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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**
$(Ce,La,Nd,Ba)(Fe^{3+},Al)_3[(As,Al)O_4]_2(OH)_6$
Fe-dominant analogue of arsenoflorencite-(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**
$(\square,K)_1(Mg,Fe^{2+})_3Fe^{3+}_2[Si_{12}O_{30}]$ Milarite group; structure determined
Hexagonal: *P6/mcc*
a 10.050, *c* 14.338 Å
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**
$NaSrKZn(Ti,Nb)_4(Si_4O_{12})_2(O,OH)_4 \cdot 7H_2O$
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**
$CoSO_4 \cdot H_2O$ Kieserite group
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**
$(K,Ba,Na)_2(Ti,Nb)_2(Si_4O_{12})(OH,O)_2 \cdot 3H_2O$
Labuntsovite group; structure determined
Monoclinic: C*m*
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**
$(Ba,Na,K)_{2-x}(Ti,Nb)_2(Si_4O_{12})(OH,O)_2 \cdot 4H_2O$
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**
$NaK_3Fe(Ti,Nb)_4(Si_4O_{12})_2(O,OH)_4 \cdot 6H_2O$
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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0003-004X/03/0010–1620$05.00

IMA No. **2002-008**
$Na_2H(PO_4)\cdot 8H_2O$ 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**
$NaNa_2(Al_2Mg_3)(Si_7Al)O_{22}(F,OH)_2$ Amphibole group; structure determined
Monoclinic: *C*2/*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 medium; 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**
$Na_2(Na,Ca)_4Ca_4(Mn,Ca)_2Zr_2Ti_2(Si_2O_7)_4(O,F)_4F_4$ 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**
$Ba_3NaCe(PO_4)_3(F,Cl)$ 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**
$Pb_3[(UO_2)_6O_8(OH)_2](H_2O)_x$; x ~ 3 New structure type
Monoclinic: *C*2/*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**
$BaBe_2Si_2O_7$ Dimorphous with barylite; structure 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**
$CaFe^{2+}Fe^{3+}(Mn,Fe^{2+})(Si_2O_7)O(OH)$ 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**
$MnV_2O_6\cdot 4H_2O$ New structure type
Monoclinic: *C*2/*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**
$(Mg,Fe)(Ta,Nb)_2O_6$ Columbite-tantalite group
Orthorhombic: *Pbcn*
a 14.355, *b* 5.735, *c* 5.058 Å
Black; semi-metallic to metallic; opaque
Light-grey; internal reflections (in air): brownish-red; anisotropism: weak; bireflectance: 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**
$Ba_2(La,Th,Ce)(CO_3)_3F$ 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**
$(Ca,K,Na)_{2-x}(Ti,Nb)_2(Si_4O_{12})(OH,O)_2\cdot 4H_2O$ Labuntsovite group; structure determined
Monoclinic: *C*2/*m*
a 14.484, *b* 14.191, *c* 7.907Å, 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**
$(Na,K,Ca)_{48}Si_{36}Al_{36}O_{144}[(SO_4)_8Cl_2]\cdot 3H_2O$ 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**
$Hg^{1+}Hg^{2+}OI$ Related to terlinguaite; new structure type
Monoclinic: *C*2/*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**
$Ce_2Si_2O_7$ Isostructural with $Ln_2Si_2O_7$
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**
$(Cu_{4.7}Ag_{3.3})_{\Sigma 8}GeS_6$ Argentian 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**
$Ce_3CaMg_2Al_2Si_5O_{19}(OH)_2F$ 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(meas.) 75°, 2V(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**
$(Na,Ca)_6(Ca,Na)_3Si_{16}O_{38}(F,OH)_2 \cdot 3H_2O$
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(meas.) 48°, 2V(calc.) 44°
11.99(100), 5.97(85), 3.97(40), 2.967(50), 2.888(100), 1.820(50)

