

**NEW MINERALS APPROVED IN 2009**  
**NOMENCLATURE MODIFICATIONS APPROVED IN 2009**  
**BY THE**  
**COMMISSION ON NEW MINERALS, NOMENCLATURE AND CLASSIFICATION**  
**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 number
- Type locality
- Corresponding author
- Chemical formula
- Relationship to other minerals
- Crystal system, Space group; Structure determined, yes or no
- Unit-cell parameters
- 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

### 2008 PROPOSALS

IMA No. **2008-053**

Băița Bihor, Romania

Gheorghe Ilinca

$\text{Cu}_7\text{Pb}_{27}\text{Bi}_{25}\text{S}_{68}$

Cu end-member of a solid solution series with neyite

Monoclinic:  $C2/m$ ; structure determined

$a$  37.432(8),  $b$  4.0529(9),  $c$  43.545(9),  $\beta$  108.803(1)<sup>o</sup>

3.735(96), 3.507(50), 3.464(53), 3.347(84), 2.956(77), 2.925(46), 2.867(100), 2.027(81)

IMA No. **2008-054**

Tanco mine, Bernic Lake, Canada

$\text{NaCaMn}_2(\text{PO}_4)[\text{PO}_3(\text{OH})]_2$

Alluaudite group

Monoclinic:  $C2/c$ ; structure determined

$a$  12.5435(9),  $b$  12.4324(9),  $c$  6.7121(4),  $\beta$  115.332(2)°

6.204(80), 5.653(70), 3.608(30), 3.187(100), 2.788(80), 2.726(90), 2.580(70), 2.185(30)

IMA No. **2008-055**

Bonao, Loma Peguera, Dominican Republic

Andrew M. McDonald

(Ni,Fe,Ir)

Ni-analogue of hexaferrum, osmium and ruthenium

Hexagonal:  $P6_3/mmc$

$a$  2.6941(4),  $c$  4.2731(6) Å

2.330(50), 2.136(30), 2.046(100), 1.576(30), 1.347(40), 1.216(40), 1.139(20), 1.126(20)

IMA No. **2008-056**

Gigante pegmatite, Punilla Department, Córdoba Province, Argentina

Anthony R. Kampf

$\text{NaMn}^{2+}\text{Fe}^{3+}_5(\text{PO}_4)_4(\text{OH})_6 \cdot 2\text{H}_2\text{O}$

Dufrénite group

Monoclinic:  $C2/c$ ; structure determined

$a$  25.975(3),  $b$  5.1766(4),  $c$  13.929(1) Å,  $\beta$  111.293(2)°

5.045(60), 4.147(37), 3.424(71), 3.179(100), 2.881(42), 2.426(36), 2.109(39), 1.585(50)

IMA No. **2008-057**

La Fossa crater, Vulcano, Italy

Italo Campostrini

$(\text{NH}_4)_4\text{NaAl}_2(\text{SO}_4)_4\text{Cl}(\text{OH})_2$

New structure type

Tetragonal:  $I4_1/acd$ ; structure determined

$a$  18.118(3),  $c$  11.320(3) Å

6.398(80), 4.530(86), 3.202(47), 3.020(65), 2.980(100), 2.739(36), 2.265(87), 1.902(44)

IMA No. **2008-058**

Erzweis area, Gastein Valley, Salzburg Province, Austria

Emil Makovicky

$\text{Ag}_5\text{Bi}_{13}\text{S}_{22}$

Pavonite homologous series

Monoclinic:  $C2/m$ ; structure determined

$a$  13.380(3),  $b$  4.0492(9),  $c$  18.690(4) Å,  $\beta$  105.494(4)°

3.578(58), 3.452(90), 3.331(36), 3.301(40), 2.861(100), 2.225(24), 2.025(25), 2.013(24)

IMA No. **2008-059**

CH3 chondrite ALH85085

Makoto Kimura

$\text{CaAl}_2\text{SiO}_6$

Pyroxene group

Monoclinic:  $C2/c$ ; known structure

$a$  9.609(3),  $b$  8.652(2),  $c$  5.274(2) Å,  $\beta$  106.06(2)°

2.940(100), 2.904(36), 2.863(45), 2.535(38), 2.509(28), 2.478(48), 1.991(35), 1.382(32)

IMA No. **2008-060**

Snezhnoye deposit, Chersky Mountains, Republic of Sakha-Yakutia, Russian Federation

Irina O. Galuskina

$\text{Mg}_2(\text{BO}_3)(\text{OH})$

OH-dominant analogue of pertsevite

Orthorhombic: *Pnma*; structure determined

*a* 20.494(3), *b* 11.890(2), *c* 4.5880(6) Å

2.748(65), 2.478(41), 2.417(39), 2.244(88), 2.237(42), 1.713(100), 1.710(45), 1.481(50)

IMA No. **2008-061**

Tsentrāl'nyi mine, Khibiny alkaline complex, Kola Peninsula, Russia

Igor V. Pekov

$\text{K}_2\text{Ca}[\text{Si}_4\text{O}_{10}] \cdot 5\text{H}_2\text{O}$

New structure type

Monoclinic: *P2<sub>1</sub>/n*; structure determined

*a* 6.4934(14), *b* 6.9919(5), *c* 32.087(3) Å, β 94.680(12)°

16.01(100), 7.98(24), 6.24(48), 3.228(22), 3.197(27), 2.995(47), 2.903(84), 2.623(23)

IMA No. **2008-062**

Tsentrāl'nyi mine, Khibiny alkaline complex, Kola Peninsula, Russia

Igor V. Pekov

$\text{KCa}[\text{Si}_4\text{O}_9(\text{OH})] \cdot 3\text{H}_2\text{O}$

New structure type

Monoclinic: *P2<sub>1</sub>/c*; structure determined

*a* 6.4897(4), *b* 6.9969(5), *c* 26.714(2) Å, β 94.597(8)°

13.33(100), 6.67(76), 6.47(55), 3.469(45), 3.068(57), 3.042(45), 2.945(62), 2.912(90)

IMA No. **2008-063**

Kintore opencut, Broken Hill, New South Wales, Australia

Stuart J. Mills

$\text{Pb}[\text{Zn}_{0.25}, \square_{0.75}]\text{Fe}_3\text{H}(\text{AsO}_4)_2(\text{OH})_6$ ; a solid-solution series extends to

$\text{Pb}[\text{Zn}_{0.5}, \square_{0.5}]\text{Fe}_3(\text{AsO}_4)_2(\text{OH})_6$

Jarosite group

Monoclinic: *C2/c*; structure determined

*a* 25.8898(6), *b* 14.8753(2), *c* 12.1700(2) Å, β 110.681(1)°

6.034(45), 3.719(31), 3.114(100), 2.844(25), 2.569(21), 2.280(37), 2.259(18), 1.508(19)

IMA No. **2008-064**

Cross Lake, Manitoba, Canada

Frank C. Hawthorne

$\text{Na}_{16}\text{Mn}^{2+}_{25}\text{Al}_8(\text{PO}_4)_{30}$

Alluaudite group

Monoclinic: *Pc*; structure determined

*a* 13.4517(7), *b* 12.5266(7), *c* 26.6765(13) Å, β 101.582(1)°

6.260(20), 3.494(47), 3.078(27), 2.881(21), 2.730(50), 2.715(100), 2.524(20), 2.518(22)

