

**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.

Each mineral is described in the following format:

IMA No. (any relationship to other minerals)

Chemical Formula

Crystal system, space group

unit cell parameters

Colour; lustre; diaphaneity.

Optical properties.

Strongest lines in the X-ray powder diffraction pattern.

The names of these approved species are considered confidential information until the authors have published their descriptions or released information themselves.

NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION.

J. A. Mandarino, Chairman Emeritus
Commission on New Minerals and Mineral Names
International Mineralogical Association

1994 PROPOSALS

IMA No. 94-001 The Fe³⁺-dominant analogue of warwickite

Mg(Fe³⁺,Fe²⁺,Al,Ti,Mg)(BO₃)O

Orthorhombic: Pnam

a 9.258(6) b 9.351(4) c 3.081(2) Å

Black; adamantine to submetallic; subtranslucent to nearly opaque.

In reflected light: light grey, weak anisotropism, indistinct birefractance, pleochroic from dark red to dark brown. R_{max}: (9.99 %)470 nm, (9.66 %)540 nm,

(9.29 %)589 nm, (8.79 %)650 nm.

6.563 (23), 4.176 (38), 2.957 (30), 2.570 (100), 2.088 (20), 1.591 (18), 1.550 (19).

Monoclinic: C2/m

a 9.89(2) b 18.04(3) c 5.29(1) Å β 104.6(1)°

Cherry red to very dark red; adamantine; transparent.

Biaxial (-), α 1.717, β 1.780, γ 1.800, 2V(meas.) 51°, 2V(calc.) 57°.

3.400 (8), 3.146 (9), 2.544 (9), 2.176 (10), 1.656 (8), 1.447 (9).

IMA No. 94-005

(Zn,Cu)₆Zn₂(OH)₁₃[(Si,S)(O,OH)₄]₂

Hexagonal (trigonal): P3̄

a 8.322(1) c 7.376(1) Å

Light green; vitreous; transparent.

Uniaxial (-), ω 1.705, ε 1.611.

7.37 (100), 3.623 (25), 3.282 (30), 2.724 (30), 2.556 (50), 2.191 (15), 1.572 (20).

IMA No. 94-002

Mn₂SiO₃(OH)₂·H₂O

Orthorhombic: Pca2₁

a 12.682(4) b 7.214(2) c 5.337(1) Å

Brown-yellowish; vitreous; transparent.

Biaxial (-), α 1.681, β 1.688, γ 1.690, 2V(meas.)

54.4°, 2V(calc.) 56.1°.

7.220 (60), 4.083 (60), 3.011 (100), 2.547 (80), 2.456 (80), 2.440 (80), 1.552 (60).

IMA No. 94-006

(Mg_{1-x}□_x)₂Mg₁₂(PO₄)₆(PO₃OH)₂O₆H_{6+4x}

x = 0 to 0.3

Hexagonal: P6₃mc

a 12.47(1) c 5.036(6) Å

Azure blue; vitreous; transparent.

Uniaxial (-), n̄ ~ 1.61, Δ ~ 0.01.

3.66 (65), 3.15 (100), 3.109 (100), 2.692 (95), 2.213 (70), 1.803 (50), 1.552 (50).

IMA No. 94-004 A member of the amphibole group.

NaNa₂Mn₂²⁺Mn₃³⁺Si₈O₂₄

IMA No. 94-007

Na₃(Fe²⁺,Fe³⁺)₆[Ti₂Si₁₂O₃₀(O,OH)₄](OH,O)₇·2H₂O

Monoclinic: P2/c

a 5.353(4) b 16.18(1) c 21.95(2) Å β 94.6(2)°

Dark brown-green; vitreous to silky; translucent.

Biaxial (-), α 1.627, β 1.667, γ 1.693, 2V(meas.) 75°, 2V(calc.) 76°.

13.00 (30), 10.94 (100), 4.44 (30), 2.728 (50), 2.641 (40), 2.547 (30), 2.480 (30).

IMA No. 94-008

AgFeS₂

Tetragonal: P4₂mc

a 5.64(1) c 10.34(3) Å

Megascopic colour not observed; metallic; opaque.

