

**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
- Colour; lustre; diaphaneity
- Optical properties
- Strongest lines in the X-ray powder diffraction pattern

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves. No other information will be released by the commission.

## 2003 PROPOSALS

IMA No. **2003-001**

$(\text{Ba,Ca,K,Na,Sr})_5\text{Al}_9\text{Si}_{127}\text{O}_{72}\cdot 22\text{H}_2\text{O}$

Ba-dominant analogue of heulandite

Structure determined

Monoclinic:  $C2/m$

$a$  17.738,  $b$  17.856,  $c$  7.419 Å,  $\beta$  116.55°

Colourless to white, rarely very pale yellowish white; vitreous, pearly; translucent to transparent

Biaxial (+),  $\alpha$  1.5056,  $\beta$  1.5064,  $\gamma$  1.5150,  $2V(\text{meas.})$  38°,  $2V(\text{calc.})$  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**

$\text{Na}(\text{Ba,Sr,Na,REE})\text{PO}_4$

Ba-dominant analogue of olgite

Structure determined

Trigonal:  $P3$

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$a$  5.549,  $c$  7.032(2) Å

Light-green; vitreous; transparent

Uniaxial (–),  $\omega$  1.628,  $\epsilon$  1.623

7.04(22), 3.964(60), 2.839(100), 2.774(100), 2.344(20), 1.984(40), 1.611(26)

IMA No. **2003-003**

$\text{Ba}_2\text{Zn}(\text{Ti},\text{Nb})_4(\text{Si}_4\text{O}_{12})_2(\text{O},\text{OH})_4 \cdot 7\text{H}_2\text{O}$

Labuntsovite group, kuzmenkoite subgroup

Structure determined

Monoclinic:  $Cm$

$a$  14.381,  $b$  13.889,  $c$  7.793(2) Å,  $\beta$  117.52°

Pale brown (light coffee-coloured); vitreous; transparent

Biaxial (+),  $\alpha$  1.683,  $\beta$  1.692,  $\gamma$  1.795,  $2V(\text{meas.})$  30°,  $2V(\text{calc.})$  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**

$(\text{Cu},\text{Fe})(\text{Re},\text{Mo})_4\text{S}_8$

Cubic:  $F\bar{4}3m$

$a$  9.563 Å

Black; metallic; opaque

In reflected light: bluish-green, no internal reflections, isotropic.  $R(\text{air})$ : 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**

$\text{Ca}_2(\text{Zn},\text{Mg})[\text{PO}_4]_2 \cdot 2\text{H}_2\text{O}$

Zn-dominant analogue of collinsite

Structure determined

Triclinic:  $P\bar{1}$

$a$  5.736,  $b$  6.767,  $c$  5.462 Å,  $\alpha$  97.41,  $\beta$  108.59,  $\gamma$  107.19°

Colourless, grey with greenish or bluish tint in aggregates and larger crystals; vitreous in crystals and silky in aggregates; transparent

Biaxial (+),  $\alpha$  1.6348,  $\beta$  1.6495,  $\gamma$  1.6686,  $2V_z(\text{calc.})$  83.4°

6.24(34), 3.230(22), 3.130(37), 3.038(40), 2.690(100), 1.668(22)

IMA No. **2003-006**

$\text{BaV}^{4+}_2\text{V}^{3+}_{12}\text{Si}_2\text{O}_{27}$

New structure type

Trigonal:  $P\bar{3}$

$a$  7.6014,  $c$  9.2195 Å

Steel-grey to black; submetallic to dull; opaque

In reflected light: grey with weak brownish tint; no internal reflections; weak birefractance, pleochroism and anisotropy.  $R_{\text{min}}$  and  $R_{\text{max}}$  (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**

$(\text{Ca},\text{Fe},\text{Th})(\text{REE},\text{Ca})(\text{Al},\text{Cr},\text{Ti})_2(\text{Mg},\text{Fe},\text{Al})\text{Si}_3\text{O}_{12}(\text{OH},\text{F})$  with  $\text{La} > \text{Ce}$

