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New minerals approved in 2003 and nomenclature modifications approved in 2003 by the Commission on New Minerals and Mineral Names, International Mineralogical Association

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

Each mineral is described in the following format:
IMA No.
Chemical Formula
Any relationship to other minerals
Structure analysis
Crystal system, space group
Unit-cell parameters
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.

2003 PROPOSALS

IMA No. **2003-001**
$(Ba,Ca,K,Na,Sr)_5Al_9Si_{27}O_{72}\cdot 22H_2O$
Ba-dominant analogue of heulandite
Structure determined
Monoclinic: *C*2/*m*
a 17.738, *b* 17.856, *c* 7.419 Å, β 116.55°
Colorless to white, rarely very pale yellowish white; vitreous, pearly; translucent to transparent
Biaxial (+), α 1.5056, β 1.5064, γ 1.5150, 2*V*(meas.) 38°, 2*V*(calc.)34.1°
7.94(66), 5.12 (59), 4.65(66), 3.978(97), 3.181(56), 2.973(100), 2.807(65)

IMA No. **2003-002**
$Na(Ba,Sr,Na,REE)PO_4$
Ba-dominant analogue of olgite
Structure determined
Trigonal: *P*3
a 5.549, *c* 7.032(2) Å
Light-green; vitreous; transparent
Uniaxial (–), ω 1.628, ε 1.623
7.04(22), 3.964(60), 2.839(100), 2.774(100), 2.344(20), 1.984(40), 1.611(26)

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IMA No. **2003-003**
$Ba_2Zn(Ti,Nb)_4(Si_4O_{12})_2(O,OH)_4\cdot 7H_2O$
Labuntsovite group, kuzmenkoite subgroup
Structure determined
Monoclinic: *Cm*
a 14.381, *b* 13.889, *c* 7.793(2) Å, β 117.52°
Pale brown (light coffee-colored); vitreous; transparent
Biaxial (+), α 1.683, β 1.692, γ 1.795, 2*V*(meas.) 30°, 2*V*(calc.) 34.5°
6.95(37), 6.39(10), 4.91(6), 3.194(100), 3.101(22), 3.050(8), 2.906(6)

IMA No. **2003-004**
$(Cu,Fe)(Re,Mo)_4S_8$
Cubic: $F\bar{4}3m$
a 9.563 Å
Black; metallic; opaque
In reflected light: bluish-green, no internal reflections, isotropic.
R(air): 38.2 (470 nm), 37.9 (546 nm), 37.4 (589 nm), 36.6 (650 nm)
5.53(100), 2.885(90), 2.389(90), 2.194(70), 1.952(60), 1.841(90), 1.690(80)

IMA No. **2003-005**
$Ca_2(Zn,Mg)[PO_4]_2\cdot 2H_2O$
Zn-dominant analogue of collinsite
Structure determined
Triclinic: $P\bar{1}$
a 5.736, *b* 6.767, *c* 5.462 Å, α 97.41, β 108.59, γ 107.19°
Colorless, gray with greenish or bluish tint in aggregates and

larger crystals; vitreous in crystals and silky in aggregates; transparent
Biaxial (+), α 1.6348, β 1.6495, γ 1.6686, $2V_z$ (calc.) 83.4°
6.24(34), 3.230(22), 3.130(37), 3.038(40), 2.690(100), 1.668(22)

IMA No. **2003-006**
$BaV^{4+}_{2}V^{3+}_{12}Si_2O_{27}$
New structure type
Trigonal: $P\overline{3}$
a 7.6014, *c* 9.2195 Å
Steel-gray to black; submetallic to dull; opaque
In reflected light: gray with weak brownish tint; no internal reflections; weak bireflectance, pleochroism and anisotropy. R_{min} and R_{max} (air): 15.9–16.8 (470 nm), 16.0–17.3 (546 nm), 15.9–17.4 (589 nm), 16.1–17.7 (650 nm)
9.22(53), 3.100(70), 2.785(100), 2.679(62), 2.402(48), 2.190(97), 1.934(75)

IMA No. **2003-007**
(Ca,Fe,Th)(REE,Ca)(Al,Cr,Ti)$_2$(Mg,Fe,Al)Si_3O_{12}(OH,F) with La > Ce
Epidote group
Structure determined
Monoclinic: $P2_1/m$
a 8.9616, *b* 5.7265, *c* 10.2353 Å, β 115.193°
Black, very dark brown; vitreous; opaque
Biaxial (+), α 1.7395, β 1.7434, γ 1.7495, $2V_\gamma$(meas.) 77.0°, $2V_\gamma$(calc.) 77.5°
3.53(49), 2.926(100), 2.860(53), 2.714(41), 2.699(44), 2.623(38), 2.553(51)

IMA No. **2003-008**
$(Na,Sr,K,Ca)_7(Ti,Nb)_8[Si_4O_{12}]_4(O,OH)_8 \cdot nH_2O$ $n \sim 8$
Labuntsovite group
Structure determined
Monoclinic: *C*2/*m*
a 14.596, *b* 14.249, *c* 15.852 Å, β 117.27(10)°
Colorless; vitreous; transparent
Biaxial (+), α 1.657, β 1.666, γ 1.765, 2*V*(meas.) 19-31°, 2*V*(calc.) 35°
7.09(100), 3.24(90), 3.15(80), 3.11(80), 2.54(70), 2.491(70)

