

Zeitschrift: Schweizerische mineralogische und petrographische Mitteilungen =
Bulletin suisse de minéralogie et pétrographie

Band: 71 (1991)

Heft: 3

Rubrik: New minerals recently approved by the Commission on New Minerals
and Mineral Names, International Mineralogical Association

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**New minerals recently approved
by the
Commission on New Minerals and Mineral Names
International Mineralogical Association**

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. It is hoped that future lists will be published in the major mineralogical journals on a quarterly or semi-annual basis.

Each mineral is described in the following format:

IMA No.

(any relationship to other minerals)

Chemical Formula

Crystal system, space group
unit cell parameters

Diaphaneity; lustre; colour

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

J.A. Mandarino, Chairman

Commission on New Minerals and Mineral Names

International Mineralogical Association

The following minerals were approved during 1990

IMA No. 90-002

(Ce,La)Al₂B₃O₉

Hexagonal, P6₂m

a 4.610, c 9.358 Å

Transparent to translucent; vitreous; light
yellow.

Uniaxial (+), ω 1.703, ε 1.711

3.67(100), 3.04(100), 2.458(75), 2.308(50),

2.020(50), 1.953(50), 1.855(50), 1.835(50)

Transparent; vitreous; pale yellow brown in
thin-section.

Biaxial (+), α 1.735, β 1.741, γ 1.758, 2V(meas.)
64°, 2V(calc.) 62°.

9.1(40), 3.50(50), 2.910(90), 2.842(50),
2.698(100), 2.622(60), 2.177(40), 2.137(40).

IMA No. 90-004

the Mg-dominant analogue of allanite-(Ce)

Ca(Ce,La)MgAl₂Si₃O₁₂(OH)

Monoclinic, P2₁/m

a 8.916, b 5.700, c 10.140 Å, β 114.72°

IMA No. 90-005

Ca₃Si₆(O,OH)₁₈ · 5 H₂O

Monoclinic, Cc or C2/c

a 11.331, b 7.353, c 22.67 Å, β 96.59°

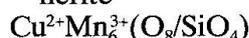
Transparent; vitreous; colourless to white.

Biaxial (-), α 1.575, β 1.580, γ 1.585, 2V(calc.)
89.8°.

11.25(100), 3.745(36), 3.304(51), 3.068(45),
3.034(60), 3.012(37), 2.811(41), 2.794(60).

IMA No. 90-007

the Cu-dominant analogue of braunite and neltnerite



Tetragonal, $I4_1/acd$

a 9.409, c 18.600 Å

Opaque; metallic; black.

In reflected light: grey, very weak anisotropism, weak bireflectance, nonpleochroic. R-values: (20.8, 21.2%) 470 nm, (19.6, 20.0%) 546 nm, (19.2, 19.7%) 589 nm, (18.7, 19.2%) 650 nm.

2.703(100), 2.352(14), 2.135(16), 1.6516(30), 1.4167(10), 1.4023(12).

Transparent; vitreous; colourless.

Uniaxial (-), ω 1.508, ε 1.506.

6.39(S), 4.77(vS), 3.69(m), 3.27(vS), 2.769(m), 2.650(m).

IMA No. 90-008



Hexagonal (trigonal), $P31c$

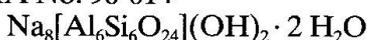
a 12.855, c 10.700 Å

Transparent; vitreous; yellow.

Uniaxial (-), ω 1.584, ε 1.660

4.824(70), 3.919(80), 3.720(100), 3.313(90), 2.694(35), 2.676(70), 2.471(35).

IMA No. 90-014



Hexagonal, $P6_3$

a 12.74, c 5.183 Å

Transparent; vitreous; light blue or colourless.

Uniaxial (+), ω 1.494, ε 1.501.

6.43(25), 4.70(60), 3.68(70), 3.26(100), 2.756(50), 2.433(30).

IMA No. 90-009



Hexagonal, $P6_22$

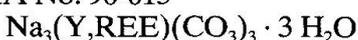
a 12.843, c 32.239 Å

Transparent; vitreous; green to greenish-yellow.