Epidote group

Structure determined

Monoclinic:  $P2_1/m$

$a$  8.9616,  $b$  5.7265,  $c$  10.2353 Å,  $\beta$  115.193°

Black, very dark brown; vitreous; opaque

Biaxial (+),  $\alpha$  1.7395,  $\beta$  1.7434,  $\gamma$  1.7495,  $2V_\gamma(\text{meas.})$  77.0°,  $2V_\gamma(\text{calc.})$  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)<sub>7</sub>(Ti,Nb)<sub>8</sub>[Si<sub>4</sub>O<sub>12</sub>]<sub>4</sub>(O,OH)<sub>8</sub>· $n$ H<sub>2</sub>O  $n \sim 8$

Labuntsovite group

Structure determined

Monoclinic:  $C2/m$

$a$  14.596,  $b$  14.249,  $c$  15.852 Å,  $\beta$  117.27(10)°

Colourless; vitreous; transparent

Biaxial (+),  $\alpha$  1.657,  $\beta$  1.666,  $\gamma$  1.765,  $2V(\text{meas.})$  19-31°,  $2V(\text{calc.})$  35°  
7.09(100), 3.24(90), 3.15(80), 3.11(80), 2.54(70), 2.491(70)

IMA No. **2003-009**

U<sup>6+</sup><sub>2-x</sub>Ti(O<sub>8-x</sub>OH<sub>4x</sub>)[(H<sub>2</sub>O)<sub>3</sub>Ca<sub>x</sub>]

New structure type

Trigonal:  $P3$

$a$  10.824,  $c$  7.549 Å

Canary-yellow to orange-yellow; vitreous; translucent

Uniaxial (+),  $\omega$  1.815,  $\epsilon$  1.910

4.60(100), 2.90(80), 1.87(30), 1.747(30), 1.211(30)

IMA No. **2003-010**

CuZn(PO<sub>4</sub>)OH

Zn-dominant analogue of libethenite

Structure determined

Orthorhombic:  $Pnmm$

$a$  8.3263,  $b$  8.2601,  $c$  5.8771 Å

Bright-green with a bluish tint; vitreous; translucent

Biaxial (-),  $\alpha$  1.660,  $\beta$  1.705,  $\gamma$  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<sub>2</sub>S<sub>4</sub>

Pavonite homologous series

Structure determined

Monoclinic:  $C2/m$

$a$  13.096,  $b$  4.004,  $c$  14.717 Å,  $\beta$  115.602(5)°

Dark grey (reddish); metallic; opaque

In reflected light: white, no internal reflections, distinct birefractance, strong anisotropy

$R_{\text{min}}$  and  $R_{\text{max}}$  (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<sub>2</sub>[BO(OH)<sub>2</sub>](OH)<sub>3</sub>

New structure type

Orthorhombic: *Pnma*

*a* 9.455, *b* 5.866, *c* 8.668 Å

Blue; vitreous; translucent

Biaxial (–),  $\alpha$  1.627,  $\beta$  1.699,  $\gamma$  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<sub>12</sub>(Mn,Sr,REE)<sub>3</sub>Ca<sub>6</sub>Fe<sup>2+</sup><sub>3</sub>Zr<sub>3</sub>NbSi<sub>25</sub>O<sub>76</sub>Cl<sub>2</sub>·H<sub>2</sub>O

Eudialyte group

Structure determined

Trigonal: *R3m*

*a* 14.262, *c* 29.949 Å

Yellow-green (different shades); vitreous; transparent or translucent

Uniaxial (–),  $\omega$  1.639,  $\epsilon$  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<sub>2</sub>Si

Cubic: *Pm3m*

*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)<sub>2</sub>(Mn,Fe)(Nb,Ti)<sub>4</sub>(Si<sub>4</sub>O<sub>12</sub>)<sub>2</sub>(O,OH)<sub>4</sub>·6H<sub>2</sub>O