IMA No. **2003-009**
$U^{6+}_{2-x}Ti(O_{8-x}OH_{4x})[(H_2O)_3Ca_x]$
New structure type
Trigonal: *P*3
a 10.824, *c* 7.549 Å
Canary-yellow to orange-yellow; vitreous; translucent
Uniaxial (+), ω 1.815, ε 1.910
4.60(100), 2.90(80), 1.87(30), 1.747(30), 1.211(30)

IMA No. **2003-010**
$CuZn(PO_4)OH$
Zn-dominant analogue of libethenite
Structure determined
Orthorhombic: *Pnnm*
a 8.3263, *b* 8.2601, *c* 5.8771 Å
Bright-green with a bluish tint; vitreous; translucent
Biaxial (–), α 1.660, β 1.705, γ 1.715
5.87(39), 4.79(100), 3.699(22), 2.935(33), 2.632(47), 2.405(19), 2.304(18)

IMA No. **2003-011**
$(Cd,Pb)Bi_2S_4$
Pavonite homologous series
Structure determined
Monoclinic: *C*2/*m*
a 13.096, *b* 4.004, *c* 14.717 Å, β 115.602(5)°
Dark gray (reddish); metallic; opaque
In reflected light: white, no internal reflections, distinct bireflectance, strong anisotropy
R_{min} and R_{max} (air): 29.6–36.4 (470 nm), 32.4–38.8 (546 nm), 31.8–38.2 (589 nm), 31.4–37.7 (650 nm)
3.689(97), 3.648(84), 3.508(81), 3.109(38), 2.935(100), 2.804(93), 2.338(43)

IMA No. **2003-012**
$Cu_2[BO(OH)_2](OH)_3$
New structure type
Orthorhombic: *Pnma*
a 9.455, *b* 5.866, *c* 8.668 Å
Blue; vitreous; translucent
Biaxial (–), α 1.627, β 1.699, γ 1.769, 2*V*(calc.) 86°
4.73(100), 3.941(90), 3.192(40), 2.545(45), 2.489(50), 1.838(40), 1.712(40)

IMA No. **2003-013**
$Na_{12}(Mn,Sr,REE)_3Ca_6Fe^{2+}_3Zr_3NbSi_{25}O_{76}Cl_2 \cdot H_2O$
Eudialyte group
Structure determined
Trigonal: *R*3*m*
a 14.262, *c* 29.949 Å
Yellow-green (different shades); vitreous; transparent or translucent
Uniaxial (–), ω 1.639, ε 1.631
6.42(54), 4.30(62), 3.202(100), 3.155(71), 2.975(98), 2.857(94), 2.591(54)

IMA No. **2003-014**
Fe_2Si
Cubic: *Pm*3*m*
a 2.831 Å
No macroscopic data (grains up to 35 μm)
In reflected light: yellowish-white, isotropic. R: 47.1 (470 nm), 48.8 (546 nm), 50.0 (589 nm), 50.9 (650 nm)
2.831, 2.000, 1.631, 1.415, 1.267, 1.157, 1.000 (no intensities given)

IMA No. **2003-015**
$(K,Na)_2(Mn,Fe)(Nb,Ti)_4(Si_4O_{12})_2(O,OH)_4 \cdot 6H_2O$
Labuntsovite group
Structure determined
Monoclinic: *C*2/*m*
a 14.563, *b* 13.961, *c* 7.851(2) Å, β 117.62°
Orange-yellow to brownish; vitreous; translucent to transparent

Biaxial (+), α 1.670, β 1.685, γ 1.775(5), 2*V*(meas.) 52°, 2*V*(calc.) 46°
6.96(100), 6.40(20), 4.94(80), 3.22(90), 3.10(80), 2.510(40)

IMA No. **2003-016**
$(Hg_2)^{2+}_{10}O_6I_3(Br_{1.6}Cl_{1.4})_{\Sigma 3.0}[(CO_3)_{0.8}S^{2-}_{0.2}]_{\Sigma 1.0}$
Structure determined
Triclinic: $P\bar{1}$
a 9.344, *b* 10.653, *c* 18.265 Å, α 93.262, β 90.548, γ 115.422°
Silvery gray to black to dark red-black; adamantine to metallic; translucent to opaque
In reflected light: gray; abundant, orange-red to blood-red internal reflections; no bireflectance, no pleochroism; moderate to strong anisotropy. R_{min} and R_{max} (air): 28.6–29.5 (470 nm), 26.2–27.1 (546 nm), 24.6–25.7 (589 nm), 22.8–24.0 (650 nm)
7.64(60), 4.20(80), 3.296(50), 3.132(90), 2.894(100), 2.722(80), 2.629(50)

IMA No. **2003-017**
$(REE,Ca)_4(Fe^{3+},Ti,Fe^{2+},\square)(Ti,Fe^{3+},Fe^{2+},Nb)_4Si_4O_{22}$
Fe-dominant analogue of polyakovite-(Ce)
Structure determined
Monoclinic: *C*2/*m*
a 13.385, *b* 5.742, *c* 11.059 Å, β 100.60°
Black or brown-black; submetallic pitchy; opaque
Biaxial (–), α 1.937, β not determined, γ 1.970
In reflected light: gray; yellowish-gray internal reflections; weak bireflectance and pleochroism; strong anisotropy. R_{min} and R_{max} (air): 12.5–14.6 (470 nm), 12.1–14.4 (546 nm), 12.1–14.3 (589 nm), 11.2–13.7 (650 nm)
4.89(35), 3.490(40), 3.189(80), 3.004(40), 2.874(40), 2.760(40), 2.722(100)