IMA No. **2008-065**

Monte Somma, Vesuvius volcanic complex, Campania, Italy

Nikita V. Chukanov  
(Na,K)<sub>6</sub>Ca<sub>2</sub>(Si<sub>6</sub>Al<sub>6</sub>O<sub>24</sub>)Cl<sub>2</sub>(CO<sub>3</sub>)  
Cancrinite group  
Hexagonal: *P*6<sub>3</sub>; structure determined  
*a* 12.695(2), *c* 5.325(1) Å  
4.797(100), 3.669(57), 3.281(73), 2.754(16), 2.662(58), 2.648(13), 2.446(31), 2.120(18)

IMA No. **2008-066**  
Ojuela mine, Mapimi, Durango, Mexico  
Anthony R. Kampf  
Mn<sub>5</sub>(H<sub>2</sub>O)<sub>4</sub>(AsO<sub>3</sub>OH)<sub>2</sub>(AsO<sub>4</sub>)<sub>2</sub>  
Mn analogue of sainfeldite  
Monoclinic: *C*2/*c*; structure determined  
*a* 18.0300(10), *b* 9.2715(5), *c* 9.7756(5) Å, β 96.266(2)°  
8.279(28), 3.357(33), 3.234(100), 3.074(68), 2.973(39), 2.676(21), 2.341(21), 1.680(26)

IMA No. **2008-067**  
Arakawa, Minami-boso City, Chiba Prefecture, Japan  
Koichi Momma  
SiO<sub>2</sub>·*n*(CH<sub>4</sub>,C<sub>2</sub>H<sub>6</sub>,C<sub>3</sub>H<sub>8</sub>,C<sub>4</sub>H<sub>10</sub>); (*n*<sub>max</sub> = 3/17)  
Natural analogue of synthetic silica clathrate MTN  
Cubic: *Fd* $\bar{3}$ ; known structure  
*a* 19.3742 (4) Å  
11.210(24), 6.858(38), 5.847(83), 5.596(46), 4.847(24), 3.956(25), 3.730(91), 3.426(40),  
3.276(100)

IMA No. **2008-068**  
Blue Bell claims, Soda Mountains, San Bernadino County, California, USA  
Anthony R. Kampf  
Ca<sub>2</sub>Pb<sub>3</sub>(PO<sub>4</sub>)<sub>3</sub>F  
Apatite group  
Hexagonal: *P*6<sub>3</sub>/*m*; structure determined  
*a* 9.640(1), *c* 7.012(1) Å  
8.381(22), 3.974(28), 3.506(25), 2.877(100), 2.346(12), 2.097(15), 1.878(26), 1.793(16)

IMA No. **2008-069**  
Mont Saint-Hilaire, Rouville County, Québec, Canada  
Igor V. Pekov  
Na<sub>3</sub>Y(CO<sub>3</sub>)<sub>3</sub>·6H<sub>2</sub>O  
New structure type  
Hexagonal: *P*6<sub>3</sub>; structure determined  
*a* 11.316(4), *c* 5.931(2) Å  
9.82(57), 5.081(100), 3.779(39), 2.627(39), 2.471(37), 2.316(29), 2.047(30), 1.938(27)

IMA No. **2008-070**  
Sutlug River, Tuva Republic, Russia  
Frank C. Hawthorne  
NaLi<sub>2</sub>(Fe<sub>2</sub>Al<sub>2</sub>Li)(Si<sub>6</sub>Al<sub>2</sub>)O<sub>22</sub>F<sub>2</sub>  
Amphibole group  
Monoclinic: *C*2/*m*; structure determined

$a$  9.3720(4),  $b$  17.6312(8),  $c$  5.2732(3) Å,  $\beta$  102.247(4)°  
8.146(10), 4.430(7), 3.383(4), 3.008(8), 2.876(3), 2.686(9), 2.485(6), 2.199(3)

## 2009 PROPOSALS

### IMA No. 2009-001

Darai-Pioz alkaline massif, Darai-Pioz River, Tadzhikistan

Leonid A. Pautov

$\text{Ba}_5(\text{Ca}, \text{REE}, \text{Y})_{22}(\text{Ti}, \text{Nb})_{18}(\text{SiO}_4)_4[(\text{PO}_4), (\text{SiO}_4)]_4(\text{BO}_3)_9\text{O}_{22}[(\text{OH}), \text{F}]_{43}(\text{H}_2\text{O})_{1.5}$

New structure type

Hexagonal:  $R\bar{3}$ ; structure determined

$a$  9.1202(2),  $c$  102.145(5) Å

4.02(2), 3.95(2), 3.112(10), 2.982(4), 2.908(2), 2.885(2), 2.632(2), 2.127(2)

### IMA No. 2009-002

Tolbachik volcano, Kamchatka peninsula, Russia

Stanislav K. Filatov

$\text{Cu}_3(\text{AsO}_4)_2$

Dimorph of lammerite; known synthetic compound

Monoclinic:  $P2_1/c$ ; structure determined

$a$  6.306(1),  $b$  8.643(1),  $c$  11.310(1) Å,  $\beta$  92.26(1)°

4.41(20), 4.02(30), 3.39(50), 2.79(100), 2.34(20), 2.13(20), 2.02(20), 1.89(20), 1.64(20)

### IMA No. 2009-004

Darai-Pioz alkaline massif, Darai-Pioz River, Tadjikistan (39° 27' N 70° 43' E)

Leonid Pautov

$\text{KCa}_7\text{Sn}_2\text{Li}_3\text{Si}_{12}\text{O}_{36}\text{F}_2$

Sn analogue of baratovite

Monoclinic:  $C2/c$

$a$  17.01(2),  $b$  9.751(6),  $c$  21.00(2) Å,  $\beta$  112.45(8)°

4.86(21), 3.712(33), 3.234(100), 3.206(34), 3.039(28), 2.894(42), 2.425(42), 1.950(25)

### IMA No. 2009-005

Lagmannsvik, Hamarøy, Nordland, Norway (holotype), Kråkmo, Hamarøy, Nordland, Norway (cotype), Vyuntspakhk Mountain, Western Keivy, Kola Peninsula, Russia (cotype)

Igor V. Pekov

$(\text{Y}, \text{Ca}, \text{Ln})_5[(\text{Si}, \text{P})\text{O}_4]_3\text{F}$

Apatite group

Hexagonal:  $P6_3/m$ ; structure determined

$a$  9.4437(2),  $c$  6.8169(2) Å

4.104(27), 3.160(27), 3.102(29), 2.826(100), 2.775(58), 2.737(46), 1.948(25), 1.839(28)

### IMA No. 2009-006

Darai-Pioz glacier (39° 30' N 70° 40' E), Alai mountain range, Tien-Shan, Tajikistan

Atali A. Agakhanov

$\text{KLi}_2\text{TiSi}_4\text{O}_{11}\text{F}$

Mica group

Monoclinic:  $C2$

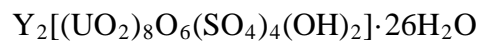
$a$  5.199(3),  $b$  9.068(7),  $c$  10.070(4) Å,  $\beta$  99.35(4)°

9.96(40), 4.48(67), 3.87(40), 3.33(100), 2.860(35), 2.600(28), 2.570(30), 2.400(31)