In reflected light: cream with a greyish tint, moderate anisotropism, no birefractance, nonpleochroic.

R_{min.} & R_{max.}: (27.2, 30.1 %)470 nm, (32.3, 36.4 %)546 nm,

(33.0, 37.1 %)589 nm, (31.2, 35.3 %)650 nm.

3.15 (10), 2.445 (2), 2.340 (2), 1.910 (4), 1.692 (2).

IMA No. 94-010 A member of the milarite group.

K(K,Na)₂(Mn,Zr,Y)₂(Zn,Li)₃Si₁₂O₃₀

Hexagonal: P6/mcc

a 10.196(5) c 14.284(8) Å

Dark blue, violet blue, greyish brown-blue; vitreous; transparent.

Uniaxial (-), ω 1.590, ϵ 1.586.

7.13 (30), 4.15 (45), 3.75 (50), 3.25 (100), 2.924 (39), 2.777 (32), 2.548 (520).

IMA No. 94-011

(NH₄,K)NO₃

Orthorhombic: Pbnm

a 7.075(5) b 7.647(5) c 5.779(5) Å

White; vitreous; transparent.

Biaxial (-), α 1.458, β 1.527, γ 1.599, 2V(meas.) ~ 90°, 2V(calc.) 87°.

3.863 (75), 3.364 (85), 3.212 (95), 3.194 (100), 2.805 (35), 2.595 (90), 2.400 (50).

IMA No. 94-012

(Na,Mn,Fe,Al,REE)₁₅(Y,REE,Ca,Na)₂(CO₃)₉(SO₃F)Cl

Hexagonal: P3

a 8.773(1) c 10.746(2) Å

Yellow to orange-brown; vitreous; transparent.

Uniaxial (-), ω 1.548, ϵ 1.537.

6.20 (40), 4.39 (80), 2.774 (80), 2.532 (100), 2.240 (80), 2.067 (30), 1.657 (40).

IMA No. 94-013

Cu₂Zn[(As,Sb)O₄](OH)₃

Hexagonal (trigonal): P3

a 8.201 (1) c 7.315 (1) Å

Emerald green; adamantine; transparent.

Uniaxial (-), ω 1.801, ϵ 1.796.

2.522 (100), 2.166 (88), 1.805 (92), 1.550 (100), 1.513 (85).

IMA No. 94-014

CuNiSb₂

Hexagonal (trigonal): P3m1

a 4.0489(2) c 5.1358(3) Å

Silver-white; metallic; opaque.

In reflected light: white with yellowish hue, distinct anisotropism, weak birefractance, nonpleochroic.

R_O & R_E: (59.3, 52.4 %)470 nm, (63.0, 56.8 %)546 nm, (65.5, 60.9 %)589 nm, (68.6, 64.9 %)650 nm.

2.901 (100), 2.572 (10), 2.074 (65), 2.023 (51), 1.660 (11), 1.284 (10).

IMA No. 94-016 The Zn-dominant analogue of hōgbomite-8H.

(Zn,Fe²⁺)_{1-2x}Ti_xAl₂O₄ x ~ 0.12

Hexagonal: most probably P6₃mc

a 5.708(4) c 18.31(2) Å

Deep brown to black; adamantine; transparent in thin sections.

Uniaxial (-), ω 1.878, ϵ 1.832.

2.85 (50), 2.60 (80), 2.42 (100), 1.592 (60), 1.550 (50), 1.470 (70), 1.425 (80).

IMA No. 94-017

Na₈(Mn,Fe³⁺,Ti)₂Si₁₀O₂₅(OH,Cl)₄·10H₂O

Orthorhombic: C22₁

a 13.46(2) b 14.98(1) c 17.51(2) Å

Yellow to orange; vitreous; transparent.

Biaxial (+), α 1.532, β 1.540, γ 1.550, 2V(meas.) 89°, 2V(calc.) 84°.

10.049 (100), 8.823 (50), 5.025 (20), 3.806 (20), 2.718 (50).

IMA No. 94-018

PbCa₂Al(F,OH)₉

Monoclinic: A2, A2/m or Am

a 23.905(5) b 7.516(2) c 7.699(2) Å β 92.25(2)°

White to colourless; vitreous; transparent.

