

**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.

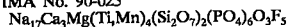
NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION.

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
 $(\text{Ce,Lu})\text{Al}_2\text{B}_2\text{O}_9$
 Hexagonal, $P6_3/m$
 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)
- IMA No. 90-004
 the Mg-dominant analogue of allanite-(Ce)
 $\text{Ca}(\text{Ce,Lu})\text{MgAl}_2\text{Si}_2\text{O}_{12}(\text{OH})$
 Monoclinic, $P2_1/m$
 a 8.916, b 5.700, c 10.140 Å, β 114.72°
 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. 90-005
 $\text{Ca}_2\text{Si}_2(\text{O,OH})_{10}\cdot 5\text{H}_2\text{O}$
 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
 $\text{Cu}^{2+}\text{Mn}_2^{3+}(\text{O}_2/\text{SiO}_2)$
 Tetragonal, $I4_1/acd$
 a 9.409, c 18.600 Å
 Opaque; metallic; black.
 In reflected light: grey, very weak anisotropism, weak birefractance, nonpleochroic. R-values: (20.8,21.2%)470nm, (19.6,20.0%)546nm, (19.2,19.7%)589nm, (18.7,19.2%)650nm.
 2.703(100), 2.352(14), 2.135(16), 1.6516(30), 1.4167(10), 1.4023(12).
- IMA No. 90-008
 $\text{Ca}(\text{Na,K})_2(\text{Si}_2\text{Al}_2\text{O}_{10})(\text{S}^{2-})_2\cdot 5\text{H}_2\text{O}$
 Hexagonal (trigonal), $P3_1c$
 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. 90-009
 $(\text{Na,Ca,K})_2(\text{Si}_2\text{Al}_2\text{O}_{10})(\text{SO}_4)_2\text{Cl}\cdot 0.5\text{H}_2\text{O}$
 Hexagonal, $P6_3/22$
 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. 90-010
 $\text{Fe}_{3-2x}((\text{As}_x\text{S}_x)\text{O}_6)_x(\text{OH})_2\cdot 5\text{H}_2\text{O}$ x is about 0.2
 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. 90-011
 $\text{HgAg}(\text{Cl,Br,I})\text{S}$
 Orthorhombic, $P2_12_12_1$
 a 6.803, b 12.87, c 4.528 Å
 Translucent to opaque; subadamantine to submetallic; black.
 Biaxial (probably -), α - 2.2, γ - 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. 90-012
 $\text{Na}_6\text{K}_2(\text{Si}_6\text{Al}_2\text{O}_{24})(\text{SO}_4)_2\cdot 2\text{H}_2\text{O}$
 Hexagonal, $P6_3$
 a 22.121, c 5.221 Å
 Transparent; vitreous; colourless.
 Uniaxial (-), ω 1508, ϵ 1506.
 6.39(S), 4.77(VS), 3.69(M), 3.27(VS), 2.769(m), 2.650(m).
- IMA No. 90-013
 $\text{Na}_7[\text{Al}_5\text{Si}_2\text{O}_{22}]\text{CO}_3\cdot 3\text{H}_2\text{O}$
 Hexagonal, $P6_3/mc$
 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. 90-014
 $\text{Na}_8[\text{Al}_6\text{Si}_6\text{O}_{24}](\text{OH})_2\cdot 2\text{H}_2\text{O}$
 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. 90-015
 $\text{Na}_3(\text{Y,REE})(\text{CO}_3)_3\cdot 3\text{H}_2\text{O}$
 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. 90-016
 an orthorhombic polymorph of natisite
 $\text{Na}_2\text{TiSiO}_5$
 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. 90-018
 a regular 1:1 interstratification of cookeite and paragonite
 $\text{Li}_{0.5}\text{Na}_{0.5}\text{Al}_3\text{Si}_2\text{AlO}_{10}(\text{OH})_2$
 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. 90-019
 the Mg-dominant analogue of chalcophanite
 $(\text{Mg,Mn,Ca})\text{Mn}_2^+\text{O}_7\cdot 3\text{H}_2\text{O}$
 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 birefractance, nonpleochroic. R-values: (23.0%)470nm, (19.9%)546nm, (19.1%)589nm, (18.6%)650nm.
 6.965(100), 5.539(3), 4.086(4), 3.522(3), 3.483(11), 2.230(8).
- IMA No. 90-020
 $\text{MnSO}_4\cdot 3\text{H}_2\text{O}$
 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 No. 90-021
 the Ti-dominant analogue of javenite
 $\text{NaCa}(\text{Mn,Fe})(\text{Ti,Nb,Zr})\text{Si}_2\text{O}_7\text{OF}$
 Monoclinic, $P2_1/a$
 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
 $3\text{UO}_2\cdot 2\text{SeO}_7\cdot 7\text{H}_2\text{O}$
 Orthorhombic, $Pnc2$ or $Pnmc$
 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
 $\text{NaKMnSi}_3\text{O}_{10}$
 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).