IMA No. **2009-008**

Červená vein, Rovnost shaft, Jáchymov, western Bohemia, Czech Republic

Jakub Plášil



Zippeite group

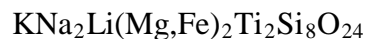
Triclinic:  $P\bar{1}$ ; structure determined

$a$  13.949(1),  $b$  14.329(1),  $c$  15.104(1) Å,  $\alpha$  107.440(4),  $\beta$  95.751(5),  $\gamma$  102.515(4)°  
14.12(5), 9.28(100), 4.64(41), 3.451(8), 3.385(7), 3.293(13), 3.094(8), 3.059(7)

IMA No. **2009-009**

Lakargi Mountain, Kabardino-Balkaria, North Caucasus, Russia (43°17' N, 43°6.42' E)

V.M. Gazeev



Neptunite group

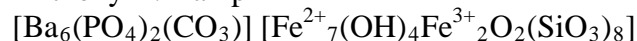
Monoclinic:  $C2/c$ ; structure determined

$a$  16.3271(7),  $b$  12.4788(4),  $c$  9.9666(4) Å,  $\beta$  115.651(5)°  
9.7(80), 4.55(40), 3.56(100), 3.90(40), 2.90(40), 2.81(40), 2.48(80), 2.16(60), 1.50(70)

IMA No. **2009-010**

Esquire #8 claim, Big Creek, Fresno County, California, USA

Anthony R. Kampf



New structure type

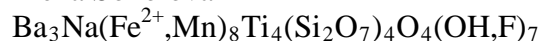
Triclinic:  $P\bar{1}$ ; structure determined

$a$  5.3437(7),  $b$  11.6726(16),  $c$  14.680(2) Å,  $\alpha$  85.573(4),  $\beta$  83.243(4),  $\gamma$  76.768(4)°  
3.859(62), 3.629(73), 3.457(70), 2.911(100), 2.665(100), 2.225(58), 2.089(66), 1.5597(73)

IMA No. **2009-011**

Verkhnee Espe deposit, Akjailyautas mountains, Kazakhstan (48°6' N 81°27' E)

Elena Sokolova



New structure type

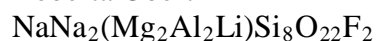
Triclinic:  $C\bar{1}$ ; structure determined

$a$  10.6965(7),  $b$  13.7861(9),  $c$  21.478(2) Å,  $\alpha$  99.345(1),  $\beta$  92.315(2),  $\gamma$  89.993(2)°  
3.825(30), 3.394(50), 3.182(50), 2.869(40), 2.788(90), 2.629(100), 2.101(50), 1.721(70)

IMA No. **2009-012**

Norra Kärr, Gränna, Jönköping, Småland, Sweden (58°06' N 14°40' E)

Roberta Oberti



Amphibole group

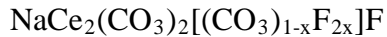
Monoclinic:  $C2/m$ ; structure determined

$a$  9.7043(5),  $b$  17.7341(8),  $c$  5.2833(3) Å,  $\beta$  104.067(4)°  
8.342(50), 4.435(80), 3.377(80), 3.096(40), 2.687(100), 2.557(30), 2.527(60), 2.259(40)

IMA No. **2009-013**

Aris phonolite, Windhoek District, Auas Mountains, Namibia and Poudrette Quarry, Mont Saint-Hilaire, Quebec, Canada

Paula C. Piilonen



Related to lukechangite-(Ce), cordylite-(Ce), huanghoite-(Ce) and horváthite-(Y)

Hexagonal:  $P\bar{6}m2$ ; structure determined

$a$  5.1109(2),  $c$  8.6713(4) Å

4.439(100), 4.352(52), 3.103(87), 2.561(38), 2.424(21), 2.212(43), 1.975(42), 1.950(16)

IMA No. **2009-014**

Mount Koashva, Khibiny Massif, Kola Peninsula, Russia

Victor N. Yakovenchuk



Fluorite group

Cubic:  $Fm\bar{3}m$

$a$  5.713(8) Å

3.324(100), 2.886(20), 2.029(90), 1.731(60), 1.434(20), 1.317(30), 1.172(50), 1.105(20)

IMA No. **2009-015**

Mount Koashva, Khibiny Massif, Kola Peninsula, Russia

Victor N. Yakovenchuk



Sr-Ce analogue of gagarinite-(Y)

Hexagonal:  $P6_3/m$

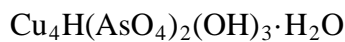
$a$  6.207(7),  $c$  3.801(9) Å

5.416(40), 3.120(100), 2.198(70), 1.796(90), 1.554(30), 1.387(30), 1.304(30), 1.173(70)

IMA No. **2009-016**

Dome Rock mine, 42 km N of Mingary railway siding, South Australia, Australia (148°24'E 31°52'S)

Peter Elliott



New structure type

Triclinic:  $P\bar{1}$ ; structure determined

$a$  5.378(11),  $b$  8.962(18),  $c$  9.841(2) Å,  $\alpha$  75.25(3),  $\beta$  83.56(3),  $\gamma$  79.97(3)°

4.716(30), 3.697(25), 3.605(30), 3.119(60), 3.073(100), 2.856(40), 2.464(50), 2.443(40)

IMA No. **2009-017**

East mine, Bayan Obo, Inner Mongolia, China (109°57'E 41°46'N)

Ritsuro Miyawaki



Mica group

Monoclinic:  $C2/m$

$a$  5.249(4),  $b$  9.095(5),  $c$  10.142(5) Å,  $\beta$  99.96(6)°

10.03(95), 4.51(45), 3.37(48), 3.12(41), 2.90(49), 2.62(43), 2.59(67), 2.41(100)

IMA No. **2009-018**

Huanzala Mine, Huallanca district, Bolognesi Province, Peru (77°00'W, 9°51'S)

Ritsuro Miyawaki



Wolframite group

Monoclinic:  $P2/c$

$a$  4.703(2),  $b$  5.689(1),  $c$  4.941(1) Å,  $\beta$  90.70(2)°

5.69(28), 4.70(74), 3.73(100), 3.63(39), 2.93(83), 2.91(94), 2.47(39), 2.18(32)

IMA No. **2009-019**

Aris phonolite, Windhoek District, Auas Mountains, Namibia

Paula C. Piilonen

$\text{NaLa}_2(\text{CO}_3)_2[(\text{CO}_3)_{1-x}\text{F}_{2x}]\text{F}$

Related to lukechangite-(Ce), cordylite-(Ce), huanghoite-(Ce) and horváthite-(Y)

Hexagonal:  $P\bar{6}m2$ ; structure determined

$a$  5.1131(7),  $c$  8.6759(17) Å

4.428(100), 4.338(41), 3.099(78), 2.557(41), 2.421(21), 2.214(31), 2.203(26), 1.972(44)

IMA No. **2009-020**

Poudrette Quarry, Mont Saint-Hilaire, Quebec, Canada

Andrew M. McDonald

$\text{Li}_4\text{Na}_{12}(\text{Y,Na,Ca,REE})_{12}(\text{PO}_4)_{12}(\text{CO}_3)_4(\text{F,OH})_8$