IMA No. **2003-018**
$Na_{5.5}Mn_{0.25}ZrSi_6O_{16}(OH)_2$
Lovozerite group
Structure determined
Monoclinic: *C*2/*m*
a 10.693, *b* 10.299, *c* 7.373(4) Å, β 91.91°
Dark cherry-colored; vitreous; transparent
Biaxial (–), some grains are uniaxial (–); α 1.585, β ≈ γ 1.589, 2V(meas.) < 5°, 2V(calc.) ~0°
7.40(36), 5.31(51), 3.690(43), 3.342(84), 3.270(92), 2.652(100), 2.580(91), 1.849(39)

IMA No. **2003-019**
$Na_6Sr_{12}Ba_2Zr_{13}Si_{39}B_4O_{123}(OH)_6{\cdot}20H_2O$
Related to benitoite
Structure determined
Hexagonal: $P6_3cm$
a 26.509, *c* 9.975 Å
Colorless to gray; vitreous; translucent
Uniaxial (+), ω 1.640, ε 1.663
5.76(40), 3.924(30), 3.761(90), 3.310(25), 3.150(50), 2.760(100), 1.991(70)

IMA No. **2003-020**
Cu_6GeWS_8
Hexagonal: $P6_3/mmc$, $P\bar{6}2c$ or $P6_3mc$
a 7.523, *c* 12.384 Å
Gray; metallic; opaque
In reflected light: grayish white with a distinct brownish tint; red internal reflections; no pleochroism, weak bireflectance; weak anisotropy. R_{min} and R_{max} (air): 24.5–25.2 (470 nm), 24.1–24.5 (546 nm), 24.5–25.1 (589 nm), 23.4–23.7 (650 nm)
6.18(40), 5.78(100), 3.153(40), 2.887(40), 2.417(40), 1.971(50), 1.881(80), 1.744(50)

IMA No. **2003-021**
$Cu_2Mg_2(Mg,Cu)(OH)_4(H_2O)_4(AsO_4)_2$
Isotypic with akrochordite
Structure determined
Monoclinic: $P2_1/c$
a 5.475, *b* 16.865, *c* 6.915 Å,β 99.80°
Blue; vitreous; transparent
Biaxial (–), α 1.664, β 1.691, γ 1.695, 2*V* (meas.) 31°, 2*V* (calc.) 42°
8.42(100), 4.32(21), 4.21(64), 3.016(12), 2.907(10), 2.809(7)

IMA No. **2003-022**
$Cs(Be_2Li)Al_2Si_6O_{18}$
Beryl group
Structure determined
Hexagonal: *R*3*c*
a 15.946, *c* 27.803 Å
Raspberry red to pink; vitreous; translucent to transparent
Uniaxial (–), ω 1.616, ε 1.608
3.271(100), 3.027(41), 3.019(29), 2.871(52), 2.229(12), 2.215(14), 1.636(14)

IMA No. **2003-024**
$(Zr,Mn)_2(Zr,Ti)(Mn,Na)(Na,Ca)_4(Si_2O_7)_2(O,F)_4$
Seidozerite group
Structure determined
Monoclinic: *P*2/*c*
a 5.6082, *b* 7.1387, *c* 18.575 Å, β 102.60°
Yellowish brown to dark brown; vitreous; translucent
Biaxial, birefringence on (001) is 0.041: α 1.694, γ_I 1.735, 2*V* > 90°
3.949(15), 3.027(68), 2.898(100), 2.613(26), 2.459(24), 1.853(24), 1.786(14), 1.650(14)

IMA No. **2003-025**
$Th_{0.5}(UO_2)_2Si_5O_{13}{\cdot}3H_2O$
Isostructural with weeksite
Orthorhombic: *Cmmb*
a 14.1676, *b* 14.1935, *c* 35.754 Å
Yellow; waxy to silky; transparent to translucent
Biaxial (–), α 1.620, β 1.627, γ 1.629, 2*V*(meas.) 40°, 2*V*(calc.) 56.1°
7.06(100), 5.56(59), 4.58(47), 3.528(86), 3.287(57), 3.188(73), 2.981(46), 2.904(78)

IMA No. **2003-026**
$(Cu,\square)_6(Pb,Bi)Se_4$
Structure determined

Monoclinic: $P2_1/m$
a 9.5341, *b* 4.1004, *c* 10.2546 Å, β 100.066º
Black; metallic; opaque
In reflected light: gray, no internal reflections, no pleochroism, very weak bireflectance, very weak anisotropism. R_{min} and R_{max} (air): 36.6–38.1 (470 nm), 36.45–38.1 (546 nm), 36.6–38.3 (589 nm), 36.6–38.5 (650 nm)
3.189(100), 3.132(100), 2.601(70), 2.505(50), 2.151(60), 2.058(80), 1.909(50)

