

**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, 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.

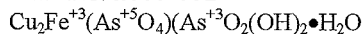
No other information will be released by the Commission

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2000 Proposals

IMA No. 2000-001



New-structure type

Orthorhombic: *Pnma*

$$a\ 9.553, b\ 13.099, c\ 8.0640\ \text{\AA}$$

Pistachio green; vitreous; transparent

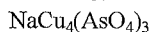
Biaxial (-), $\alpha\ 1.80(5)$, $\beta\ 1.84(5)$, $\gamma\ 1.86(5)$,

$$2V(\text{meas}) = 65(5)^\circ, 2V(\text{calc}) = 69(3)^\circ$$

6.88(25), 6.161(90), 3.861(20), 3.231(40),

3.080(100), 2.700(25), 2.211(25)

IMA No. 2000-002



Alluaudite-wyllieite group; structure

Monoclinic: *C2/c*

$$a\ 12.051, b\ 12.434, c\ 7.2662\ \text{\AA}, \beta\ 117.94^\circ$$

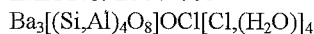
Dark-blue; strong vitreous; translucent

Biaxial (-), $\alpha\ 1.76$, $\beta\ 1.92$, $\gamma\ 1.96$, $2V(\text{calc})\ 49.5^\circ$

6.22(13), 3.60(21), 3.43(100), 3.21(35), 2.791(24),

2.696(18), 2.683(30)

IMA No. 2000-003



Cymrite-like; structure

Hexagonal: *P6₃mc*

$$a\ 5.243, c\ 29.859\ \text{\AA}$$

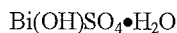
Light-blue grey; vitreous; translucent

Uniaxial (-), $\omega\ 1.642$, $\varepsilon\ 1.594$

14.67(100), 3.883(100), 3.357(50), 2.988(60),

2.887(50), 2.616(70)

IMA No. 2000-004



Second natural bismuth sulfate

Monoclinic: *P2₁/n*

$$a\ 6.0118, b\ 13.3355, c\ 6.4854\ \text{\AA}, \beta\ 112.91^\circ$$

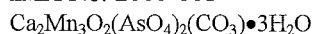
Light beige to light grey; vitreous; translucent

 $\eta\ 1.78$

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



Mitridatite type

Monoclinic: *Cm*

$$a\ 11.253, b\ 19.628, c\ 8.932\ \text{\AA}, \beta\ 100.05^\circ$$

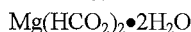
Dark red-brown to black; vitreous; translucent

Biaxial (-), $\alpha\ 1.757$, $\beta \approx \gamma > 1.80$, $\Delta_{\beta,\gamma} = 0.004$,
 $2V(\text{meas}) \sim 32^\circ$

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



Second natural formate

Monoclinic: *P2₁/c*

$$a\ 8.64, b\ 7.15, c\ 9.38\ \text{\AA}, \beta\ 98.0^\circ$$

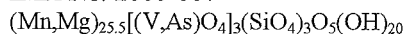
White; vitreous; translucent

Biaxial (+), $\alpha\ 1.465$, $\beta\ 1.486$, $\gamma\ 1.516$, $2V(\text{calc})$ $81(5)^\circ$

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



Similar to megovernite; structure

Trigonal: *R* $\bar{3}c$

$$a\ 8.259, c\ 204\ \text{\AA}$$

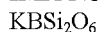
Bright yellow to orange; vitreous; transparent

Uniaxial (-), $\eta\ 1.787$

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



Similar to Li-A(BW) zeolite; structure

Orthorhombic: *P2₁2₁2₁*

$$a\ 9.9630, b\ 10.4348, c\ 4.7044\ \text{\AA}$$

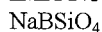
Colourless; vitreous; transparent

Biaxial (-), $\alpha\ 1.561$, $\beta\ 1.563$, $\gamma\ 1.564$, $2V(\text{meas})\ 51^\circ$, $2V(\text{calc})\ 70^\circ$

