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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°

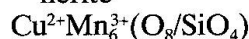
Transparent; vitreous; colourless to white.

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, $I4_1/a$

a 9.409, c 18.600 Å

Opaque; metallic; black.

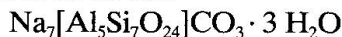
In reflected light: grey, very weak anisotropism, weak bireflectance, nonpleochroic. R-values: (20.8, 21.2%) 470 nm, (19.6, 20.0%) 546 nm, (19.2, 19.7%) 589 nm, (18.7, 19.2%) 650 nm. 2.703(100), 2.352(14), 2.135(16), 1.6516(30), 1.4167(10), 1.4023(12).

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. 90-013



Hexagonal, $P6_3mc$

a 12.575, c 5.105 Å

Transparent; vitreous; dark- to light-lilac.

Uniaxial (–), ω 1.509, ε 1.490.

6.30(70), 4.61(50), 3.65(90), 3.22(100), 2.722(50), 2.597(20), 2.402(20), 2.097(20).

IMA No. 90-008



Hexagonal (trigonal), $P31c$

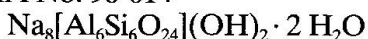
a 12.855, c 10.700 Å

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, $P6_3$

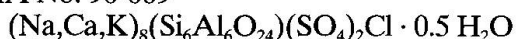
a 12.74, c 5.183 Å

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, $P6_222$

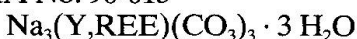
a 12.843, c 32.239 Å

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

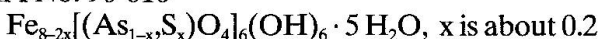
a 10.136, b 17.348, c 5.970 Å

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

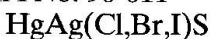
a 9.827, b 9.167, c 4.799 Å

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

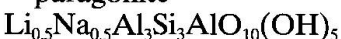
Translucent to opaque; subadamantine to submetallic; black.

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
 $(\text{Mg,Mn,Ca})\text{Mn}_3^+\text{O}_7 \cdot 3 \text{H}_2\text{O}$

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

$\text{MnSO}_3 \cdot 3 \text{H}_2\text{O}$

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

$\text{NaCa}(\text{Mn,Fe})(\text{Ti,Nb,Zr})\text{Si}_2\text{O}_7\text{OF}$

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

$3 \text{UO}_3 \cdot 2 \text{SeO}_2 \cdot 7 \text{H}_2\text{O}$

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

$\text{NaKMnSi}_4\text{O}_{10}$

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

$\text{Na}_{17}\text{Ca}_3\text{Mg}(\text{Ti,Mn})_4(\text{Si}_2\text{O}_7)_2(\text{PO}_4)_6\text{O}_3\text{F}_5$

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

$\text{Na}_{14}\text{CaMgTi}_4(\text{Si}_2\text{O}_7)_2(\text{PO}_4)_4\text{O}_4\text{F}_2$

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

$(\text{Ca,Mn})_4\text{Be}_3\text{Si}_6\text{O}_{17}(\text{OH})_4 \cdot 3 \text{H}_2\text{O}$

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

$\text{NaLiSi}_2\text{O}_5 \cdot 2 \text{H}_2\text{O}$

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

NaLi_2PO_4

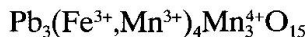
Orthorhombic, Pmn

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



Hexagonal, $P6_3/mcm$

a 10.037, c 13.67 Å

Opaque; metallic; black.

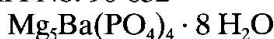
In reflected light: bright white, strong anisotropism, moderate bireflectance, nonpleochroic.

