807(35), 2.762(30), 2.545(35), 2.521(30), 2.361(40)

IMA No. **2006-027**

Konder river, Ayan-Maya region, Aldan Plateau, Khabarovsk District, Russia

Yury S. Polekhovsky



Tetragonal: possibly *P4/mmm*

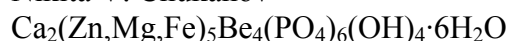
a 6.00, *c* 8.50 Å

3.00(1), 2.67(1), 2.13(10), 1.737(1), 1.501(3), 1.346(2), 1.224(8), 1.059(4)

IMA No. **2006-028**

Granite pegmatite near the Piauí river, Itinga county, Minas Gerais, Brazil

Nikita V. Chukanov



Roscherite group

Monoclinic: *C2/c*

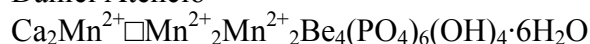
a 15.98, *b* 11.84, *c* 6.63 Å, β 95.15°

9.48(90), 5.98(100), 4.82(80), 3.152(90), 3.052(70), 2.961(70), 2.841(70), 2.708(80)

IMA No. **2006-029**

Foote Mine, Kings Mountain District, Cleveland Co., North Carolina, USA

Daniel Atencio



Roscherite group

Triclinic: *P1*; structure determined

a 6.742, *b* 9.883, *c* 9.981 Å, α 74.12, β 86.10, γ 87.36°

9.393 (53), 5.922(100), 4.799(26), 3.173(44), 2.983(14), 2.787(35), 2.413(14)

NOMENCLATURE MODIFICATIONS

IMA No. **06-A**

New nomenclature rules for the minerals of the pearceite-polybasite group:

1) The name pearceite is applied to minerals having $As > Sb$;
old formula: $(Ag,Cu)_{16}(As,Sb)_2S_{11}$ – new formula: $[Ag_9CuS_4][(Ag,Cu)_6(As,Sb)_2S_7]$
The name polybasite is applied to minerals having $Sb > As$;
old formula: $(Ag,Cu)_{16}(Sb,As)_2S_{11}$ – new formula: $[Ag_9CuS_4][(Ag,Cu)_6(Sb,As)_2S_7]$

2) The following names are applied to the known polytypes:
pearceite-*Tac* ($As > Sb$ – unit-cell type 111 – old name: pearceite)
polybasite-*Tac* ($Sb > As$ – unit-cell type 111 – old name: antimonpearceite)
pearceite-*T2ac* ($As > Sb$ – unit-cell type 221 – old name: arsenpolybasite)
pearceite-*M2a2b2c* ($As > Sb$ – unit-cell type 222 – old name: arsenpolybasite)
polybasite-*T2ac* ($Sb > As$ – unit-cell type 221 – old name: polybasite)
polybasite-*M2a2b2c* ($Sb > As$ – unit-cell type 222 – old name: polybasite)

IMA No. **06-D**

Pradetite has been revalidated as a mineral species. The mineral was approved as 91-046, but after new results obtained on the holotype lindackerite, the CNMMN decided in 1995 that the latter name was to be preferred over pradetite. Single-crystal studies of lindackerite in 2003 showed that pradetite is the Co-dominant analogue of lindackerite. Mineral 2005-053 is the Zn-dominant analogue of lindackerite and pradetite.

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PROPOSALS APPROVED IN OCTOBER 2006

IMA No. **2006-030**

Tsumeb, Namibia

John L. Jambor

$\text{Cu}_5\text{Ge}_{0.5}\text{S}_4$

Cubic: $Fm\bar{3}m$, $F432$, or $F\bar{4}3m$

a 5.337 Å

3.053(100), 2.639(10), 1.869(90), 1.595(30)

IMA No. **2006-031**

Långban deposit, Bergslagen ore region, Filipstad district, Värmland, Sweden

Nikita V. Chukanov

$\text{Pb}_{7+x}\text{Mg}_{4.5}[(\text{Si},\text{Al})_5\text{O}_{14}](\text{BO}_3)(\text{BO}_3,\text{AsO}_4)(\text{CO}_3)(\text{OH},\text{O})_7$

Layer silicate

Triclinic: $P\bar{1}$; structure determined

a 9.3409, b 9.3597, c 18.8333 Å, α 80.365, β 75.816, γ 59.870°

18.1 (100), 3.39(30), 3.02(90), 2.698(70), 2.275(30), 1.867(30), 1.766(40), 1.519(40)

IMA No. **2006-032**

Konsomolsk mine, Talnakh, Norilsk, Russia

Julia D. Grtisenko

(Fe,Co)As₃

Skutterudite group

Cubic: $Im\bar{3}$

a 8.17 Å

5.8(3), 3.34(4), 2.585(10), 2.182(9), 1.928(4), 1.829(7), 1.667(5), 1.602(7), 1.402(6)

IMA No. **2006-033**

Kirovskii mine, Mt. Kukisvumchorr, Khibiny massif, Kola Peninsula, Russia

Igor V. Pekov

BaCa₂(CO₃)₂F₂

New structure type

Orthorhombic: $Cmcm$; structure determined

a 12.511, b 5.857, c 9.446 Å

5.303(21), 3.527(100), 3.397(71), 2.609(20), 2.313(43), 2.302(22), 1.948(39), 1.940(40)

IMA No. **2006-034**

La Fossa crater, Vulcano, Eolian Islands, Italy

Italo Campostrini

K₂[SiF₆]

Polymorphous with hieratite

Hexagonal: $P6_3mc$; structure determined

a 5.6461, c 9.2322 Å

4.90(25), 4.62(75), 4.32(43), 2.358(22), 2.301(100), 2.155(54), 1.909(14), 1.403(13)

IMA No. **2006-035**

NWA 470 chondrite, near Er Rachidia, Moroccan Sahara

Marina A. Ivanova

CaAl₂O₄

Monoclinic: $P2_1/c$

a 7.95, b 8.62, c 10.25 Å, β 93.10°

3.018(100), 2.920(83), 2.882(52), 2.559(42), 2.505(46), 2.371(31), 1.888(29), 1.467(29)

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PROPOSALS APPROVED IN NOVEMBER 2006

IMA No. **2006-036**

Jadar Basin, Serbia

Chris J. Stanley

$\text{LiNaB}_3\text{SiO}_7(\text{OH})$

New structure type

Monoclinic: $P2_1/n$

a 6.816, b 13.789, c 6.758 Å, β 111.08°

4.666(62), 3.716(39), 3.180(82), 3.152(74), 3.027(40), 2.946(100), 2.252(38), 2.241(74)

CHANGES IN EXISTING NOMENCLATURE

IMA No. **06-C**

About 130 minerals and/or mineral names have been discredited in preparation of an official CNMNC list of GQN minerals (G = grandfathered, Q = questionable, N = non-approved).

After approval of the GQN list it will constitute together with the ARD list (A = approved, R = redefined, D = discredited) and some other categories (group names, polytypes,

intermediate names) the official CNMNC list, to be made available as the MINERAL database (Nickel & Nicols), distributed by MDI.

IMA No. **06-E**

Species and name surkhobite (IMA 2002-037) have been discredited because the species corresponds to jinshajiangite (IMA 81-061).

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PROPOSALS APPROVED IN DECEMBER 2006

IMA No. **2006-037**

Dar-i-Pioz glacier, Alai mountain range, northern Tajikistan

Atali A. Agakhanov

$K_2Na(Ca_6Na)Ti_4Li_6Si_{24}O_{66}F_2$

Related to beryl-group and milarite-group minerals

Triclinic: $P\bar{1}$; structure determined

a 9.8156, b 9.8249, c 17.3087 Å, α 99.209, β 94.670, γ 119.839°

4.25(60), 3.35(100), 3.14(20), 3.06(90), 2.885(55), 2.870(10), 1.868(17), 1.848(40)

IMA No. **2006-038**

Dar-i-Pioz glacier, Alai mountain range, northern Tajikistan

Atali A. Agakhanov

$Li_2NaFe^{2+}_7Ti_2Si_8O_{26}(OH)_4F$

Astrophyllite group

Triclinic: $P\bar{1}$; structure determined

a 5.3745, b 11.9299, c 11.6509 Å, α 113.325, β 94.524, γ 103.080°

10.56(100), 3.50(100), 2.780(80), 2.648(45), 2.578(70), 2.295(30), 2.106(35), 1.760(30)

IMA No. **2006-039**

Shergotty meteorite, Gaya, Bihar, India

Sergey N. Britvin

$\text{Ca}_9\text{NaFe}(\text{PO}_4)_7$

Whitlockite group

Trigonal: $R\bar{3}c$

a 10.372, c 37.217 Å

8.13(2), 6.42(2), 3.19(6), 2.990(2), 2.860(10), 2.747(2), 2.594(5), 1.917(2)

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PROPOSALS APPROVED IN JANUARY 2007

IMA No. 2006-040

Benitoite Mine, New Idria District, San Benito County, California, USA

Chi Ma

BaTiO₃

Perovskite group

Orthorhombic: *Amm*2

a 3.9874, *b* 5.6751, *c* 5.6901 Å

4.018(18), 2.845(30), 2.830(100), 2.316(20), 2.312(23), 2.009(28), 1.637(19), 1.415(15)

IMA No. 2006-041

132 North deposit, Widgiemooltha, Western Australia, Australia

Peter A. Williams

Cu₃NiCl₂(OH)₆

Atacamite group

Trigonal: *R* $\bar{3}$ *m*; structure determined

a 6.8364, *c* 13.8459 Å

5.463(100), 4.651(16), 4.519(11), 2.903(19), 2.755(69), 2.728(14), 2.257(39), 1.820(13)

IMA No. **2006-042**

La Fossa crater, Vulcano, Aeolian Islands, Italy

Francesco Demartin



Orthorhombic: *Imm2*; structure determined

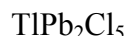
a 5.522, *b* 17.106, *c* 9.175 Å

8.55(50), 8.10(25), 4.724(25), 4.043(100), 3.175(30), 2.281(50), 2.095(25), 1.795(25)

IMA No. **2006-043**

La Fossa crater, Vulcano, Aeolian Islands, Italy

Francesco Demartin



Isostructural with challacolloite

Monoclinic: *P2₁/c*; structure determined

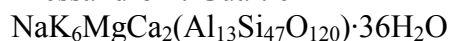
a 8.9477, *b* 7.9218, *c* 12.4955 Å, β 90.092°

3.971(83), 3.696(100), 2.851(38), 2.569(42), 2.273(22), 2.236(25), 2.109(45), 1.848(41)

IMA No. **2006-044**

Mont Peylenc, near the town of St. Pierre Eynac, Massif Central, France

Alessandro F. Gualtieri



Zeolite group

Orthorhombic: *Pmnm*; structure determined

a 7.5789, *b* 18.2010, *c* 26.1539 Å

9.077(60), 7.846(41), 4.234(44), 3.549(47), 3.484(71), 3.269(55), 3.182(100), 2.907(48)

OLDER PROPOSAL

IMA No. **86-036a**

Parwan lava cave, 45 km WNW of Melbourne, Victoria, Australia

William D. Birch



Monoclinic: *P2*, *Pm*, *P2/m*, *P2₁*, *Pc* or *P2₁/c*

a 26.148, *b* 11.781, *c* 20.494 Å, β 111.27°

12.202(12), 10.538(100), 10.031(14), 9.570(13), 9.360(13), 8.937(10), 8.718(11), 4.878(10)

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PROPOSALS APPROVED IN FEBRUARY 2007

IMA No. **2006-045**

East Mine, Bayan Obo, Inner Mongolia, China

Ritsuro Miyawaki

BaFCl

Matlockite group

Tetragonal: $P4/mmm$

a 4.3951, c 7.223 Å

3.75(100), 3.11(94), 2.79(67), 2.36(82), 2.20(32), 1.898(49), 1.726(34), 1.670(39)

IMA No. **2006-046**

Haydee mine, 144 km South of Iquique, Tarapacá Province, Northern Chile

Jochen Schlüter

$Cu_3Mg(OH)_6Cl_2$

Atacamite group

Trigonal: $R\bar{3}m$; structure determined

a 6.2728, c 5.7462 Å

5.745(100), 2.872(17), 2.54(1), 2.455(2), 1.972(1), 1.915(9), 1.565(1), 1.437(1)