3.944(5), 3.495(8), 3.282(10), 3.149(4), 2.704(4),

2.293(4)

IMA No. 2000-009



Similar to kalsilite and beryllonite

Hexagonal: *P6₃*

$$a\ 13.8964, c\ 7.7001\ \text{\AA}$$

White, colourless in thin fragments; vitreous; transparent or slightly turbid

Uniaxial (-), $\omega\ 1.612$, $\varepsilon\ 1.615$

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

$(\text{Na}, \text{H}_3\text{O})_{15}(\text{Ca}, \text{Mn}, \text{REE})_6\text{Fe}^{3+}_2\text{Zr}_3(\square, \text{Zr})(\square, \text{Si})\text{Si}_{24}\text{O}_{66}(\text{O}, \text{OH})_6\text{Cl} \cdot n\text{H}_2\text{O}$ ($n = 2-3$)

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

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 analogue of neustädtelite; structure

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. 2000-014 $\text{Pd}_3\text{Pb}_2\text{S}_2$ Related to parkerite $\text{Ni}_3\text{Bi}_2\text{S}_2$ Monoclinic: $C2/m$ 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 $\text{Na}_3\text{Sr}(\text{La}, \text{Ce})\text{FeSi}_6\text{O}_{17}$

Nordite group

Orthorhombic: $Pcca$ a 14.440, b 5.191, c 19.86 Å

Colourless, pale brownish; vitreous; transparent

Biaxial (-), α 1.624, β 1.637, γ 1.644, $2V(\text{meas})$ 60°, $2V(\text{calc})$ 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 $(\text{Ti}, \text{Fe}, \text{Mg}, \text{Mn})_{1-x}\text{Ti}_2\text{O}_5$

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

$\text{Na}_{11}\text{Ca}_9(\text{Fe}^{3+}, \text{Fe}^{2+})_2\text{Zr}_3\text{Nb}[\text{Si}_{25}\text{O}_{73}](\text{OH}, \text{H}_2\text{O}, \text{Cl}, \text{O})_5$

Eudialyte group; structure

Trigonal: $R3m$ a 14.255, c 30.170 Å

Dark brown to brownish-black; vitreous; translucent

Uniaxial (-), ω 1616, 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. 2000-018 $\text{VOSO}_4(\text{H}_2\text{O})_5$

Polymorph of minasragrite; structure

Orthorhombic: $Pnm2_1$ 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, $2V(\text{meas})$ 2°, $2V(\text{calc})$ 0°

4.70(100), 3.734(20), 3.322(50), 2.865(40), 2.602(30), 2.363(20), 2.030(20)

IMA No. 2000-019 $\text{Cu}_5(\text{UO}_2)_6(\text{SO}_4)_3(\text{OH})_{16} \cdot 14\text{H}_2\text{O}$

Second natural uranyl-sulfate

Triclinic: $P\bar{1}$ or $P\bar{1}$ a 13.754, b 9.866, c 8.595, α 103.84,
 β 90.12, γ 106.75°

Grey olive; opaque

Biaxial (+), α 1.725, β 1.730, γ 1.787, 2V(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

 $\text{Fe}_4[\text{AsO}_3\text{OH}]_5[\text{AsO}_2(\text{OH})_2]_2 \cdot 20\text{H}_2\text{O}$

Orthorhombic

 a 10.676, b 19.027, c 10.012 Å

White-beige; aggregates are earthy; opaque

 η 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. 2000-021

 $\text{Ca}_3(\text{Si,Fe}^{3+},\text{Al})[\text{SO}_4][\text{B}(\text{OH})_4](\text{OH},\text{O})_6 \cdot 12\text{H}_2\text{O}$

Ettringite group

Trigonal (pseudo-hexagonal): $P31c$ (by analogy) a 11.14, c 20.99 ÅLight grey with violet shade; vitreous, earthy in
aggregates; translucentUniaxial (+), ω 1.523, ϵ 1.5329.70(8), 3.85(6), 3.040(8), 2.736(6), 2.596(10),
2.374(6), 2.121(9)

