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 Fe^{3+}-dominant analogue of warwickite
$Mg(Fe^{3+},Fe^{2+},Al,Ti,Mg)(BO_3)O$
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 bireflectance, 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).

IMA No. 94-002
$Mn_2SiO_3(OH)_2 \cdot H_2O$
Orthorhombic: $Pca2_1$
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. 94-004 A member of the amphibole group.
$NaNa_2Mn_2^{2+}Mn_3^{3+}Si_8O_{24}$
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
$(Zn,Cu)_6Zn_2(OH)_{13}[(Si,S)(O,OH)_4]_2$
Hexagonal (trigonal): $P\bar{3}$
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. 94-006
$(Mg_{1-x}\square_x)_2Mg_{12}(PO_4)_6(PO_3OH)_2O_6H_{6+4x}$
x = 0 to 0.3
Hexagonal: $P6_3mc$
a 12.47(1) c 5.036(6) Å
Azure blue; vitreous; transparent.
Uniaxial (-), $\bar{n} \sim 1.61$, $\Delta \sim 0.01$.
3.66 (65), 3.15 (100), 3.109 (100), 2.692 (95), 2.213 (70), 1.803 (50), 1.552 (50).

IMA No. 94-007
$Na_3(Fe^{2+},Fe^{3+})_6[Ti_2Si_{12}O_{30}(O,OH)_4](OH,O)_7 \cdot 2H_2O$