IMA No. **2006-047**

Kamariza, Lavrion, Attikí Prefecture, Greece

Nikita V. Chukanov

$\text{CuZn}(\text{AsO}_4)(\text{OH})$

Libethenite group

Orthorhombic: *Pnmm*; structure determined

a 8.5839, *b* 8.5290, *c* 5.9696 Å

6.00(54), 4.860(64), 3.002(100), 2.690(67), 2.662(53), 2.456(94), 2.437(86), 1.604(49)

IMA No. **2006-048**

Broken Hill, New South Wales, Australia

Peter Elliott

$\text{Cd}_2\text{Cu}_2(\text{PO}_4)_2(\text{SO}_4)\cdot 5\text{H}_2\text{O}$

New structure type

Orthorhombic: *Pnma*; structure determined

a 20.8938, *b* 6.1640, *c* 10.4768 Å

10.451(100), 5.146(30), 4.223(40), 3.484(40), 2.902(70), 2.719(30), 2.652(30), 1.919(80)

IMA No. **2006-049**

Hirao mine, Minoo (Minoh) City, Osaka Prefecture, Japan

Masayuki Ohnishi

$\text{Zn}_4\text{SO}_4(\text{OH})_6\cdot 5\text{H}_2\text{O}$

New structure type

Triclinic: $P\bar{1}$

a 8.358, *b* 8.337, *c* 11.027 Å, α 94.97, β 83.16, γ 119.6°

10.96(100), 5.47(16), 3.642(17), 3.229(8), 2.717(21), 2.663(8), 2.562(9), 1.574(18)

IMA No. **2006-050**

Veta Negra, Laurani, Bolivia

Werner H. Paar

$\text{NaCu}_5(\text{Ti,Sb})_2\text{O}_2(\text{AsO}_4)_4[\text{AsO}_3(\text{OH})]_2\cdot 8\text{H}_2\text{O}$

New structure type

Triclinic: $P\bar{1}$; structure determined

a 7.0308, *b* 9.8823, *c* 10.6754 Å, α 106.973, β 104.274, γ 93.839°

9.825(100), 5.887(50), 4.635(30), 3.354(30), 3.232(30), 2.947(60), 2.736(30), 2.442(30)

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PROPOSALS APPROVED IN MARCH 2007

IMA No. **2006-052**

Dolores prospect, Pastrana, Murcia Province, Spain

John L. Jambor

$(\text{Ca,Cu,Na,Fe}^{3+},\text{Al})_{12}\text{Fe}^{3+}_2(\text{AsO}_4)_8(\text{OH,Cl})_x \cdot n\text{H}_2\text{O}$

Smolianinovite group (?)

Monoclinic: $P2/a$ or Pa

a 10.172, b 22.43, c 5.286 Å, β 93.09°

22.0(100), 11.2(70), 5.068(20), 3.345(20), 2.763(30), 2.660(20), 2.541(20)

IMA No. **2006-053**

De Lamar mine, Owyhee County, Idaho, U.S.A.

Luca Bindi

$[(\text{Ag,Cu})_6(\text{Sb,As})_2(\text{S,Se})_7][\text{Ag}_9\text{Cu}(\text{S,Se})_2\text{Se}_2]$

Pearceite-polybasite group

Trigonal: $P\bar{3}m1$; structure determined

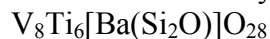
a 7.5950, c 12.0731 Å

3.1731(48), 3.0183(84), 2.8880(48), 2.8880(100), 2.5466(23), 2.3629(34), 2.2237(28),
1.8987(31)

IMA No. **2006-054**

Pereval quarry, Sludyanka, Irkutsk region, Siberia, Russia

Leonid Z. Reznitsky



Derbylite-hemloite group

Triclinic: $P\bar{1}$; structure determined

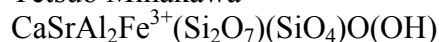
a 7.521, b 7.643, c 9.572 Å, α 110.20, β 103.34, γ 98.28°

3.10(8), 2.85(10), 2.63(8), 2.23(6), 2.13(8), 1.781(8), 1.582(10), 1.433(10)

IMA No. **2006-055**

Ananai mine, Ohotoyo town, Kochi Prefecture, Japan

Tetsuo Minakawa



Epidote group

Monoclinic: $P2_1/m$; structure determined

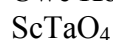
a 8.925, b 5.651, c 10.243 Å, β 114.45°

3.500(42), 3.262(23), 2.921(100), 2.825(32), 2.724(41), 2.614(42), 2.580(49), 2.181(22)

IMA No. **2006-056**

Heftetjern pegmatite, Tørdal, Drangedal, Telemark, Norway

Uwe Kolitsch



Wolframite group

Monoclinic: $P2/c$; structure determined

a 4.784, b 5.593, c 5.120 Å, β 91.15°

4.783(33), 3.807(32), 3.662(53), 3.000(100), 2.9570(97), 2.4877(34), 1.7639(27), 1.7157(22)

WITHDRAWAL OF AN APPROVED MINERAL

Proposal 2005-012 was approved (mineral and name) in June 2005. The authors have recently submitted additional data on this phase which show that it is merely a monoclinic polytype of mackelveyite-(Y), namely mackelveyite-(Y)-2M. The approval for this proposal is thus withdrawn.

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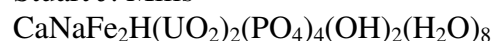
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PROPOSALS APPROVED IN April 2007

IMA No. 2007-001

A quarry, 10 km SSW of the township of Lake Boga, north-western Victoria, Australia

Stuart J. Mills



Uranyl phosphate

Monoclinic: *Cc*; structure determined

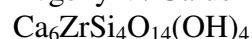
a 19.6441, *b* 7.0958, *c* 18.7029 Å, β 115.692°

6.60(10), 4.07(2), 3.80(2), 3.56(2), 3.31(2), 3.16(4), 2.797(2), 2.002(2)

IMA No. 2007-002

Dovyren massif, Siberia, Russia

Evgeny V. Galuskin



New structure

Orthorhombic: *Pnmm*; structure determined

A 5.666, *B* 18.844, *C* 3.728 Å

5.4260(63), 3.1406(39), 3.0727(100), 2.7468(36), 2.5979(25), 1.8786(26), 1.8640(33), 1.6848(26)

IMA No. **2007-003**

Chende Region, China

Zuxiang Yu

CuPtBiS₃

Lapieite group

Orthorhombic: *P2₁2₁2₁*; structure determined

a 7.7152, *b* 12.838, *c* 4.9248 Å

6.40(30), 5.93(20), 3.24(80), 3.03(100), 2.27(40), 2.14(50), 1.865(60), 1.423(30)

IMA No. **2007-004**

Grandview mine, Grand Canyon National Park, Coconino County, Arizona, USA

Peter A. Williams

Cu₃Al₉(SO₄)₂(OH)₂₉

Monoclinic: *P2*, *Pm* or *P2/m*

a 10.908, *b* 6.393, *c* 10.118 Å, β 107.47°

9.667(33), 6.208(100), 5.287(35), 3.949(79), 3.625(10), 2.990(9), 2.816(14), 2.413(9)

IMA No. **2007-005**

Vanadium Queen mine, 18 km east of La Sal, San Juan County, Utah, USA

John M. Hughes

Na₂Mg₂(V₁₀O₂₈)·20H₂O

Pascoite-sherwoodite group

Monoclinic: *C2/c*; structure determined

a 23.9019, *b* 10.9993, *c* 17.0504 Å, β 118.284°

9.72(100), 9.09(60), 8.19(60), 7.42(70), 6.67(80), 2.882(50), 2.706(50), 1.861(50)

OLDER PROPOSAL

IMA No. **2006-019a**

Cassagna mine, Val Graveglia, eastern Liguria, northern Apennines, Italy

Riccardo Basso

(Ca,Mn²⁺)₄(Fe³⁺,Mn³⁺,Al)₄(OH)₄(V³⁺,Mg,Al)₂(O,OH)₄(Si₃O₁₀)(SiO₄)₂

Orthorhombic: *Cmcm*; structure determined

a 6.066, *b* 8.908, *c* 18.995 Å

9.52(100), 4.98(45), 4.85(50), 4.03(40), 3.02(60), 2.66(70), 2.54(60), 2.32(40)

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PROPOSALS APPROVED IN MAY 2007

IMA No. **2007-006**

San Piero in Campo, Elba, Italy

Rainer Thomas

$\text{Rb}[\text{B}_5\text{O}_6(\text{OH})_4] \cdot 2\text{H}_2\text{O}$

Neso-pentaborate

Orthorhombic: *Aba2*

a 11.304, *b* 10.963, *c* 9.337 Å

3.554(100), 5.481(85), 3.391(63), 2.826(47), 6.018(38), 3.329(38), 2.894(28), 3.259(26)

IMA No. **2007-007**

San Piero in Campo, Elba, Italy

Rainer Thomas

$\text{Cs}[\text{B}_5\text{O}_6(\text{OH})_4] \cdot 2\text{H}_2\text{O}$

Neso-pentaborate

Monoclinic: *C2/c*

a 8.130, *b* 12.045, *c* 11.792 Å, β 93.34°

6.023(100), 3/365(68), 2.943(55), 3.278(49), 3.467(44), 3.464(44), 5.886(43), 3.321(34)

IMA No. **2007-008**

Koashva apatite quarry, Khibina alkaline massif, Kola Peninsula, Russia

Alexander P. Khomyakov

$\text{Na}_{12}(\text{K},\text{Sr},\text{Ce})_3\text{Ca}_6\text{Mn}_3\text{Zr}_3\text{NbSi}_{25}\text{O}_{73}(\text{O},\text{H}_2\text{O},\text{OH})_5$

Eudialyte group

Trigonal: *R3m*; structure determined

a 14.281, *c* 30.243 Å

6.447(60), 5.719(40), 4.322(71), 3.540(38), 3.222(70), 3.170(50), 2.982(100), 2.860(94)

IMA No. **2007-009**

Monte Trisa, Torrebelvicino, Vicenza, Italy

Paolo Orlandi

$\text{Cu}_6(\text{SO}_4)(\text{OH})_{10}\cdot\text{H}_2\text{O}$

Dimorphous with redgillite

Orthorhombic: *Cmc2₁*; structure determined

a 2.989, *b* 16.970, *c* 14.812 Å

7.45(100), 3.73(35), 2.788(18), 2.654(8), 2.503(14), 2.341(9), 2.166(9), 1.598(20)

CHANGES IN EXISTING NOMENCLATURE

IMA No. **07-A**

The mineral surkhobite and its name are revalidated. Surkhobite is redefined as $(\text{Ba},\text{K})_2\text{CaNa}(\text{Mn},\text{Fe}^{2+},\text{Fe}^{3+})_8\text{Ti}_4(\text{Si}_2\text{O}_7)_4\text{O}_4(\text{F},\text{OH},\text{O})_6$, it differs from jinshajiangite because Mn prevails over Fe^{2+} , and it differs from perraultite because Ca dominates in the A(6) site. Decision IMA No. **06-E** [Species and name surkhobite (IMA 2002-037) have been discredited because the species corresponds to jinshajiangite (IMA 81-061)] is thus nullified.

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PROPOSALS APPROVED IN JUNE 2007

IMA No. **2007-010**

Zarshuran deposit, Takab region, NW Iran

Werner H. Paar

$\text{PbHgAs}_2\text{S}_6$

Sulphosalt

Monoclinic: *P* lattice

a 19.113, b 4.233, c 22.958 Å, β 114.78°

8.672(80), 5.680(30), 4.653(50), 3.867(40), 3.395(50), 3.148(40), 2.722(100), 2.187(50)

IMA No. **2007-011**

Venables Valley, 20 km SSW of Ashcroft, British Columbia, Canada

Ronald C. Peterson and Elif Genceli

$\text{MgSO}_4 \cdot 11\text{H}_2\text{O}$

Triclinic: $P\bar{1}$; structure determined

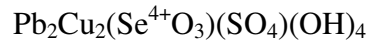
a 6.7459, b 6.8173, c 17.2799 Å, α 88.137, β 89.481, γ 62.719°

5.73(35), 5.62(56), 5.41(54), 4.91(84), 4.85(90), 2.988(58) 2.958(100), 2.940(67)

IMA No. **2007-012**

Kato mine, Munakata City, Fukuoka Prefecture, Japan

Satoshi Matsubara



Linarite-chenite group

Monoclinic: $P2_1/m$

a 9.766, b 5.666, c 9.291(10) Å, β 102.40°

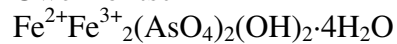
4.86(44), 4.47(57), 3.53(39), 3.18(100), 3.14(68), 2.72(22), 2.33(18), 1.813(19)

OLDER PROPOSAL

IMA No. **98-053a**

Bendada near Guarda, province Beira Alta, central Portugal

Uwe Kolitsch



Whitmoreite group

Monoclinic: $P2_1/c$; structure determined

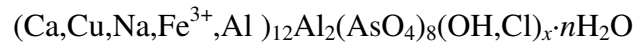
a 10.239, b 9.713, c 5.552 Å, β 94.11°

10.22(10), 7.036(8), 4.833(3), 4.520(2), 4.250(5), 3.490(2), 2.907(3), 2.865(4)

IMA No. **2006-051**

Dolores prospect, Pastrana, Murcia Province, Spain

John L. Jambor



Smolianinovite group (?)