Uniaxial (+), ω 1.528, ε 1.543

4.84(40), 3.711(100), 3.314(80), 3.035(20), 2.988(16), 2.687(25), 2.470(16), 2.139(25).

IMA No. 90-015



Orthorhombic, space group unknown, lattice is primitive

a 10.136, b 17.348, c 5.970 Å

Transparent; vitreous to dull; colourless.

Biaxial (+), α 1.528, β 1.529, γ 1.531, 2V(meas.) 45°, 2V(calc.) 71°.

6.53(55), 5.05(50), 4.85(65), 2.858(70), 2.597(50), 2.229(50), 2.076(100).

IMA No. 90-010



Orthorhombic, $Pbcm$

a 6.412, b 19.45, c 8.941 Å

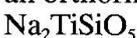
Transparent to translucent; greasy; cadmium orange.

Biaxial (-), α 1.94, β 2.05, γ 2.06, 2V(meas.) 5°, 2V(calc.) 32°.

9.75(10), 4.476(4), 3.208(9), 3.047(5), 2.680(4), 2.153(4), 1.604(4).

IMA No. 90-016

an orthorhombic polymorph of natisite



Orthorhombic, $Pmma$

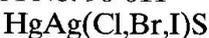
a 9.827, b 9.167, c 4.799 Å

Translucent; adamantine; yellow, orange-yellow, orange-brown.

Biaxial (+), α 1.740, β 1.741, γ 1.765, 2V(meas.) 20°, 2V(calc.) 23°.

2.748(100), 2.257(25), 1.720(30), 1.680(30), 1.475(33), 1.443(35).

IMA No. 90-011



Orthorhombic, $P2_12_12$

a 6.803, b 12.87, c 4.528 Å

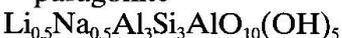
Translucent to opaque; subadamantine to submetallic; black.

Biaxial (probably -), $\alpha \sim 2.2$, $\gamma \sim 2.3$.

6.43(40), 3.762(60), 3.637(60), 3.283(30), 2.664(100), 2.265(40), 2.047(20).

IMA No. 90-018

a regular 1:1 interstratification of cookeite and paragonite



Monoclinic, $C2/m$

a 5.158, b 8.914, c 23.83 Å, β 94.23°

Transparent; pearly; white.

Biaxial (-), α 1.58 << 1.59, β 1.58 << 1.59, γ 1.59 << 1.60, 2V(meas.) 30–50°.

11.89(70), 4.456(90), 4.325(90), 2.547(100), 2.476(70), 1.486(90).

IMA No. 90-012

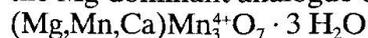


Hexagonal, $P6_3$

a 22.121, c 5.221 Å

IMA No. 90-019

the Mg-dominant analogue of chalcophanite



Triclinic, P1

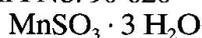
a 7.534, b 7.525, c 8.204 Å, α 89.753°,
 β 117.375°, γ 120.000°

Opaque; dull; coffee black.

In reflected light: grey, clear anisotropism,
weak bireflectance, nonpleochroic. R-values:
(23.0%) 470 nm, (19.9%) 546 nm, (19.1%)
589 nm, (18.6%) 650 nm.

6.965(100), 5.539(3), 4.086(4), 3.522(3),
3.483(11), 2.230(8).

IMA No. 90-020



Orthorhombic, Pnma

a 9.762, b 5.639, c 9.558 Å

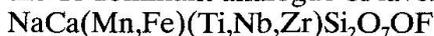
Transparent; vitreous; colourless.

Biaxial (+), α 1.590, β 1.596, γ 1.636, 2V(meas.)
41°, 2V(calc.) 43°.

6.83(S), 4.33(VS), 3.43(VS), 2.704(M),
2.666(M), 2.414(M), 1.726(M). IMA

IMA No. 90-021

the Ti-dominant analogue of lavenite



Monoclinic, P2₁/a

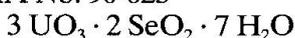
a 10.828, b 9.790, c 7.054 Å, β 108.20°

Translucent to transparent; vitreous; orange-
brown, yellow.

Biaxial (-), α 1.743, β 1.785, γ 1.810, 2V(meas.)
72–84°, 2V(calc.) 74°.

