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NEW MINERALS APPROVED IN 2000 BY THE COMMISSION ON NEW MINERALS AND MINERAL NAMES, INTERNATIONAL MINERALOGICAL ASSOCIATION

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The information given here is provided by the Commission on New Minerals and Mineral Names (CNMMN), International Mineralogical Association (IMA), for comparative purposes and as a service to mineralogists working on new species. Each mineral is described in the following format:

IMA Number
Chemical Formula (any relationship to other minerals; structure analysis)

Crystal system, space group
unit-cell parameters
Color; luster; diaphaneity
Optical properties
Strongest lines in the X-ray powder-diffraction pattern [*d* in Å(I)]

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.

2000 PROPOSALS

IMA No. **2000–001**
$Cu_2Fe^{3+}(As^{5+}O_4)(As^{3+}O_2)(OH)_2 \cdot H_2O$ New structure-type

Orthorhombic: *Pnma*
a 9.553, *b* 13.099, *c* 8.0640 Å
Pistachio green; vitreous; transparent
Biaxial (–), α 1.80(5), β 1.84(5), γ 1.86(5), 2*V*(meas.) = 65(5)°, 2*V*(calc.) = 69(3)°
6.88(25), 6.161(90), 3.861(20), 3.231(40), 3.080(100), 2.700(25), 2.211(25)

IMA No. **2000–002**
$NaCu_4(AsO_4)_3$ Alluaudite–wyllieite group structure determined

Monoclinic: *C*2/*c*
a 12.051, *b* 12.434, *c* 7.2662 Å, β 117.94°
Dark-blue; strong vitreous; translucent
Biaxial (–), α 1.76, β 1.92, γ 1.96, 2*V*(calc.) 49.5°
6.22(13), 3.60(21), 3.43(100), 3.21(35), 2.791(24), 2.696(18), 2.683(30)

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IMA No. **2000–003**
$Ba_3[(Si,Al)_4O_8]OCl[Cl,(H_2O)]_4$ Cymrite-like structure determined
Hexagonal: $P6_3mc$
a 5.243, *c* 29.859 Å
Light-blue grey; vitreous; translucent
Uniaxial (–), ω 1.642, ε 1.594
14.67(100), 3.883(100), 3.357(50), 2.988(60), 2.887(50), 2.616(70)

IMA No. **2000–004**
$Bi(OH)SO_4•H_2O$ Second natural bismuth sulfate

Monoclinic: $P2_1/n$
a 6.0118, *b* 13.3355, *c* 6.4854 Å, β 112.91°
Light beige to light grey; vitreous; translucent
n 1.78
5.453(42), 5.193(32), 5.115(37), 4.260(100), 3.335(42), 3.113(36), 2.915(22)

IMA No. **2000–005**
$Ca_2Mn_3O_2(AsO_4)_2(CO_3)•3H_2O$ Mitridatite type

Monoclinic: *Cm*
a 11.253, *b* 19.628, *c* 8.932 Å, β 100.05°
Dark red-brown to black; vitreous; translucent
Biaxial (–), α 1.757, $\beta \approx \gamma > 1.80$, $\Delta_{\beta,\gamma} = 0.004$, $2V$(meas.) ~ 32°
8.796(100), 5.654(31), 2.934(76), 2.886(23), 2.816(24), 2.769(39), 2.201(57)

IMA No. **2000–006**
$Mg(HCO_2)_2•2H_2O$ Second natural formate

Monoclinic: $P2_1/c$
a 8.64, *b* 7.15, *c* 9.38 Å, β 98.0°
White; vitreous; translucent
Biaxial (+), α 1.465, β 1.486, γ 1.516, $2V$(calc.) 81(5)°
4.90(9), 4.64(8), 4.30(7), 3.68(8), 3.40(10), 3.05(4), 2.87(4)

IMA No. **2000–007**
$(Mn,Mg)_{25.5}[(V,As)O_4]_3(SiO_4)_3O_5(OH)_{20}$ Similar to mcgovernite
Trigonal: $R\bar{3}c$ structure determined
a 8.259, *c* 204 Å
Bright yellow to orange; vitreous; transparent
Uniaxial (–), *n* 1.787
4.13(70), 3.46(60), 3.26(80), 2.86(100), 2.38(60), 2.35(50), 1.559(90)

IMA No. **2000–008**
$KBSi_2O_6$ Similar to Li–A(BW) zeolite structure determined
Orthorhombic: $P2_12_12_1$
a 9.9630, *b* 10.4348, *c* 4.7044 Å
Colorless; vitreous; transparent
Biaxial (–), α 1.561, β 1.563, γ 1.564, $2V$(meas.) 51°, $2V$(calc.) 70°
3.944(5), 3.495(8), 3.282(10), 3.149(4), 2.704(4), 2.293(4)

IMA No. **2000–009**
$NaBSiO_4$ Similar to kalsilite and beryllonite structure determined
Hexagonal: $P6_3$
a 13.8964, *c* 7.7001 Å
White, colorless in thin fragments; vitreous; transparent or slightly turbid
Uniaxial (–), ω 1.591, ε 1.582
3.86(6), 3.61(6), 2.780(10), 2.320(7), 2.216(9), 1.928(5), 1.721(7)