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



Orthorhombic, $Pmma$, $Pmc2_1$ or $Pma2$

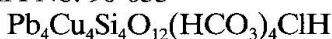
a 12.829, b 8.335, c 18.312 Å

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



Tetragonal, $I4/m$

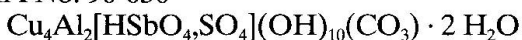
a 14.234, c 6.103 Å

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



Monoclinic, $P2_1$

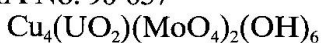
a 10.765, b 2.903, c 12.527 Å, β 95.61°

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



Monoclinic, $A121$, $A1m1$ or $A12/m1$

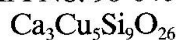
a 5.529, b 6.112, c 19.83 Å, β 103.9°

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



Monoclinic, $C2/c$

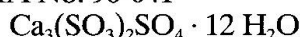
a 10.160, b 10.001, c 19.973 Å, β 91.56°

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



Hexagonal, $R\bar{3}m$

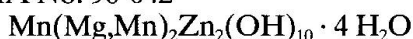
a 11.350, c 28.321 Å

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



Monoclinic, $C2/m$

a 15.47, b 6.369, c 5.576 Å, β 101.29°

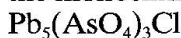
Mostly opaque but also translucent; vitreous to dull to earthy; dark brown.

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



Monoclinic, $P2_1/b$

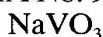
a 10.189, b 20.372, c 7.46 Å, β 119.88°

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



Orthorhombic, $Pnma$

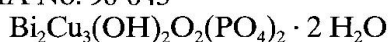
a 14.134, b 3.648, c 5.357 Å

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



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(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

Monoclinic, P2₁/c

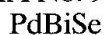
a 6.61, b 4.60, c 11.10 Å, β 101.4°

Opaque; metallic; dark bronze to black.

In reflected light: white with a brownish hue, very strong anisotropism, very strong bireflectance, 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

Cubic, P4₁32 or P4₃32

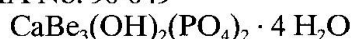
a 6.448 Å

Opaque; metallic; light yellow.

In reflected light: pinkish-yellow, no anisotropism, no bireflectance, 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



Monoclinic, Cc

a 11.897, b 9.707, c 9.633 Å, β 95.76°

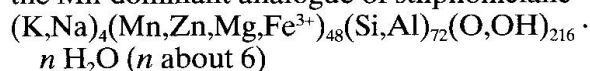
Translucent; vitreous; colourless.

Biaxial (+), α 1.5203, β 1.5205, γ 1.5300, 2V(meas.) < 10°, 2V(calc.) 17°.

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



Triclinic, P1 or P1̄

a 5.521, b 9.560, c 36.57 Å (orthohexagonal cell)

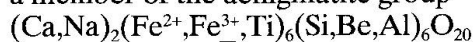
Transparent to translucent; vitreous; dark brown.

Biaxial (–), α 1.545, β 1.583, γ 1.583, 2V(meas.) 10°, 2V(calc.) 0°.

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



Triclinic, P1 or P1̄

a 10.385, b 10.751, c 8.959 Å, α 104.76°, β 97.03°, γ 125.47°

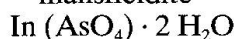
Opaque to subtranslucent; vitreous; black.

Biaxial (–?), α 1.78, γ 1.82, 2V(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



Orthorhombic, Pcab

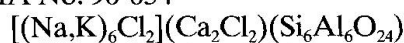
a 10.45, b 10.32, c 9.09 Å

Transparent; vitreous; pale green to yellowish-green.

Biaxial (–), mean n about 1.65, 2V(meas.) 55–76°.

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

Hexagonal, P6₃ or P6₃/m

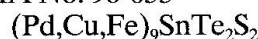
a 25.771, c 5.371 Å

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



Tetragonal, space group unknown

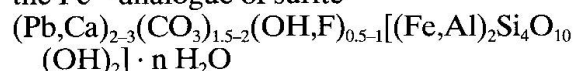
a 9.044, c 4.937 Å

Opaque; metallic; megascopic colour unknown.

In reflected light: yellowish-rose, strong anisotropism, distinct to strong bireflectance, pronounced pleochroism. R_{min.}, R_{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 Fe³⁺-analogue of suriteMonoclinic, P2₁ or P2₁/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).

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