IMA No. **2003-027**
$Pb_{21}SnAs_{11}Bi_{11}S_{50}Cl_8Se$
Structure determined
Orthorhombic: *F*2*mm*
a 45.824, *b* 8.368, *c* 53.990 Å
Silvery gray; metallic; opaque
In reflected light: white, no internal reflections, no pleochroism, no bireflectance, weak anisotropism. *R* (air): 34.25 (470 nm), 32.95 (546 nm), 32.60 (589 nm), 31.05 (650 nm)
3.34(80), 3.17(60), 2.85(80), 2.69(80), 2.17(60), 2.10(70), 2.07(100), 2.04(50)

IMA No. **2003-028**
(La,Ce)OF
Structure determined
Cubic: *Fm*3*m*
a 5.628 Å
Light yellow; powdery; translucent
Isotropic, n = 1.85
3.252(100), 2.815(26), 1.991(56), 1.6969(39)

IMA No. **2003-029**
$Mn(C_2O_4)\cdot 2H_2O$
Mn analogue of humboldtine (oxalate)
Monoclinic: *C*2/*c*
a 11.955, *b* 5.632, *c* 9.967 Å, β 128.34°
White to grayish white; vitreous; transparent
Biaxial (–), α 1.424, β 1.550, γ 1.65, 2*V*(meas.) 80°, 2*V*(calc.) 77°
4.85(26), 4.80(100), 4.70(84), 3.91(23), 3.62(22), 2.996(58)

IMA No. **2003-030**
$CeCu_6(AsO_4)_3(OH)_6\cdot 3H_2O$
Mixite group
Hexagonal: $P6_3/m$
a 13.59, *c* 5.89 Å
Green to yellowish green; vitreous, in part silky; translucent to transparent
Uniaxial (+), ω 1.725, ε 1.810
11.88(10), 4.47(8), 3.56(8), 2.95(8), 2.70(5), 2.57(5), 2.46(9)

IMA No. **2003-032**
Tl(Cl,Br)
Sal ammoniac group
Structure determined
Cubic: *Pm*3*m*
a 3.8756 Å
Gray-brown; resinous to greasy; translucent
Isotropic, *n* (calc.) 2.015
3.887(80), 2.745(100), 2.237(55), 1.937(50), 1.733(45), 1.583(70)

IMA No. **2003-033**
$NaFe^{3+}_2(Mg,Mn)(AsO_4)_3\cdot H_2O$
Alluaudite group
Structure determined
Monoclinic: *C*2/*c*
a 12.181, *b* 12.807, *c* 6.6391 Å, β 112.441°
Brown to brown-black; adamantine; translucent
Biaxial (–), α 1.870, β 1.897, γ 1.900, 2*V*(meas.) 35°, 2*V*(calc.) 36.5°
6.40(20), 5.63(20), 3.575(30), 3.202(40), 2.917(35), 2.768(100), 2.611(40)

IMA No. **2003-034**
$Cs_4Na_2Zr_3(Si_{18}O_{45})(H_2O)_2$
Phyllosilicate
New structure type
Monoclinic: *C*2/*c*
a 26.3511, *b* 7.5464, *c* 22.9769, β 107.237°
Colorless; vitreous; transparent
Biaxial (–), α 1.585, β 1.598, γ 1.603, 2*V*(calc.) 63°
6.32(50), 3.65(50), 3.35(100), 3.14(90), 2.82(50), 2.62(70)

IMA No. **2003-035**
$SrB_2Si_2O_8$
Sr-dominant analogue of danburite
Structure determined
Orthorhombic: *Pnma*
a 8.155, *b* 7.919, *c* 8.921 Å
Colorless; vitreous; transparent
Biaxial (–), α 1.597, β 1.627, γ 1.632, 2*V* (meas.) 43°, 2*V*(calc.) 44°
5.94(60), 3.62(100), 3.51(90), 3.31(80), 3.01(60), 2.786(90), 2.706(60), 1.982(70)

IMA No. **2003-036**
$Ba_2Mn(VO_4)_2(OH)$
Mn-dominant analogue of gamagarite
Monoclinic: $P2_1/m$
a 9.10, *b* 6.13, *c* 7.89, β 112.2°
Black-red; vitreous; translucent
Biaxial, *n* (calc.) 2.03
3.46(26), 3.31(100), 3.00(16), 2.90(19), 2.80(62), 2.71(40), 2.16(18)

IMA No. **2003-037**
$Ce_2Fe^{2+}[Si_2O_7](CO_3)$
New structure type
Monoclinic: $P2_1/c$
a 6.512, *b* 6.744, *c* 18.94(4) Å, β 111.90°
Brown; vitreous; translucent
Biaxial (–), α 1.785, β 1.810, γ 1.820, 2*V* (meas.) 66°, 2*V*(calc.) 64°
4.41(4), 3.61(4), 3.30(5), 2.92(10), 2.65(5), 2.23(5)

IMA No. **2003-039**

$Pb_2(Pb,Sb)_2S_8[Te,Au]_2$
Nagyágite-buckhornite homologous series
Monoclinic: $P2_1/m$
a 4.361, *b* 6.618, *c* 20.858 Å, β 92.71°
Dark silver-gray; metallic; opaque
In reflected light: gray color, very low bireflectance and pleochroism, distinct anisotropy. *R*(air): 38.4–40.3 (471 nm), 38.1–40.1 (548 nm), 37.5–39.4 (587 nm), 35.9–38.0 (652 nm)
6.93(38), 4.80(52), 4.10(40), 3.56(100), 3.47(58), 3.31(40), 2.99(50), 2.98(30), 2.56(41)