3.942(20), 3.234(30), 2.859(100), 2.807(70),
1.762(20), 1.741(20), 1.727(20), 1.688(20),
1.627(20).

IMA No. 90-023



Orthorhombic, Pnc2 or Pncm

a 8.025, b 17.43, c 6.935 Å

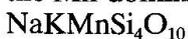
Translucent to transparent; vitreous; bright
yellow.

Biaxial (-), α 1.618, β 1.738, γ 1.765, 2V(meas.)
43°, 2V(calc.) 48°.

8.01(100), 4.01(70), 3.468(60), 3.186(50),
3.119(70), 2.912(80), 2.471(40).

IMA No. 90-024

the Mn-dominant analogue of fenaksite



Triclinic, P1

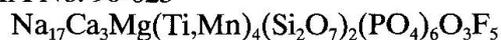
a 6.993, b 8.219, c 10.007 Å, α 105.11°,
 β 100.76°, γ 114.79°

Transparent; vitreous; colourless to light
pinkish-cream.

Biaxial (-), α 1.540, β 1.551, γ 1.557, 2V(meas.)
73°, 2V(calc.) 72°.

6.89(70), 3.45(100), 3.26(90), 3.05(80),
2.880(70), 2.715(70), 2.463(70).

IMA No. 90-025



Triclinic, P1

a 5.412, b 7.079, c 26.56 Å, α 95.21°, β 93.51°,
 γ 90.10°

Translucent to transparent; vitreous to pearly;
light brown.

Biaxial (-), α 1.600, β 1.658, γ 1.676, 2V(meas.)
56°, 2V(calc.) 57°.

2.937(10), 2.702(9), 2.659(8), 2.048(8B),
1.771(5B), 1.730(5).

IMA No. 90-026



Triclinic, P1

a 5.415, b 7.081, c 20.34 Å, α 86.85°, β 94.40°,
 γ 89.94°

Translucent to transparent; vitreous to pearly;
light brown.

Biaxial (-), α 1.630, β 1.678, γ 1.697, 2V(meas.)
62°, 2V(calc.) 63°.

2.880(10), 2.702(8B), 2.636(7), 2.050(5),
1.662(4B), 1.600(5).

IMA No. 90-027



Orthorhombic, space group unknown

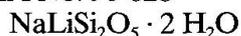
a 8.724, b 23.14, c 4.923 Å

Translucent; vitreous; white to pale grey or
beige.

Biaxial, average index of refraction is 1.604.

11.64(93), 5.80(68), 3.87(76), 3.16(74),
2.889(75), 2.837(100), 2.494(58).

IMA No. 90-028



Monoclinic, A2/n

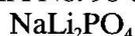
a 5.061, b 8.334, c 14.383 Å, β 96.67°

Transparent to opaque; vitreous to earthy;
colourless to white.

Biaxial (+), α 1.515, β 1.516, γ 1.518, 2V(meas.)
64°, 2V(calc.) 71°.

7.14(100), 4.24(80), 4.14(100), 4.02(80),
2.847(100), 2.698(50), 1.610(40), 1.557(40).

IMA No. 90-030



Orthorhombic, Pmnb

a 6.884, b 9.976, c 4.927 Å

Transparent to translucent; vitreous; colourless,
white, very pale blue, very pale yellow.

Biaxial (-), α 1.533, β 1.540, γ 1.541, 2V(meas.) 49°, 2V(calc.) 41°.
4.020(100), 3.507(100), 3.441(100), 2.833(40),
2.712(40), 2.493(90), 2.462(90), 1.721(40).

IMA No. 90-031

$\text{Pb}_3(\text{Fe}^{3+}, \text{Mn}^{3+})_4\text{Mn}_3^{4+}\text{O}_{15}$
Hexagonal, $\text{P6}_3/\text{mcm}$
a 10.037, c 13.67 Å
Opaque; metallic; black.
In reflected light: bright white, strong anisotropism, moderate bireflectance, nonpleochroic.
 R_O and R_E : (31.0, 26.1%) 470 nm,
(29.5, 25.1%) 546 nm, (28.5, 24.4%) 589 nm,
(27.2, 23.4%) 650 nm.
3.42(5), 3.18(8), 2.828(7), 2.663(10), 2.366(6),
1.687(8).