New structure type; related to IMA 2009-021

Orthorhombic:  $P222$ ; structure determined

$a$  11.167(2),  $b$  11.164(2)  $c$  11.162(1) Å

4.56(57), 3.95(57), 3.54(46), 3.23(37), 3.23(83), 2.71(38), 2.63(100), 2.149(42)

IMA No. **2009-021**

Poudrette Quarry, Mont Saint-Hilaire, Quebec, Canada

Andrew M. McDonald

$\text{Li}_4(\text{Na,Ca})_{12}(\text{Y,Ca,REE})_6\text{Zr}_6(\text{PO}_4)_{12}(\text{CO}_3)_4\text{O}_4[(\text{OH}),\text{F}]_4$

New structure type; related to IMA 2009-020

Triclinic:  $P1$ ; structure determined

$a$  10.9977(6),  $b$  10.9985(6),  $c$  10.9966(6) Å,  $\alpha$  90.075(4),  $\beta$  89.984(4),  $\gamma$  89.969(4)°

11.04(76), 7.80(79), 6.36(75), 3.89(100), 3.48(68), 2.94(98), 2.59(98), 2.117(65)

IMA No. **2009-022**

Su Senargiu, Sarroch, Sardinia, Italy

Paolo Orlandi

$\text{BiMo}_{2+x}\text{O}_7(\text{OH})\cdot\text{H}_2\text{O}$

New structure type

Monoclinic:  $P2_1/n$ ; structure determined

$a$  5.855(1),  $b$  9.048(1),  $c$  13.920(3) Å,  $\beta$  100.44(3)°

4.83(100), 3.41(21), 3.30(25), 3.015(50), 2.755(60), 2.080(50), 1.688(20), 1.509(30)

IMA No. **2009-023**

Bird Nest drift, Otto Mountain, San Bernardino County, California, USA (35°16.6'N, 116°6.0'W)

Anthony R. Kampf

$\text{Pb}_6(\text{Te}_2\text{O}_{10})(\text{CO}_3)\text{Cl}_2(\text{H}_2\text{O})$

New structure type

Monoclinic:  $C2/c$ ; structure determined

$a$  21.305(1),  $b$  11.059(1),  $c$  7.564(1) Å,  $\beta$  101.112(4)°

10.43(35), 3.733(27), 3.595(33), 3.351(66), 3.224(100), 3.093(30), 2.900(44), 2.133(38)



IMA No. **2009-024**

Aga mine (35°16.4'N, 116°5.7'W and the Bird Nest drift (35°16.6'N, 116°6.0'W), Otto Mountain, San Bernardino County, California, USA

Anthony R. Kampf



New structure type

Monoclinic:  $P2_1/n$ ; structure determined

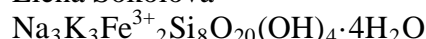
$a$  7.8552(5),  $b$  10.4837(7),  $c$  11.0426(8) Å,  $\beta$  95.547(2)°

3.336(69), 3.292(50), 3.195(100), 3.068(47), 3.007(49), 2.942(80), 2.723(29), 2.580(38)

IMA No. **2009-025**

Khibiny alkaline massif, Mount Yukspor, Kola Peninsula, Russia

Elena Sokolova



$\text{Fe}^{3+}$ -dominant analogue of ershovite

Triclinic:  $P\bar{1}$ ; structure determined

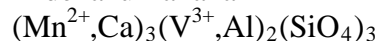
$a$  10.1978 (5),  $b$  12.0155(6),  $c$  5.2263(3) Å,  $\alpha$  103.439(1),  $\beta$  96.020(1),  $\gamma$  91.683(1)°

11.778(100), 4.390(70), 4.109(60), 3.390(50), 3.012(70), 2.730(60), 2.606(70)

IMA No. **2009-026**

Kurase mine, Saijo City, Ehime Prefecture, Japan

Hidekazu Tanaka



Garnet group

Cubic:  $Ia\bar{3}d$

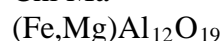
$a$  11.9242(7) Å

2.982(78), 2.667(100), 2.435(42), 2.339(20), 2.178(20), 1.935(21), 1.654(20), 1.594(30)

IMA No. **2009-027**

Allende meteorite

Chi Ma



Plumboferrite group

Hexagonal:  $P6_3/mmc$

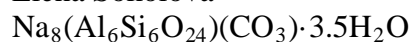
$a$  5.613,  $c$  22.285 Å

5.571(62), 2.807(100), 2.663(48), 2.506(54), 2.229(43), 2.228(51), 2.134(65), 1.403(61)

IMA No. **2009-028**

Koashva quarry, Khibina alkaline massif, Kola Peninsula, Russia

Elena Sokolova



Cancrinite group

Trigonal:  $P31c$ ; structure determined

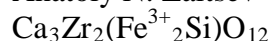
$a$  12.6678(5),  $c$  10.3401(4) Å

6.378(80), 4.689(100), 3.867(70), 3.664(70), 3.249(100), 2.661(80), 2.399(50), 2.117(60)

IMA No. **2009-029**

Kerimasi volcano, Tanzania (2°52'S 35°57'E)

Anatoly N. Zaitsev



Garnet group

Cubic:  $Ia\bar{3}d$ ; structure determined

$a$  12.549(1) Å

4.441(41), 3.140(91), 2.808(70), 2.564(93), 1.985(21), 1.741(26), 1.677(100), 1.403(17)

IMA No. **2009-030**

Har Ye'elim Mountain, Dead Sea, Israel (31°14'49"N 35°16'59"E)

Nikita V. Chukanov

BaFe<sup>3+</sup><sub>12</sub>O<sub>19</sub>

Magnetoplumbite group

Hexagonal:  $P6_3/mmc$

$a$  5.875(3),  $c$  23.137(19) Å

2.938(46), 2.770(100), 2.624(94), 2.420(44), 2.225(40), 2.120(25), 1.665(25), 1.627(56)

IMA No. **2009-031**

La Fossa crater, Vulcano, Aeolian Islands, Italy

Francesco Demartin

NaAl<sub>6</sub>(SO<sub>4</sub>)<sub>6</sub>(SO<sub>3</sub>F)F<sub>6</sub>·36H<sub>2</sub>O

New structure type

Trigonal:  $R\bar{3}$ ; structure determined

$a$  22.023(2),  $c$  9.237(2) Å

10.997(50), 4.584(25), 4.152(100), 3.873(70), 2.770(20), 2.345(17), 2.166(20)

IMA No. **2009-032**

Upper Chegem structure, Kabardino-Balkaria, North Caucasus, Russia (43.2°N 43.1° E)

Evgeny V. Galuskin

CaUO<sub>4</sub>

Fluorite-type structure

Cubic:  $Fm\bar{3}m$ ; structure determined

$a$  5.3813(2) Å

3.107(100), 2.691(30), 1.902(63), 1.623(54), 1.235(24), 1.203(16), 1.098(22), 0.910(18)

IMA No. **2009-033**

Upper Chegem structure, Kabardino-Balkaria, North Caucasus, Russia (43°17' N 43°6.42' E)

Irina O. Galuskina

Ca<sub>3</sub>Sn<sub>2</sub>Fe<sub>2</sub>SiO<sub>12</sub>

Garnet group

Cubic:  $Ia\bar{3}d$

$a$  12.55(3) Å

4.437(67), 3.138(74), 2.806(59), 2.562(100), 1.984(23), 1.677(91), 1.146(31), 1.046(25)