IMA No. **2002-027**
$BaB_2Si_2O_8$ Ba-dominant analogue of danburite; structure determined
Orthorhombic: *Pnma*
a 8.141, 8.176, *c* 9.038 Å
White; vitreous; transparent
Biaxial (-), α 1.649, β 1.656, γ 1.656, 2V(meas.) 5°, 2V(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**
$Ca_{0.3}(Fe^{2+},Mg,Fe^{3+})_3(Si,Al)_4O_{10}(OH)_2 \cdot 4H_2O$
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(meas.) 5°, 2V(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**
$Na_6MnTi_4Si_8O_{28} \cdot 4H_2O$ Mn-dominanat 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(meas.) 70°, 2V(calc.)70°
14.47(100), 6.43(20), 4.83(10), 3.025(40), 2.881(20)

IMA No. **2002-030**
$Mg_2(BO_3)F$ Isostructural with $Mg_2(BO_3)F$; 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(meas.) 65°, 2V(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**
$Na_2K(Y,REE)$ $[Si_6O_{15}]$ K and *REE* analogue of Na_3 Y $[Si_6O_{15}]$;
structure determined
Orthorhombic: *Ibmm*
a 10.623, *b* 14.970, *c* 8.552 Å
White; vitreous; transparent
Biaxial (+), α 1.555, β 1.558, γ1.566, 2V (meas.) 64°, 2V (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**
$Na_{1-2}(Ti,Fe^{3+})_4(Si_7Al)O_{22}(OH)_4(H_2O)$ Related to vinogradovite; structure determined
Triclinic: *P*1
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(meas.) 64°, 2V(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**
$CdSO_4 \cdot 4H_2O$ 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(meas.) ~70°, 2V(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**
$(\square,Cu^{2+},V^{3+})_8$ $Al_8(PO_4)_8F_8(H_2O)_{23}$
New structure type
Orthorhombic: *Pmmn*
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(meas.) 76°, 2V(calc.) 76°
9.54(80), 6.08(100), 5.62(90), 3.430(40), 2.983(60), 2.661(40)

IMA No. **2002-036**
$(Ba,Ca)_2Al_3(Si,Al)_4O_{10}(CO_3)(OH)_6 \cdot nH_2O$
Surite series
Monoclinic: *C*2/*m*, *C*2 or C*m*
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(meas.) 0–10°, 2V(calc.) 0°
4.49(90), 3.68(60), 2.585(100), 2.230(90), 2.069(80), 1.692(60)