IMA No. 2000-022

 $\text{Ca}_2\text{Mn}^{2+}\text{Fe}^{3+}\text{Si}_4\text{O}_{12}(\text{OH})(\text{H}_2\text{O})_2$

4-membered silicate rings; structure

Triclinic: $P\bar{1}$ a 9.960, b 13.875, c 6.562, α 133.19,
 β 101.50, γ 66.27°Dark brown (clusters), light brown (thinner crystals);
vitreousBiaxial (-), α 1.667, β 1.679, γ 1.690, 2V(meas) 89°,
2V(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. 2000-023

 $\text{Ba}_6\text{Fe}^{3+}_3\text{Si}_8\text{O}_{23}(\text{CO}_3)_2\text{Cl}_3 \cdot \text{H}_2\text{O}$

Unique structure

Trigonal: $P3m$ a 10.740, c 7.0950 ÅJet black to a dirty grey-brown; vitreous to adamantine;
opaque to translucentUniaxial (-), ω 1.723, ϵ 1.7113.892(100), 3.148(40), 2.820(90), 2.685(80),
2.208(40), 2.136(40), 1.705(35)

IMA No. 2000-024

 $\text{Na}_2\text{BeSi}_4\text{O}_{10} \cdot 4\text{H}_2\text{O}$

4-membered and 8-membered silicate rings; structure

Orthorhombic: $P2_12_12_1$ a 9.722, b 10.142, c 12.030 Å

Colourless, whitish; vitreous; transparent

Biaxial (+), α 1.499, β 1.507, γ 1.511, 2V(meas)
65°, 2V(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

 $(\text{Sr,Ca})_2\text{Na}[\text{Al}_5\text{Si}_5\text{O}_{20}] \cdot 7\text{H}_2\text{O}$

Thomsonite series zeolite; structure

Orthorhombic: $Pcmm$ a 13.050, b 13.123, c 13.241 Å

Colourless; vitreous; transparent

Biaxial (+), α 1.528, β 1.532, γ 1.540, 2V(meas)
62°, 2V(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

 $(\text{Mn,Li})_4(\text{Ta,Sn})_4(\text{Ta,Nb})_8\text{O}_{32}$

Wodginite group

Monoclinic: $C2/c$ a 9.5104, b 11.5196, c 5.1179 Å,
 β 91.221(48)°

Reddish brown; vitreous; translucent

 $\eta > 2.0$ 3.644(46), 2.976(100), 2.966(95), 2.465(36),
1.767(17), 1.715(23), 1.455(18)

IMA No. 2000-027

 $\text{Sr}_4\text{TiTi}_4\text{Si}_4\text{O}_{22}$

Perrierite group; structure

Monoclinic: $P2_1/a$ (pseudo $C2/m$) a 13.848, b 5.626, c 11.878 Å, β 114.19°

Grey with a blue tin; 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)

Synthetic equivalent

IMA No. 2000-028

$\text{Na}_{27}\text{K}_8\text{Ca}_{12}\text{Fe}_3\text{Zr}_6\text{Si}_{52}\text{O}_{144}(\text{O},\text{OH},\text{H}_2\text{O})_6\text{Cl}_2$

Eudialyte group; structure

Trigonal: $R\bar{3}m$

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)

Triclinic: $P\bar{1}$

a 6.932, b 6.925, c 16.154 Å, α 82.21,
 β 89.70, γ 119.51°

Colourless; vitreous; transparent

Biaxial (-), α 1.459, β 1.470, γ 1.470, 2V(meas) 25°,
2V(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. 2000-029

$\text{Cu}_5\text{Cl}_2(\text{OH})_8(\text{H}_2\text{O})_2$

Similar to atacamite; structure

Monoclinic: $C2/m$

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, 2V(meas) 33°,
2V(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. 2000-033

$(\text{Ba},\text{Na},\text{K})(\text{Al},\text{Mg})_2(\text{Si},\text{Al})_4\text{O}_{10}(\text{OH})_2$