Labuntsovite group

Structure determined

Monoclinic: *C2/m*

*a* 14.563, *b* 13.961, *c* 7.851(2) Å,  $\beta$  117.62°

Orange-yellow to brownish ; vitreous; translucent to transparent

Biaxial (+),  $\alpha$  1.670,  $\beta$  1.685,  $\gamma$  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<sub>2</sub>)<sup>2+</sup><sub>10</sub>O<sub>6</sub>I<sub>3</sub>(Br<sub>1.6</sub>Cl<sub>1.4</sub>)<sub>Σ3.0</sub>[(CO<sub>3</sub>)<sub>0.8</sub>S<sup>2-</sup><sub>0.2</sub>]<sub>Σ1.0</sub>

Structure determined

Triclinic: *P1̄*

*a* 9.344, *b* 10.653, *c* 18.265 Å,  $\alpha$  93.262,  $\beta$  90.548,  $\gamma$  115.422°

Silvery grey to black to dark red-black; adamantine to metallic; translucent to opaque

In reflected light: grey; abundant, orange-red to blood-red internal reflections; no birefractance, no pleochroism; moderate to strong anisotropy. R<sub>min</sub> and R<sub>max</sub> (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)<sub>4</sub>(Fe<sup>3+</sup>,Ti,Fe<sup>2+</sup>,□)(Ti,Fe<sup>3+</sup>,Fe<sup>2+</sup>,Nb)<sub>4</sub>Si<sub>4</sub>O<sub>22</sub>

Fe-dominant analogue of polyakovite-(Ce)

Structure determined

Monoclinic:  $C2/m$

$a$  13.385,  $b$  5.742,  $c$  11.059 Å,  $\beta$  100.60°

Black or brown-black; submetallic pitchy; opaque

Biaxial (-),  $\alpha$  1.937,  $\beta$  not determined,  $\gamma$  1.970

In reflected light: grey; yellowish-grey 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**

$\text{Na}_{5.5}\text{Mn}_{0.25}\text{ZrSi}_6\text{O}_{16}(\text{OH})_2$

Lovozerite group

Structure determined

Monoclinic:  $C2/m$

$a$  10.693,  $b$  10.299,  $c$  7.373(4) Å,  $\beta$  91.91°

Dark cherry-coloured; vitreous; transparent

Biaxial (-), some grains are uniaxial (-);  $\alpha$  1.585,  $\beta \approx \gamma$  1.589,  $2V(\text{meas.}) < 5^\circ$ ,  $2V(\text{calc.}) -0^\circ$   
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**

$\text{Na}_6\text{Sr}_{12}\text{Ba}_2\text{Zr}_{13}\text{Si}_{39}\text{B}_4\text{O}_{123}(\text{OH})_6 \cdot 20\text{H}_2\text{O}$

Related to benitoite

Structure determined

Hexagonal:  $P6_3cm$

$a$  26.509,  $c$  9.975 Å

Colourless to grey; vitreous; translucent

Uniaxial (+),  $\omega$  1.640,  $\epsilon$  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**

$\text{Cu}_6\text{GeWS}_8$

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

$a$  7.523,  $c$  12.384 Å

Grey; metallic; opaque

In reflected light: greyish 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**

$\text{Cu}_2\text{Mg}_2(\text{Mg,Cu})(\text{OH})_4(\text{H}_2\text{O})_4(\text{AsO}_4)_2$

Isotypic with akrochordite

Structure determined

Monoclinic:  $P2_1/c$

$a$  5.475,  $b$  16.865,  $c$  6.915 Å,  $\beta$  99.80°

Blue; vitreous; transparent

Biaxial (-),  $\alpha$  1.664,  $\beta$  1.691,  $\gamma$  1.695,  $2V(\text{meas.}) 31^\circ$ ,  $2V(\text{calc.}) 42^\circ$

8.42(100), 4.32(21), 4.21(64), 3.016(12), 2.907(10), 2.809(7)

IMA No. **2003-022**

$\text{Cs}(\text{Be}_2\text{Li})\text{Al}_2\text{Si}_6\text{O}_{18}$

Beryl group

Structure determined

Hexagonal:  $R3c$

$a$  15.946,  $c$  27.803 Å

Raspberry red to pink; vitreous; translucent to transparent

Uniaxial (-),  $\omega$  1.616,  $\epsilon$  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**