Monoclinic: $P2/a$ or Pa

a 9.972, b 22.44, c 5.272(8) Å, β 92.9°

22.0(100), 11.16(70), 4.983(50), 3.655(25), 3.333(45), 3.003(30), 2.767(30)

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PROPOSALS APPROVED IN JULY 2007

IMA No. **2007-013**

Mina Santa Rosa, Iquique, Northern Chile

Jochen Schlüter

CuB_2O_4

Natural analogue of copper metaborate

Tetragonal: $I\bar{4}2d$; structure determined

a 11.517, c 5.632 Å

3.797(100), 3.638(47), 2.876(17), 2.775(35), 2.572(26), 2.501(26), 1.822(21), 1.793(20)

IMA No. **2007-014**

Verkhn'ehegemskiy volcanic structure, Kabardino-Balkaria, North Caucasus, Russia

Evgeny V. Galuskin

CaZrO_3

Perovskite group

Orthorhombic: $Pnma$; structure determined

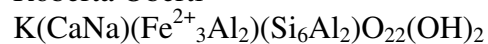
a 5.65, b 7.93, c 5.55 Å

4.013(35), 4.009(16), 2.881(25), 2.836(100), 2.796(22), 2.006(29), 1.654(17), 1.622(24)

IMA No. **2007-015**

Sierra de los Filabres, Almería, SE Spain

Roberta Oberti



Amphibole group

Monoclinic: $C2/m$; structure determined

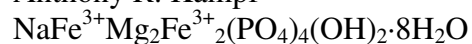
a 9.8505, b 18.0075, c 5.3518 Å, β 104.775°

8.420(100), 3.400(38), 3.127(53), 2.714(75), 2.596(49), 2.565(60), 2.340(32), 2.166(34)

IMA No. **2007-016**

Tip Top mine, Custer County, South Dakota, USA

Anthony R. Kampf



Whiteite-jahnsite group

Monoclinic: $P2/a$

a 15.0811, b 7.1403, c 9.8299 Å, β 110.445°

9.218(100), 4.884(25), 3.537(25), 2.973(25), 2.854(20), 2.819(70), 2.593(25), 1.933(20)

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PROPOSALS APPROVED IN AUGUST 2007

IMA No. **2007-017**

Vesle Arøy island, Langesundsfjord district, Larvik community, Vestfold county, Norway

Alf Olav Larsen

$\text{KNa}_6\text{Be}_2(\text{Si}_{15}\text{Al}_3)_{\Sigma=18}\text{O}_{39}\text{F}_2$

Leifite group

Trigonal: $P\bar{3}m1$; structure determined

a 14.3865, c 4.8733 Å

4.710(29), 4.153(21), 3.386(70), 3.161(100), 3.115(17), 2.466(31), 2.398(19), 2.217(20)

IMA No. **2007-020**

Bambolla mine, Moctezuma, Sonora, Mexico

Joël Brugger

$\text{Ca}_2\text{Mn}^{4+}_2\text{Te}^{6+}_2\text{O}_{12}\cdot\text{H}_2\text{O}$

Tellurate

Monoclinic: $P2$, $P2/m$, Pm , $P2_1$ or $P2_1/m$

a 10.757, b 4.928, c 8.492 Å, β 102.39°

4.924(34), 4.361(51), 3.267(100), 2.520(71), 2.244(32), 1.996(21), 1.762(39), 1.455(24)

IMA No. **2007-021**

Mount Stafford, Northern Territory, Australia

Edward S. Grew

$\text{Al}_{4.5}\text{SiB}_{0.5}\text{O}_{9.5}$

Structurally related to mullite

Orthorhombic: $Cmc2_1$; structure determined

a 5.7168, b 15.023, c 7.675 Å

5.37(50), 3.38(100), 2.67(60), 2.51(60), 2.19(80), 2.11(50), 1.682(30), 1.512(80)

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PROPOSALS APPROVED IN SEPTEMBER 2007

IMA No. **2007-022**

La Fossa crater, Vulcano, Aeolian Islands, Italy

Francesco Demartin

BiSBr

New structure type

Orthorhombic: *Pnam*; structure determined

a 8.0424, *b* 9.8511, *c* 4.0328 Å

4.220(68), 3.740(62), 3.721(44), 2.909(100), 2.429(43), 2.036(47), 1.865(63), 1.774(88)

IMA No. **2007-023**

Mt. Alluaiv, Lovozero alkaline massif, Kola Peninsula, Russia

Alexander P. Khomyakov

$\text{Na}_{15}(\text{Na,Ca,Ce})_3(\text{Mn,Ca})_3\text{Fe}_3\text{Zr}_3\text{Si}_{26}\text{O}_{72}(\text{OH,O})_4\text{Cl} \cdot \text{H}_2\text{O}$

Eudialyte group

Trigonal: *R3*; structure determined

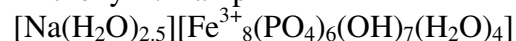
a 14.205, *c* 30.265 Å

4.316(85), 3.536(41), 3.221(43), 3.166(37), 3.039(41), 2.970(100), 2.848(84), 2.157(34)

IMA No. 2007-024

Silver Coin mine, Valmy, Iron Point district, Humboldt County, Nevada, USA

Anthony R. Kampf



Meurigite group

Monoclinic: $C2/c$

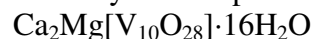
a 28.835, b 5.1848, c 19.484 Å, β 106.983°

13.80(20), 9.349(100), 4.843(20), 4.318(20), 3.206(40), 3.107(30), 2.971(15), 1.574(20)

IMA No. 2007-025

Blue Cap mine, about 15 km east of La Sal, San Juan Co., Utah, USA

Anthony R. Kampf



Pascoite group

Monoclinic: $C2/m$; structure determined

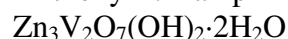
a 19.8442, b 9.9353, c 10.7149 Å, β 120.305°

9.242(20), 8.872(30), 8.571(100), 7.270(40), 5.477(15), 4.590(15), 4.355(15), 2.137(20)

IMA No. 2007-026

Blue Cap mine, about 15 km east of La Sal, San Juan Co., Utah, USA

Anthony R. Kampf



Zn-dominant analogue of volborthite

Hexagonal: $P\bar{3}m1$; structure determined

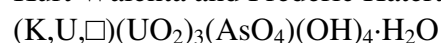
a 6.0818, c 7.1793 Å

7.211(100), 4.252(20), 2.968(50), 2.628(35), 2.470(40), 1.773(20), 1.513(20), 1.485(25)

OLDER PROPOSAL**IMA No. 2002-045b**

Menzenschwand, Southern Black Forest, Baden-Württemberg, Germany

Kurt Walenta and Frédéric Hatert



New structure type

Orthorhombic: $Cccm$; structure determined

a 8.154, b 11.55, c 13.75 Å

6.71(80), 6.03(100), 3.78(70), 3.33(80), 2.96(60), 2.88(40), 2.63(50), 1.942(50).

REDEFINITION**IMA No. 07-B**

The mineral calcio-olivine is redefined as the calcium-dominant member of the olivine group. Calcio-olivine is the natural equivalent of synthetic γ - Ca_2SiO_4 , not of synthetic α - Ca_2SiO_4 as erroneously reported in literature. Calcio-olivine is a polymorph of larnite, monoclinic β - Ca_2SiO_4 .

NOMENCLATURE CHANGES**Ardennite**

The approval of IMA No. 2005-037 for ardennite-(V) and its publication in Eur. J. Mineral., 19 (2007), 581-587 necessitates a name change for ardennite into ardennite-(As).

IMA No. **07-C**

Several decisions have been taken on the nomenclature of a number of mineral names: The authors of new-mineral proposals should use a suffix nomenclature rather than a prefix nomenclature. Some minerals in well-known groups are to be renamed.

Mineral names consisting of two words are to be renamed.

Mineral names having superfluous hyphens are to be renamed (with the exception of the current amphibole names, for which a subcommittee is discussing a new nomenclature).

Minerals named after localities or persons should have the original spelling in their name, including the diacritical marks. A list of such names is to be published.

Mineral names having superfluous diacritical marks (marks not present in the original names of localities or persons) are to be renamed.

Lists of mineral names to be changed by these decisions will be published by the chairman in *Mineralogical Record*.

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IMA No. **2007-027**

Allende meteorite, Pueblito de Allende, Chihuahua, Mexico

Chi Ma

$\text{Sc}_4\text{Zr}_3\text{O}_{12}$

New structure type

Trigonal: $R\bar{3}$; structure determined

a 9.396, c 8.720 Å

4.698(5), 2.900(100), 2.513(18), 1.779(27), 1.776(32), 1.515(19), 1.450(4), 1.152(4)

IMA No. **2007-028**

Tsumeb, Namibia

Marcus J. Origlieri

AsSbO_3

Claudetite group

Monoclinic: $P2_1/n$; structure determined

a 4.5757, b 13.1288, c 5.4216 Å, β 95.039°

4.99(32), 3.51(100), 3.282(82), 3.238(71), 2.805(39), 2.801(31), 2.656(28), 2.279(34)

IMA No. **2007-029**

Allende meteorite, Pueblito de Allende, Chihuahua, Mexico

Chi Ma

(Mo,Ru,Fe,Ir,Os)

Hexagonal: $P63/mmc$

a 2.7506, c 4.4318 Å

2.382(24), 2.216(26), 2.098(100), 1.622(15), 1.375(17), 1.255(18), 1.169(20), 1.150(14)

IMA No. **2007-030**

La Fossa crater, Vulcano, Aeolian Islands, Italy

Francesco Demartin

$K_2[AlF_3SO_4]$

Orthorhombic: $Pbcn$; structure determined

a 10.810, b 8.336, c 6.822 Å

6.631(70), 5.429(14), 3.317(28), 2.983(100), 2.702(82), 2.648(14), 2.208(30), 1.712(58)

IMA No. **2007-031**

Mount Kukisvumchorr, Khibina alkaline massif, Kola Peninsula, Russia

Alexander P. Khomyakov

$K_3Na_3Ca_5Si_{12}O_{30}F_4 \cdot H_2O$

Canasite group

Monoclinic: Cm ; structure determined

a 18.846, b 7.242, c 12.650(2) Å, β 111.84°

5.872(31), 4.724(20), 4.711(25), 4.204(40), 3.012(22), 2.915(100), 2.357(30), 2.310(23)

IMA No. **2007-032**

Poudrette quarry, Mont Saint-Hilaire, Rouville County, Québec, Canada

Igor V. Pekov

$NaBe(CO_3)(OH) \cdot 2H_2O$

New structure type

Tetragonal: $P4/mcc$; structure determined

a 13.087, c 5.404 Å

13.01(100), 9.20(62), 3.611(34), 3.256(95), 2.693(44), 2.605(37), 2.489(60), 2.076(32)

IMA No. **2007-033**

Allende meteorite, Pueblito de Allende, Chihuahua, Mexico

Chi Ma

MoNiP

Barringerite group

Hexagonal: $P\bar{6}2m$

a 5.681, c 3.704 Å

2.298(100), 2.094(69), 1.918(73), 1.852(24), 1.408(20), 1.332(17), 1.316(18), 1.111(14)

PUBLICATION OF IMA-CNMNC REPORT

The report of the Subcommittee for Unnamed Minerals on a system of codification for unnamed minerals has been published by Dorian G.W. Smith and Ernest H. Nickel in Canadian Mineralogist, 45 (2007), 983-1055. The paper contains a complete list of unnamed minerals.