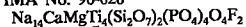
IMA No. 90-025



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).

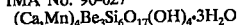
IMA No. 90-026



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

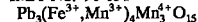


Orthorhombic, Pmnb

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).

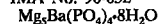
IMA No. 90-031

Hexagonal, P6₃/mcm

a 10.037, c 13.67 Å

Opaque; metallic; black.
 In reflected light: bright white, strong anisotropism, moderate
 bireflectance, nonpleochroic. R_{D} & R_{E} : (31.0,26.1%)470nm,
 (29.5,25.1%)546nm, (28.5,24.4%)589nm, (27.2,23.4 %)650nm.
 3.42(5), 3.18(8), 2.828(7), 2.663(10), 2.366(6), 1.687(8).

IMA No. 90-032

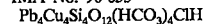


Orthorhombic, Pmma, Pmc2, or Pma2

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

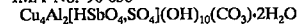


Tetragonal, I4/m

a 14.234, c 6.103 Å

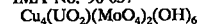
Transparent; vitreous; bright blue.
 Uniaxial (+), ω 1.786, ϵ 1.800
 10.2(10), 5.644(7), 4.495(10), 3.333(10), 3.013(9), 2.611(5).

IMA No. 90-036

Monoclinic, P2₁a 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

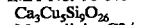


Monoclinic, A121, A1m1 or A12/m1

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

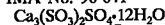


Monoclinic, C2/c

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

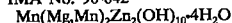


Hexagonal, R3m

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



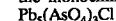
Monoclinic, C2/m

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(min., max.): (8.54,8.65%)470nm,
 (8.07,8.23%)546nm, (8.00,8.19%)589nm, (7.89,8.18%)650nm.
 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, P2₁/ba 10.189, b 20.372, c 7.46 Å, β 119.88°

Translucent; resinous; yellowish-white.
 Biaxial (-), α , β and $\gamma > 1.8$, 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

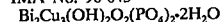


Orthorhombic, Pnma

a 14.134, b 3.648, c 5.357 Å

Transparent; silky; colourless.
 Biaxial (+), α 1.780, β 1.800, $\gamma > 1.85$, 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/ca 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. & min.):
 (54.8,35.2%)470nm, (58.6,38.6%)546nm, (60.8,40.2%)589nm,
 (63.2,42.4%)650nm.
 5.45(60), 3.27(60), 2.93(80), 2.78(60), 2.648(60B), 2.465(60), 1.875(100B),
 1.812(70).

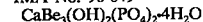
IMA No. 90-048

Cubic, P4₃2 or P4₃2

a 6.448 Å

Opaque; metallic; light yellow.
 In reflected light: pinkish-yellow, no anisotropism, no bireflectance,
 nonpleochroic. R: (47.5%)470nm, (48.3%)546nm, (46.8%)589nm,
 (45.6%)650nm.
 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
 $(\text{K},\text{Na})_2(\text{Mn},\text{Zn},\text{Mg},\text{Fe}^{3+})_{46}(\text{Si},\text{Al})_{72}(\text{O},\text{OH},\text{O}_{216},\text{H}_2\text{O})_n$ (n about 6)

Triclinic, P1 or P1

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

$(\text{Ca},\text{Na})_2(\text{Fe}^{2+},\text{Fe}^{3+},\text{Ti})_6(\text{Si},\text{Be},\text{Al})_6\text{O}_{20}$

Triclinic, P1 or P1

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

$\text{In}(\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O}$

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(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

$[(\text{Na},\text{K})_6\text{Cl}_2](\text{Ca}_2\text{Cl}_2)(\text{Si}_6\text{Al}_6\text{O}_{24})$

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

$(\text{Pd},\text{Cu},\text{Fe})_9\text{SnTe}_2\text{S}_2$

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

bireflectance, pronounced pleochroism. $R_{\text{min}}, R_{\text{max}}$:

(33.7, 41.6%) 470nm, (38.5, 48.7%) 546nm, (40.4, 51.8%) 589nm,

(42.0, 54.9%) 650nm.

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 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, 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(calc.) 76°. 16.1(40), 4.53(100), 3.727(35), 3.240(90), 2.612(80), 2.272(50).

IMA No. 90-057

$(\text{Sr}_{1.5}\text{Ca}_{1.2})\text{Ca}_2(\text{Ca}_{2.2}\text{Na}_{1.8})\text{K}_{1.4}\text{Al}_7\text{Si}_{19}\text{O}_{72} \cdot 34\text{H}_2\text{O}$

Hexagonal, P6₃/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).