Mica group

Monoclinic: $C2/c$

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,
2V(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. 2000-030

$\text{CaMg}_3(\text{Al}_5\text{Mg})(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_3(\text{OH})$

Tourmaline group; structure

Trigonal: $R\bar{3}m$

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. 2000-034

$(\text{UO}_2)_2\text{CO}_3(\text{OH})_2 \cdot 4\text{H}_2\text{O}$

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(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. 2000-031

$\text{K}_2\text{Mn}(\text{Nb},\text{Ti})_4(\text{Si}_4\text{O}_{12})_2(\text{OH})_4 \cdot 6\text{H}_2\text{O}$

Labuntsovite group; structure

Monoclinic: $C2/m$

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, 2V(meas)
40°, 2V(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. 2000-035

$\text{Na}_2\text{Ba}_2\text{FeTiSi}_2\text{O}_7(\text{CO}_3)(\text{OH})_3\text{F}$

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(meas)
71°, 2V(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

$\text{Zn}_2\text{Mg}_2\text{Fe}_4\text{Sb}_2\text{O}_{14}(\text{OH})_2$

Isostructural with nolanite

Hexagonal; $P6_3/mmc$, $P6_3mc$ or $P\bar{6}2c$

IMA No. 2000-032

$\text{Mg}_3(\text{PO}_4)_2 \cdot 22\text{H}_2\text{O-LA2}$

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

$\text{Ca}_{19}(\text{Al}, \text{Mg})_{13}[\text{SiO}_4]_{10}[\text{Si}_2\text{O}_7]_4(\text{F}, \text{OH})_{10}$

F-analogue of vesuvianite; structure

Tetragonal: $P4/mnc$

a 15.510, c 11.779 Å

Colourless 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

$(\text{Fe}, \text{Ni})_2\text{P}$

Isostructural with rhodarsenide; structure

Orthorhombic: $Pmma$

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

$\text{Ca}_2(\text{C}_2\text{O}_4)\text{Cl}_2 \cdot 2\text{H}_2\text{O}$

New structure-type

Monoclinic: $I2/m$

a 6.933, b 7.372, c 7.446 Å, β 94.5°

Colourless; 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

$\text{Ca}_{19}\text{Mn}^{3+}(\text{Al}, \text{Mn}^{3+})_{10}(\text{Mg}, \text{Mn}^{2+})_2\text{Si}_{18}\text{O}_{69}(\text{OH})_9$

Mn-analogue of vesuvianite; structure

Tetragonal: $P4/n$ and/or $P4nc$

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

$\text{CaCe}(\text{Fe}^{3+}, \text{Fe}^{2+}, \text{Al})_3[\text{SiO}_4][\text{Si}_2\text{O}_7]\text{O}(\text{OH})$

Fe^{3+} -analogue of allanite-(Ce); structure

Monoclinic: $P2_1/m$

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

$\text{Mg}_6\text{Cr}_2(\text{OH})_{16}\text{Cl}_2 \cdot 4\text{H}_2\text{O}$

Hydrotalcite group; structure

Trigonal: $R\bar{3}m$

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

$\text{Cu}_{1.6}\text{Pb}_{1.6}\text{Bi}_{6.4}\text{S}_{12}$

Bismuthinite-aikinite derivative; structure

Orthorhombic: $Pmc2_1$

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

$(\text{Na}, \text{H}_3\text{O}, \text{K}, \text{Sr}, \text{Ba})_2(\text{Ti}, \text{Nb})_2[\text{Si}_4\text{O}_{12}]$

$\text{OH}, \text{O})_2 \cdot 3\text{H}_2\text{O}$

Labuntsovite group; structure

Monoclinic: Cm

a 14.604, b 14.274, c 7.933 Å, β 117.40°

Colourless, white, light brown; vitreous; transparent to translucent

Biaxial (+), α 1.658, β 1.668, γ 1.770, 2V(meas) 25°, 2V(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

$\text{Mg}(\text{V}^{5+}_2\text{O}_6) \cdot 7\text{H}_2\text{O}$

Structural relationships to munitrite 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, 2V(meas) 78°, 2V(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