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IMA No. 2007-034

Luobusa mine, Qusong County, Tibet, China

Fang Qinsong

WC

Hexagonal: $P\bar{6}m2$

a 2.902, c 2.831 Å

2.833(44), 2.511(94), 1.878(90), 1.449(25), 1.291(36), 1.233(22), 1.149(23), 0.9008(23)

IMA No. 2007-035

Luobusa mine, Qusong County, Tibet, China

Shi Nicheng

$(Cr_4Fe_4Ni)_{29}C_4$

Hexagonal: $P6_3mc$; structure determined

a 18.839, c 4.4960 Å

6.920(100), 4.530(35), 3.596(55), 2.493(36), 2.023(98), 1.998(32), 1.825(47), 1.798(45)

IMA No. **2007-036**

Luobusa mine, Qusong County, Tibet, China

Li Guowu

TiFeSi₂

Orthorhombic: *Pbam*; structure determined

a 8.6053, *b* 9.5211, *c* 7.6436 Å

3.822(35), 2.294(18), 2.230(97), 2.124(100), 2.098(43), 1.911(44), 1.829(19), 1.292(19)

IMA No. **2007-037**

Horoman, Samani-cho, Samani-gun, Hokkaido, Japan

Arashi Kitakaze

Fe₆Ni₃S₈

Tetragonal: *P4/mmm*

a 8.707, *c* 10.439 Å

6.160(10), 3.080(100), 2.955(32), 2.435(6), 1.984(25), 1.947(51), 1.825(60), 1.805(54)

IMA No. **2007-038**

Horoman, Samani-cho, Samani-gun, Hokkaido, Japan

Arashi Kitakaze

Cu₂Fe₅Ni₂S₈

Tetragonal: *P4₂/mmm*

a 10.089, *c* 10.402 Å

5.880(15), 3.118(100), 3.050(20), 2.703(5), 1.981(5), 1.873(25), 1.844(50), 1.595(45)

OLDER PROPOSALS

IMA No. **89-035a**

Glücksstern mine, Gottlob Hill, Friedrichroda, Thüringen, Germany

Thomas Witzke

LaVO₄

Xenotime group

Tetragonal: *I4₁/amd*; structure determined

a 7.406, *c* 6.504 Å

3.707(100), 2.939(5), 2.759(10), 2.623(7), 2.309(5), 2.088(5), 1.902(4), 1.853(19)

IMA No. **2007-019**

Matsumaezawa pit, Tanohata mine, Tanohata Village, Iwate Prefecture, Japan

Hidemichi Hori

LiMn₂Si₃O₈(OH)

Wollastonite group

Triclinic: *P* $\bar{1}$

a 7.612, *b* 7.038, *c* 6.700 Å, α 90.23, β 94.70, γ 105.26°

6.640(35), 3.666(26), 3.134(89), 3.109(69), 2.946(100), 2.814(33), 2.581(22), 2.182(40)

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IMA No. 2007-039

Poudrette quarry, Mont Saint-Hilaire, Rouville County, Quebec, Canada.

Joel D. Grice

$(\text{Ce}, \text{REE})_3(\text{Na}, \text{H}_2\text{O})_6\text{MnSi}_9\text{Be}_5(\text{O}, \text{OH})_{30}\text{F}_4$

Monoclinic: $C2/c$; structure determined

a 11.654, b 13.916, c 16.583 Å, β 95.86°

8.120(100), 3.543(39), 3.454(21), 3.176(19), 2.959(24), 2.863(48), 2.749(23), 2.668(33)

IMA No. 2007-040

Fuengirola, Málaga Province, Spain

María Dolores Ruiz Cruz

$(\text{NH}_4)\text{Fe}_3(\text{Si}_3\text{Al})\text{O}_{10}(\text{OH})_2$

Mica group

Monoclinic: $C2/m?$

a 5.296, b 9.199, c 10.412(6) Å, β 99.991°

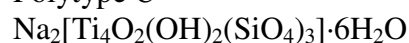
10.242(83), 3.422(46), 3.170(33), 2.290(16), 2.011(16), 2.007(18), 1.544(23), 1.524(15)

IMA No. **2007-041**

Koashva Mountain, Khibiny Massif, Kola Peninsula, Russia

Victor N. Yakovenchuk

Polytype *C*

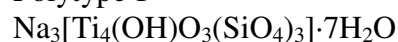


Cubic: $P\bar{4}3m$

a 7.856 Å

7.88(100), 4.53(30), 3.20(80), 2.774(30), 2.622(40), 2.478(40), 1.96(30), 1.843(30)

Polytype *T*



Trigonal: $R3m$

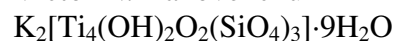
a 10.94, c 13.97 Å

7.88(100), 3.277(60), 3.175(80), 2.730(50), 2.607(70), 2.471(50), 1.960(60), 1.916(50)

IMA No. **2007-042**

Koashva Mountain, Khibiny Massif, Kola Peninsula, Russia

Victor N. Yakovenchuk



Cubic: $P\bar{4}3m$

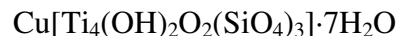
a 7.808 Å

7.85(100), 3.91(20), 3.201(80), 2.765(20), 2.602(30), 2.471(40), 1.951(30), 1.839(30)

IMA No. **2007-043**

Koashva Mountain, Khibiny Massif, Kola Peninsula, Russia

Victor N. Yakovenchuk



Cubic: $P\bar{4}3m$

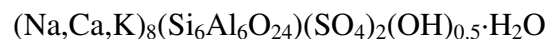
a 7.850 Å

7.87(100), 3.94(20), 3.205(80), 2.774(20), 2.616(30), 2.481(30), 1.960(30), 1.843(30)

IMA No. **2007-044**

Biachella Valley, Sacrofano municipality, Rome province, Latium region, Italy

Nikita V. Chukanov



Cancrinite group

Trigonal: $P3$; structure determined

a 12.913, c 79.605 Å

11.07(19), 6.45(18), 4.782(15), 3.720(100), 3.576(18), 3.469(14), 3.300(47), 3.220(16)

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PROPOSALS APPROVED IN JANUARY 2008

IMA No. **2007-045**

Colima volcano, Colima State, México

Mikhail Ostrooumov

K_3VS_4

Orthorhombic: *Pnma*

a 9.138, b 10.627, c 9.131 Å

3.464(77), 3.237(57), 3.229(66), 2.926(70), 2.890(52), 2.799(100), 2.787(75), 2.676(80)

IMA No. **2007-046**

Sarbai Mine, Turgai region, Kazakhstan

Luca Bindi

$[Cu_6As_2S_7][Ag_9CuS_4]$

Pearceite-polybasite group

Trigonal: $P\bar{3}m1$; structure determined

a 7.3218, c 11.8877 Å

11.89(54), 3.063(38), 2.972(100), 2.797(44), 2.476(45), 2.349(45), 2.168(42), 1.831(50)

IMA No. **2007-047**

Mina Asunción, Sierra Gorda, Caracoles District, Antofagasta Province, Chile

Joël Brugger

$\text{Pb}_2[\text{B}_5\text{O}_9]\text{Cl}\cdot 0.5\text{H}_2\text{O}$

Hilgardite group

Orthorhombic: $Pnn2$; structure determined

a 11.3757, b 11.5051, c 6.5568 Å

5.71(80), 4.04(100), 3.29(40), 3.16(30), 2.84(100), 2.55(40), 2.019(70), 1.877(40)

IMA No. **2007-049**

Kumdy Kol, Kokchetav, Northern Kazakhstan

Shyh-Lung Hwang

$\text{NaAlSi}_3\text{O}_8$

Feldspar group

Orthorhombic: $P2nn$ or $Pmnn$

a 8.24, b 8.68, c 4.84 Å

5.97, 4.33, 4.21, 4.18, 4.12, 3.76, 3.23, 3.02, 2.95, 2.74

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PROPOSALS APPROVED IN FEBRUARY 2008

IMA No. 2007-050

Santa Rosa mine, Sijes, Salta province, Argentina

Frank C. Hawthorne

$\text{Ca}_4(\text{H}_2\text{O})_4 [\text{B}_4\text{O}_4(\text{OH})_6]_4 \{ \text{H}_2\text{O} \}_{15}$

New structure type

Orthorhombic: $Pca2_1$; structure determined

a 12.161, b 40.477, c 10.1843 Å

10.501(10), 9.992(5), 5.226(7), 4.623(6), 3.837(7), 3.118(7), 2.612(6), 2.538(6)

IMA No. 2007-051

Eldfell, Heimaey island, Vestmannaeyjar archipelago, Iceland

Tonči Balić-Žunić

$\text{NaFe}(\text{SO}_4)_2$

Yavapaiite group

Monoclinic: $C2/m$

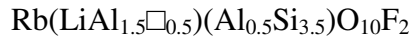
a 8.022, b 5.135, c 7.123 Å, β 92.15°

3.72(76), 3.64(54), 3.43(54), 2.77(100), 2.72(57), 2.57(31), 2.370(63), 1.650(32)

IMA No. **2007-052**

Mt. Vasin-Myl'k, Voron'i Tundry, Kola Peninsula, Russia

Igor V. Pekov



Mica group

Monoclinic: *C2/c*

a 5.191, *b* 9.025, *c* 20.40 Å, β 95.37°

10.1(60), 5.08(40), 4.55(80), 3.98(40), 3.49(50), 3.35(60), 2.575(100), 2.017(50)

IMA No. **2007-053**

Kabutochiba, Kameyama, Mie Prefecture, Japan

Yasuyuki Banno



Amphibole group

Monoclinic: *C2/m*; structure determined

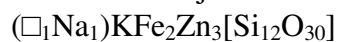
a 9.937, *b* 18.108, *c* 5.335 Å, β 105.30°

8.48(81), 3.40(51), 3.15(46), 2.72(100), 2.61(59), 2.57(43), 2.36(37), 2.17(39)

IMA No. **2007-054**

Klöch, north of Bad Radkersburg, Eastern Styria, Austria

Hans-Peter Bojar



Milarite group

Hexagonal: *P6/mcc*; structure determined

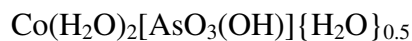
a 10.120, *c* 14.298 Å

7.149(100), 5.540(43), 4.130(40), 3.736(70), 3.227(67), 2.920(40), 2.770(68), 2.530(43)

IMA No. **2007-055**

Keeley mine, South Lorrain Township, Timiskaming District, Ontario, Canada

Frank C. Hawthorne



New structure type

Monoclinic: *P2₁/n*; structure determined

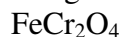
a 4.7058, *b* 9.299, *c* 12.738 Å, β 98.933°

7.446(100), 6.267(44), 3.725(29), 3.260(25), 3.089(20), 2.998(31), 2.970(21), 2.596(23)

IMA No. **2007-056**

Suizhou L6 chondrite: Dayanpo, Suizhou County, Hubei Province, China

Ming Chen



Spinel group

Orthorhombic: *Bbmm*

a 9.462, *b* 9.562, *c* 2.916 Å

2.650(100), 2.389(20), 2.089(10), 1.953(90), 1.566(60), 1.439(15), 1.425(15), 1.337(40)

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PROPOSALS APPROVED IN MARCH 2008

IMA No. **2007-057**

Granite quarry 10 km SSW of the township of Lake Boga, northwestern Victoria, Australia
Stuart J. Mills

$\text{CuFe}^{3+}_2(\text{PO}_4)_2(\text{OH})_2 \cdot 4\text{H}_2\text{O}$

Whitmoreite group

Monoclinic: $P2_1/c$

a 9.863, b 9.661, c 5.476 Å, β 92.45°

9.849(100), 6.892(80), 4.924(80), 4.386(90), 4.333(45), 4.225(35), 2.697(60), 2.654(31)

IMA No. **2007-058**

Altebürg, Otting and Seelbronn in and around the Ries Crater in Bavaria, Germany

Ahmed El Goresy

TiO_2

Baddeleyite group

Monoclinic: $P2_1/c$

a 4.606, b 4.986, c 4.933 Å, β 99.17°

2.929(100), 2.626(91), 2.494(24), 2.437(42), 2.017(40), 1.742(40), 1.686(42), 1.54(31)

IMA No. **2007-059**

Talnakh deposit, Noril'sk-Talnakh camp, Taimyr Autonomous District, Siberia, Russia
Anna Vymazalová

$\text{Pd}_3\text{Pb}_2\text{Te}_2$

Shandite group

Orthorhombic: *Pmmn*; structure determined

a 8.599, *b* 5.9381, *c* 6.3173 Å

6.3152(34), 3.1572(33), 3.0495(100), 2.5456(63), 2.4424(34), 2.2786(42), 2.1637(71),
1.8906(42)

