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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**
$(Ce,La,Nd,Ba)(Fe^{3+},Al)_3[(As,Al)O_4]_2(OH)_6$ — Fe-dominant analogue of
Trigonal, *R*3*m* — arsenoflorencite-(Ce)
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**
$(\square,K)(Mg,Fe^{2+})_3Fe^{3+}_2[Si_{12}O_{30}]$ — Milarite group;
Hexagonal, *P*6/*mcc* — structure determined
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;
Monoclinic, *Cm* — 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**
$CoSO_4•H_2O$ Kieserite group
Monoclinic, *C*2/*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**
$(K,Ba,Na)_2(Ti,Nb)_2(Si_4O_{12})(OH,O)_2•3H_2O$ 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**
$(Ba,Na,K)_{2-x}(Ti,Nb)_2(Si_4O_{12})(OH,O)_2•4H_2O$ Labuntsovite group;
Monoclinic, *C*2/*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**
$NaK_3Fe(Ti,Nb)_4(Si_4O_{12})_2(O,OH)_4•6H_2O$ 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**
$Na_2H(PO_4)•8H_2O$ 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, 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**
$NaNa_2(Al_2Mg_3)(Si_7Al)O_{22}(F,OH)_2$ Amphibole group;
Monoclinic, *C*2/*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**
$Na_2(Na,Ca)_4Ca_4(Mn,Ca)_2Zr_2Ti_2(Si_2O_7)_4(O,F)_4F_4$ Rosenbuschite group;
Triclinic, *P*1 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**
$Ba_3NaCe(PO_4)_3(F,Cl)$ Ba-dominant analogue of belovite-(Ce);
Trigonal, $P\bar{3}$ structure determined
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**
$Pb_3[(UO_2)_6O_8(OH)_2](H_2O)_x$, $x \approx 3$ 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;
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**
$CaFe^{2+}Fe^{3+}(Mn,Fe^{2+})(Si_2O_7)O(OH)$ 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 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**
$MnV_2O_6 \cdot 4H_2O$ 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; semimetallic 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);
Monoclinic, $P2_1/m$ structure determined
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, 2*V*(meas.) 5°, 2*V*(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;
Monoclinic, *C*2/*m* structure determined
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, 2*V*(meas.) 30°, 2*V*(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;
Hexagonal or trigonal,
*P*62*c* or *P*31*c* 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**
$Hg^{1+}Hg^{2+}OI$ Related to terlinguaite;
Monoclinic, *C*2/*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. **2002–023**
$Ce_2Si_2O_7$ 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*43*m*
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**
$Ce_3CaMg_2Al_2Si_5O_{19}(OH)_2F$ 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, 2*V*(meas.) 75°, 2*V*(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;
Triclinic, *P*1 structure determined
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)

IMA No. **2002–027**
$BaB_2Si_2O_8$ Ba-dominant analogue of danburite;
Orthorhombic, *Pnma* structure determined
a 8.141, 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)

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; 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)

IMA No. **2002–029**
$Na_6MnTi_4Si_8O_{28} \cdot 4H_2O$ 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, 2*V*(meas.) 70°, 2*V*(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 $Mg_2(BO_3)F$;
Orthorhombic, $Pna2_1$ structure determined
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)

IMA No. **2002–031**
$Na_2K(Y,REE)[Si_6O_{15}]$ K and *REE* analogue of $Na_3Y[Si_6O_{15}]$;
Orthorhombic, *Ibmm* structure determined
a 10.623, *b* 14.970, *c* 8.552 Å
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. **2002–033**
$Na_{1-2}(Ti,Fe^{3+})_4(Si_7Al)O_{22}(OH)_4(H_2O)$ Related to vinogradovite;
Triclinic, *P*1 structure determined
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)

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, 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)

IMA No. **2002–035**
$(\square,Cu^{2+},V^{3+})_8Al_8(PO_4)_8F_8(H_2O)_{23}$ 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, 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. **2002–036**
$(Ba,Ca)_2Al_3(Si,Al)_4O_{10}(CO_3)(OH)_6 \cdot nH_2O$ Surite group
Monoclinic, *C*2/*m*, *C*2 or C*m*
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. **2002–037**
$(Ca,Na)(Ba,K)(Fe^{2+},Mn)_4Ti_2(Si_4O_{14})O_2(F,OH,O)_3$ Bafertisite series;
Monoclinic, *C*2 structure determined
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)