$(\text{Zr},\text{Mn})_2(\text{Zr},\text{Ti})(\text{Mn},\text{Na})(\text{Na},\text{Ca})_4(\text{Si}_2\text{O}_7)_2(\text{O},\text{F})_4$

Seidozerite group

Structure determined

Monoclinic:  $P2/c$

$a$  5.6082,  $b$  7.1387,  $c$  18.575 Å,  $\beta$  102.60°

Yellowish brown to dark brown; vitreous; translucent

Biaxial, birefringence on (001) is 0.041:  $\alpha$  1.694,  $\gamma_1$  1.735,  $2V > 90^\circ$

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**

$\text{Th}_{0.5}(\text{UO}_2)_2\text{Si}_5\text{O}_{13}\cdot 3\text{H}_2\text{O}$

Isostructural with weeksite

Orthorhombic:  $Cmmb$

$a$  14.1676,  $b$  14.1935,  $c$  35.754 Å

Yellow; waxy to silky; transparent to translucent

Biaxial (-),  $\alpha$  1.620,  $\beta$  1.627,  $\gamma$  1.629,  $2V(\text{meas.})$  40°,  $2V(\text{calc.})$  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**

$(\text{Cu},\square)_6(\text{Pb},\text{Bi})\text{Se}_4$

Structure determined

Monoclinic:  $P2_1/m$

$a$  9.5341,  $b$  4.1004,  $c$  10.2546 Å,  $\beta$  100.066°

Black; metallic; opaque

In reflected light: grey, 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**

$\text{Pb}_{21}\text{SnAs}_{11}\text{Bi}_{11}\text{S}_{50}\text{Cl}_8\text{Se}$

Structure determined

Orthorhombic:  $F2mm$

$a$  45.824,  $b$  8.368,  $c$  53.990 Å

Silvery grey; 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: *Fm3m*

*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<sub>2</sub>O<sub>4</sub>)·2H<sub>2</sub>O

Mn analogue of humboldtine (oxalate)

Monoclinic: *C2/c*

*a* 11.955, *b* 5.632, *c* 9.967 Å, β 128.34°

White to greyish 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<sub>6</sub>(AsO<sub>4</sub>)<sub>3</sub>(OH)<sub>6</sub>·3H<sub>2</sub>O

Mixite group

Hexagonal: *P6<sub>3</sub>/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: *Pm3m*

*a* 3.8756 Å

Grey-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<sup>3+</sup><sub>2</sub>(Mg,Mn)(AsO<sub>4</sub>)<sub>3</sub>·H<sub>2</sub>O

Alluaudite group

Structure determined

Monoclinic: *C2/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<sub>4</sub>Na<sub>2</sub>Zr<sub>3</sub>(Si<sub>18</sub>O<sub>45</sub>)(H<sub>2</sub>O)<sub>2</sub>

Phyllosilicate

New structure type  
Monoclinic:  $C2/c$   
 $a$  26.3511,  $b$  7.5464,  $c$  22.9769,  $\beta$  107.237°  
Colourless; vitreous; transparent  
Biaxial (–),  $\alpha$  1.585,  $\beta$  1.598,  $\gamma$  1.603, 2V(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  
Colourless; vitreous; transparent  
Biaxial (–),  $\alpha$  1.597,  $\beta$  1.627,  $\gamma$  1.632, 2V (meas.) 43°, 2V(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,  $\beta$  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,  $\beta$  111.90°  
Brown; vitreous; translucent  
Biaxial (–),  $\alpha$  1.785,  $\beta$  1.810,  $\gamma$  1.820, 2V (meas.) 66°, 2V(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,  $\beta$  92.71°  
Dark silver-grey; metallic; opaque  
In reflected light: grey colour, 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**  
 $(Mg,Cu)SO_4 \cdot 7H_2O$   
Melanterite group  
Structure determined  
Monoclinic:  $P2_1/c$



