

**NEW MINERALS APPROVED IN 2002 AND NOMENCLATURE MODIFICATIONS
APPROVED IN 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, 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 No.	
Chemical formula	any relationship to other minerals;
Crystal system, space group	structure analysis
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. Note that new proposals should be sent to the new Chairman: Prof. Ernst A. J. Burke, Faculty of Earth and Life Sciences, Vrije Universiteit, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands. *E-mail address:* ernst.burke@falw.vu.nl

2002 PROPOSALS

IMA No. 2002-001

(Ce,La,Nd,Ba)(Fe³⁺,Al)₃

[(As,Al)O₄]₂(OH)₆

Trigonal, *R* $\bar{3}m$

a 7.260, *c* 16.77 Å

Light green to brownish; resinous; transparent

Uniaxial (–), mean index of refraction 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)(Mg, Fe²⁺)₃Fe³⁺₂[Si₁₂O₃₀]

Hexagonal, *P*6/*mcc*

a 10.050, *c* 14.338 Å

Fe-dominant analogue of
arsenoflorencite-(Ce)

Milarite group;
structure determined

Deep blue to yellowish green; vitreous; translucent

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

Monoclinic, *Cm* Labuntsovite group;
structure determined

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, 2*V*(meas.) 25°,
2*V*(calc.) 31°

6.96(100), 3.21(80), 3.11(90), 2.60(35), 2.50(40),

1.74(30), 1.70(40)

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IMA No. 2002-004

CoSO₄•H₂O
 Monoclinic, *C2/c*
a 6.980, *b* 7.588, *c* 7.639 Å, β 118.65°
 Pink; powdery; transparent
 Biaxial (+), *n* ~ 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;
 Monoclinic, *Cm* structure determined
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, 2*V*(meas.) 35°,
 2*V*(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;
 Monoclinic, *C2/m* structure determined
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, 2*V*(meas.) 30°,
 2*V*(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)₂
 (O,OH)₄•6H₂O
 Labuntsovite group;
 Monoclinic, *Cm* structure determined
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, 2*V*(meas.) 25°,
 2*V*(calc.) 30°
 6.93(100), 4.93(80), 3.21(100), 3.11(90), 2.62(60),
 2.49(50), 1.687(40)

IMA No. 2002-008

Na₂H(PO₄)•8H₂O
 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, 2*V*(meas.) 29°,
 2*V*(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

NaNa₂(Al₂Mg₃)(Si₇Al)O₂₂(F,OH)₂
 Amphibole group;
 Monoclinic, *C2/m* structure determined
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, 2*V* moderate,
 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

GaO(OH)
 Isostructural with goethite
 Orthorhombic, *Pbnm*
a 4.512, *b* 9.772, *c* 2.967 Å
 Pale greenish yellow to beige; pearly; translucent
 Biaxial, *n*(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

Na₂(Na,Ca)₄Ca₄(Mn,Ca)₂
 Zr₂Ti₂(Si₂O₇)₄(O,F)₄F₄
 Triclinic, *P1*
 Rosenbuschite group;
 structure determined
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, 2*V*(meas.) 73°,
 2*V*(calc.) 70°
 3.951(30), 3.028(60), 2.908(100), 2.600(80), 1.868(60),
 1.670(50)

IMA No. 2002-013

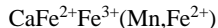
Ba₃NaCe(PO₄)₃(F,Cl)
 Ba-dominant analogue
 of belovite-(Ce);
 structure determined
 Trigonal, *P3̄*
a 9.909, *c* 7.402 Å
 Light rose; vitreous; translucent
 Uniaxial (-), ω 1.694, ε 1.669
 4.078(40), 3.693(40), 2.969(100), 2.867(60), 1.965(80),
 1.863(60)

IMA No. 2002-014

Pb₃[(UO₂)₆O₈(OH)₂](H₂O)_x, *x* ≈ 3
 New structure-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

BaBe₂Si₂O₇
 Dimorphous with barylite;
 Monoclinic, *Pm* structure determined
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, 2*V*(meas.) 70°,
 2*V*(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 $(\text{Si}_2\text{O}_7)\text{O}(\text{OH})$ Mn-dominant analogue of ilvaiteMonoclinic, $P2_1/a$

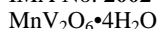
a 13.0246, b 8.8511, c 5.8485 Å, β 90.17°

Black; vitreous; opaque

In reflected light (in air): grey to bluish grey; internal reflections: red; anisotropy: strong in blue-greyish hues.