Biaxial (-), α 1.510, β 1.528, γ 1.531, 2V(meas.) 36°, 2V(calc.) 44°.

11.9 (100), 3.71 (70), 3.51 (85), 2.98 (60), 2.94 (60), 2.027 (60), 1.971 (60).

IMA No. 94-019 The cobalt-dominant member of the halotrichite group.

(Co,Mg,Ni)Al₂(SO₄)₄·22H₂O

Monoclinic: P2₁/c

a 6.189(4) b 24.23(1) c 21.20(1) Å β 100.33(5)°

Empire rose; silky; transparent.

Biaxial (sign unknown), α 1.477, β unknown, γ 1.484, 2V unknown.

6.03 (22), 4.790 (100), 4.295 (27), 4.106 (22), 3.945 (26), 3.768 (33), 3.494 (92).

IMA No. 94-020 A member of the magnetoplumbite group.
 $\text{Pb}(\text{Zn}, \text{Fe}^{3+})_3(\text{Fe}^{3+}, \text{Mn}^{3+}, \text{Mn}^{4+}, \text{Al}, \text{Ti})_9\text{O}_{19}$
 Hexagonal: $\text{P6}_3/\text{mmc}$
 a 5.854(1) c 22.882(6) Å Black; metallic; opaque.
 In reflected light: black, isotropic, no birefractance, nonpleochroic. R_{mean} : (23.8 %)470 nm, (22.4 %)546 nm, (21.7 %)589 nm, (20.7 %)650 nm.
 11.39 (45), 3.811 (100), 2.858 (75), 2.745 (50), 2.605 (40), 2.407 (25), 1.6361 (30).

IMA No. 94-021 The gallium-dominant analogue of beudantite.
 $\text{Pb}(\text{Ga}, \text{Al}, \text{Fe})_3(\text{AsO}_4)(\text{SO}_4)(\text{OH})_6$
 Hexagonal: $\text{R}\bar{3}\text{m}$
 a 7.225(4) c 17.03(2) Å
 Pale yellow; vitreous; transparent.
 Uniaxial (-), ω 1.763, ϵ 1.750.
 5.85 (90), 3.59 (40), 3.038 (100), 2.851 (30), 2.513 (30), 2.271 (40), 1.948 (30).

IMA No. 94-022 The F-analogue of thalenite-(Y).
 $\text{Y}_3\text{Si}_3\text{O}_{10}\text{F}$
 Monoclinic: $\text{P2}_1/\text{n}$
 a 7.321(2) b 11.133(4) c 10.375(6) Å
 β 97.17(2)°
 Colourless to white; adamantine; translucent.
 Biaxial (-), α 1.719, β 1.739, γ 1.748, $2V(\text{meas.})$ 73°, $2V(\text{calc.})$ 67°.
 5.60 (5), 3.81 (5), 3.12 (10), 2.828 (8), 2.253 (8), 2.187 (4), 2.131 (4).

IMA No. 94-023 The Ir-dominant analogue of isoferroplatinum.
 Ir_3Fe
 Cubic: $\text{Pm}\bar{3}\text{m}$
 a 3.792(5) Å
 Steel black; metallic; opaque.
 In reflected light: bright white with yellowish tint, isotropic, nonbirefractant, nonpleochroic. R: (66.2 %)470 nm, (69.3 %)546 nm, (71.1 %)589 nm, (72.5 %)650 nm.
 2.18 (80), 1.89 (60), 1.34 (70), 1.26 (20), 1.200 (15), 1.142 (100), 1.094 (80).

IMA No. 94-024 An orthorhombic polymorph of walpurgite.
 $(\text{UO}_2)\text{Bi}_4\text{O}_4(\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O}$
 Orthorhombic: Pbcm
 a 5.492(1) b 13.324(2) c 20.685(3) Å
 Yellow; adamantine; transparent.
 Biaxial (-), α 1.90, β 1.99, γ 2.00 (calc.), $2V(\text{meas.})$ 36°.
 10.354 (94), 5.610 (40), 3.277 (56), 3.208 (100), 3.088 (76), 2.999 (50), 2.852 (46).