IMA No. **2002-037**
$(Ca,Na)(Ba,K)(Fe^{2+},Mn)_4Ti_2(Si_4O_{14})O_2(F,OH,O)_3$ Bafertisite series; structure determined
Monoclinic: *C*2
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(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**
$Mg_2(Al_{1-2x}Mg_xSn_x)(BO_3)O_2$ Hulsite group; structure determined
Monoclinic: *P*2/*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(meas.) 33°, 2V(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**
$Hg_4^{1+}Al(PO_4)_{1.74}(OH)_{1.78}$ New structure type
Monoclinic: *C*2/*c*
a 17.022, *b* 9.074, *c* 7.015 Å, β 101.20°
Colorless to white; vitreous; transparent to translucent
Biaxial (+), *n*(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**
$KPb_{1.5}ZnCu_6O_2(SeO_3)_2Cl_{10}$New structure type
Orthorhombic: *Pnnm*
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**
$Na_2(Ba,K)_6Ce_2Fe^{2+}Ti_3Si_{12}O_{36}(OH)_3(OH,H_2O)_9$
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**
$Zn_2Te_3O_8$ 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**
$K(\square,Na)_2(Mn,Fe,Mg)_2(Be,Al)_3[Si_{12}O_{30}]$
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**
$(Mn^{2+},Ca)(Ce,REE)AlMn^{3+}Mn^{2+}Si_2O_7SiO_4O(OH)$ 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 (+), α > 1.74, 2V(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**
$Ca_4AlSi(SO_4)F_{13}\cdot 12H_2O$ Related to chukhrovite-(Ce)
Cubic: $Fd\bar{3}$
a 16.722 Å
White to yellowish; vitreous; transparent
Isotropic; *n*(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**
$(Na,K)Ca_2(Mg_3Al_2)Si_5Al_3O_{22}(OH)_2$ Amphibole group; structure determined
Monoclinic: *C* 2/*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(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**
$K[(Al,Zn)_2(As,Si)_2O_8]$ Feldspar group; structure determined
Monoclinic: *C*2/*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(meas.) 60°; 2V(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**
$Tl_6Ag_3Cu_6As_9S_{21}$ Related to imhofite; structure determined
Triclinic: *P*1bar
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**
$La(CO_3)(OH)$ Ancylite 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
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**
$Na_{12}Sr_3Ca_6Fe_3Zr_3NbSi_{25}O_{73}(O,OH,H_2O)_3Cl_2$
Eudialyte group; structure determined
Trigonal: *R*3*m*
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**
$(Na,\square)_{12}(Na,Ce)_3Ca_6Mn_3Zr_3Nb(Si_{25}O_{73})(OH)_3(CO_3)\cdot H_2O$ Eudialyte group; structure determined
Trigonal: *R*3*m*
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**
$(Na,\square)_{12}(Ce,Na)_3Ca_6Mn_3Zr_3Nb(Si_{25}O_{73})(OH)_3(CO_3)\cdot H_2O$ Eudialyte group; structure determined
Trigonal: *R*3*m*
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**
$Cu_4AgPb_2Bi_9S_{18}$ Related to makovickyite; structure determined
Monoclinic: *C*2/*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**
$(Ni,Co,Cu)_{30}(As_2O_7)_{15}$ New structure type
Monoclinic: *C*2
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**
$Cu_2Pd_3Se_4$ 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**
$Na(H_3O)(UO_2)_3(SeO_3)_2O_2\cdot 4H_2O$ Related to

haynesite; structure determined
Monoclinic: *P*11*m*
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: *C*2 or *C*2/*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**
$(Na,K,Sr)_{35}Ca_{12}Fe_3Zr_6TiSi_{51}O_{144}(O,OH,H_2O)_9Cl_3$
Eudialyte group; structure determined
Trigonal: *R*3
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: *R*3
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: *R*3
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**
$(Na,H_3O)_{15}(Ca,Mn,REE)_6Fe_2^{3+}Zr_3(\square,Zr)(\square,Si)Si_{24}O_{66}(O,OH)_6Cl\cdot nH_2O$ Eudialyte group; structure determined
Trigonal: *R*3*m*
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: *R*3*m*
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**
$Na(Na_{1.0\text{-}1.5}Li_{0.5\text{-}1.0})_2(Fe_2^{3+}Mg_2Li)Si_8O_{22}(OH)_2$
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: *R*3*m*
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/signitite

IMA Code 99-A – Platynite **discredited** = mixture of laitakarite and selenian galena.

IMA Code 99-B – Peprossiite-(Ce) **redefined** as $(Ce,La)(Al_3O)_{2/3}B_4O_{10}$.

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); tadzhikite = tadzhikite-(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-8*H* = magnesiohögbomite-2*N*2*S*; högbomite-10*T* = magnesiohögbomite-2*N*3*S*; högbomite-24*R* = magnesiohögbomite-6*N*6*S*; zincohögbomite-8*H* = zincohögbomite-2*N*2*S*; zincohögbomite-16*H* = zincohögbomite-2*N*6*S*; nigerite-6*T* = ferronigerite-2*N*1*S*; nigerite-24*R* = ferronigerite-6*N*6*S*; pengzhizhongite-6*T* = magnesionigerite-2*N*1*S*; pengzhizhongite-24*R* = magnesionigerite-6*N*6*S*; taaffeite = magnesiotaaffeite-2*N*'2*S*; musgravite = magnesiotaaffeite-6*N*'3*S*; pehrmanite = ferrotaaffeite-6*N*'3*S*;

IMA Code 01-B - Duhamelite **discredited** = mottramite.

IMA Code 02-A - Tripuhyite 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 malhmoodite.

Name change approved – "magnocolumbite" is now magnesiocolumbite