 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

New structure-type

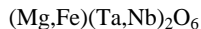
Monoclinic, $C2/c$

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

Columbite–tantalite group

Orthorhombic, $Pbcn$

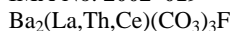
a 14.355, b 5.735, c 5.058 Å

Black; semimetallic to metallic; opaque

Light grey; internal reflections (in air): brownish 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

La-dominant analogue of kukharenkoite-(Ce); structure determined

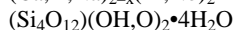
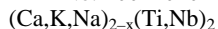
Monoclinic, $P2_1/m$

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, $2V(\text{meas.})$ 5°, $2V(\text{calc.})$ 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

Labuntsovitte group; structure determined

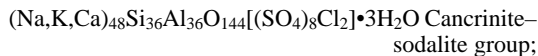
Monoclinic, $C2/m$

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, $2V(\text{meas.})$ 30°, $2V(\text{calc.})$ 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

Hexagonal or trigonal,

 $P\bar{6}2c$ or $P31c$

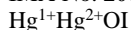
structure discussed

a 12.880, c 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

Related to terlinguaite;

Monoclinic, $C2/c$

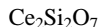
new structure-type

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)

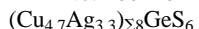
IMA No. 2002-023Isostructural with $\text{Ln}_2\text{Si}_2\text{O}_7$ Tetragonal, $P4_1$

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)

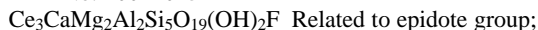
IMA No. 2002-024Argentine variety of α - Cu_8GeS_6 Cubic, $F43m$

a 10.201 Å

Iron-black; vitreous to metallic; opaque

In reflected light (air): pale rose-brownish; internal reflections: none; 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

Related to epidote group;

Monoclinic, $P2_1/m$

structure determined

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(Na,Ca)₆(Ca,Na)₃Si₁₆O₃₈(F,OH)₂•3H₂OTriclinic, *P1**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, 2*V*(meas.) 48°, 2*V*(calc.) 44°

11.99(100), 5.97(85), 3.97(40), 2.967(50), 2.888(100), 1.820(50)

Reyerite group;
structure determined

White; vitreous; transparent

Biaxial (+), α 1.555, β 1.558, γ 1.566, 2*V*(meas.) 64°, 2*V*(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. 2002-033Na₁₋₂(Ti,Fe³⁺)₄(Si₇Al)O₂₂(OH)₄(H₂O)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, 2*V*(meas.) 64°, 2*V*(calc.) 64°

11.9(58), 5.98(35), 5.88(65), 4.35(38), 3.182(100), 3.085(29), 2.735(21)

Related to vinogradovite;
structure determined**IMA No. 2002-027**BaB₂Si₂O₈Orthorhombic, *Pnma**a* 8.141, *b* 8.176, *c* 9.038 Å

White; vitreous; transparent

Biaxial (-), α 1.649, β 1.656, γ 1.656, 2*V*(meas.) 5°, 2*V*(calc.) 0°

6.07(60), 4.86(30), 3.62(100), 3.39(60), 2.83(50), 2.481(40), 2.021(70)

Ba-dominant analogue of danburite;
structure determined**IMA No. 2002-034**CdSO₄•4H₂OMonoclinic, *P2₁/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, 2*V*(meas.) ~70°, 2*V*(calc.) 77.3°

5.98(85), 4.84(70), 3.146(85), 2.967(85), 2.708(75), 2.654(100)

Rozenite group

IMA No. 2002-028Ca_{0.3}(Fe²⁺,Mg,Fe³⁺)₃(Si,Al)₄O₁₀(OH)₂•4H₂OMonoclinic, 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; 2*V*(meas.) 5°, 2*V*(calc.) 7.5°

7.37(90), 4.72(90), 3.80(80), 3.03(100), 2.585(90), 2.429(90), 1.549(90)

Smectite group

IMA No. 2002-035(□,Cu²⁺,V³⁺)₈Al₈(PO₄)₈F₈(H₂O)₂₃ New structure-typeOrthorhombic, *Pmnm**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, 2*V*(meas.) 76°, 2*V*(calc.) 76°

9.54(80), 6.08(100), 5.62(90), 3.430(40), 2.983(60), 2.661(40)

IMA No. 2002-029Na₆MnTi₄Si₈O₂₈•4H₂OOrthorhombic, *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, 2*V*(meas.) 70°, 2*V*(calc.) 70°

14.47(100), 6.43(20), 4.83(10), 3.025(40), 2.881(20)

Mn-dominant analogue
of kukisvumite**IMA No. 2002-036**(Ba,Ca)₂Al₃(Si,Al)₄O₁₀(CO₃)(OH)₆•*n*H₂O Surite groupMonoclinic, *C2/m*, *C2* or *Cm**a* 5.176, *b* 8.989, *c* 16.166 Å, γ 96.44°