IMA No. **2002–038**
$Mg_2(Al_{1-2x}Mg_xSn_x)(BO_3)O_2$ Hulsite group;
Monoclinic, *P*2/*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, 2*V*(meas.) 33°, 2*V*(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**
$Hg^{1+}{}_4Al(PO_4)_{1.74}(OH)_{1.78}$ 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 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**
$Na_2(Ba,K)_6Ce_2Fe^{2+}Ti_3Si_{12}$
$O_{36}(OH)_3(OH,H_2O)_9$ New structure-type
Trigonal, *R*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, *C*2/*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**
$K(\_,Na)_2(Mn,Fe,Mg)_2$
$(Be,Al)_3[Si_{12}O_{30}]$ Milarite group;
Hexagonal, *P*6/*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**
$(Mn^{2+},Ca)(Ce,REE)AlMn^{3+}$
$Mn^{2+}Si_2O_7SiO_4O(OH)$ 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 (+), α > 1.74, 2*V*(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**
$Ca_4AlSi(SO_4)F_{13}{\bullet}12H_2O$ Related to chukhrovite-(Ce)
Cubic, *Fd*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;
Monoclinic, *C*2/*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, 2*V*(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;
Monoclinic, *C*2/*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, 2*V*(meas.) 60°; 2*V*(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;
Triclinic, *P*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**
$La(CO_3)(OH)$ 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 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**
$Na_{12}Sr_3Ca_6Fe_3Zr_3NbSi_{25}O_{73}(O,OH,H_2O)_3Cl_2$
Eudialyte group;
Trigonal, *R*3*m* structure determined
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**
$(Na,\square)_{12}(Na,Ce)_3Ca_6Mn_3Zr_3Nb(Si_{25}O_{73})(OH)_3(CO_3)\bullet H_2O$ Eudialyte group;
Trigonal, *R*3*m* structure determined
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**
$(Na,\square)_{12}(Ce, Na)_3Ca_6Mn_3Zr_3Nb(Si_{25}O_{73})(OH)_3(CO_3)\bullet H_2O$ Eudialyte group;
Trigonal, *R*3*m* structure determined
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**
$Cu_4AgPb_2Bi_9S_{18}$ Related to makovickyite;
Monoclinic, *C*2/*m* structure determined
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, *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;
Monoclinic, $P2_1/c$ structure determined
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**
$Na(H_3O)(UO_2)_3(SeO_3)_2O_2\bullet 4H_2O$
Related to haynesite;
Monoclinic, *P*11*m* structure determined
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, 2*V*(meas.) 20°; 2*V*(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;
Monoclinic, $P2_1/n$ structure determined
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, 2*V*(meas.) 86°, 2*V*(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, 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**
$(Na,K,Sr)_{35}Ca_{12}Fe_3Zr_6TiSi_{51}$
$O_{144}(O,OH,H_2O)_9Cl_3$ Eudialyte group;
Trigonal, *R*3 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**
$(H_3O)_8(Na,K,Sr)_5Ca_6$
$Zr_3Si_{26}O_{66}(OH)_9Cl$ Eudialyte group;
Trigonal, *R*3 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**
$Na_{15}Ca_3Fe_3(Na,Zr)_3Zr_3(Si,Nb)$
$(Si_{25}O_{73})(OH,H_2O)_3(Cl,OH)$ Eudialyte group;
Trigonal, *R*3 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**
$(Na,H_3O)_{15}(Ca,Mn,REE)_6Fe^{3+}{}_2Zr_3(\square,Zr)$
$(\square,Si)Si_{24}O_{66}(O,OH)_6Cl{\bullet}nH_2O$ Eudialyte group;
Trigonal, *R*3*m* 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**
$Na_{27}K_8Ca_{12}Fe_3Zr_6Si_{52}$
$O_{144}(OH,O)_6Cl_2$ Eudialyte group;
Trigonal, *R*3*m* 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**
$Na(Na_{1.0-1.5}Li_{0.5-1.0})_2$
$(Fe^{3+}{}_2Mg_2Li)Si_8O_{22}(OH)_2$ Amphibole group;
Monoclinic, *C*2/*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**
$Ca_3(PO_4)$ 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 Case 98–D: discreditation
Monsmedite = **voltaite**

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 $(Ce,La)(Al_3O)_{2/3}B_4O_{10}$ (approximate ideal formula)

IMA Case 00–A: redefinition
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 Case 00–B: revalidation
Kurgantaite

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 $Fe_2(PO_4)(SO_4)(OH)\cdot 6H_2O$

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 $Mg(UO_2)_2(SO_4)(OH)_4\cdot 1.5H_2O$

IMA Case 01–A: redefinitions
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 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 $Cu_2Mg(AsO_4)(OH)_3$

IMA Case 02–D: corrected spelling
Mahlmoodite = **malhmoodite**
Approval of change in name
Magnocolumbite = **magnesiocolumbite**