IMA No. **2003-040**
$(Mg,Cu)SO_4·7H_2O$
Melanterite group
Structure determined
Monoclinic: $P2_1/c$
a 14.166, *b* 6.534, *c* 10.838 Å, β 105.922°
Blue; vitreous; transparent
Biaxial (+), α 1.462, β 1.465, γ 1.469, 2*V*(meas.) 79.8°, 2*V*(calc.) 82°
4.85(100), 4.79(14), 4.44(16), 3.779(38), 3.663(15), 3.254(15), 3.078(14), 2.721(14)

IMA No. **2003-041**
$Cu_3Zn(OH)_6Cl_2$
Related to paratacamite
Structure determined
Trigonal: $R\bar{3}m$
a 6.834, *c* 14.075 Å
Dark-green to blue-green; vitreous; transparent
Uniaxial (–), ω 1.825, ε 1.815
5.47(55), 4.70(14), 2.899(11), 2.764(100), 2.730(13), 2.266(36), 1.820(13), 1.709(18)

IMA No. **2003-042**
$CdIn_2S_4$
Linnaeite group
Cubic: $Fd3m$
a 10.81 Å
Black; adamantine; translucent
In reflected light: gray color, isotropic, brown-red internal reflections. *R*(air): 23.9 (470 nm), 21.6 (546 nm), 20.8 (589 nm), 20.2 (650 nm)
3.87(4), 3.27(10), 2.70(6), 2.07(8), 1.91(9), 1.41(6), 1.246(7), 1.107(9), 1.045(8)

IMA No. **2003-043**
$KNa_2Fe^{2+}{}_4Fe^{3+}Si_8O_{22}(OH)_2$
Amphibole group
Structure determined
Monoclinic: $C2/m$
a 10.002 *b* 18.054 *c* 5.319(1) Å, β 103.90(3)°
Black or dark blue-green; vitreous; translucent to transparent
Biaxial (–), α 1.683, β 1.692, γ 1.699, 2*V*(meas.) > 60°, 2*V*(calc.) 82°
9.02(28), 8.53(100), 3.419(12), 3.303(23), 3.184(40), 2.847(17), 2.725(10)

IMA No. **2003-044**
$BaNa\{(Na,Ti)_4[(Ti,Nb)_2(OH,O)_3Si_4O_{14}](OH,F)_2\}·3H_2O$
Heterophyllosilicate
Structure determined
Monoclinic: $I11b$
a 5.552, *b* 7.179, *c* 50.94(1) Å, γ 91.10°
Creamy or pale yellow; silky; semi-transparent
Biaxial (+), α 1.668, β 1.679, γ 1.710, 2*V*(meas.) 63°, 2*V*(calc.) 63°
25.50(100), 12.68(14), 8.48(72), 5.11(11), 3.44(14), 3.17(74), 2.763(20), 2.110(14)

IMA No. **2003-046**
$(U,Th)(Ca,Na)_2(K_{1-x}\square_x)Si_8O_{20}·H_2O$
Steacyite group
Structure determined
Tetragonal: $P4/mcc$
a 7.6506, *c* 14.9318 Å
Dark-green; vitreous; transparent
Uniaxial (–), ω 1.615, ε 1.610
5.34(23), 5.28(38), 3.37(100), 3.31(59), 2.640(64), 2.515(21), 2.161(45), 2.016(29), 1.644(30)

IMA No. **2003-047**
$Ca_3(Al,Mn^{3+})_2(SiO_4)_2(OH)_4$
Garnet group
Structure determined
Tetragonal: $I4_1/acd$
a 12.337, *c* 11.930 Å
Brownish yellow; vitreous; transparent
Uniaxial (+), ω 1.718, ε 1.746
3.08(44), 2.978(45), 2.757(55), 2.743(100), 2.685(54), 2.501(47), 1.614(56)

IMA No. **2003-048**
$KMg(PO_4)·6H_2O$
Schertelite-struvite group
Structure determined
Orthorhombic: $Pmn2_1$
a 6.892, *b* 6.166, *c* 11.139 Å
Colorless; vitreous; transparent
Biaxial (+), α 1.490(2), β 1.493(2), γ not determined, $2V_z$ (meas.) large
4.26(100), 4.14(80), 3.27(90), 2.905(50), 2.699(50), 2.650(70), 1.954(50)

IMA No. **2003-049**
CuPd
CsCl structure
Cubic: $Pm3m$
a 3.0014 Å
Steel-gray with a bronze tint; metallic; opaque
In reflected light: creamy to bright white, isotropic, no internal reflections. *R*(air): 58.7 (470 nm), 62.6 (546 nm), 64.1 (589 nm), 65.3 (650 nm)
2.122(100), 1.500 (30), 1.225(70), 1.061(40), 0.9491(50), 0.8021(60)

IMA No. **2003-050**

$NaCa_2(Mg_3Fe^{2+}Al)_5(Si_6Al_2)_8O_{22}F_2$
Amphibole group
Structure determined
Monoclinic: *C*2/*m*
a 9.8771, *b* 18.041, *c* 5.3092 Å, β 105.133°
Black; vitreous; transparent to translucent in very thin fragments
Biaxial (+), α 1.634, β 1.642, γ 1.654, 2*V*(meas.) 68°, 2*V*(calc.) 79°
8.42(100), 3.28(20), 3.21(84), 3.00(13), 2.825(54), 2.379(17), 2.347(15), 1.443(15)