White with light greenish tint; pearly; translucent

Biaxial (-), α 1.580, β 1.625, γ 1.625, 2*V*(meas.) 0–10°, 2*V*(calc.) 0°

4.49(90), 3.68(60), 2.585(100), 2.230(90), 2.069(80), 1.692(60)

IMA No. 2002-030Mg₂(BO₃)FOrthorhombic, *Pna2₁**a* 20.490, *b* 4.571, *c* 11.890 Å

Colorless; vitreous; transparent

Biaxial (+), α 1.609, β 1.620, γ 1.642, 2*V*(meas.) 65°, 2*V*(calc.) 71°

2.743(77), 2.474(49), 2.414(46), 2.241(100), 2.234(49), 1.708(92), 1.705(44)

Isostructural with Mg₂(BO₃)F;
structure determined**IMA No. 2002-037**(Ca,Na)(Ba,K)(Fe²⁺,Mn)₄Ti₂(Si₄O₁₄)O₂(F,OH,O)₃Monoclinic, *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, 2*V*(meas.) 65°

10.39(20), 3.454(100), 3.186(15), 2.862(15), 2.592(70), 2.074(40), 1.728(15)

Bafertisite series;
structure determined**IMA No. 2002-031**Na₂K(Y,REE) [Si₆O₁₅]Orthorhombic, *Ibmm**a* 10.623, *b* 14.970, *c* 8.552 ÅOrthorhombic, *Ibmm*K and REE analogue
of Na₃Y [Si₆O₁₅];

structure determined

IMA No. **2002-038**

$\text{Mg}_2(\text{Al}_{1-2x}\text{Mg}_x\text{Sn}_x)(\text{BO}_3)\text{O}_2$ Hulsite group;
Monoclinic, $P2/m$ structure determined
 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**

$\text{Hg}^{1+}_4\text{Al}(\text{PO}_4)_{1.74}(\text{OH})_{1.78}$ 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 indices of refraction 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**

$\text{Na}_2(\text{Ba,K})_6\text{Ce}_2\text{Fe}^{2+}\text{Ti}_3\text{Si}_{12}$
 $\text{O}_{36}(\text{OH})_3(\text{OH},\text{H}_2\text{O})_9$ 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**

$\text{K}(\text{Na})_2(\text{Mn,Fe,Mg})_2$
 $(\text{Be,Al})_3[\text{Si}_{12}\text{O}_{30}]$ Milarite group;
Hexagonal, $P6/mcc$ structure determined
 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**

$(\text{Mn}^{2+},\text{Ca})(\text{Ce,REE})\text{AlMn}^{3+}$
 $\text{Mn}^{2+}\text{Si}_2\text{O}_7\text{SiO}_4\text{O}(\text{OH})$ Epidote group;
Monoclinic, $P2_1/m$ structure determined
 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 chukhrovite-(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**

$(\text{Na,K})\text{Ca}_2(\text{Mg}_3\text{Al}_2)$
 $\text{Si}_5\text{Al}_3\text{O}_{22}(\text{OH})_2$ Amphibole group;
Monoclinic, $C2/m$ structure determined
 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;
Monoclinic, $C2/c$ structure determined
 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**

$\text{Tl}_6\text{Ag}_3\text{Cu}_6\text{As}_9\text{S}_{21}$ Related to imhofite;
Triclinic, $P\bar{1}$ structure determined
 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**

La(CO₃)(OH) Ancylyte group
 Orthorhombic, *Pmcn*
 a 4.986, b 8.513, c 7.227 Å
 Pale pinkish purple to white; vitreous; diaphaneity not given
 No optical data provided
 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**

Na₁₂Sr₃Ca₆Fe₃Zr₃NbSi₂₅O₇₃(O,OH,H₂O)₃Cl₂ 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**

(Na,□)₁₂(Na,Ce)₃Ca₆Mn₃Zr₃Nb
 (Si₂₅O₇₃)(OH)₃(CO₃)•H₂O 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**

(Na,□)₁₂(Ce, Na)₃Ca₆Mn₃Zr₃
 Nb(Si₂₅O₇₃)(OH)₃(CO₃)•H₂O Eudialyte group;
 structure determined
 Trigonal, *R3m*
 a 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**

Cu₄AgPb₂Bi₉S₁₈ 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**

(Ni,Co,Cu)₃₀(As₂O₇)₁₅ New structure-type
 Monoclinic, *C2*
 a 33.256, b 8.482, 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**

Cu₂Pd₃Se₄ Chrisstanleyite series;
 structure determined
 Monoclinic, *P2₁/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**