IMA No. **2007-060**

Ratti quarry, Baveno, Verbania, Piemonte region, Italy

Fabrizio Nestola

$(\text{Ce}, \text{Ln}, \text{Ca})_9(\text{Al}, \text{Fe}^{3+})(\text{SiO}_4)_3[\text{SiO}_3(\text{OH})]_4(\text{OH})_3$

Cerite group

Trigonal: *R3c*; structure determined.

a 10.581, *c* 37.932 Å

3.405(27), 3.250(26), 2.914(100), 2.647(58), 2.198(40), 1.923(34), 1.750(46), 1.732(34)

IMA No. **2007-061**

Mono Lake, California, USA

Hexiong Yang

$\text{KNaMg}_2(\text{PO}_4)_2 \cdot 14\text{H}_2\text{O}$

Struvite group

Orthorhombic: *Pmnb*; structure determined

a 6.9349, *b* 25.1737, *c* 11.2189 Å

4.302(100), 4.184(22), 3.262(20), 2.803(32), 2.786(43), 2.767(51), 2.742(48), 2.670(51)

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2007 PROPOSALS

IMA No. 2007-001

A quarry, 10 km SSW of the township of Lake Boga, north-western Victoria, Australia
Stuart J. Mills

$\text{CaNaFe}_2\text{H}(\text{UO}_2)_2(\text{PO}_4)_4(\text{OH})_2(\text{H}_2\text{O})_8$

Uranyl phosphate

Monoclinic: *Cc*; structure determined

a 19.6441, *b* 7.0958, *c* 18.7029 Å, β 115.692°

6.60(10), 4.07(2), 3.80(2), 3.56(2), 3.31(2), 3.16(4), 2.797(2), 2.002(2)

IMA No. 2007-002

Dovyren massif, Siberia, Russia

Evgeny V. Galuskin

$\text{Ca}_6\text{ZrSi}_4\text{O}_{14}(\text{OH})_4$

New structure

Orthorhombic: *Pnmm*; structure determined

A 5.666, *B* 18.844, *C* 3.728 Å

5.4260(63), 3.1406(39), 3.0727(100), 2.7468(36), 2.5979(25), 1.8786(26), 1.8640(33),
1.6848(26)

IMA No. **2007-003**

Chende Region, China

Zuxiang Yu

CuPtBiS_3

Lapieite group

Orthorhombic: $P2_12_12_1$; structure determined

a 7.7152, b 12.838, c 4.9248 Å

6.40(30), 5.93(20), 3.24(80), 3.03(100), 2.27(40), 2.14(50), 1.865(60), 1.423(30)

IMA No. **2007-004**

Grandview mine, Grand Canyon National Park, Coconino County, Arizona, USA

Peter A. Williams

$\text{Cu}_3\text{Al}_9(\text{SO}_4)_2(\text{OH})_{29}$

Monoclinic: $P2$, Pm or $P2/m$

a 10.908, b 6.393, c 10.118 Å, β 107.47°

9.667(33), 6.208(100), 5.287(35), 3.949(79), 3.625(10), 2.990(9), 2.816(14), 2.413(9)

IMA No. **2007-005**

Vanadium Queen mine, 18 km east of La Sal, San Juan County, Utah, USA

John M. Hughes

$\text{Na}_2\text{Mg}_2(\text{V}_{10}\text{O}_{28})\cdot 20\text{H}_2\text{O}$

Pascoite-sherwoodite group

Monoclinic: $C2/c$; structure determined

a 23.9019, b 10.9993, c 17.0504 Å, β 118.284°

9.72(100), 9.09(60), 8.19(60), 7.42(70), 6.67(80), 2.882(50), 2.706(50), 1.861(50)

IMA No. **2007-006**

San Piero in Campo, Elba, Italy

Rainer Thomas

$\text{Rb}[\text{B}_5\text{O}_6(\text{OH})_4]\cdot 2\text{H}_2\text{O}$

Neso-pentaborate

Orthorhombic: $Ab2$

a 11.304, b 10.963, c 9.337 Å

3.554(100), 5.481(85), 3.391(63), 2.826(47), 6.018(38), 3.329(38), 2.894(28), 3.259(26)

IMA No. **2007-007**

San Piero in Campo, Elba, Italy

Rainer Thomas

$\text{Cs}[\text{B}_5\text{O}_6(\text{OH})_4]\cdot 2\text{H}_2\text{O}$

Neso-pentaborate

Monoclinic: $C2/c$

a 8.130, b 12.045, c 11.792 Å, β 93.34°

6.023(100), 3/365(68), 2.943(55), 3.278(49), 3.467(44), 3.464(44), 5.886(43), 3.321(34)

IMA No. **2007-008**

Koashva apatite quarry, Khibina alkaline massif, Kola Peninsula, Russia

Alexander P. Khomyakov

$\text{Na}_{12}(\text{K},\text{Sr},\text{Ce})_3\text{Ca}_6\text{Mn}_3\text{Zr}_3\text{NbSi}_{25}\text{O}_{73}(\text{O},\text{H}_2\text{O},\text{OH})_5$

Eudialyte group

Trigonal: $R\bar{3}m$; structure determined

a 14.281, c 30.243 Å

6.447(60), 5.719(40), 4.322(71), 3.540(38), 3.222(70), 3.170(50), 2.982(100), 2.860(94)

IMA No. **2007-009**

Monte Trisa, Torrebelvicino, Vicenza, Italy

Paolo Orlandi

$\text{Cu}_6(\text{SO}_4)(\text{OH})_{10}\cdot\text{H}_2\text{O}$

Dimorphous with redgillite

Orthorhombic: $Cmc2_1$; structure determined

a 2.989, b 16.970, c 14.812 Å

7.45(100), 3.73(35), 2.788(18), 2.654(8), 2.503(14), 2.341(9), 2.166(9), 1.598(20)

IMA No. **2007-010**

Zarshuran deposit, Takab region, NW Iran

Werner H. Paar

$\text{PbHgAs}_2\text{S}_6$

Sulphosalt

Monoclinic: P lattice

a 19.113, b 4.233, c 22.958 Å, β 114.78°

8.672(80), 5.680(30), 4.653(50), 3.867(40), 3.395(50), 3.148(40), 2.722(100), 2.187(50)

IMA No. **2007-011**

Venables Valley, 20 km SSW of Ashcroft, British Columbia, Canada

Ronald C. Peterson and Elif Genceli

$\text{MgSO}_4\cdot 11\text{H}_2\text{O}$

Triclinic: $P\bar{1}$; structure determined

a 6.7459, b 6.8173, c 17.2799 Å, α 88.137, β 89.481, γ 62.719°

5.73(35), 5.62(56), 5.41(54), 4.91(84), 4.85(90), 2.988(58) 2.958(100), 2.940(67)

IMA No. **2007-012**

Kato mine, Munakata City, Fukuoka Prefecture, Japan

Satoshi Matsubara

$\text{Pb}_2\text{Cu}_2(\text{Se}^{4+}\text{O}_3)(\text{SO}_4)(\text{OH})_4$

Linarite-chenite group

Monoclinic: $P2_1/m$

a 9.766, b 5.666, c 9.291(10) Å, β 102.40°

4.86(44), 4.47(57), 3.53(39), 3.18(100), 3.14(68), 2.72(22), 2.33(18), 1.813(19)

IMA No. **2007-013**

Mina Santa Rosa, Iquique, Northern Chile

Jochen Schlüter

CuB_2O_4

Natural analogue of copper metaborate

Tetragonal: $I\bar{4}2d$; structure determined

a 11.517, c 5.632 Å

3.797(100), 3.638(47), 2.876(17), 2.775(35), 2.572(26), 2.501(26), 1.822(21), 1.793(20)

IMA No. **2007-014**

Verkhn'echegemskiy volcanic structure, Kabardino-Balkaria, North Caucasus, Russia

Evgeny V. Galuskin

CaZrO₃

Perovskite group

Orthorhombic: *Pnma*; structure determined

a 5.65, *b* 7.93, *c* 5.55 Å

4.013(35), 4.009(16), 2.881(25), 2.836(100), 2.796(22), 2.006(29), 1.654(17), 1.622(24)

IMA No. **2007-015**

Sierra de los Filabres, Almería, SE Spain

Roberta Oberti

K(CaNa)(Fe²⁺₃Al₂)(Si₆Al₂)O₂₂(OH)₂

Amphibole group

Monoclinic: *C2/m*; structure determined

a 9.8505, *b* 18.0075, *c* 5.3518 Å, β 104.775°

8.420(100), 3.400(38), 3.127(53), 2.714(75), 2.596(49), 2.565(60), 2.340(32), 2.166(34)

IMA No. **2007-016**

Tip Top mine, Custer County, South Dakota, USA

Anthony R. Kampf

NaFe³⁺Mg₂Fe³⁺₂(PO₄)₄(OH)₂·8H₂O

Whiteite-jahnsite group

Monoclinic: *P2/a*

a 15.0811, *b* 7.1403, *c* 9.8299 Å, β 110.445°

9.218(100), 4.884(25), 3.537(25), 2.973(25), 2.854(20), 2.819(70), 2.593(25), 1.933(20)

IMA No. **2007-017**

Vesle Arøy island, Langesundsfjord district, Larvik community, Vestfold county, Norway

Alf Olav Larsen

KNa₆Be₂(Si₁₅Al₃)_{Σ=18}O₃₉F₂

Leifite group

Trigonal: *P $\bar{3}$ m1*; structure determined

a 14.3865, *c* 4.8733 Å

4.710(29), 4.153(21), 3.386(70), 3.161(100), 3.115(17), 2.466(31), 2.398(19), 2.217(20)

IMA No. **2007-019**

Matsumaezawa pit, Tanohata mine, Tanohata Village, Iwate Prefecture, Japan

Hidemichi Hori

LiMn₂Si₃O₈(OH)

Wollastonite group

Triclinic: *P $\bar{1}$*

a 7.612, *b* 7.038, *c* 6.700 Å, α 90.23, β 94.70, γ 105.26°

6.640(35), 3.666(26), 3.134(89), 3.109(69), 2.946(100), 2.814(33), 2.581(22), 2.182(40)

IMA No. **2007-020**

Bambolla mine, Moctezuma, Sonora, Mexico

Joël Brugger

Ca₂Mn⁴⁺₂Te⁶⁺₂O₁₂·H₂O

Tellurate

Monoclinic: $P2$, $P2/m$, Pm , $P2_1$ or $P2_1/m$
 a 10.757, b 4.928, c 8.492 Å, β 102.39°
4.924(34), 4.361(51), 3.267(100), 2.520(71), 2.244(32), 1.996(21), 1.762(39), 1.455(24)

IMA No. **2007-021**

Mount Stafford, Northern Territory, Australia

Edward S. Grew

$\text{Al}_{4.5}\text{SiB}_{0.5}\text{O}_{9.5}$

Structurally related to mullite

Orthorhombic: $Cmc2_1$; structure determined

a 5.7168, b 15.023, c 7.675 Å

5.37(50), 3.38(100), 2.67(60), 2.51(60), 2.19(80), 2.11(50), 1.682(30), 1.512(80)

IMA No. **2007-022**

La Fossa crater, Vulcano, Aeolian Islands, Italy

Francesco Demartin

BiSBr

New structure type

Orthorhombic: $Pnam$; structure determined

a 8.0424, b 9.8511, c 4.0328 Å

4.220(68), 3.740(62), 3.721(44), 2.909(100), 2.429(43), 2.036(47), 1.865(63), 1.774(88)

IMA No. **2007-023**

Mt. Alluaiv, Lovozero alkaline massif, Kola Peninsula, Russia

Alexander P. Khomyakov

$\text{Na}_{15}(\text{Na},\text{Ca},\text{Ce})_3(\text{Mn},\text{Ca})_3\text{Fe}_3\text{Zr}_3\text{Si}_{26}\text{O}_{72}(\text{OH},\text{O})_4\text{Cl} \cdot \text{H}_2\text{O}$

Eudialyte group

Trigonal: $R3$; structure determined

a 14.205, c 30.265 Å

4.316(85), 3.536(41), 3.221(43), 3.166(37), 3.039(41), 2.970(100), 2.848(84), 2.157(34)