IMA No. **2003-051**
$Bi_7O_4(MoO_4)_2(AsO_4)_3$
New structure type
Orthorhombic: *Pnca*
a 5.303, *b* 16.169, *c* 23.980 Å
Yellow; adamantine; transparent
Biaxial (–), α 2.22, β 2.255, γ 2.26, 2*V*(meas.) 42°, 2*V*(calc.) 41°
3.41(37), 2.996(69), 2.963(48), 2.688(100), 2.001(28), 1.887(13), 1.657(14)

IMA No. **2003-052**
$Fe^{3+}Ge_3^{4+}O_7(OH)$
Orthorhombic: *P****
a 8.302, *b* 9.718, *c* 4.527 Å
Dirty brown-green; vitreous; opaque in aggregates, transparent in crystals
Biaxial (+), with at least two indices of refraction greater than 1.8, 2*V*(meas.) large
4.11(40), 3.68(100), 3.12(60), 2.921(100), 2.512(40), 2.403(90), 1.646(80), 1.624(50)

IMA No. **2003-053**
$YTaO_4$
Dimorphous with formanite
Structure determined
Monoclinic: *P*2/*a*
a 5.262, *b* 5.451, *c* 5.110 Å, β 95.12°
Amber brown to brown; vitreous to adamantine; translucent
R(air): 13.8–14.1 (470 nm), 13.6–13.8 (546 nm), 13.6–13.9 (589 nm), 13.7–14.0 (650 nm)
3.13(100), 2.95(94), 2.73(26), 2.62(23), 1.890(29), 1.862(29), 1.614(20)

IMA No. **2003-055**
$Mn^{2+}V^{3+}Al(Si_2O_6)(OH)_4$
Carpholite group
Structure determined
Orthorhombic: *Ccca*
a 13.830, *b* 20.681, *c* 5.188 Å
Pale straw-yellow to brown; vitreous to silky; transparent
Biaxial (+), α 1.684, β 1.691 (calc.), γ 1.700, 2*V* (meas.) 85°
5.75(100), 5.15(18), 4.72(14), 3.46(15), 3.08(22), 2.641(26)

IMA No. **2003-056**
PdSbSe
Ullmannite group
Structure determined
Cubic: $P2_1/3$
a 6.3181 Å
Silver-gray; metallic; opaque
In reflected light: white, isotropic, no internal reflections. *R*(air): 48.6 (470 nm), 47.5 (546 nm), 47.6 (589 nm), 49.0 (650 nm)
3.16(53), 2.825(100), 2.579(81), 2.233(32), 1.905(98), 1.752(27), 1.688(25), 1.379(18)

IMA No. **2003-057**
$(Fe^{2+},Mg)_6Fe^{3+}{}_2(OH)_{18}\cdot 4H_2O$
Meixnerite group
Structure determined
Trigonal: $R\bar{3}m$
a 3.125, *c* ~ 22.5 Å
Bluish-gray; earthy
No optical data
7.97(100), 3.97(32), 2.692(34), 2.027(19), 1.595(9), 1.563(10)

IMA No. **2003-058**
$Na_8Al_8Si_{28}O_{72}\cdot 30H_2O$
Zeolite group
Structure determined
Hexagonal: $P6_3/mmc$
a 18.235, *c* 7.636 Å
Colorless, white; vitreous; transparent
Uniaxial (+), ω 1.471, ε 1.472
9.08(100), 6.86(70), 5.95(70), 4.68(40), 3.79(80), 3.51(40), 3.15(70)

IMA No. **2003-059**
$WO_3\cdot 0.5H_2O$
Related to ferritungstite
Cubic: *Fd*3*m*
a 10.203 Å
White; vitreous; translucent
Isotropic, *n* 2.240
5.88(100), 3.08(62), 2.944(78), 2.551(12), 1.964(17), 1.804(23), 1.725(14), 1.538(14)

IMA No. **2003-060**
$Sr_3Al_{3.5}Si_{3.5}O_{10}(OH,O)_8Cl_2\cdot H_2O$
New structure type
Monoclinic: *P*2/*m*, *P*2, or *Pm*
a 5.893, *b* 7.262, *c* 10.288 Å, β 97.23°
White; silky; translucent
Biaxial (+), α 1.639, β 1.648, γ 1.665, 2*V* (meas.) 75°, 2*V* (calc.) 72.7°
10.13(100), 3.23(80), 2.96(100), 2.90(100), 2.505(100), 2.182(80), 2.104(60), 1.855(70)

IMA No. **2003-061**
$NaNa_2(Mg_2Mn^{3+}LiTi^{4+})Si_8O_{22}O_2$
Amphibole group
Structure determined
Monoclinic: *C*2/*m*
a 9.808, *b* 17.840, *c* 5.2848 Å, β 104.653°
Pink-red; vitreous; transparent
Biaxial (+), α 1.688, β 1.692, γ 1.721. 2*V* (meas.) 49°, 2*V*

(calc.) 41°
4.45(6), 3.38(7), 3.13(8), 2.697(10), 2.542(9), 2.154(7), 1.434(7)