$\text{K}_6\text{Fe}_{24}\text{S}_{26}(\text{Cl},\text{S})$

Cl-analogue of bartonite; structure

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

$\text{NaCa}_2\text{Mg}_5(\text{Si}_7\text{Al})\text{O}_{22}\text{F}_2$

Amphibole group; structure

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, 2V(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

$\text{KCaCu}_7\text{O}_2(\text{SeO}_3)_2\text{Cl}_6$

Similarity to ilinskite; structure

Hexagonal: $P6_3/mmc$

a 8.7805, c 15.521 Å

Dark red; vitreous to metalloid; opaque to translucent

No optical measurements possible, η (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

$\text{Ca}_2\text{ScSn}(\text{Si}_2\text{O}_7)(\text{Si}_2\text{O}_6\text{OH})$

Unique structure

Triclinic: $C1$

a 10.028, b 8.408, c 13.339 Å, α 90.01,
 β 109.10, γ 90.00°

Colourless to white; vitreous; transparent to translucent

η 1.74

5.18(53), 3.146(100), 3.089(63), 2.901(19),
2.595(34), 2.142(17)

IMA No. 00-D

$\text{Ba}_2\text{Na}(\text{La},\text{Ce})_2\text{Fe}^{2+}\text{Ti}_2\text{Si}_8\text{O}_{26}(\text{OH},\text{O},\text{F}) \cdot \text{H}_2\text{O}$

Orthorhombic: probably $Ccmm$

Joaquinite group

a 10.539, b 9.680, c 22.345 Å

Brown; silky; transparent

Biaxial (+), α 1.754, β 1.760, γ 1.797, 2V(meas) 40°, 2V(calc) 45°

5.58(67), 3.00(9), 2.95(17), 2.91(10), 2.80(100),
2.232(8), 1.596(13)

Previous years proposals**IMA No. 1999-033**

$(\text{Ca},\text{Y})_3\text{Al}[\text{PO}_3\text{OH},\text{CO}_3][(\text{CO}_3)(\text{OH})_6] \cdot 12\text{H}_2\text{O}$

Ettringite group, structure

Hexagonal: $P6_3$

a 10.828, c 10.516 Å

Colourless 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

$(\text{Fe}^{2+}, \text{Fe}^{3+}, \text{Mg})_{11}(\text{PO}_4)_2\text{O}_2(\text{OH})_{16} \cdot 4\text{H}_2\text{O}$

New-structure type

Monoclinic: $P2_1/n$

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, 2V(meas) > 50, 2V(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

$(\text{Ce}, \text{REE}, \text{Ca})_4(\text{Mg}, \text{Fe}^{2+})(\text{Cr}, \text{Fe}^{3+})_2$
 $\text{Ti}_1\text{Nb}_2\text{Si}_4\text{O}_{22}$

Cr analogue of chevkinite-(Ce),
structure

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

$\text{Na}_4\text{K}_4[\text{Ba}_2(\text{H}_2\text{O}, \text{OH})_2]\text{Mg}[\text{Ti}_8(\text{Si}_4\text{O}_{12})_4$
 $(\text{O}, \text{OH})_8] \cdot 8\text{H}_2\text{O}$

Labuntsovite group, structure

Monoclinic: $C2/m$

a 14.292, b 13.750, c 7.792 Å, β 117.03°

Colourless, yellowish, pink or light orange; vitreous;
translucent or transparent

Biaxial (+), α 1.688, β 1.692, γ 1.802, 2V(meas)
37°, 2V(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

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(meas)
32°, 2V(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

Monoclinic: $C2/m$

a 14.216, b 13.755, c 7.767 Å, β 116.7°

Bright orange to reddish-orange; vitreous; transpa-
rent

Biaxial (+), α 1.683, β 1.690, γ 1.820, 2V(meas)
37°, 2V(calc) 28°
6.93(26), 6.31(28), 3.16(100), 3.09(24), 3.02(25),
2.577(25)