IMA No. **2009-034**

Coyote Peak, 20 km southeast of Orick, Humboldt County, California, USA

Frank C. Hawthorne

NaNa<sub>2</sub>(Fe<sup>2+</sup><sub>3</sub>Fe<sup>3+</sup>Ti)Si<sub>8</sub>O<sub>22</sub>O<sub>2</sub>

Amphibole group

Monoclinic:  $C2/m$ ; structure determined

$a$  9.845(4),  $b$  18.018(8),  $c$  5.296(3) Å,  $\beta$  103.86(3)°

8.515(80), 4.514(20), 3.407(60), 3.144(50), 2.722(100), 2.596(50), 2.533(40), 2.178(30)

IMA No. **2009-036**

Zálesí deposit, Zálesí, Rychlebské hory Mountains, northern Moravia, Czech Republic  
Jiří Sejkora



Ag dominant analogue of watkinsonite

Monoclinic:  $P2_1/m$ ; structure determined

$a$  13.182(2),  $b$  4.1840(8),  $c$  15.299(2) Å,  $\beta$  109.11(1)°

3.684(53), 3.625(39), 3.201(76), 3.028(100), 2.980(88), 2.892(95), 2.822(35), 2.094(31)

IMA No. **2009-037**

Black Pine mine, Philipsburg, Granite County, Montana, USA

Stuart J. Mills



$\text{Fe}^{3+}$ -analogue of zincolivenite

Orthorhombic:  $Pnmm$ ; structure determined

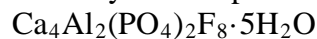
$a$  8.6235(7),  $b$  8.2757(7),  $c$  5.9501(5) Å

5.996(44), 4.884(100), 4.218(69), 2.991(92), 2.669(74), 2.476(85), 2.416(83), 1.582(54)

IMA No. **2009-038**

Gigante pegmatite, Punilla Department, Córdoba Province, Argentina, 31°24'31.0"S  
64°46'19.6"W

Anthony R. Kampf



New structure type

Triclinic:  $P\bar{1}$ ; structure determined

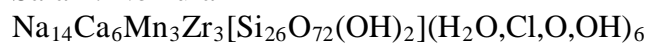
$a$  6.1933(7),  $b$  9.871(1),  $c$  13.580(2) Å,  $\alpha$  89.716(3),  $\beta$  75.303(4),  $\gamma$  88.683(4)°

7.904(70), 5.994(100), 3.280(58), 3.113(30), 2.945(82), 2.887(44), 2.262(27), 1.821(27)

IMA No. **2009-039**

Poços de Caldas massif, Minas Gerais, Brazil

Sara F. Nomura



Eudialyte group

Trigonal:  $R\bar{3}m$ ; structure determined

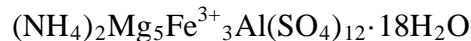
$a$  14.2418(1),  $c$  30.1143(3) Å

6.421(37), 4.329(30), 3.526(46), 3.218(100), 3.023(25), 1.763(16), 1.609(77), 1.605(41)

IMA No. **2009-040**

Köves Hill (46.16°N 18.32°E), Pécs-Vasas, Mecsek Mountains, Hungary

Sándor Szakáll



$\text{NH}_4^+$ - $\text{Mg}^{2+}$  analogue of voltaite

Cubic:  $Fd\bar{3}c$

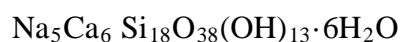
$a$  27.351(3) Å

6.85(24), 5.59(100), 3.562(66), 3.420(72), 3.059(22), 2.197(22), 1.784(25), 1.558(25)

IMA No. **2009-041**

Aris phonolite, Windhoek District, Auas Mountains, Namibia

Victor N. Yakovenchuk



New structure type

Triclinic:  $P\bar{1}$

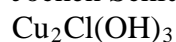
$a$  9.55(3),  $b$  9.395(8),  $c$  16.329(3) Å,  $\alpha$  100.2(1),  $\beta$  94.9(2),  $\gamma$  117.8(2)°

15.50(100), 4.98(14), 4.89(14), 4.22(16), 3.159(30), 3.022(33), 2.792(24), 1.823(30)

IMA No. **2009-042**

La Vendita Mine, Sierra Gorda, Antofagasta Region, Chile

Jochen Schlueter



Polymorph of atacamite

Triclinic:  $P\bar{1}$ ; structure determined

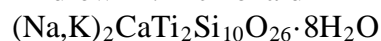
$a$  9.1646(9),  $b$  9.2029(8),  $c$  9.2102(8) Å,  $\alpha$  95.858(6),  $\beta$  96.290(7),  $\gamma$  96.507(2)°

5.432(100), 4.657(10), 2.889(39), 2.747(94), 2.257(56), 1.895(7), 1.812(21), 1.702(29)

IMA No. **2009-043**

Poudrette Quarry, Rouville County, Mont Saint-Hilaire, Quebec, Canada

Andrew M. McDonald



Related to natrolemoynite, altisite and lemoynite

Monoclinic:  $C2/m$ ; structure determined

$a$  10.1839(5),  $b$  15.8244(6),  $c$  9.1327(7) Å,  $\beta$  104.463 (2)°

8.835(85), 7.913(100), 6.849(70), 5.526(40), 4.336(45), 3.514(80), 3.426(55), 2.792(50)

IMA No. **2009-044**

Bird Nest drift, Otto Mountain, San Bernardino County, California, USA (35°16.6'N, 116°6.0'W)

Anthony R. Kampf



Isostructural with perite and nadorite

Orthorhombic:  $Bmmb$ ; structure determined

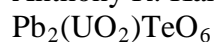
$a$  5.5649(6),  $b$  5.5565(6),  $c$  12.475(1) Å

3.750(58), 2.857(100), 2.781(43), 2.075(31), 1.966(30), 1.665(21), 1.620(52), 1.250(17)

IMA No. **2009-045**

Aga mine (35°16.4'N, 116°5.7'W) and the Bird Nest drift (35°16.6'N, 116°6.0'W), Otto Mountain, San Bernardino County, California, USA

Anthony R. Kampf



Known structure type

Monoclinic:  $P2_1/c$ ; structure determined

$a$  5.7217(16),  $b$  7.7478(2),  $c$  7.889(2) Å,  $\beta$  90.833(5)°

3.501(29), 3.234(100), 2.985(37), 2.861(40), 2.768(30), 2.220(23), 1.990(21), 1.713(22)

IMA No. **2009-046**

Cleveland tin mine, Luina, Waratah, Tasmania, Australia (41°28'57"S, 145°23'7"E; type locality); Mount Bendoc, Victoria, Australia (37°7'60"S, 148°54'0"E); Mount Bischoff, Tasmania, Australia (41°25'S, 145°31'E); Blue Mountain Saddle (Bald Hornet Claim), North Bend, King County, Washington, USA (47°31'N, 121°43'W)

Stuart J. Mills

$(\text{Na}, \square)(\text{Fe}^{2+}, \text{Mg})_3\text{Al}_6(\text{BO}_3)_3\text{Si}_6\text{O}_{18}(\text{OH})_4$