IMA No. **2003-062**
$Na(CaMn)_{\Sigma 2}Mg_5(Si_7Al)O_{22}(OH)_2$
Amphibole group
Structure determined
Monoclinic: *C*2/*m*
a 9.795, *b* 18.047, *c* 5.287 Å, β 104.28°
Very pale pinkish-brown; vitreous; translucent
Biaxial (–), α 1.620, β 1.632, γ 1.642, 2*V* (calc.) 84°
10.53(50), 3.39(59), 3.27(48), 3.12(61), 2.948(47), 2.720(46), 2.711(100), 2.594(49)

IMA No. **2003-063**
$\square NaFe^{2+}Fe^{3+}Al(PO_4)_3$
Wyllieite group
Structure determined
Monoclinic: $P2_1/n$
a 11.838, *b* 12.347, *c* 6.2973 Å, β 114.353°
Dark-green to bronze; resinous; transparent
Biaxial (–), α 1.730, β 1.758, γ 1.775, 2*V* (meas.) 82°, 2*V* (calc.) 75°
8.10(30), 6.17(50), 5.38(40), 4.05(45), 3.45(65), 3.01(40), 2.693(75), 2.677(100)

IMA No. **2003-064**
$Cu_2AgPbBiS_4$
Higher homologue of miharaite
Structure determined
Monoclinic: $P2_1/n$
a 4.0329, *b* 12.734, *c* 14.639 Å, β 90.103°
Gray; metallic; opaque
In reflected light: yellowish-brownish, moderate bireflectance, distinct anisotropy, no internal reflections. *R*(air): 40.2–45.7 (470 nm), 39.3–44.5 (546 nm), 38.9–44.1 (589 nm), 38.6–44.1 (650 nm)
3.67(100), 3.66(64), 3.41(60), 3.319(62), 3.317(62), 3.111(69), 3.022(72), 3.017(72)

IMA No. **2003-065**
$Ca(REE,Ca)Al_2(Fe^{2+},Fe^{3+})(SiO_4)(Si_2O_7)O(OH)$
Epidote group
Structure determined
Monoclinic: $P2_1/m$
a 8.914, *b* 5.726, *c* 10.132 Å, β 114.87°
Black; vitreous; transparent to translucent
Biaxial, α' 1.755, β 1.760, γ' 1.765, 2*V* not determined 7.93(15), 3.51(20), 2.901(100), 2.860(40), 2.692(60), 2.611(50), 2.283(15), 2.174(25)

IMA No. **2003-066**
Parvowinchite $Na(NaMn)_{\Sigma 2}(Mg_4Fe^{3+})_{\Sigma 5}Si_8O_{22}(OH)_2$
Amphibole group
Structure determined
Monoclinic: *C*2/*m*
a 9.704, *b* 17.990, *c* 5.297 Å, β 103.51°
Straw-yellow; vitreous; translucent
Mean index of refraction (*n*) 1.665 (calc.)
8.36(76), 3.40(62), 3.26(34), 3.10(66), 2.714(100), 2.591(35), 2.522(61), 2.166(36)
Exceptionally, the name of this new mineral is published here, on request of the author (Roberta Oberti of Pavia, Italy). Similar amphibole material has been previously described as "tirodite", but this name was discredited in the 1997 paper on amphibole nomenclature, the new name being "(alkali-bearing) manganocummingtonite". The new name "parvowinchite" has already been attributed in the Leake et al. (2003) amphibole paper (Canadian Mineralogist, 41, 1355–1362) to the specimen described by Oberti and Ghose (1993, European Journal of Mineralogy, 5, 1153–1160). Because further characterization of the available material is not possible, no further report will be published.

OLDER PROPOSALS

IMA No. **95-020c**
$CaB_3O_4(OH)_3$
New structure type
Monoclinic: $P2_1/a$
a 8.386, *b* 8.142, *c* 7.249 Å, β 98.33°
White to colorless; vitreous; translucent to transparent
Biaxial (+), α 1.573, β 1.586, γ 1.626, 2*V*(meas.) 60°, 2*V*(calc.) 61°
4.32(57), 3.39(100), 3.13(50), 2.93(23), 2.606(25), 2.360(17), 2.287(19), 1.849(25)

IMA No. **2000-043a**
$(Al,Ga)_2(Ge,C)O_4(OH)_2$
Isotypic with topaz
Structure determined
Orthorhombic: *Pnma*
a 9.1111, *b* 8.5276, *c* 4.8064 Å
Beige to white; greasy; translucent
Biaxial, *n*(calc.) = 1.757
3.811(78), 3.315(48), 3.016(100), 2.464(24), 2.417(27), 2.247(38), 1.398(29)

IMA No. **2001-067a**
$^{A}\square^{B}(Na_1Li_1)^{C}(Fe^{3+}_2Mg_3)^{T}Si_8O_{22}(OH)_2$
Amphibole group
Structure determined
Monoclinic: *C*2/*m*
a 9.535, *b* 17.876, *c* 5.234 Å, β 102.54°
Black; vitreous; translucent
Biaxial, no other optical properties given
8.27(15), 3.408(18), 3.058(36), 2.710(100), 2.501(68), 1.581(19), 1.399(20)

IMA No. **2002-009a**
$Ca_2Fe^{2+}_4Fe^{3+}TiSi_4BeAlO_{20}$
Aenigmatite group
Structure determined
Triclinic: $P\overline{1}$
a 10.3549, *b* 10.7508, *c* 8.8732 Å, α 105.707, β 96.227, γ 124.861°