$a$  14.166,  $b$  6.534,  $c$  10.838 Å,  $\beta$  105.922°

Blue; vitreous; transparent

Biaxial (+),  $\alpha$  1.462,  $\beta$  1.465,  $\gamma$  1.469, 2V(meas.) 79.8°, 2V(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**

$\text{Cu}_3\text{Zn}(\text{OH})_6\text{Cl}_2$

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 (-),  $\omega$  1.825,  $\epsilon$  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**

$\text{CdIn}_2\text{S}_4$

Linnaeite group

Cubic:  $Fd\bar{3}m$

$a$  10.81 Å

Black; adamantine; translucent

In reflected light: grey colour, 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**

$\text{KNa}_2\text{Fe}^{2+}_4\text{Fe}^{3+}\text{Si}_8\text{O}_{22}(\text{OH})_2$

Amphibole group

Structure determined

Monoclinic:  $C2/m$

$a$  10.002  $b$  18.054  $c$  5.319(1) Å,  $\beta$  103.90(3)°

Black or dark blue-green; vitreous; translucent to transparent

Biaxial (-),  $\alpha$  1.683,  $\beta$  1.692,  $\gamma$  1.699, 2V(meas.) > 60°, 2V(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**

$\text{BaNa}\{(\text{Na},\text{Ti})_4[(\text{Ti},\text{Nb})_2(\text{OH},\text{O})_3\text{Si}_4\text{O}_{14}](\text{OH},\text{F})_2\}\cdot 3\text{H}_2\text{O}$

Heterophyllosilicate

Structure determined

Monoclinic:  $I11b$

$a$  5.552,  $b$  7.179,  $c$  50.94(1) Å,  $\gamma$  91.10°

Creamy or pale yellow; silky; semi-transparent

Biaxial (+),  $\alpha$  1.668,  $\beta$  1.679,  $\gamma$  1.710, 2V(meas.) 63°, 2V(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**

$(\text{U},\text{Th})(\text{Ca},\text{Na})_2(\text{K}_{1-x}\square_x)\text{Si}_8\text{O}_{20}\cdot\text{H}_2\text{O}$

Steacyite group

Structure determined

Tetragonal:  $P4/mcc$

$a$  7.6506,  $c$  14.9318 Å  
Dark-green; vitreous; transparent  
Uniaxial (-),  $\omega$  1.615,  $\epsilon$  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**  
 $\text{Ca}_3(\text{Al,Mn}^{3+})_2(\text{SiO}_4)_2(\text{OH})_4$   
Garnet group  
Structure determined  
Tetragonal:  $I4_1/acd$   
 $a$  12.337,  $c$  11.930 Å  
Brownish yellow; vitreous; transparent  
Uniaxial (+),  $\omega$  1.718,  $\epsilon$  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**  
 $\text{KMg}(\text{PO}_4) \cdot 6\text{H}_2\text{O}$   
Schertelite-struvite group  
Structure determined  
Orthorhombic:  $Pmn2_1$   
 $a$  6.892,  $b$  6.166,  $c$  11.139 Å  
Colourless; vitreous; transparent  
Biaxial (+),  $\alpha$  1.490(2),  $\beta$  1.493(2),  $\gamma$  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**  
 $\text{CuPd}$   
CsCl structure  
Cubic:  $Pm\bar{3}m$   
 $a$  3.0014 Å  
Steel-grey with a bronze tint; metallic; opaque  
In reflected light: creamy to bright white, isotropic, no internal reflections.  $R(\text{air})$ : 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**  
 $\text{NaCa}_2(\text{Mg}_3\text{Fe}^{2+}\text{Al})_5(\text{Si}_6\text{Al}_2)_8\text{O}_{22}\text{F}_2$   
Amphibole group  
Structure determined  
Monoclinic:  $C2/m$   
 $a$  9.8771,  $b$  18.041,  $c$  5.3092 Å,  $\beta$  105.133°  
Black; vitreous; transparent to translucent in very thin fragments  
Biaxial (+),  $\alpha$  1.634,  $\beta$  1.642,  $\gamma$  1.654,  $2V(\text{meas.})$  68°,  $2V(\text{calc.})$  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**  
 $\text{Bi}_7\text{O}_4(\text{MoO}_4)_2(\text{AsO}_4)_3$   
New structure type  
Orthorhombic:  $Pnca$   
 $a$  5.303,  $b$  16.169,  $c$  23.980 Å