IMA No. **2007-024**

Silver Coin mine, Valmy, Iron Point district, Humboldt County, Nevada, USA

Anthony R. Kampf

$[\text{Na}(\text{H}_2\text{O})_{2.5}][\text{Fe}^{3+}_8(\text{PO}_4)_6(\text{OH})_7(\text{H}_2\text{O})_4]$

Meurigite group

Monoclinic: $C2/c$

a 28.835, b 5.1848, c 19.484 Å, β 106.983°

13.80(20), 9.349(100), 4.843(20), 4.318(20), 3.206(40), 3.107(30), 2.971(15), 1.574(20)

IMA No. **2007-025**

Blue Cap mine, about 15 km east of La Sal, San Juan Co., Utah, USA

Anthony R. Kampf

$\text{Ca}_2\text{Mg}[\text{V}_{10}\text{O}_{28}] \cdot 16\text{H}_2\text{O}$

Pascoite group

Monoclinic: $C2/m$; structure determined

a 19.8442, b 9.9353, c 10.7149 Å, β 120.305°

9.242(20), 8.872(30), 8.571(100), 7.270(40), 5.477(15), 4.590(15), 4.355(15), 2.137(20)

IMA No. **2007-026**

Blue Cap mine, about 15 km east of La Sal, San Juan Co., Utah, USA

Anthony R. Kampf

$\text{Zn}_3\text{V}_2\text{O}_7(\text{OH})_2 \cdot 2\text{H}_2\text{O}$

Zn-dominant analogue of volborthite

Hexagonal: $P\bar{3}m1$; structure determined

a 6.0818, c 7.1793 Å

7.211(100), 4.252(20), 2.968(50), 2.628(35), 2.470(40), 1.773(20), 1.513(20), 1.485(25)

IMA No. **2007-027**

Allende meteorite, Pueblito de Allende, Chihuahua, Mexico

Chi Ma

$\text{Sc}_4\text{Zr}_3\text{O}_{12}$

New structure type

Trigonal: $R\bar{3}$; structure determined

a 9.396, c 8.720 Å

4.698(5), 2.900(100), 2.513(18), 1.779(27), 1.776(32), 1.515(19), 1.450(4), 1.152(4)

IMA No. **2007-028**

Tsumeb, Namibia

Marcus J. Origlieri

AsSbO_3

Claudetite group

Monoclinic: $P2_1/n$; structure determined

a 4.5757, b 13.1288, c 5.4216 Å, β 95.039°

4.99(32), 3.51(100), 3.282(82), 3.238(71), 2.805(39), 2.801(31), 2.656(28), 2.279(34)

IMA No. **2007-029**

Allende meteorite, Pueblito de Allende, Chihuahua, Mexico

Chi Ma

(Mo,Ru,Fe,Ir,Os)

Hexagonal: $P63/mmc$

a 2.7506, c 4.4318 Å

2.382(24), 2.216(26), 2.098(100), 1.622(15), 1.375(17), 1.255(18), 1.169(20), 1.150(14)

IMA No. **2007-030**

La Fossa crater, Vulcano, Aeolian Islands, Italy

Francesco Demartin

$\text{K}_2[\text{AlF}_3\text{SO}_4]$

Orthorhombic: $Pbcn$; structure determined

a 10.810, b 8.336, c 6.822 Å

6.631(70), 5.429(14), 3.317(28), 2.983(100), 2.702(82), 2.648(14), 2.208(30), 1.712(58)

IMA No. **2007-031**

Mount Kukisvumchorr, Khibina alkaline massif, Kola Peninsula, Russia

Alexander P. Khomyakov

$\text{K}_3\text{Na}_3\text{Ca}_5\text{Si}_{12}\text{O}_{30}\text{F}_4 \cdot \text{H}_2\text{O}$

Canasite group

Monoclinic: Cm ; structure determined

a 18.846, b 7.242, c 12.650(2) Å, β 111.84°

5.872(31), 4.724(20), 4.711(25), 4.204(40), 3.012(22), 2.915(100), 2.357(30), 2.310(23)

IMA No. **2007-032**

Poudrette quarry, Mont Saint-Hilaire, Rouville County, Québec, Canada

Igor V. Pekov

$\text{NaBe}(\text{CO}_3)(\text{OH})\cdot 2\text{H}_2\text{O}$

New structure type

Tetragonal: $P4/mcc$; structure determined

a 13.087, c 5.404 Å

13.01(100), 9.20(62), 3.611(34), 3.256(95), 2.693(44), 2.605(37), 2.489(60), 2.076(32)

IMA No. **2007-033**

Allende meteorite, Pueblito de Allende, Chihuahua, Mexico

Chi Ma

MoNiP

Barringerite group

Hexagonal: $P\bar{6}2m$

a 5.681, c 3.704 Å

2.298(100), 2.094(69), 1.918(73), 1.852(24), 1.408(20), 1.332(17), 1.316(18), 1.111(14)

IMA No. **2007-034**

Luobusa mine, Qusong County, Tibet, China

Fang Qinsong

WC

Hexagonal: $P\bar{6}m2$

a 2.902, c 2.831 Å

2.833(44), 2.511(94), 1.878(90), 1.449(25), 1.291(36), 1.233(22), 1.149(23), 0.9008(23)

IMA No. **2007-035**

Luobusa mine, Qusong County, Tibet, China

Shi Nicheng

$(\text{Cr}_4\text{Fe}_4\text{Ni})_{29}\text{C}_4$

Hexagonal: $P6_3mc$; structure determined

a 18.839, c 4.4960 Å

6.920(100), 4.530(35), 3.596(55), 2.493(36), 2.023(98), 1.998(32), 1.825(47), 1.798(45)

IMA No. **2007-036**

Luobusa mine, Qusong County, Tibet, China

Li Guowu

TiFeSi_2

Orthorhombic: $Pbam$; structure determined

a 8.6053, b 9.5211, c 7.6436 Å

3.822(35), 2.294(18), 2.230(97), 2.124(100), 2.098(43), 1.911(44), 1.829(19), 1.292(19)

IMA No. **2007-037**

Horoman, Samani-cho, Samani-gun, Hokkaido, Japan

Arashi Kitakaze

$\text{Fe}_6\text{Ni}_3\text{S}_8$

Tetragonal: $P4/mmm$

a 8.707, c 10.439 Å

6.160(10), 3.080(100), 2.955(32), 2.435(6), 1.984(25), 1.947(51), 1.825(60), 1.805(54)

IMA No. **2007-038**

Horoman, Samani-cho, Samani-gun, Hokkaido, Japan

Arashi Kitakaze



Tetragonal: $P4_2/mmm$

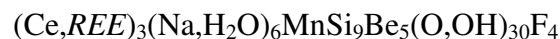
a 10.089, c 10.402 Å

5.880(15), 3.118(100), 3.050(20), 2.703(5), 1.981(5), 1.873(25), 1.844(50), 1.595(45)

IMA No. **2007-039**

Poudrette quarry, Mont Saint-Hilaire, Rouville County, Quebec, Canada.

Joel D. Grice



Monoclinic: $C2/c$; structure determined

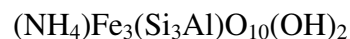
a 11.654, b 13.916, c 16.583 Å, β 95.86°

8.120(100), 3.543(39), 3.454(21), 3.176(19), 2.959(24), 2.863(48), 2.749(23), 2.668(33)

IMA No. **2007-040**

Fuengirola, Málaga Province, Spain

María Dolores Ruiz Cruz



Mica group

Monoclinic: $C2/m?$

a 5.296, b 9.199, c 10.412(6) Å, β 99.991°

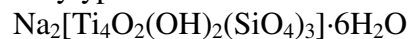
10.242(83), 3.422(46), 3.170(33), 2.290(16), 2.011(16), 2.007(18), 1.544(23), 1.524(15)

IMA No. **2007-041**

Koashva Mountain, Khibiny Massif, Kola Peninsula, Russia

Victor N. Yakovenchuk

Polytype *C*

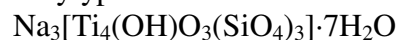


Cubic: $P\bar{4}3m$

a 7.856 Å

7.88(100), 4.53(30), 3.20(80), 2.774(30), 2.622(40), 2.478(40), 1.96(30), 1.843(30)

Polytype *T*



Trigonal: $R3m$

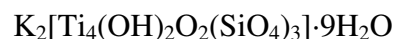
a 10.94, c 13.97 Å

7.88(100), 3.277(60), 3.175(80), 2.730(50), 2.607(70), 2.471(50), 1.960(60), 1.916(50)

IMA No. **2007-042**

Koashva Mountain, Khibiny Massif, Kola Peninsula, Russia

Victor N. Yakovenchuk



Cubic: $P\bar{4}3m$

a 7.808 Å

7.85(100), 3.91(20), 3.201(80), 2.765(20), 2.602(30), 2.471(40), 1.951(30), 1.839(30)

IMA No. **2007-043**

Koashva Mountain, Khibiny Massif, Kola Peninsula, Russia

Victor N. Yakovenchuk

$\text{Cu}[\text{Ti}_4(\text{OH})_2\text{O}_2(\text{SiO}_4)_3] \cdot 7\text{H}_2\text{O}$

Cubic: $P\bar{4}3m$

a 7.850 Å

7.87(100), 3.94(20), 3.205(80), 2.774(20), 2.616(30), 2.481(30), 1.960(30), 1.843(30)

IMA No. **2007-044**

Biachella Valley, Sacrofano municipality, Rome province, Latium region, Italy

Nikita V. Chukanov

$(\text{Na,Ca,K})_8(\text{Si}_6\text{Al}_6\text{O}_{24})(\text{SO}_4)_2(\text{OH})_{0.5} \cdot \text{H}_2\text{O}$

Cancrinite group

Trigonal: $P3$; structure determined

a 12.913, c 79.605 Å

11.07(19), 6.45(18), 4.782(15), 3.720(100), 3.576(18), 3.469(14), 3.300(47), 3.220(16)

IMA No. **2007-045**

Colima volcano, Colima State, México

Mikhail Ostrooumov

K_3VS_4

Orthorhombic: $Pnma$

a 9.138, b 10.627, c 9.131 Å

3.464(77), 3.237(57), 3.229(66), 2.926(70), 2.890(52), 2.799(100), 2.787(75), 2.676(80)

IMA No. **2007-046**

Sarbai Mine, Turgai region, Kazakhstan

Luca Bindi

$[\text{Cu}_6\text{As}_2\text{S}_7][\text{Ag}_9\text{CuS}_4]$

Pearceite-polybasite group

Trigonal: $P\bar{3}m1$; structure determined

a 7.3218, c 11.8877 Å

11.89(54), 3.063(38), 2.972(100), 2.797(44), 2.476(45), 2.349(45), 2.168(42), 1.831(50)

IMA No. **2007-047**

Mina Asunción, Sierra Gorda, Caracoles District, Antofagasta Province, Chile

Joël Brugger

$\text{Pb}_2[\text{B}_5\text{O}_9]\text{Cl} \cdot 0.5\text{H}_2\text{O}$

Hilgardite group

Orthorhombic: $Pnn2$; structure determined

a 11.3757, b 11.5051, c 6.5568 Å

5.71(80), 4.04(100), 3.29(40), 3.16(30), 2.84(100), 2.55(40), 2.019(70), 1.877(40)

IMA No. **2007-049**

Kumdy Kol, Kokchetav, Northern Kazakhstan

Shyh-Lung Hwang

$\text{NaAlSi}_3\text{O}_8$

Feldspar group

Orthorhombic: $P2nn$ or $Pmnn$

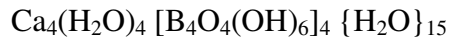
a 8.24, b 8.68, c 4.84 Å

5.97, 4.33, 4.21, 4.18, 4.12, 3.76, 3.23, 3.02, 2.95, 2.74

IMA No. **2007-050**

Santa Rosa mine, Sijes, Salta province, Argentina

Frank C. Hawthorne



New structure type

Orthorhombic: *Pca*2₁; structure determined

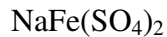
a 12.161, *b* 40.477, *c* 10.1843 Å

10.501(10), 9.992(5), 5.226(7), 4.623(6), 3.837(7), 3.118(7), 2.612(6), 2.538(6)

IMA No. **2007-051**

Eldfell, Heimaey island, Vestmannaeyjar archipelago, Iceland

Tonči Balić-Žunić



Yavapaiite group

Monoclinic: *C2/m*

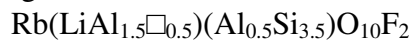
a 8.022, *b* 5.135, *c* 7.123 Å, β 92.15°