Tourmaline group

Monoclinic: *Cm*; structure determined

*a* 10.408(3), *b* 15.991(5), *c* 7.189(2) Å,  $\beta$  117.44(2)°

6.47(55), 4.26(52), 4.01(79), 3.51(49), 2.98(48), 2.59(100), 2.06(41), 2.05(44)

IMA No. **2009-047**

Tom's phosphate quarry, Kapunda, South Australia, Australia (34°21'S 138°55'E)

Stuart J. Mills

$\text{CaNaFe}_4(\text{PO}_4)_4(\text{OH})_3 \cdot 5\text{H}_2\text{O}$

New structure type

Triclinic:  $P\bar{1}$

*a* 7.725(4), *b* 6.333(2), *c* 9.786(5) Å,  $\alpha$  99.10(3),  $\beta$  105.50(2),  $\gamma$  89.86(3)°

9.338(100), 7.442(37), 5.173(52), 3.828(45), 3.123(34), 2.817(33), 2.753(64), 2.417(48)

IMA No. **2009-048**

Block 14 open cut, Broken Hill, New South Wales, Australia

Peter Elliott

$\text{Cu}_3\text{Cd}_2(\text{SO}_4)_2(\text{OH})_6 \cdot 4\text{H}_2\text{O}$

Structurally related to Cu and Zn sulphate minerals containing sheets of edge-sharing

( $\text{Cu}^{2+}, \text{Zn}$ ) $\phi_6$  octahedra

Monoclinic:  $P2_1/c$ ; structure determined

*a* 10.863(2), *b* 13.129(3), *c* 11.169(2) Å,  $\beta$  113.04(3)°

9.991(90), 5.001(90), 4.591(45), 3.332(60), 2.824(40), 2.769(55), 2.670(47)

IMA No. **2009-049**

La Fossa crater, Vulcano, Aeolian Islands, Italy

Italo Campostrini

BiSI

I-dominant analogue of demicheleite-(Br) and demicheleite-(Cl)

Orthorhombic: *Pnam*

*a* 8.4501(7), *b* 10.1470(9), *c* 4.1389(4) Å

6.490(100), 4.346(94), 3.896(90), 3.243(22), 2.999(22), 2.709(60), 2.466(21), 2.161(38)

IMA No. **2009-050**

Bonnet Island, Georgian Bay, Parry Sound, Ontario, Canada (UTM coordinates 0567531W 5003719N NAD 83)

Edward S. Grew

$\{(\text{Y}, \text{REE})(\text{Ca}, \text{Fe}^{2+})_2\}[(\text{Mg}, \text{Fe}^{2+})(\text{Fe}^{3+}, \text{Al})]\text{Si}_3\text{O}_{12}$ ; end member is  $(\text{Y}_2\text{Ca})(\text{Mg}_2)\text{Si}_3\text{O}_{12}$

Garnet group

Cubic:  $Ia\bar{3}d$ ; structure determined

*a* 11.9947(6) Å

2.999(36), 2.682(100), 2.448(33), 2.190(17), 1.663(17), 1.603(44), 1.309(18)

IMA No. **2009-051**

Upper Chegem volcanic structure, Kabardino-Balkaria, North Caucasus, Russia (43°17'N 43°6.42'E)

Irina O. Galuskina

$\text{Ca}_3\text{U}^{6+}\text{ZrFe}^{3+}_2\text{Fe}^{2+}\text{O}_{12}$

Garnet group

Cubic:  $Ia\bar{3}d$ ; structure determined

$a$  12.7456(9) Å

2.846, 2.598, 2.012, 1.701, 1.423, 1.357

IMA No. **2009-052**

Upper Chegem volcanic structure, Kabardino-Balkaria, North Caucasus, Russia (43°17'N 43°6'E)

Irina O. Galuskina

$\text{Ca}_3\text{SbSnAl}_3\text{O}_{12}$

Garnet group

Cubic:  $Ia\bar{3}d$ ; structure determined

$a$  12.492(1) Å

4.407(77), 3.118(93), 2.789(62), 2.546(97), 1.973(20), 1.732(15), 1.669(100), 1.396(15)

IMA No. **2009-053**

Upper Chegem volcanic structure, Kabardino-Balkaria, North Caucasus, Russia (43°17'N 43°6.42'E)

Irina O. Galuskina

$\text{Ca}_3\text{SbZrFe}_3\text{O}_{12}$

Garnet group

Cubic:  $Ia\bar{3}d$ ; structure determined

$a$  12.49 Å

4.416(60), 3.123(71), 2.793(55), 2.550(97), 1.732(22), 1.669(100), 1.396(26), 1.140(40)

IMA No. **2009-054**

Wiluy River, Yakutia, Russia (63.0°N 112.3°E)

Irina O. Galuskina

$\text{Ca}_3\text{Sc}_2\text{Si}_3\text{O}_{12}$

Garnet group

Cubic:  $Ia\bar{3}d$ ; structure determined

$a$  12.255(1) Å

3.064(62), 2.740(88), 2.502(72), 1.670(32), 1.638(100), 1.138(23), 1.119(30)

IMA No. **2009-055**

Dúbrava Sb deposit, Low Tatra Mountains, Slovak Republic

Dan Topa

$\text{Pb}_{15-2x}\text{Sb}_{14+2x}\text{S}_{36}\text{O}_x$  ( $x \sim 0.2$ )

New structure type

Monoclinic:  $C2/m$ ; structure determined

$a$  48.189(48),  $b$  4.1104(40),  $c$  34.235(35) Å,  $\beta$  106.059(15)°

4.012(39), 3.966(39), 3.793(23), 3.433(100), 3.387(31), 3.376(27), 3.269(29), 2.996(26)

IMA No. **2009-056**

Nishny Tagil ultramafic complex, Solovyeva Gora, Alexandrov Log, Russia (57°40'N 59°39'W) and the Konder placer, Konder alkaline-ultrabasic massif, Maya River basin, South Yakutia, East Siberia, Russia (57°36'N 134°37'W)

Victor D. Begizov

(Fe,Rh,Ni,Ir,Cu,Pt)<sub>9</sub>S<sub>8</sub>

Possibly a distorted pentlandite derivative

Tetragonal: Primitive

*a* 10.009(5), *c* 9.840(8) Å

5.72(5), 3.01(7), 2.81(3), 2.23(10), 1.933(6), 1.772(4), 1.367(3), 1.167(4)

IMA No. **2009-057**

Kobokobo pegmatite, Kobokobo, South Kivu Province, Democratic Republic of Congo (3°5'S 27°8'E)

Stuart J. Mills

Al<sub>6</sub>(PO<sub>4</sub>)<sub>4</sub>(OH)<sub>6</sub>·11H<sub>2</sub>O

New structure type

Triclinic: *P*1 or *P* $\bar{1}$

*a* 7.399(13), *b* 7.771(17), *c* 12.144(16) Å,  $\alpha$  99.03(17),  $\beta$  91.98(17),  $\gamma$  116.11(15)°

12.03(100), 6.89(60), 4.77(19), 3.740(26), 3.561(42), 3.092(23), 2.914(20), 2.561(20)

IMA No. **2009-058**

Lengenbach, Binn Valley, Switzerland

Fabrizio Nestola

Tl<sub>5-x</sub>Pb<sub>2x</sub>(As,Sb)<sub>21-x</sub>S<sub>34</sub> (*x* ~ 1)