IMA No. 94-025
 $(\text{UO}_2)_8(\text{SO}_4)(\text{OH})_{14} \cdot 13\text{H}_2\text{O}$
 Monoclinic: $\text{P2}_1/\text{a}$
 a 18.553(8) b 9.276(2) c 13.532(7) Å
 β 125.56(2)°
 Yellow; vitreous; translucent.
 Biaxial (-), α 1.715, β 1.718, γ 1.720, $2V(\text{calc.})$ 78°. 7.56 (100), 7.13 (48), 3.771 (34), 3.554 (20), 3.234 (10), 3.206 (13), 2.052 (8).

IMA No. 94-026
 $\text{NaCa}_2[\text{B}_9\text{O}_{14}(\text{OH})_4] \cdot 2\text{H}_2\text{O}$
 Monoclinic: $\text{P2}_1/\text{c}$
 a 11.4994(8) b 12.5878(9) c 10.5297(1) Å
 β 99.423(6)°
 Colourless to light dirty-yellow and light grey; vitreous; transparent.
 Biaxial (+), α 1.532, β 1.538, γ 1.564, $2V(\text{meas.})$ 54°, $2V(\text{calc.})$ 52°.
 5.41 (66), 5.20 (57), 4.20 (56), 3.35 (89), 3.27 (59), 3.04 (100), 2.210 (59).

IMA No. 94-030
 $\text{Pb}_2\text{Bi}_2(\text{S}, \text{Se})_3$
 Hexagonal (trigonal): $\text{P}\bar{3}$ or $\text{P}\bar{3}\text{m}$
 a 4.191(2) c 39.60(3) Å
 Silver-grey; metallic; opaque.
 In reflected light: yellowish-white, distinct anisotropism, practically absent birefractance, bluish-grey to brownish pleochroism. R_1 & R_2 : (49.7, 48.5 %) 470 nm, (48.4, 47.4 %) 546 nm, (47.9, 46.8 %) 589 nm, (47.9, 46.2 %) 650 nm.
 3.42 (5), 3.04 (10), 2.096 (8), 1.806 (6), 1.725 (5), 1.298 (7), 1.233 (6).

IMA No. 94-031
 $\text{HgSAg}(\text{Cl}, \text{Br})$
 Hexagonal: P6_2 , P6_4 , $\text{P6}_2\bar{2}$ or $\text{P6}_4\bar{2}$
 a 8.234(4) c 19.38(1) Å
 Red to brownish red; adamantine; translucent.
 Uniaxial (-), ω 2.3 (from polished section), ϵ could not be measured).
 6.47 (20), 4.124 (30), 3.357 (60), 3.237 (30), 3.127 (50), 2.879 (100), 2.009 (50).

IMA No. 94-032
 Si_3N_4
 Hexagonal (trigonal): P31c
 a 7.758(5) c 5.623(5) Å
 Brownish red to colourless; probably adamantine; transparent.
 Uniaxial (-), ω 2.03, ϵ 2.02.
 2.893 (85), 2.599 (75), 2.547 (100), 2.320 (60), 1.486 (70), 1.418 (60), 1.351 (75).

IMA No. 94-033 Isostructural with the arrojadite-dickonsonite series.



Monoclinic: C2/c

$$a\ 16.406(5)\quad b\ 9.945(3)\quad c\ 24.470(5)\ \text{\AA}$$

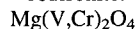
$$\beta\ 105.73(2)^\circ$$

Greenish-grey; greasy; translucent.

Biaxial (sign unknown), $n_{\text{average}}\ 1.65$.

3.186 (45), 3.018 (100), 2.824 (39), 2.813 (36), 2.685 (50), 2.530 (35).

IMA No. 94-034 The magnesium-analogue of coulsonite.



Cubic: Fd3m

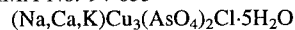
$$a\ 8.385(3)\ \text{\AA}$$

Black; metallic; opaque.