3.72(76), 3.64(54), 3.43(54), 2.77(100), 2.72(57), 2.57(31), 2.370(63), 1.650(32)

IMA No. **2007-052**

Mt. Vasin-Myl'k, Voron'i Tundry, Kola Peninsula, Russia

Igor V. Pekov



Mica group

Monoclinic: *C2/c*

a 5.191, *b* 9.025, *c* 20.40 Å, β 95.37°

10.1(60), 5.08(40), 4.55(80), 3.98(40), 3.49(50), 3.35(60), 2.575(100), 2.017(50)

IMA No. **2007-053**

Kabutoichiba, Kameyama, Mie Prefecture, Japan

Yasuyuki Banno



Amphibole group

Monoclinic: *C2/m*; structure determined

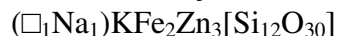
a 9.937, *b* 18.108, *c* 5.335 Å, β 105.30°

8.48(81), 3.40(51), 3.15(46), 2.72(100), 2.61(59), 2.57(43), 2.36(37), 2.17(39)

IMA No. **2007-054**

Klöch, north of Bad Radkersburg, Eastern Styria, Austria

Hans-Peter Bojar



Milarite group

Hexagonal: *P6/mcc*; structure determined

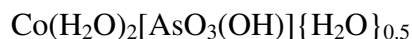
a 10.120, *c* 14.298 Å

7.149(100), 5.540(43), 4.130(40), 3.736(70), 3.227(67), 2.920(40), 2.770(68), 2.530(43)

IMA No. **2007-055**

Keeley mine, South Lorrain Township, Timiskaming District, Ontario, Canada

Frank C. Hawthorne



New structure type

Monoclinic: $P2_1/n$; structure determined
 a 4.7058, b 9.299, c 12.738 Å, β 98.933°
7.446(100), 6.267(44), 3.725(29), 3.260(25), 3.089(20), 2.998(31), 2.970(21), 2.596(23)

IMA No. **2007-056**

Suizhou L6 chondrite: Dayanpo, Suizhou County, Hubei Province, China

Ming Chen

FeCr_2O_4

Spinel group

Orthorhombic: $Bbmm$

a 9.462, b 9.562, c 2.916 Å

2.650(100), 2.389(20), 2.089(10), 1.953(90), 1.566(60), 1.439(15), 1.425(15), 1.337(40)

IMA No. **2007-057**

Granite quarry 10 km SSW of the township of Lake Boga, northwestern Victoria, Australia

Stuart J. Mills

$\text{CuFe}^{3+}_2(\text{PO}_4)_2(\text{OH})_2 \cdot 4\text{H}_2\text{O}$

Whitmoreite group

Monoclinic: $P2_1/c$

a 9.863, b 9.661, c 5.476 Å, β 92.45°

9.849(100), 6.892(80), 4.924(80), 4.386(90), 4.333(45), 4.225(35), 2.697(60), 2.654(31)

IMA No. **2007-058**

Altebürg, Otting and Seelbronn in and around the Ries Crater in Bavaria, Germany

Ahmed El Goresy

TiO_2

Baddeleyite group

Monoclinic: $P2_1/c$

a 4.606, b 4.986, c 4.933 Å, β 99.17°

2.929(100), 2.626(91), 2.494(24), 2.437(42), 2.017(40), 1.742(40), 1.686(42), 1.54(31)

IMA No. **2007-059**

Talnakh deposit, Noril'sk-Talnakh camp, Taimyr Autonomous District, Siberia, Russia

Anna Vymazalová

$\text{Pd}_3\text{Pb}_2\text{Te}_2$

Shandite group

Orthorhombic: $Pmnm$; structure determined

a 8.599, b 5.9381, c 6.3173 Å

6.3152(34), 3.1572(33), 3.0495(100), 2.5456(63), 2.4424(34), 2.2786(42), 2.1637(71),
1.8906(42)

IMA No. **2007-060**

Ratti quarry, Baveno, Verbania, Piemonte region, Italy

Fabrizio Nestola

$(\text{Ce}, \text{Ln}, \text{Ca})_9(\text{Al}, \text{Fe}^{3+})(\text{SiO}_4)_3[\text{SiO}_3(\text{OH})]_4(\text{OH})_3$

Cerite group

Trigonal: $R3c$; structure determined.

a 10.581, c 37.932 Å

3.405(27), 3.250(26), 2.914(100), 2.647(58), 2.198(40), 1.923(34), 1.750(46), 1.732(34)

IMA No. **2007-061**

Mono Lake, California, USA

Hexiong Yang

$\text{KNaMg}_2(\text{PO}_4)_2 \cdot 14\text{H}_2\text{O}$

Struvite group

Orthorhombic: *Pmnb*; structure determined

a 6.9349, *b* 25.1737, *c* 11.2189 Å

4.302(100), 4.184(22), 3.262(20), 2.803(32), 2.786(43), 2.767(51), 2.742(48), 2.670(51)

OLDER PROPOSALS

IMA No. **2006-019a**

Cassagna mine, Val Graveglia, eastern Liguria, northern Apennines, Italy

Riccardo Basso

$(\text{Ca}, \text{Mn}^{2+})_4(\text{Fe}^{3+}, \text{Mn}^{3+}, \text{Al})_4(\text{OH})_4(\text{V}^{3+}, \text{Mg}, \text{Al})_2(\text{O}, \text{OH})_4(\text{Si}_3\text{O}_{10})(\text{SiO}_4)_2$

Orthorhombic: *Cmcm*; structure determined

a 6.066, *b* 8.908, *c* 18.995 Å

9.52(100), 4.98(45), 4.85(50), 4.03(40), 3.02(60), 2.66(70), 2.54(60), 2.32(40)

IMA No. **98-053a**

Bendada near Guarda, province Beira Alta, central Portugal

Uwe Kolitsch

$\text{Fe}^{2+}\text{Fe}^{3+}_2(\text{AsO}_4)_2(\text{OH})_2 \cdot 4\text{H}_2\text{O}$

Whitmoreite group

Monoclinic: *P2₁/c*; structure determined

a 10.239, *b* 9.713, *c* 5.552 Å, β 94.11°

10.22(10), 7.036(8), 4.833(3), 4.520(2), 4.250(5), 3.490(2), 2.907(3), 2.865(4)

IMA No. **2002-045b**

Menzenschwand, Southern Black Forest, Baden-Württemberg, Germany

Kurt Walenta and Frédéric Hatert

$(\text{K}, \text{U}, \square)(\text{UO}_2)_3(\text{AsO}_4)(\text{OH})_4 \cdot \text{H}_2\text{O}$

New structure type

Orthorhombic: *Cccm*; structure determined

a 8.154, *b* 11.55, *c* 13.75 Å

6.71(80), 6.03(100), 3.78(70), 3.33(80), 2.96(60), 2.88(40), 2.63(50), 1.942(50).

IMA No. **2006-051**

Dolores prospect, Pastrana, Murcia Province, Spain

John L. Jambor

$(\text{Ca}, \text{Cu}, \text{Na}, \text{Fe}^{3+}, \text{Al})_{12}\text{Al}_2(\text{AsO}_4)_8(\text{OH}, \text{Cl})_x \cdot n\text{H}_2\text{O}$

Smolianinovite group (?)

Monoclinic: *P2₁/a* or *Pa*

a 9.972, *b* 22.44, *c* 5.272(8) Å, β 92.9°

22.0(100), 11.16(70), 4.983(50), 3.655(25), 3.333(45), 3.003(30), 2.767(30)

IMA No. **89-035a**

Glücksstern mine, Gottlob Hill, Friedrichroda, Thüringen, Germany

Thomas Witzke

LaVO_4

Xenotime group

Tetragonal: $I4_1/amd$; structure determined

a 7.406, c 6.504 Å

3.707(100), 2.939(5), 2.759(10), 2.623(7), 2.309(5), 2.088(5), 1.902(4), 1.853(19)

WITHDRAWAL OF AN APPROVED MINERAL

Proposal 2005-012 was approved (mineral and name) in June 2005. The authors have recently submitted additional data on this phase which show that it is merely a monoclinic polytype of mackelveyite-(Y), namely mackelveyite-(Y)-2M. The approval for this proposal is thus withdrawn.

CHANGES IN EXISTING NOMENCLATURE

IMA No. 07-A

The mineral surkhobite and its name are revalidated. Surkhobite is redefined as $(Ba,K)_2CaNa(Mn,Fe^{2+},Fe^{3+})_8Ti_4(Si_2O_7)_4O_4(F,OH,O)_6$, it differs from jinshajiangite because Mn prevails over Fe^{2+} , and it differs from perraultite because Ca dominates in the A(6) site. Decision IMA No. 06-E [Species and name surkhobite (IMA 2002-037) have been discredited because the species corresponds to jinshajiangite (IMA 81-061)] is thus nullified.

Meurigite

The approval of IMA No. 2007-024 necessitates a name change for meurigite (IMA No. 95-022) into meurigite-K.

Ardennite

The approval of IMA No. 2005-037 for ardennite-(V) and its publication in *Eur. J. Mineral.*, 19 (2007), 581-587 necessitates a name change for ardennite into ardennite-(As).

IMA No. 07-B

The mineral calcio-olivine is redefined as the calcium-dominant member of the olivine group. Calcio-olivine is the natural equivalent of synthetic γ - Ca_2SiO_4 , not of synthetic α - Ca_2SiO_4 as erroneously reported in literature. Calcio-olivine is a polymorph of larnite, monoclinic β - Ca_2SiO_4 .

IMA No. 07-C

Several decisions have been taken on the nomenclature of a number of mineral names:

The authors of new-mineral proposals should use a suffix nomenclature rather than a prefix nomenclature. Some minerals in well-known groups are to be renamed.

Mineral names consisting of two words are to be renamed.

Mineral names having superfluous hyphens are to be renamed (with the exception of the current amphibole names, for which a subcommittee is discussing a new nomenclature).

Minerals named after localities or persons should have the original spelling in their name, including the diacritical marks. A list of such names is to be published.

Mineral names having superfluous diacritical marks (marks not present in the original names of localities or persons) are to be renamed.

Lists of mineral names to be changed by these decisions have been published by the chairman in *Mineralogical Record*, 39 (2008), 131-135. The paper is available on the CNMNC website.

PUBLICATION OF IMA-CNMNC REPORT

The report of the Subcommittee for Unnamed Minerals on a system of codification for unnamed minerals has been published by Dorian G.W. Smith and Ernest H. Nickel in *Canadian Mineralogist*, 45 (2007), 983-1055. The paper contains a complete list of unnamed minerals. Paper and lists are available on the CNMNC website.

NEW MINERALS APPROVED IN 2008
NOMENCLATURE MODIFICATIONS APPROVED IN 2008
BY THE
COMMISSION ON NEW MINERALS, NOMENCLATURE AND CLASSIFICATION
INTERNATIONAL MINERALOGICAL ASSOCIATION

Ernst A.J. Burke* (Chairman, CNMNC) and Frédéric Hatert** (Vice-Chairman, CNMNC)

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PROPOSALS APPROVED IN APRIL 2008

IMA No. 2008-001

Khibinpakhchorr Mt., Khibiny massif, Kola Peninsula, Russia.

Yulya V. Azarova

$(\text{K,Na,Sr,Ba})_4\text{Ca}_2(\text{Ti,Nb})_8[\text{Si}_4\text{O}_{12}]_4(\text{OH,O})_8 \cdot 12\text{H}_2\text{O}$

Labuntsovite group

Monoclinic: $C2/m$; structure determined

a 14.529, b 14.203, c 7.899 Å, β 117.37°

7.08(70), 3.25(100), 3.11(70), 2.61(50), 2.49(70), 1.712(70), 1.577(70), 1.444(70)

IMA No. 2008-003

Dronino village, Kasimov District, Ryazan' Oblast, 350 km south-east of Moscow, Russia

Nikita V. Chukanov

$\text{Ni}_3\text{Fe}^{3+}\text{Cl}(\text{OH})_8 \cdot 2\text{H}_2\text{O}$

Hydrotalcite group

Trigonal: $R\bar{3}m$, $R3m$ or $R32$

a 6.206, c 46.184 Å

7.76(100), 3.88(40), 2.64(25), 2.32(20), 1.965(15), 1.546(10), 1.536(10), 1.337(10)

IMA No. **2008-004**

Premier Mine, Stewart, British Columbia, Canada

Luca Bindi

[Cu₆Sb₂S₇][Ag₉CuS₄]

Pearceite-polybasite group

Trigonal: $P\bar{3}m1$; structure determined

a 7.341, c 11.805 Å

11.81(44), 3.069(44), 2.951(100), 2.799(52), 2.473(43), 2.355(40), 2.163(43), 1.835(46)

CHANGES IN EXISTING NOMENCLATURE

07-E

The mineral hastite, orthorhombic CoSe₂ (marcasite group), is discredited. The type material has been shown to consist of ferroselite, FeSe₂.