IMA No. 90-032

$\text{Mg}_3\text{Ba}(\text{PO}_4)_4 \cdot 8 \text{H}_2\text{O}$
Orthorhombic, Pmma , $\text{Pmc}2_1$ or $\text{Pma}2$
a 12.829, b 8.335, c 18.312 Å
Transparent; vitreous with a silky sheen;
yellow-brown to light pink.
Biaxial (+), α 1.552, β 1.552, γ 1.558, 2V(meas.)
23°, 2V(calc.) 0°.
10.51(100), 3.874(32), 3.520(34), 3.081(78),
3.054(41), 2.969(44), 2.839(34).

IMA No. 90-033

$\text{Pb}_4\text{Cu}_4\text{Si}_4\text{O}_{12}(\text{HCO}_3)_4\text{ClH}$
Tetragonal, I4/m
a 14.234, c 6.103 Å
Transparent; vitreous; bright blue.
Uniaxial (+), ω 1.786, ε 1.800
10.2(10), 5.644(7), 4.495(10), 3.333(10),
3.013(9), 2.611(5).

IMA No. 90-036

$\text{Cu}_4\text{Al}_2[\text{HSbO}_4, \text{SO}_4](\text{OH})_{10}(\text{CO}_3) \cdot 2 \text{H}_2\text{O}$
Monoclinic, $\text{P}2_1$
a 10.765, b 2.903, c 12.527 Å, β 95.61°
Transparent; silky; green-blue.
Biaxial (+), α 1.626, β 1.646, γ 1.682, 2V(meas.)
77°, 2V(calc.) 75°.
5.62(50), 5.160(90), 4.276(100), 3.565(40),
2.380(35), 2.326(35).

IMA No. 90-037

$\text{Cu}_4(\text{UO}_2)(\text{MoO}_4)_2(\text{OH})_6$
Monoclinic, $\text{A}121$, $\text{A}1\text{m}1$ or $\text{A}12/\text{m}1$
a 5.529, b 6.112, c 19.83 Å, β 103.9°
Transparent; vitreous to greasy; dark green to
black.
Biaxial (-), α 1.90, β 1.93, γ 1.96, 2V(meas.) 90°,
2V(calc.) 89°.

4.815(80), 4.425(40), 4.276(40), 4.100(100),
3.734(90), 3.254(40), 2.628(40), 2.482(60).

IMA No. 90-040

$\text{Ca}_3\text{Cu}_5\text{Si}_9\text{O}_{26}$
Monoclinic, $\text{C}2/c$
a 10.160, b 10.001, c 19.973 Å, β 91.56°
Transparent; vitreous; greenish blue.
Biaxial (+), α 1.722, β 1.723, γ 1.734, 2V(meas.)
73°, 2V(calc.) 34°.
7.13(60), 6.70(70), 3.12(90), 3.00(100), 2.45(60),
2.41(70).

IMA No. 90-041

$\text{Ca}_3(\text{SO}_3)_2\text{SO}_4 \cdot 12 \text{H}_2\text{O}$
Hexagonal, $\text{R}\bar{3}\text{m}$
a 11.350, c 28.321 Å
Transparent; vitreous; colourless.
Uniaxial (+), ω 1.4941, ε 1.4960.
8.11(80), 5.73(100), 3.63(60), 3.28(40), 2.69(80),
2.11(40).

IMA No. 90-042

$\text{Mn}(\text{Mg}, \text{Mn})_2\text{Zn}_2(\text{OH})_{10} \cdot 4 \text{H}_2\text{O}$
Monoclinic, $\text{C}2/\text{m}$
a 15.47, b 6.369, c 5.576 Å, β 101.29°
Mostly opaque but also translucent; vitreous to
dull to earthy; dark brown.
In reflected light: gray, weak anisotropism, very
weak bireflectance, nonpleochroic. $R(\text{min.},$
 $\text{max.})$: (8.54, 8.65%) 470 nm, (8.07, 8.23%)
546 nm, (8.00, 8.19%) 589 nm, (7.89, 8.18%)
650 nm.
7.61(10), 3.96(5), 3.45(3), 2.997(4), 2.745(6),
2.673(3).