In reflected light: light grey, isotropic, no bireflectance, nonpleochroic. R: (14.0 %)470 nm, (13.7 %)546 nm, (13.7 %)589 nm, (13.7 %)650 nm.

4.84 (9), 2.52 (10), 2.093 (8), 1.612 (8), 1.482 (9), 1.092 (7), 1.048 (5).

IMA No. 94-035



Tetragonal: P₄2₁2 or P₄2₂

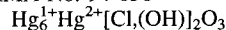
$$a\ 10.085(2)\quad c\ 23.836(8)\ \text{\AA}$$

Intense blue to emerald green; vitreous; translucent.

Uniaxial (-), $\omega\ 1.686$, $\epsilon\ 1.635$.

11.90 (100), 9.29 (60), 7.132 (50), 5.043 (60), 4.641 (40), 3.098 (80), 3.061 (70).

IMA No. 94-036



Orthorhombic: Pbma

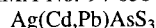
$$a\ 11.790(3)\quad b\ 13.881(4)\quad c\ 6.450(2)\ \text{\AA}$$

Black to very dark brown; metallic; opaque.

In reflected light: white, strong anisotropism, moderate bireflectance, pleochroic from white to a higher reflecting blue-white. R₁ & R₂: (22.8, 29.6 %)470 nm, (20.7, 25.7 %)546 nm, (20.3, 24.6 %)589 nm, (20.2, 23.2 %)650 nm.

5.25 (80), 3.164 (60), 3.053 (100), 2.954 (70), 2.681 (50), 2.411 (50).

IMA No. 94-038



Tetragonal: I4/amd

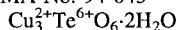
$$a\ 5.499(5)\quad c\ 33.91(4)\ \text{\AA}$$

Grey; metallic; opaque.

In reflected light: greyish white with bluish tint; anisotropism, bireflectance and pleochroism not observed. R₀: (31.3 %)470 nm, (30.4 %)543 nm, (29.3 %)587 nm, (27.1 %)657 nm.

3.19 (50), 2.77 (100), 1.960 (80), 1.679 (70), 1.598 (70), 1.274 (60).

IMA No. 94-043



Monoclinic: P2₁/n

$$a\ 9.204(2)\quad b\ 9.170(2)\quad c\ 7.584(1)\ \text{\AA}\ \beta$$

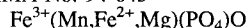
$$102.32(3)^\circ$$

Emerald green; adamantine; transparent.

Biaxial (sign unknown), $n\ 1.91 - 1.92$.

6.428 (100), 3.217 (70), 2.601 (40), 2.530 (50), 2.144 (35), 1.750 (35).

IMA No. 94-045



Monoclinic: I2/a

$$a\ 9.977(2)\quad b\ 6.339(2)\quad c\ 11.836(3)\ \text{\AA}$$

$$\beta\ 105.77(3)^\circ$$

Black; weakly submetallic; opaque.

Optical properties could not be measured due to the opaque nature of the mineral.

3.256 (23), 2.970 (100), 2.861 (35), 2.810 (98), 2.064 (25), 1.778 (22).

IMA No. 94-046 A member of the amphibole group.



[OH,F,O]₂

Monoclinic: C2/m

$$a\ 9.9199(4)\quad b\ 18.0591(8)\quad c\ 5.3180(3)\ \text{\AA}$$

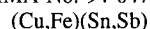
$$\beta\ 105.36(1)^\circ$$

Black; vitreous; opaque, but translucent in thin splinters.

Biaxial (-), $\alpha\ 1.654$, $\beta\ 1.664$, $\gamma\ 1.670$, $2V(\text{meas.}) = 79^\circ$, $2V(\text{calc.}) = 75^\circ$.

8.45 (95), 3.283 (45), 3.140 (100), 2.707 (35), 2.344 (70), 2.018 (35), 1.652 (40).

IMA No. 94-047



Tetragonal: space group unknown

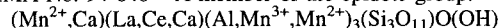
$$a\ 4.22(1)\quad c\ 5.10(3)\ \text{\AA}$$

Megascopic colour was not observed; metallic; opaque.