STATUS OF OLGITE and BARIO-OLGITE

E.A.J. Burke, chairman IMA-CNMNC

It is stated, in several media, that bario-oligite, approved by the IMA-CNMMN as 2003-002 and published by Pekov *et al.* (2004), has been discredited, or should be discredited as a valid mineral. These opinions are based on the conclusion by Sokolova *et al.* (2005) that “bario-oligite is not distinct from oligite, the former should be considered for discreditation”. This consideration became reality when Sokolova and Hawthorne submitted in 2005, on invitation of the IMA-CNMMN, an official proposal to discredit bario-oligite. In the period from January to May 2006, this proposal was intensely discussed, guided by Giovanni Ferraris as vice-chairman of the CNMMN, between its authors, the authors of bario-oligite and the members of the CNMMN.

The history of oligite and bario-oligite is as follows:

1. Until 2004, oligite was considered in all mineralogical reference books to be a strontium mineral, due to the formula given in the original description by Khomyakov *et al.* (1980), Na(Sr,Ba)PO₄, and to the composition of the *M1* structural site as obtained by Sokolova *et al.* (1984), (Sr_{0.52}Ba_{0.48}), on type material from Mt. Karnasurt, Lovozero massif, Kola Peninsula, Russia.
2. Sokolova *et al.* (1990) published data on ‘oligite II’ and ‘oligite III’ (the original oligite being ‘oligite I’), two specimens from Mt. Alluaiv in the Lovozero massif having Ba as dominant constituent on the *M1* site. This paper failed to give a clear definition of oligite, no nomenclatural distinction was made between the 1984 oligite (Sr-dominant *M1*) and the 1990 oligite (Ba-dominant *M1*).
3. Pekov *et al.* started in 2002 a study on ‘oligite’ specimens from several pegmatites and hydrothermal veins at Mt. Kedykverpakhk in the Lovozero massif. The results indicated that ‘oligite’ consists of two mineral species, with either Sr or Ba dominant on the *M1* site. Because oligite was traditionally interpreted as a strontium mineral, Pekov *et al.* (2004) published their material with a Ba-dominant *M1* site as the new mineral bario-oligite after approval by the CNMMN in 2003. It is evident that ‘oligite II’ and ‘oligite III’ are also bario-oligite. Pekov (2005) published data of an ‘oligite’

specimen from one of the veins having a Sr-dominant *M1* composition of ($\text{Sr}_{0.57}\text{Ba}_{0.42}\text{K}_{0.01}$).

4. Sokolova *et al.* (2005) re-examined the material described previously as ‘oligite I’ (= the original type material) and ‘oligite III’. They found that the real space group of these specimens is $P-3m1$, not $P3$ as published in 1984 and 1990 and also by Pekov *et al.* (2004) for bario-oligite. The change of space group has no implications for the occupancy of the *M1* site, which is identical in both space groups. The new data obtained on the type ‘oligite I’ specimen, however, show that its *M1* site has a composition ($\text{Ba}_{0.76}\text{Sr}_{0.20}\text{K}_{0.04}$). Calculation of the empirical formula from the original analysis by Khomyakov *et al.* (1980) along the same crystal-chemical principles leads to essentially the same results. No convincing explanation was offered for the strong difference with the 1984 results (with a Sr-dominant *M1* site) on the same specimen.

Giovanni Ferraris proposed in June 2006 the following compromise to end the discussion:

1. It is evident that ‘re-examined oligite’ and ‘bario-oligite’ represent the same mineral species.
2. According to the CNMMN rules, the older name (oligite) should have priority. But taking into account the work done by Pekov in 2005 showing that in the near future a ‘strontio-oligite’ will be described, as an exception (but that would not be the first time!) to the priority rule, the name ‘oligite’ is discredited and the name ‘bario-oligite’ is retained.
3. The samples studied by Pekov *et al.* (2004) and by Sokolova *et al.* (2005) are the cotypes of the redefined ‘bario-oligite’.

It was at that time also agreed between Ferraris, Pekov, Sokolova and Hawthorne that:

1. Sokolova and Hawthorne have withdrawn their proposal to discredit bario-oligite after reading the comments of the CNMMN members.
2. In the future, ‘oligite’ will be used as the name of a series consisting of the species ‘bario-oligite’ and ‘strontio-oligite’ after approval of the latter as a mineral.
3. Pekov *et al.* will at some moment submit a proposal for the Mt. Kedykverpakhk ‘strontio-oligite’ together with an official discreditation of the old ‘oligite’ and a revision of the formula of ‘bario-oligite’.

Conclusions in 2008:

1. The 2006 compromise and agreements are taken over by the CNMNC: bario-oligite is to be redefined, oligite is to be discredited as a mineral name and is to be used as a series name (comparable to the apatite, columbite, apophyllite, *etc.*), and ‘strontio-oligite’ is to be proposed as a new mineral. The authors of the latter are invited to consider renaming the minerals of the oligite series along a suffix-based nomenclature: oligite-(Ba) and oligite-(Sr). Until that time, the names bario-oligite and oligite, respectively, are to be used for these two minerals.
2. Sokolova *et al.* (2005) would have avoided a lot of confusion and discussion if they had contacted the authors of bario-oligite and/or the CNMMN before publishing their results.
3. Publication of the results of the 2006 discussion within the CNMMN is necessary to correct wrong statements in several media.

References

- Khomyakov, A.P., Semenov, E.I., Shumyatskaya, N.G., Timoshenkov, I.M., Laputina, I.P., Smol'yaninova, N.N. (1980): Olgite, $\text{Na}(\text{Sr},\text{Ba})\text{PO}_4$ - a new mineral. *Zapiski VMO*, **109**, 3, 347-351 (in Russian).
- Pekov, I.V. (2005): Genetic Mineralogy and Crystal Chemistry of Rare Elements in High-Alkaline Postmagmatic Systems. D.Sc. Thesis. Moscow State University, 652 pp.
- Pekov, I.V., Chukanov, N.V., Kulikova, I.M., Zubkova, N.V., Krotova, O.D., Sorokina, N.I., Pushcharovsky, D.Yu. (2004): A new mineral bario-olgite and its crystal structure. *Zapiski VMO*, **133**, 1, 41-49 (in Russian)
- Sokolova, E.V., Egorov-Tismenko, Yu.K., Yamnova, N.A., Simonov, M.A. (1984): The crystal structure of olgite, $\text{Na}(\text{Sr}_{0.52}\text{Ba}_{0.48})(\text{Sr}_{0.58}\text{Na}_{0.42})(\text{Na}_{0.81}\text{Sr}_{0.19})[\text{PO}_{3.40}][\text{P}_{0.76}\text{O}_{3.88}]$. *Kristallografiya*, **29**, 6, 1079-1083 (in Russian).
- Sokolova, E.V., Nadezhina, T.N., Khomyakov, A.P. (1990): The X-ray study of high-barian olgite. *Vestnik Moskovskogo Universiteta*, ser. 4: Geology, No. 1, 87-91 (in Russian).
- Sokolova, E., Hawthorne, F.C., Khomyakov, A.P. (2005): Refinement of the crystal structure and revision of the chemical formula of olgite: $(\text{Ba},\text{Sr})(\text{Na},\text{Sr},\text{REE})_2\text{Na}[\text{PO}_4]_2$. *Can. Mineral.*, **43**, 1521-1526.

NEW MINERALS APPROVED IN 2008
NOMENCLATURE MODIFICATIONS APPROVED IN 2008
BY THE
COMMISSION ON NEW MINERALS, NOMENCLATURE AND CLASSIFICATION
INTERNATIONAL MINERALOGICAL ASSOCIATION

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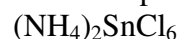
NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION

PROPOSALS APPROVED IN MAY 2008

IMA No. 2008-005

La Fossa crater, Vulcano, Aeolian Islands, Italy

Italo Campostrini



Cubic: $Fm\bar{3}m$; structure determined

a 10.064 Å

5.81(100), 5.03(73), 3.035(48), 2.516(69), 2.250(39), 1.937(23), 1.779(42), 1.701(22)

IMA No. 2008-006

Torre Stracciacappe, Trevignano community (Rome province), Latium, Italy

Fabio Bellatreccia



Cancrinite-sodalite group

Trigonal: $P\bar{3}$; structure determined

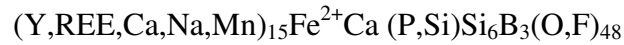
a 12.8742, c 87.215 Å

6.85(66), 6.39(65), 5.74(52), 3.773(60), 3.691(100), 3.587(70), 3.551(53), 2.639(73)

IMA No. **2008-007**

Tommot, Yakutia, Russia

Gunnar Raade



Vicanite group

Trigonal: $R\bar{3}m$; structure determined

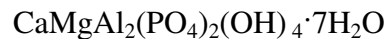
a 10.7527, c 27.4002 Å

4.441(36), 3.144(77), 3.028(45), 2.968(100), 2.672(30), 1.806(30), 1.782(32), 1.713(32)

IMA No. **2008-008**

Angaston, in the Mount Lofty Ranges, 100 km NNE of Adelaide, South Australia, Australia

Stuart J. Mills



Triclinic: $P\bar{1}$

a 19.819, b 12.858, c 5.468 Å, α 90.088, β 89.067, γ 91.032°

IMA No. **2008-009 (Name NOT approved)**

Kirovskii underground apatite mine, Mountain Kukisvumchorr, Khibiny alkaline complex, Kola Peninsula, Russia

Igor V. Pekov



Apatite group

Hexagonal: $P6_3/m$; structure determined

a 9.845, c 7.383 Å

3.71(30), 3.21(40), 2.940(100), 2.823(35), 2.009(50), 1.955(45), 1.831(50), 1.500(30)

GENERAL NOMENCLATURE PROPOSAL

A proposal from CNMNC officers Frédéric Hatert and Ernst A.J. Burke to revise and extend the dominant-constituent rule (also known under the misleading name “50% rule”) has been approved. The (rather long) manuscript will be published in one or more mineralogical journals.

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PROPOSALS APPROVED IN JUNE 2008

IMA No. 2008-010

Jáchymov, Krušné hory Mountains, western Bohemia, Czech Republic

Jiří Sejkora



Lindackerite group

Triclinic: $P\bar{1}$; structure determined

a 6.432, b 7.986, c 10.827 Å, α 85.75, β 81.25, γ 85.04°

10.67(100), 3.970(10), 3.648(11), 3.560(18), 3.286(10), 3.173(13), 2.922(10), 2.736(10)

IMA No. 2008-011

Interplanetary dust particle collected from the stratosphere over south-western USA, probably from Comet 26P/Grigg-Skjellerup

Keiko Nakamura-Messenger

MnSi

Fersilicite group

Cubic: $P2_13$

a 4.557 Å

3.223(18), 2.632(16), 2.038(100), 1.861(50), 1.374(10), 1.218(24), 0.9946(12), 0.8464(15)

IMA No. **2008-012**

Mutnovsky volcano, Kamchatka Peninsula, Far East Asia, Russia

Filippo Vurro

$\text{Pb}_{20}\text{Cd}_2(\text{As},\text{Bi})_{22}\text{S}_{50}\text{Cl}_{10}$

Zinkenite plesiotypic series

Monoclinic: *C2/c*; structure determined

a 8.352, *b* 45.592, *c* 27.261 Å, β 98.84°

4.35(21), 4.07(39), 3.80(53), 3.66(24), 3.361(65), 3.313(100), 2.835(39), 2.789(36)

IMA No. **2008-013**

Broken Hill, New South Wales, Australia

Peter Elliott

$\text{ZnFe}^{3+}_4(\text{PO}_4)_3(\text{OH})_5$

Rockbridgeite group

Orthorhombic: *Cmcm*; structure determined

a 5.141, *b* 13.811, *c* 16.718 Å

4.638(50), 3.388(50), 3.369(55), 3.168(100), 2.753(60), 2.575(90), 2.414(75), 2.400(50)