Na(H₃O)(UO₂)₃(SeO₃)₂O₂•4H₂O 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**

Cu₂HgPb₂₃Sb₂₇S_{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)Al₄(VO₃)₂ Ni-dominant analogue of alvanite;
 structure determined
 Monoclinic, *P2₁/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)(Mn²⁺,Fe²⁺,Li)₂
(Al,Si)₄Si₄O₁₂(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, 2*V*(meas.) 57°,
2*V*(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)₃₅Ca₁₂Fe₃Zr₆TiSi₅₁
O₁₄₄(O,OH,H₂O)₉Cl₃ Eudialyte group;
Trigonal, *R3* structure determined

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**

(H₃O)₈(Na,K,Sr)₅Ca₆
Zr₃Si₂₆O₆₆(OH)₉Cl Eudialyte group;
Trigonal, *R3* structure determined

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**

Na₁₅Ca₃Fe₃(Na,Zr)₃Zr₃(Si,Nb)
(Si₂₅O₇₃)(OH,H₂O)₃(Cl,OH) Eudialyte group;
Trigonal, *R3* structure determined

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,H₃O)₁₅(Ca,Mn,*REE*)₆Fe³⁺₂Zr₃(\square ,Zr)
(\square ,Si)Si₂₄O₆₆(O,OH)₆Cl•nH₂O Eudialyte group;
Trigonal, *R3m* structure determined

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**

Na₂₇K₈Ca₁₂Fe₃Zr₆Si₅₂
O₁₄₄(OH,O)₆Cl₂ Eudialyte group;
Trigonal, *R3m* structure determined

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
(Fe³⁺₂Mg₂Li)Si₈O₂₂(OH)₂ Amphibole group;
Monoclinic, *C2/m* structure determined

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**

Ca₃(PO₄)₃ 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 Case 98-D: discreditation
Monsmedite = **voltait**

IMA Case 98-E: discreditation
Arsenobismite = mixture of **preisingerite**, minor
atelestite and minor **beudantite** or **segnitite**

IMA Case 99-A: discreditation
Platynite = mixture of **laitakarite** and selenian **galena**

IMA Case 99-B: redefinition
Peprossiite-(Ce) is (Ce,La)(Al₃O)_{2/3}B₄O₁₀ (approximate ideal formula)

IMA Case 00-A: redefinition
Vuoriyarvite = **vuoriyarvite-K**
Kuzmenkoite = **kuzmenkoite-Mn**
Lemleinite = **lemleinite-K**
Labuntsovite (of Semenov & Burova 1955) =
labuntsovite-Mn
Labuntsovite (of Milton *et al.* 1958) =
paralabuntsovite-Mg

IMA Case 00-B: revalidation
Kurgantait

IMA Case 00–C: discreditation

Baiyuneboite-(Ce) = **cordylite-(Ce)**

IMA Case 00–D: redefinition

The nomenclature of the joaquinite group is redefined to conform with the Levinson system. The members of the group are: **orthojoaquinite-(La)**, **joaquinite-(Ce)**, **orthojoaquinite-(Ce)**, **strontiojoaquinite**, **strontio-orthojoaquinite**, **bario-orthojoaquinite**, **byelorussite-(Ce)**.

IMA Case 00–E: redefinition

Destinezite is triclinic $\text{Fe}_2(\text{PO}_4)(\text{SO}_4)(\text{OH}) \cdot 6\text{H}_2\text{O}$

IMA Case 00–F: redefinition

Hellandite = **hellandite-(Y)**

Tadzhikite = **tadzhikite-(Ce)**

IMA Case 00–G: redefinition

Neotype approved, and **magnesium-zippeite** is redefined as monoclinic $\text{Mg}(\text{UO}_2)_2(\text{SO}_4)(\text{OH})_4 \cdot 1.5\text{H}_2\text{O}$

IMA Case 01–A: redefinitions

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 = **magnesiotaaffeite-2N'2S**

Musgravite = **magnesiotaaffeite-6N'3S**

Pehrmanite = **ferrotaaffeite-6N'3S**

IMA Case 01–B: discreditation

Duhamelite = **mottramite**

IMA Case 02–A: redefinition and discreditation

Squawcreekite (of Foord *et al.* 1991) = **tripuhyite**, redefined as FeSbO_4

IMA Case 02–B: redefinition

Arhbarite is redefined as triclinic $\text{Cu}_2\text{Mg}(\text{AsO}_4)(\text{OH})_3$

IMA Case 02–D: corrected spelling

Mahlmoodite = **malhmoodite**

Approval of change in name

Magnocolumbite = **magnesiocolumbite**