In reflected light: pinkish-white, distinct anisotropism, distinct bireflectance, pleochroic from light pink to pinkish-white. R_{max.} & R_{min.}: (72.6, 64.8 %)470 nm, (77.4, 68.2 %)546 nm, (78.5, 68.9 %)589 nm, (79.0, 69.0 %)650 nm.

2.96 (9), 2.10 (10), 1.72 (3), 1.488 (3), 1.214 (4), 1.092 (4).

IMA No. 94-048 A member of the epidote group.



Monoclinic: P2₁/m

$$a\ 8.891(3)\quad b\ 5.704(3)\quad c\ 10.107(8)\ \text{\AA}$$

$$\beta\ 113.99(2)^\circ$$

Brown-red; vitreous; transparent.

Because of the small grain size, most of the optical properties could not be determined.

2.897 (100), 2.857 (45), 2.707 (60), 2.615 (60), 2.178 (60), 2.145 (60).

IMA No. 94-049

$\text{Mn}_3(\text{Nb,Ta})_3(\text{Nb,Mn})_2\text{W}_2\text{O}_{20}$

Monoclinic: $P2_1$

a 24.73(2) b 5.056(3) c 5.760(3) Å
 β 103.50(7)°

Red to brown-red; metallic; opaque.

In reflected light: light grey, weak anisotropism, weak bireflectance, nonpleochroic. R_{max} & R_{min} : (19.2, 18.0 %)470 nm, (18.5, 17.5 %)546 nm, (19.3, 18.5 %)589 nm, (16.5, 16.0 %)650 nm.

6.0 (5), 3.74 (8), 3.69 (8), 2.98 (10), 1.783 (5), 1.744 (6), 1.732 (7), 1.456 (5).

IMA No. 94-050 An F-dominant, triclinic polymorph of canasite, with additional H_2O .

$\text{K}_3\text{Na}_3\text{Ca}_5(\text{Si}_{12}\text{O}_{30})(\text{F}_3\text{OH})\cdot\text{H}_2\text{O}$

Triclinic: $P1$

a 10.0941(3) b 12.6913(2) c 7.2405(1) Å
 α 90.00(2)° β 111.02(2)° γ 110.20(2)°

Lilac-grey, blue-grey, rarely greenish; vitreous; translucent.

Biaxial (-), α 1.536, β 1.539, γ 1.542, $2V(\text{meas.}) = 70^\circ$, $2V(\text{calc.}) = 89.8^\circ$.

5.88 (37), 4.70 (54), 4.21 (40), 3.01 (25), 2.915 (100), 2.354 (30), 2.307 (21).

IMA No. 94-051

$\text{Pb}_2\text{Bi}_2\text{Te}_2\text{S}_3$

Hexagonal: space group unknown

a 4.230(4) c 33.43(2) Å

Dark grey to black; metallic; opaque.

In reflected light: greyish-white with a slight pinkish tint, very faint anisotropism, very weak bireflectance, nonpleochroic. R_{O} & R_{E} : (40.4, 39.3 %)470 nm, (42.1, 40.8 %)546 nm, (41.3, 40.8 %)589 nm, (41.9, 40.9 %)650 nm.

3.35 (40), 3.06 (100), 2.22 (25), 2.115 (50), 1.311 (25), 1.213 (25).

IMA No. 94-052

$\text{K}_2\text{Na}_4\text{Ca}_3\text{Ti}_2\text{Be}_4\text{Si}_{12}\text{O}_{38}$

Orthorhombic: $Fddd$

a 12.778(4) b 14.343(3) c 33.69(1) Å

Pink, dark red, seldom white; vitreous; transparent.

Biaxial (+), α 1.630, β 1.644(calc.), γ 1.675, $2V(\text{meas.}) = 70^\circ$.

9.23 (9), 4.15 (10), 3.30 (10), 3.16 (10), 2.53 (10), 2.42 (10), 1.582 (9).

IMA No. 94-053

$\text{Na}_2\text{C}_2\text{O}_4$

Monoclinic: $P2_1/a$

a 10.426(9) b 5.255(5) c 3.479(3) Å β 93.14(8)°
 Pale yellow; vitreous; transparent.