As-dominant analogue of chabournéite

Triclinic: *P*1 (by analogy with chabournéite)

*a* 16.217(7), *b* 42.544(9), *c* 8.557(4) Å,  $\alpha$  95.72(4),  $\beta$  90.25(4),  $\gamma$  96.78(4)°

3.927(100), 3.775(45), 3.685(45), 3.620(50), 3.124(50), 2.929(60), 2.850(70), 2.097(60)

IMA No. **2009-059**

Liley, Üdersdorf, Daun, Eifel Mountains, Rheinland-Pfalz, Germany (holotype);

Tausonitovaya Gorka, Murun alkaline complex, Irkutsk province, Russia (cotype)

Yulia Uvarova

NaKBaTi<sub>2</sub>(Si<sub>4</sub>O<sub>12</sub>)O<sub>2</sub>

K analogue of batisite

Orthorhombic: *Imma*; structure determined

*a* 8.0884(4), *b* 10.4970(5), *c* 13.9372(6) Å

8.353(70), 3.377(30), 3.196(50), 2.907(100), 2.694(30), 2.241(40), 2.179(40), 2.097(50)

IMA No. **2009-060**

Prága Hill, Bazsi, Veszprém County, Transdanubia, Hungary (46°56'N 17°15'E)

Giovanna Vezzalini

(Mg<sub>0.7</sub>K<sub>0.5</sub>Ca<sub>0.5</sub>Na<sub>0.1</sub>)[Al<sub>3</sub>Si<sub>9</sub>O<sub>24</sub>]·10H<sub>2</sub>O

Mg-dominant chabazite

Rhombohedral: *R* $\bar{3}$ ; structure determined

*a* 9.3433(5) Å,  $\alpha$  94.894(4)°

9.306(60), 5.537(37), 4.958(25), 4.315(100), 3.856(20), 3.550(38), 2.924(78), 2.869(41)

IMA No. **2009-061**

N'chwaning 2 mine, Kalahari manganese field, Republic of South Africa

Stephen Guggenheim

Mn<sub>2</sub>Fe<sup>3+</sup>(SiFe<sup>3+</sup>)O<sub>5</sub>(OH)<sub>4</sub>

Serpentine group

Hexagonal: *P*6<sub>3</sub>; structure determined

*a* 5.5472(3), *c* 14.296(2) Å  
7.21(100), 3.543(50), 2.706(14), 2.568(39), 2.381(25), 1.982(26), 1.640(12), 1.498(10)

IMA No. **2009-062**

Tolbachik volcano, Kamchatka, Far-Eastern Region, Russia

Mikhail E. Zelenskiy

$\text{Cu}_3(\text{VO}_4)_2$

Dimorph of triclinic mcbirneyite

Monoclinic:  $P2_1/c$ ; structure determined

*a* 6.2695(4), *b* 8.0195(3), *c* 6.3620(3) Å,  $\beta$  111.96(1)°

4.70(60), 3.30(70), 3.22(87), 3.18(34), 2.894(72), 2.761(100), 2.479(59), 2.419(67)

IMA No. **2009-063**

Aga mine (35°16.4'N, 116°5.7'W) and the Bird Nest drift (35°16.6'N, 116°6.0'W), Otto Mountain, San Bernardino County, California, USA

Anthony R. Kampf

$\text{Pb}_2\text{TeO}_5$

New structure type

Monoclinic:  $Cc$ ; structure determined

*a* 13.099(3), *b* 5.714(1), *c* 7.520(2) Å,  $\beta$  123.80(3)°

3.131(64), 3.055(90), 3.105(100), 2.112(29), 1.810(21), 1.773(43), 1.686(20)

IMA No. **2009-064**

Aga mine (35°16.4'N, 116°5.7'W) and the Bird Nest drift (35°16.6'N, 116°6.0'W), Otto Mountain, San Bernardino County, California, USA

Anthony R. Kampf

$\text{Pb}_2\text{Cu}_5(\text{TeO}_6)_2(\text{OH})_2$

New structure type

Orthorhombic:  $P2_1nm$ ; structure determined

*a* 5.2000(2), *b* 9.6225(4), *c* 11.5340(5) Å

3.693(43), 3.578(44), 3.008(84), 2.950(88), 2.732(100), 1.785(33), 1.475(36)

IMA No. **2009-065**

Aga mine (35°16.4'N, 116°5.7'W), Otto Mountain, San Bernardino County, California, USA

Anthony R. Kampf

$\text{Pb}_2\text{Cu}_4(\text{TeO}_6)_2(\text{H}_2\text{O})_2$

New structure type

Orthorhombic:  $P2_12_12_1$ ; structure determined

*a* 5.2006(5), *b* 9.6335(10), *c* 11.6837(13) Å

4.771(76), 4.463(32), 3.544(44), 3.029(100), 2.973(48), 2.665(41), 2.469(40), 2.246(34)

IMA No. **2009-066**

Kvanefjeld prospect, Ilimaussaq alkaline complex, Southern Greenland (60°54'N 45°50'W)

Ian E. Grey

$\text{Na}_8\text{ZrSi}_6\text{O}_{18}$

Lovozerite group

Trigonal:  $R\bar{3}m$ ; structure determined

*a* 10.345(2), *c* 13.103(2) Å

5.286(33), 5.175(28), 4.240(14), 3.698(100), 3.280(42), 2.645(42), 2.585(45), 1.849(35)



IMA No. **2009-067**

Tsentral'nyi mine, Rasvumchorr Mountain, Khibiny alkaline complex, Kola Peninsula, Russia

Igor V. Pekov



Related to rhodesite

Orthorhombic:  $Pm2_1n$ ; structure determined

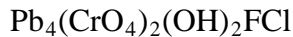
$a$  24.335(2),  $b$  7.0375(5),  $c$  6.5400(6) Å

3.517(38), 3.072(100), 3.040(46), 2.943(47), 2.893(53), 2.880(41), 2.759(25), 1.759(30)

IMA No. **2009-068**

Mammoth-St. Anthony mine, Tiger, Pinal County, Arizona, USA

Frank C. Hawthorne



New structure type

Orthorhombic:  $Pm\bar{m}n$ ; structure determined

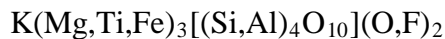
$a$  7.6257(6),  $b$  11.6078(9),  $c$  6.8961(5) Å

6.371(60), 3.357(60), 3.308(80), 3.195(80), 3.143(60), 2.131(100)

IMA No. **2009-069**

Rothenberg basalt quarry, Mendig, Eifel Mountains, Rhineland-Palatinate, Germany

Nikita V. Chukanov



Mica group

Monoclinic:  $C2/m$ ; structure determined

$a$  5.3165(1),  $b$  9.2000(2),  $c$  10.0602(2) Å,  $\beta$  100.354(2)°

9.91(32), 4.53(11), 3.300(100), 3.090(12), 1.985(21), 1.659(12), 1.527(16)

IMA No. **2009-070**

Cleveland tin mine, Luina, Tasmania, Australia (41°28'57"S 145°23'7"E)