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
$AgFeS_2$
Tetragonal: $P4_2mc$
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 bireflectance, 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.
$K(K,Na,)(Mn,Zr,Y)_2(Zn,Li)_3Si_{12}O_{30}$
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
$(NH_4,K)NO_3$
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
$(Na,Mn,Fe,Al,REE)_{15}(Y,REE,Ca,Na)_2(CO_3)_9(SO_3F)Cl$
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
$Cu_2Zn[(As,Sb)O_4](OH)_3$
Hexagonal (trigonal): $P\bar{3}$
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
$CuNiSb_2$
Hexagonal (trigonal): $P\bar{3}m1$
a 4.0489(2) c 5.1358(3) Å
Silver-white; metallic; opaque.
In reflected light: white with yellowish hue, distinct anisotropism, weak bireflectance, 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 högbomite-*8H*.
$(Zn,Fe^{2+})_{1-2x}Ti_xAl_2O_4$ $x \sim 0.12$
Hexagonal: most probably $P6_3mc$
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
$Na_8(Mn,Fe^{3+},Ti)_2Si_{10}O_{25}(OH,Cl)_4 \cdot 10H_2O$
Orthorhombic: $C222_1$
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
$PbCa_2Al(F,OH)_9$
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.
$(Co,Mg,Ni)Al_2(SO_4)_4 \cdot 22H_2O$
Monoclinic: $P2_1/c$
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.
$Pb(Zn,Fe^{3+})_3(Fe^{3+},Mn^{3+},Mn^{4+},Al,Ti)_9O_{19}$
Hexagonal: $P6_3/mmc$
a 5.854(1) c 22.882(6) ÅBlack; metallic; opaque.
In reflected light: black, isotropic, no bireflectance, 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.
$Pb(Ga,Al,Fe)_3(AsO_4)(SO_4)(OH)_6$
Hexagonal: R3m
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).
$Y_3Si_3O_{10}F$
Monoclinic: $P2_1/n$
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(meas.) 73°, 2V(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: Pm3m
a 3.792(5) Å
Steel black; metallic; opaque.
In reflected light: bright white with yellowish tint, isotropic, nonbireflectant, 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.
$(UO_2)Bi_4O_4(AsO_4)_2{\cdot}2H_2O$
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(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
$(UO_2)_8(SO_4)(OH)_{14}{\cdot}13H_2O$
Monoclinic: $P2_1/a$
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(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
$NaCa_2[B_9O_{14}(OH)_4]{\cdot}2H_2O$
Monoclinic: $P2_1/c$
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(meas.) 54°, 2V(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
$Pb_2Bi_2(S,Se)_3$
Hexagonal (trigonal): $P\bar{3}$ or $P\bar{3}m$
a 4.191(2) c 39.60(3) Å
Silver-grey; metallic; opaque.
In reflected light: yellowish-white, distinct anisotropism, practically absent bireflectance, 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
HgSAg(Cl,Br)
Hexagonal: $P6_2$, $P6_4$, $P6_222$ or $P6_422$
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.
$(Ba,K,Pb)Na_3(Ca,Sr)(Fe,Mg,Mn)_{14}Al(OH)_2(PO_4)_{12}$
Monoclinic: C2/c
a 16.406(5) b 9.945(3) c 24.470(5) Å β 105.73(2)°
Greenish-grey; greasy; translucent.
Biaxial (sign unknown), $n_{average}$ 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.
$Mg(V,Cr)_2O_4$
Cubic: Fd3m
a 8.385(3) Å
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
$(Na,Ca,K)Cu_3(AsO_4)_2Cl\cdot 5H_2O$
Tetragonal: $P4_22_12$ or $P4_222$
a 10.085(2) c 23.836(8) Å
Intense blue to emerald green; vitreous; translucent.
Uniaxial (-), ω 1.686, ε 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
$Hg_6^{1+}Hg^{2+}[Cl,(OH)]_2O_3$
Orthorhombic: Pbma
a 11.790(3) b 13.881(4) c 6.450(2) Å
Black to very dark brown; metallic; opaque.
In reflected light: white, strong anisotropism, moderate bireflectance, pleochroic from white to a higher reflecting blue-white. R_1 & R_2: (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
$Ag(Cd,Pb)AsS_3$
Tetragonal: I4/amd
a 5.499(5) c 33.91(4) Å
Grey; metallic; opaque.
In reflected light: greyish white with bluish tint; anisotropism, bireflectance and pleochroism not observed. R_O: (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
$Cu_3^{2+}Te^{6+}O_6\cdot 2H_2O$
Monoclinic: $P2_1/n$
a 9.204(2) b 9.170(2) c 7.584(1) Å β 102.32(3)°
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
$Fe^{3+}(Mn,Fe^{2+},Mg)(PO_4)O$
Monoclinic: I2/a
a 9.977(2) b 6.339(2) c 11.836(3) Å β 105.77(3)°
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.
$(K,Na)Ca_2(Mg,Fe^{2+},Al,Fe^{3+},Ti)_5(Si,Al)_8O_{22}[(OH),F,O]_2$
Monoclinic: C2/m
a 9.9199(4) b 18.0591(8) c 5.3180(3) Å β 105.36(1)°
Black; vitreous; opaque, but translucent in thin splinters.
Biaxial (−), α 1.654, β 1.664, γ 1.670, 2V(meas.) = 79°, 2V(calc.) = 75°.
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
(Cu,Fe)(Sn,Sb)
Tetragonal: space group unknown
a 4.22(1) c 5.10(3) Å
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.
$(Mn^{2+},Ca)(La,Ce,Ca)(Al,Mn^{3+},Mn^{2+})_3(Si_3O_{11})O(OH)$
Monoclinic: $P2_1/m$
a 8.891(3) b 5.704(3) c 10.107(8) Å β 113.99(2)°
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
$Mn_3(Nb,Ta)_3(Nb,Mn)_2W_2O_{20}$
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.
$K_3Na_3Ca_5(Si_{12}O_{30})(F_3OH)\cdot H_2O$
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(meas.) = 70°, 2V(calc.) = 89.8°.
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
$Pb_2Bi_2Te_2S_3$
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
$K_2Na_4Ca_3Ti_2Be_4Si_{12}O_{38}$
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(meas.) = 70°.
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
$Na_2C_2O_4$
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(meas.) = 72°, 2V(calc.) = 72°.
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.
$Na_3Mg_3Ca_5Al_{19}Si_{117}O_{272}\cdot 93H_2O$
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(meas.) < 60°, 2V(calc.) 48°.
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.
$SrCuSi_4O_{10}$
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
$Ag_{24}HgAs_5S_{20}$
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.
$(Sr,Pb)(Y,U)(Ti,Fe^{3+})_{20}O_{38}$
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.
$BaMn_2^{3+}[Si_2O_7](OH)_2\cdot H_2O$
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.
$(Na,K)(Ca,Na,Fe^{2+})_2Mg_5(Si,Al)_8O_{22}(F,O,OH)_2$
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).