IMA No. 90-043

the monoclinic dimorph of mimetite
 $\text{Pb}_5(\text{AsO}_4)_3\text{Cl}$
Monoclinic, $\text{P}2_1/\text{b}$
a 10.189, b 20.372, c 7.46 Å, β 119.88°
Translucent; resinous; yellowish-white.
Biaxial (-), α , β and γ > 1.8, 2V(meas.) 8°.
3.342(50), 3.048(100), 3.008(70), 2.947(70),
2.106(60), 1.961(50), 1.903(50).

IMA No. 90-044

NaVO_3
Orthorhombic, Pnma
a 14.134, b 3.648, c 5.357 Å
Transparent; silky; colourless.
Biaxial (+), α 1.780, β 1.800, γ > 1.85, 2V(meas.)
30–40°.
7.07(11), 5.05(100), 3.530(25), 3.241(18),
3.016(13), 2.957(35), 2.685(12).

- IMA No. 90-045
 $\text{Bi}_2\text{Cu}_3(\text{OH})_2\text{O}_2(\text{PO}_4)_2 \cdot 2 \text{H}_2\text{O}$
 Monoclinic, $C2/m$
 a 12.358, b 6.331, c 9.060 Å, β 122.70°
 Translucent; vitreous; sky blue to dark azure blue.
 Biaxial (-), β 1.89, $2V(\text{meas.})$ 68°.
 7.623(8), 6.093(6), 5.405(6), 5.201(7), 3.039(10), 2.921(9), 2.197(6).
- IMA No. 90-047
 Pt_5Se_4
 Monoclinic, $P2_1/c$
 a 6.61, b 4.60, c 11.10 Å, β 101.4°
 Opaque; metallic; dark bronze to black.
 In reflected light: white with a brownish hue, very strong anisotropism, very strong birefractance, weak pleochroism. R (max. and min.): (54.8, 35.2%) 470 nm, (58.6, 38.6%) 546 nm, (60.8, 40.2%) 589 nm, (63.2, 42.4%) 650 nm.
 5.45(60), 3.27(60), 2.93(80), 2.78(60), 2.648(60B), 2.465(60), 1.875(100B), 1.812(70).
- IMA No. 90-048
 PdBiSe
 Cubic, $P4_132$ or $P4_32$
 a 6.448 Å
 Opaque; metallic; light yellow.
 In reflected light: pinkish-yellow, no anisotropism, no birefractance, nonpleochroic. R : (47.5%) 470 nm, (48.3%) 546 nm, (46.8%) 589 nm, (45.6%) 650 nm.
 2.89(10), 2.63(9), 1.943(9), 1.724(5), 1.376(4).
- IMA No. 90-049
 $\text{CaBe}_3(\text{OH})_2(\text{PO}_4)_2 \cdot 4 \text{H}_2\text{O}$
 Monoclinic, Cc
 a 11.897, b 9.707, c 9.633 Å, β 95.76°
 Translucent; vitreous; colourless.
 Biaxial (+), α 1.5203, β 1.5205, γ 1.5300, $2V(\text{meas.}) < 10^\circ$, $2V(\text{calc.}) 17^\circ$.
 5.92(60), 4.33(50), 3.421(70), 2.959(60), 2.945(45), 2.5130(100).
- IMA No. 90-050
 the Mn-dominant analogue of stilpnomelane
 $(\text{K}, \text{Na})_4(\text{Mn}, \text{Zn}, \text{Mg}, \text{Fe}^{3+})_{48}(\text{Si}, \text{Al})_{72}(\text{O}, \text{OH})_{216} \cdot n \text{H}_2\text{O}$ (n about 6)
 Triclinic, $P1$ or $P\bar{1}$
 a 5.521, b 9.560, c 36.57 Å (orthohexagonal cell)
 Transparent to translucent; vitreous; dark brown.
 Biaxial (-), α 1.545, β 1.583, γ 1.583, $2V(\text{meas.}) 10^\circ$, $2V(\text{calc.}) 0^\circ$.
- 12.3(100), 2.737(30), 2.583(40), 2.362(30), 1.594(30), 1.580(30).