Black; vitreous; opaque.
Biaxial (sign not known), α 1.799, β–, γ 1.86, 2*V* not known
8.00(57), 4.78(29), 3.12(32), 2.924(69), 2.676(77), 2.530(100), 2.410(28), 2.075(39)

OTHER NOMENCLATURE DECISIONS

IMA No. **03-A**
It has been approved that the general CNMMN advocacy of Schaller modifiers [Hey and Gottardi, Canadian Mineralogist, 18 (1980), 261–262; Nickel and Mandarino, Canadian Mineralogist, 25 (1987), 353–377] is to be dropped. When it is desired to indicate the presence of subordinate chemical components in a mineral, Schaller modifiers may be used in unambiguous cases, namely those in which the element has two, and only two, valence states. In the more general case, adjectival modifiers such as "-bearing" or "-rich" should be used, together with the specified element(s), and with the numerical oxidation state, if required, e.g., "$Mn^{(2+)}$-rich," "V(III)-deficient," "Mg-bearing," etc.

IMA No. **03-B**
Spodiosite discredited: Spodiosite is a mixture of fluorapatite, calcite and serpentine.

IMA No. **03-C**

Naming polytypes of wagnerite: The known polytypes of wagnerite, ideally $Mg_2(PO_4)F$, are named wagnerite-*Ma*2*bc* (space group $P2_1/c$), wagnerite-*Ma*5*bc* (space group *Ia*), wagnerite-*Ma*7*bc* (space group $P2_1$), and wagnerite-*Ma*9*bc* (space group *Ia*). Polytypes of zwieselite and triplite can be written in analogy with those of wagnerite.

Magniotriplite discredited: Magniotriplite and wagnerite are polytypes, not polymorphs, of one another. The name wagnerite has priority (1821 vs. 1951 for magniotriplite), therefore the species and name *magniotriplite* is discredited.

Nomenclature of a mineral group

Amphiboles: additions and revisions to the International Mineralogical Association's amphibole nomenclature.

See Canadian Mineralogist, 41 (2003), 1355–1362, European Journal of Mineralogy, 16 (2004), 191–196, and other journals, and also on the CNMMN website (www.geo.vu.nl/~ima-cnmmn).

IMA No. **2003-058**
Mazzite renamed mazzite-Mg: the approval of IMA No. 2003-058 as a new mineral automatically implies that the name of the existing mazzite is changed to mazzite-Mg, and that these two minerals form the new mazzite series within the zeolites.

Withdrawal of an approved mineral

Prassoite: the mineral prassoite, Rh_3S_4, was approved as mineral 70-041 by the CNMMN in March 1971. The author, Kingston, published some data in his Ph.D. thesis in 1977. These data were summarized by Cabri in 1981, but he stated that the true formula might be $Rh_{17}S_{15}$. Augé found the same mineral as Kingston in 1988, with the formula Rh_3S_4 (Canadian Mineralogisty, 26, 177–192), and this paper was mentioned by Jambor in 1989 (American Mineralogist, 74, 1220).

Britvin et al. proposed the mineral miassite (97-029) to the CNMMN with the formula $Rh_{17}S_{15}$. This mineral was approved in October 1997, but the name was suspended because of possible problems with prassoite. The authors were asked to contact Kingston. They tried to do so, but to no avail.

After having heard from Britvin et al. that Kingston did not reply to any search, the suspension on the name miassite was lifted, but the CNMMN chairman then made a mistake (probably by not having access to the 1971 archives). In his Memorandum of July 1999, Joel Grice wrote: "Prassoite" was never approved by the CNMMN, and no type material can be found. It is apparent that the authors of miassite have done everything possible to establish or refute the existence of this dubious mineral and the name "prassoite" is to be discouraged from further usage. In his letter to Britvin et al., lifting the suspension, Joel Grice wrote: I would ask you to make it clear in your publication that all attempts were made to find the type material for a formal discrediation of prassoite but none existed.

Britvin et al. published their miassite in ZVMO 130(2), 41–44 (2001), stating in the paper that prassoite was never approved by the CNMMN, this, of course, on the authority of Joel Grice. The paper was abstracted by Jambor (American Mineralogist, 87, p. 1511), with the correction that prassoite had indeed been approved by the CNMMN back in 1971.

Later, it became apparent that the type material of prassoite was present in the British Museum (on the same specimen as the type material for kingstonite), but the letters of Britvin et al. to Kingston were never forwarded to the curator of the British Museum.

We have, meanwhile, the strange fact that there are at least ten papers using the name prassoite (the most recent one in Canadian Mineralogist, 40 (2002), 1127–1146), but only a single paper on miassite! Moreover, the name "prassoite" has never been officially discredited or withdrawn.

In view of the delay in the (incomplete) publication of the inadequately described prassoite and the uncertainties about its composition, **the name "prassoite" is withdrawn for the time being in favor of miassite**. Unambiguous evidence for the existence of Rh_3S_4 as a mineral might reinstate the name prassoite.

Recommendations on CNMMN procedures

On request and proposal of Donald Peacor the following recommendations on CNMMN procedures have been approved in 1999/2000, but never published until now:

- Mineral status should be accorded to those materials occurring in sub-micrometer-sized crystallites only if they are of sufficient total volume or concentration to be detected by at least one commonly used laboratory technique.
- CNMMN criteria for approval of mineral species status should be viewed as flexible guidelines.