Biaxial (-), α 1.415, β 1.524, γ 1.592, $2V(\text{meas.}) = 72^\circ$, $2V(\text{calc.}) = 72^\circ$.

5.203 (13), 2.898 (27), 2.826 (100), 2.602 (56), 2.334 (33), 2.177 (13), 2.041 (14).

IMA No. 94-054 A member of the zeolite group.

$\text{Na}_3\text{Mg}_3\text{Ca}_5\text{Al}_{19}\text{Si}_{117}\text{O}_{272}\cdot 93\text{H}_2\text{O}$

Orthorhombic: $Cmca$

a 13.698(2) b 25.213(3) c 22.660(2) Å

Colourless to light straw; vitreous; transparent.

Biaxial (-), α 1.480, β 1.485, γ 1.486, $2V(\text{meas.}) < 60^\circ$, $2V(\text{calc.}) 48^\circ$.

11.34 (100), 10.64 (31), 4.64 (35), 4.37 (79), 4.01 (57), 3.938 (36), 3.282 (68).

IMA No. 94-055 A member of the cuprorivaite group.

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

Tetragonal: $P4/ncc$

a 7.366(1) c 15.574(3) Å

Colour; vitreous; transparent.

Uniaxial (-), ω 1.630, ϵ 1.590.

7.79 (35), 3.444 (40), 3.330 (100), 3.119 (55), 3.033 (50), 2.605 (30), 2.322 (30).

IMA No. 94-056

$\text{Ag}_{24}\text{HgAs}_5\text{S}_{20}$

Hexagonal: space group unknown

a 15.00(1) c 15.46(3) Å

Wine-red to violet; metallic; opaque. In reflected light:

grey, weak to moderate anisotropism, very low

bireflectance, weak pleochroism. R_{max} & R_{min} :

(31.0, 30.3 %)470 nm, (29.2, 27.6 %)546 nm,

(27.6, 26.0 %)589 nm, (24.6, 23.9 %)650 nm.

3.17 (6), 3.091 (10), 2.998 (4), 2.755 (3), 1.878 (8).

IMA No. 94-057 A member of the crichtonite group.

$(\text{Sr,Pb})(\text{Y,U})(\text{Ti,Fe}^{3+})_{20}\text{O}_{38}$

Hexagonal (rhombohedral): $R\bar{3}$

a 9.197(1) α 68.75(2)°

Black; metallic; opaque.

In reflected light: ash-grey with pale bluish tones, weak anisotropism, low bireflectance, very weak pleochroism. R_1 & R_2 : (17.73, 17.22 %)470 nm,

(17.14, 16.50 %)546 nm, (16.54, 16.11 %)589 nm,

(16.48, 16.00 %)650 nm.

3.412 (m), 2.902 (m), 2.846 (mw), 2.499 (mw), 1.916 (mw), 1.603 (m), 1.441 (m).

IMA No. 94-058 The Ba-analogue of hennomartinite.

$\text{BaMn}_2^+[\text{Si}_2\text{O}_7](\text{OH})_2\cdot\text{H}_2\text{O}$

Orthorhombic: $Cmcm$ (?)

a 6.325(1) b 9.120(1) c 13.618(1) Å

Dark brown; earthy to brilliant; translucent to transparent.

Biaxial (–), α 1.82, β 1.845 (calc.), γ 1.85, 2V(meas.) 46°.

4.85 (100), 4.557 (50), 4.322 (59), 3.416 (77), 2.869 (80), 2.729 (82).

IMA No. 94-059 A member of the amphibole group.

$(\text{Na,K})(\text{Ca,Na,Fe}^{2+})_2\text{Mg}_5(\text{Si,Al})_8\text{O}_{22}(\text{F,O,OH})_2$

Monoclinic: C2/m

a 9.893(4) b 18.015(5) c 5.279(3) Å β 104.61(4)°

Grey to black; vitreous; opaque, but thin fragments are transparent.

Biaxial (–), α 1.603, β 1.613, γ 1.623, 2V(meas.) 90°, 2V(calc.) 89°.

9.06 (6), 8.46 (8), 3.282 (9), 3.140 (10), 2.703 (6), 1.443 (7).