Yellow; adamantine; transparent

Biaxial (-),  $\alpha$  2.22,  $\beta$  2.255,  $\gamma$  2.26, 2V(meas.) 42°, 2V(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**

$\text{Fe}^{3+}\text{Ge}^{4+}_3\text{O}_7(\text{OH})$

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, 2V(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**

$\text{YTaO}_4$

Dimorphous with formanite

Structure determined

Monoclinic:  $P2/a$

$a$  5.262,  $b$  5.451,  $c$  5.110 Å,  $\beta$  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**

$\text{Mn}^{2+}\text{V}^{3+}\text{Al}(\text{Si}_2\text{O}_6)(\text{OH})_4$

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 (+),  $\alpha$  1.684,  $\beta$  1.691 (calc.),  $\gamma$  1.700, 2V (meas.) 85°

5.75(100), 5.15(18), 4.72(14), 3.46(15), 3.08(22), 2.641(26)

IMA No. **2003-056**

$\text{PdSbSe}$

Ullmannite group

Structure determined

Cubic:  $P2_1/3$

$a$  6.3181 Å

Silver-grey; 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**

$(\text{Fe}^{2+}, \text{Mg})_6\text{Fe}^{3+}_2(\text{OH})_{18} \cdot 4\text{H}_2\text{O}$

Meixnerite group

Structure determined

Trigonal:  $R\bar{3}m$

$a$  3.125,  $c$  ~ 22.5 Å

Bluish-grey; 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**

$\text{Na}_8\text{Al}_8\text{Si}_{28}\text{O}_{72}\cdot 30\text{H}_2\text{O}$

Zeolite group

Structure determined

Hexagonal:  $P6_3/mmc$

$a$  18.235,  $c$  7.636 Å

Colourless, white; vitreous; transparent

Uniaxial (+),  $\omega$  1.471,  $\epsilon$  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**

$\text{WO}_3\cdot 0.5\text{H}_2\text{O}$

Related to ferritungstite

Cubic:  $Fd\bar{3}m$

$a$  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**

$\text{Sr}_3\text{Al}_{3.5}\text{Si}_{3.5}\text{O}_{10}(\text{OH},\text{O})_8\text{Cl}_2\cdot \text{H}_2\text{O}$

New structure type

Monoclinic:  $P2/m$ ,  $P2$  or  $Pm$

$a$  5.893,  $b$  7.262,  $c$  10.288 Å,  $\beta$  97.23°

White; silky; translucent

Biaxial (+),  $\alpha$  1.639,  $\beta$  1.648,  $\gamma$  1.665, 2V (meas.) 75°, 2V (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**

$\text{NaNa}_2(\text{Mg}_2\text{Mn}^{3+}\text{LiTi}^{4+})\text{Si}_8\text{O}_{22}\text{O}_2$

Amphibole group

Structure determined

Monoclinic:  $C2/m$

$a$  9.808,  $b$  17.840,  $c$  5.2848 Å,  $\beta$  104.653°

Pink-red; vitreous; transparent

Biaxial (+),  $\alpha$  1.688,  $\beta$  1.692,  $\gamma$  1.721. 2V (meas.) 49°, 2V (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**

$\text{Na}(\text{CaMn})_{\Sigma 22}\text{Mg}_5(\text{Si}_7\text{Al})\text{O}_{22}(\text{OH})_2$

Amphibole group

Structure determined

Monoclinic:  $C2/m$

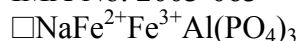
$a$  9.795,  $b$  18.047,  $c$  5.287 Å,  $\beta$  104.28°

Very pale pinkish-brown; vitreous; translucent

Biaxial (-),  $\alpha$  1.620,  $\beta$  1.632,  $\gamma$  1.642, 2V (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**