William D. Birch



A rhombohedral pyrochlore group mineral

Rhombohedral:  $R\bar{3}m$ ; structure determined

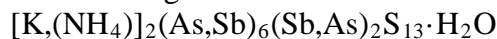
$a$  7.1756(1) Å,  $\alpha$  59.867(1)°

5.86(12), 3.054(8), 2.926(100), 2.325(33), 2.067(8), 1.949(19), 1.791(66), 1.528(20)

IMA No. **2009-071**

Carrera quarry, Signols, Oulx, Upper Susa Valley, Torino, Piedmont, Italy

Cristian Biagioni



New structure type

Triclinic:  $P\bar{1}$ ; structure determined

$a$  9.704(1),  $b$  11.579(1),  $c$  12.102(2) Å,  $\alpha$  112.82(1),  $\beta$  103.44(1),  $\gamma$  90.49(1)°

10.78(100), 5.79(55), 5.39(32), 5.31(34), 4.23(35), 3.747(31), 3.157(30), 2.876(30)

IMA No. **2009-072**

Centennial Eureka mine, near Eureka, Tintic district, Juab County, Utah, USA

Igor V. Pekov



New structure type

Monoclinic:  $P2_1$ ,  $Pm$ , or  $P2/m$

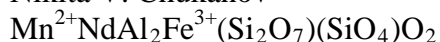
$a$  8.28(3),  $b$  18.97(2),  $c$  7.38(2) Å,  $\beta$  121.3(6)°

18.92(100), 9.45(19), 4.716(10), 4.111(13), 3.777(24), 2.692(15), 2.524(41), 1.558(22)

IMA No. **2009-073**

Åskagen, near Filipstad, Värmland, Sweden

Nikita V. Chukanov



Epidote group

Monoclinic:  $P2_1/m$

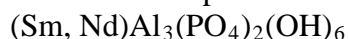
$a$  8.78(1),  $b$  5.710(6),  $c$  10.02(1) Å,  $\beta$  114.6(2)°

3.50(46), 3.22(50), 2.897(100), 2.850(73), 2.687(73), 2.606(52), 2.121(48), 1.630(59)

IMA No. **2009-074**

Svodovy area, Maldynyrd mountain, Subpolar Urals, Russia (65°11'17"N 60°09'46"E)

Valentina I. Popova



Alunite-jarosite group

Trigonal:  $R\bar{3}m$

$a$  6.972(4),  $c$  16.182(7) Å

5.65(43), 3.479(37), 2.925(100), 2.206(17), 2.191(22), 2.161(46), 1.881(58), 1.738(20)

IMA No. **2009-075**

Karnasurt Mine, Karnasurt Mountain, Lovozero alkaline massif, Kola Peninsula, Russia

Igor V. Pekov



Cancrinite group

Hexagonal:  $P6_3$ ; structure determined

$a$  12.7345(2),  $c$  5.1798(1) Å

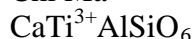
6.380(30), 4.695(91), 3.681(37), 3.250(100), 2.758(33), 2.596(31), 2.436(21), 2.121(24)

## OLDER PROPOSALS

IMA No. **2008-042a**

Allende meteorite

Chi Ma



Clinopyroxene (diopside group)

Monoclinic:  $C2/c$

$a$  9.884,  $b$  8.988,  $c$  5.446 Å,  $\beta$  105.86°

2.996(100), 2.964(31), 2.909(25), 2.581(42), 2.560(28), 2.535(47), 2.130(19), 1.431(19)

## GENERAL NOMENCLATURE PROPOSALS

### IMA 07-D ALUNITE SUPERGROUP

The recommended nomenclature of the alunite supergroup is accepted. Minamiite is renamed natroalunite-2R, and beaverite is renamed beaverite-(Cu). Orpheite is discredited because it is identical to P-rich hinsdalite.

## **09-A-bis STANDARDISATION OF MINERAL GROUP HIERARCHIES**

Criteria for the definition of mineral groups, and a hierarchical scheme for the nomenclature of groups, have been set up. The latter has been applied to selected cases of existing groups, and will serve as a basis for a forthcoming compilation of mineral groups including as many minerals as possible.

## **NOMENCLATURE OF THE TOURMALINE GROUP MINERALS**

Re-examination and redefinition of tourmaline end-members and potential new end-members and species has undertaken, including a classification guide for naming tourmalines.

### **CHANGES IN EXISTING NOMENCLATURE**

#### **IMA 07-D ALUNITE SUPERGROUP**

The recommended nomenclature of the alunite supergroup is accepted. Minamiite is renamed natroalunite-2*R*, and beaverite is renamed beaverite-(Cu). Orpheite is discredited because it is identical to P-rich hinsdalite.

#### **IMA 07-E HASTITE**

The mineral hastite, orthorhombic CoSe<sub>2</sub> (marcasite group), is discredited. The type material has been shown to be ferroselite, FeSe<sub>2</sub>.

#### **IMA 08-B β-DOMEKYITE**

Proposal IMA 68-3 is nullified. The name “wrightite” is discredited and the original name β-domeykite is revalidated.

#### **IMA 08-C KHINITE and PARAKHINITE**

Khinite and parakhinite are polytypic. As a consequence, khinite is renamed khinite-4*O*, and parakhinite is renamed khinite-3*T*.

#### **IMA 08-D SLAVIKITE**

The proposed revision of chemical composition and crystal structure of slavikite is accepted. The formula of slavikite now becomes (H<sub>3</sub>O<sup>+</sup>)<sub>3</sub>Mg<sub>6</sub>Fe<sub>15</sub>(SO<sub>4</sub>)<sub>21</sub>(OH)<sub>18</sub>·98H<sub>2</sub>O.

#### **PERTSEVITE IS RENAMED PERTSEVITE-(F)**

A new mineral from the Snezhnoye deposit, Chersky Mountains, Republic of Sakha-Yakutia, Russian Federation (IMA 2008-060) has been approved by the CNMNC. Its formula is Mg<sub>2</sub>(BO<sub>3</sub>)(OH) and it is the OH-dominant analogue of pertsevite, Mg<sub>2</sub>(BO<sub>3</sub>)F. In voting comments on the name of the proposed new mineral (IMA 2008-060), six CNMNC members explicitly agreed in having pertsevite renamed as pertsevite-(F); only one member asked for an official decision by CNMNC. Accordingly, the Chair of CNMNC has authorised the renaming of pertsevite as pertsevite-(F) in order to standardise the nomenclature in the pertsevite group.

#### **IMA 09-B DISCREDITATION OF PARASPURRITE, THE MONOCLINIC POLYMORPH OF SPURRITE**

Paraspurrite is discredited. It corresponds to polysynthetically twinned spurrite.

#### **IMA 09-C MOSANDRITE: REDEFINITION OF ITS COMPOSITION. RINKITE IS NO MORE QUESTIONABLE**

Mosandrite is a mineral species belonging to the rinkite group and differing from rinkite in

its chemical, crystallographic and structural features. The formula of mosandrite is redefined as  $\text{Ti}(\square, \text{Ca}, \text{Na})_3(\text{Ca}, \text{REE})_4(\text{Si}_2\text{O}_7)_2[\text{H}_2\text{O}, \text{OH}, \text{F}]_4 \cdot \text{H}_2\text{O}$ . Rinkite is no more a questionable (Q) species, but a fully valid member, together with mosandrite and nacareniobsite-(Ce), of the rinkite group of minerals.