- IMA No. 90-051
 a member of the aenigmatite group
 $(\text{Ca}, \text{Na})_2(\text{Fe}^{2+}, \text{Fe}^{3+}, \text{Ti})_6(\text{Si}, \text{Be}, \text{Al})_6\text{O}_{20}$
 Triclinic, $P1$ or $P\bar{1}$
 a 10.385, b 10.751, c 8.959 Å, α 104.76°, β 97.03°, γ 125.47°
 Opaque to subtranslucent; vitreous; black.
 Biaxial (-?), α 1.78, γ 1.82, $2V(\text{meas.})$ large.
 8.029(90), 3.122(46), 2.9243(59), 2.6756(48), 2.5291(100), 2.0993(63), 2.0758(47).
- IMA No. 90-052
 the indium-dominant analogue of scorodite and mansfieldite
 $\text{In}(\text{AsO}_4) \cdot 2 \text{H}_2\text{O}$
 Orthorhombic, $Pcab$
 a 10.45, b 10.32, c 9.09 Å
 Transparent; vitreous; pale green to yellowish-green.
 Biaxial (-), mean n about 1.65, $2V(\text{meas.}) 55-76^\circ$.
 5.719(70), 4.537(100), 4.162(40), 3.2461(80), 3.1073(80), 2.6568(50), 2.5426(45).
- IMA No. 90-054
 $[(\text{Na}, \text{K})_6\text{Cl}_2](\text{Ca}_2\text{Cl}_2)(\text{Si}_6\text{Al}_6\text{O}_{24})$
 Hexagonal, $P6_3$ or $P6_3/m$
 a 25.771, c 5.371 Å
 Transparent; vitreous; colourless.
 Uniaxial (+), ω 1.529, ϵ 1.532
 4.85(S), 3.71(vS), 3.31(vS), 2.788(S), 2.677(m), 2.474(m), 2.147(m), 1.804(m), 1.380(m).
- IMA No. 90-055
 $(\text{Pd}, \text{Cu}, \text{Fe})_9\text{SnTe}_2\text{S}_2$
 Tetragonal, space group unknown
 a 9.044, c 4.937 Å
 Opaque; metallic; megascopic colour unknown.
 In reflected light: yellowish-rose, strong anisotropism, distinct to strong birefractance, pronounced pleochroism. $R_{\text{min.}}$, $R_{\text{max.}}$: (33.7, 41.6%) 470 nm, (38.5, 48.7%) 546 nm, (40.4, 51.8%) 589 nm, (42.0, 54.9%) 650 nm.
 2.472(10), 2.260(9), 2.022(6), 1.361(4), 1.213(5), 1.205(5), 1.129(5).
- IMA No. 90-056
 the Fe^{3+} -analogue of surite
 $(\text{Pb}, \text{Ca})_{2.3}(\text{CO}_3)_{1.5-2}(\text{OH}, \text{F})_{0.5-1}[(\text{Fe}, \text{Al})_2\text{Si}_4\text{O}_{10}(\text{OH})_2] \cdot n \text{H}_2\text{O}$
 Monoclinic, $P2_1$ or $P2_1/m$
 a 5.241, b 9.076, c 16.23 Å, β 90.03°
 Transparent; silky; light yellow green to dark forest green.

Biaxial (+), α 1.757, β 1.763, γ 1.773, $2V(\text{calc.})$
76°.
16.1(40), 4.53(100), 3.727(35), 3.240(90),
2.612(80), 2.272(50).

IMA No. 90-057

$(\text{Sr}_{1.5}\text{Ca}_{1.2})\text{Ca}_2(\text{Ca}_{2.2}\text{Na}_{1.8})\text{K}_{1.4}\text{Al}_{17}\text{Si}_{19}\text{O}_{72} \cdot 34 \text{H}_2\text{O}$
Hexagonal, $P6_3/mmc$
 a 13.244, c 15.988 Å
Transparent; vitreous; colourless.
Uniaxial (-), ω 1.522, ε 1.507
6.58(80), 3.80(100), 2.95(70), 2.70(50), 2.50(50),
2.21(70), 1.83(50).

Manuscript received and accepted October 25,
1991.