Wyllieite group

Structure determined

Monoclinic:  $P2_1/n$

$a$  11.838,  $b$  12.347,  $c$  6.2973 Å,  $\beta$  114.353°

Dark-green to bronze; resinous; transparent

Biaxial (–),  $\alpha$  1.730,  $\beta$  1.758,  $\gamma$  1.775, 2V (meas.) 82°, 2V (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**



Higher homologue of miharaite

Structure determined

Monoclinic:  $P2_1/n$

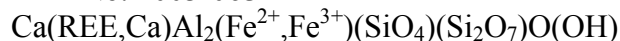
$a$  4.0329,  $b$  12.734,  $c$  14.639 Å,  $\beta$  90.103°

Grey; 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**



Epidote group

Structure determined

Monoclinic:  $P2_1/m$

$a$  8.914,  $b$  5.726,  $c$  10.132 Å,  $\beta$  114.87°

Black; vitreous; transparent to translucent

Biaxial,  $\alpha'$  1.755,  $\beta$  1.760,  $\gamma'$  1.765, 2V 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**



Amphibole group

Structure determined

Monoclinic:  $C2/m$

$a$  9.704,  $b$  17.990,  $c$  5.297 Å,  $\beta$  103.51°

Straw-yellow; vitreous; translucent

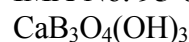
Mean index of refraction ( $n$ ) 1.665 (calc.)

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**



New structure type

Monoclinic:  $P2_1/a$

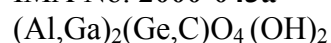
$a$  8.386,  $b$  8.142,  $c$  7.249 Å,  $\beta$  98.33°

White to colourless; vitreous; translucent to transparent

Biaxial (+),  $\alpha$  1.573,  $\beta$  1.586,  $\gamma$  1.626, 2V(meas.) 60°, 2V(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**



Isotypic with topaz

Structure determined

Orthorhombic:  $Pnma$

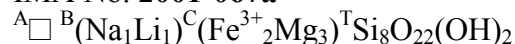
$a$  9.1111,  $b$  8.5276,  $c$  4.8064 Å

Beige to white; greasy; translucent

Biaxial,  $n(\text{calc.}) = 1.757$

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**



Amphibole group

Structure determined

Monoclinic:  $C2/m$

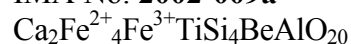
$a$  9.535,  $b$  17.876,  $c$  5.234 Å,  $\beta$  102.54°

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**



Aenigmatite group

Structure determined

Triclinic:  $P\bar{1}$

$a$  10.3549,  $b$  10.7508,  $c$  8.8732 Å,  $\alpha$  105.707,  $\beta$  96.227,  $\gamma$  124.861°

Black; vitreous; opaque.

Biaxial (sign not known),  $\alpha$  1.799,  $\beta$  -,  $\gamma$  1.86, 2V 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 & Gottardi, Can. Mineral. 18 [1980], 261-262; Nickel & Mandarino, Can. Mineral. 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<sup>(2+)</sup>-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<sub>2</sub>(PO<sub>4</sub>)F, are named wagnerite-*Ma2bc* (space group *P2<sub>1</sub>/c*), wagnerite-*Ma5bc* (space group *Ia*), wagnerite-*Ma7bc* (space group *P2<sub>1</sub>*) and wagnerite-*Ma9bc* (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 *Can. Mineral.* 41 (2003), 1355-1362, *Eur. J. Mineral.* 16 (2004), 191-196, and other journals, and also on the CNMMN website ([www.geo.vu.nl/~ima-cnmmn](http://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<sub>3</sub>S<sub>4</sub>, 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<sub>17</sub>S<sub>15</sub>. Augé found the same mineral as Kingston in 1988, with the formula Rh<sub>3</sub>S<sub>4</sub> (*Can. Mineral.* 26, 177-192), and this paper was mentioned by Jambor in 1989 (*Am. Mineral.* 74, 1220).

Britvin *et al.* proposed the mineral miassite (97-029) to the CNMMN with the formula Rh<sub>17</sub>S<sub>15</sub>. 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 discreditation 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 (Am. Mineral. 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 Can. Mineral. 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 favour 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.