IMA No. **2000–010**
$(Na,H_3O)_{15}(Ca,Mn,REE)_6Fe^{3+}{}_2Zr_3(\square,Zr)(\square,Si)Si_{24}O_{66}(O,OH)_6Cl•nH_2O$ ($2 < n < 3$) Eudialyte group

Trigonal: $R3m$
a 14.167, *c* 30.081 Å
Yellow; vitreous; transparent
Uniaxial (+), ω 1.612, ε 1.615
6.41(41), 4.30(91), 3.521(57), 3.205(44), 2.963(92), 2.841(100), 2.588(37)

IMA No. **2000–011**
$KCaCu_5(AsO_4)_4[As(OH)_2O_2]_2•H_2O$ Polymorph of calcioandyrobertsite
Orthorhombic: *Pnma* structure determined
a 19.576, *b* 10.0536, *c* 9.921 Å
Intense blue; vitreous; transparent
Biaxial (–), α 1.715, β 1.730, γ 1.735, $2V$(meas.) 55°, $2V$(calc.) 60°
7.064(70), 6.642(60), 4.810(70), 4.469(90), 3.950(60), 3.105(100), 2.748(90)

IMA No. **2000–012**
$Bi_2Fe^{3+}(Co,Fe^{3+})(O,OH)_2(OH)_2(AsO_4)_2$ Co-dominant analogue of neustädtelite
Triclinic: $P\bar{1}$ structure determined
a 9.156, *b* 6.148, *c* 9.338 Å, α 83.24, β 70.56, γ 86.91°
Brown; adamantine; transparent to translucent
Biaxial (–), α 2.02, β 2.09(calc.), γ 2.12, $2V$(meas.) 65°
8.757(55), 3.752(100), 3.552(55), 3.507(44), 2.901(96), 2.750(39), 2.667(72)

IMA No. **2000–014**
$Pd_3Pb_2S_2$ Related to parkerite, $Ni_3Bi_2S_2$

Monoclinic: *C*2/*m*
a 11.673, *b* 8.323, *c* 8.419 Å, β 135.38°
Cream with a brownish tint (in reflected light in air); opaque; metallic
In reflected light (air): brownish; internal reflections not observed, anisotropy weak. R_{min} and R_{max}: 45.2–46.1% (460 nm), 46.3–47.2% (540 nm), 47.4–48.5% (580 nm), 49.3–49.8% (640 nm)
5.953(6), 4.144(10), 3.379(4), 2.917(9), 2.413(8), 2.365(7), 2.082(5)

IMA No. **2000–015**
$Na_3Sr(La,Ce)FeSi_6O_{17}$ Nordite group

Orthorhombic: *Pcca*
a 14.440, *b* 5.191, *c* 19.86 Å
Colorless, pale brownish; vitreous; transparent
Biaxial (–), α 1.624, β 1.637, γ 1.644, 2*V*(meas.) 60°, 2*V*(calc.) 72°
7.20(40), 4.21(100), 3.323(82), 2.964(88), 2.873(99), 2.595(58), 2.442(44)

IMA No. **2000–016**
$(Ti,Fe,Mg,Mn)_{1-x}Ti_2O_5$ Pseudobrookite group

Orthorhombic: *Pban*
a 9.765, *b* 3.732, *c* 9.957 Å
Dark grey
In reflected light (air): blue–grey, no internal reflections, anisotropic. R_{min} and R_{max}: 11.5–11.1% (460 nm), 10.3–(10.3)% (540 nm), 10.1–10.2% (580 nm), 10.3–10.4% (640 nm)
3.47(7), 2.75(10), 1.965(3), 1.871(9), 1.727(9), 1.548(3)

IMA No. **2000–017**
$Na_{11}Ca_9(Fe^{3+},Fe^{2+})_2Zr_3Nb[Si_{25}O_{73}](OH,H_2O,Cl,O)_5$ Eudialyte group
Trigonal: *R*3*m* structure determined
a 14.255, *c* 30.170 Å
Dark brown to brownish black; vitreous; translucent
Uniaxial (–), ω 1.616, ε 1.620
6.43(39), 4.31(69), 3.218(56), 3.036(42), 2.977(81), 2.854(100), 2.602(44)

IMA No. **2000–018**
$VOSO_4(H_2O)_5$ Polymorph of minasragrite structure determined
Orthorhombic: $Pmn2_1$
a 7.246, *b* 9.333, *c* 6.210 Å
Bright blue to pale blue; vitreous
Biaxial(–), α 1.529, β 1.534, γ 1.534, 2*V*(meas.) 2°, 2*V*(calc.) 0°
4.70(100), 3.734(20), 3.322(50), 2.865(40), 2.602(30), 2.363(20), 2.030(20)

IMA No. **2000–019**
$Cu_5(UO_2)_6(SO_4)_3(OH)_{16}\cdot 14H_2O$ Second natural uranyl sulfate
Triclinic: *P*1 or $P\bar{1}$
a 13.754, *b* 9.866, *c* 8.595 Å, α 103.84, β 90.12, γ 106.75°
Grey olive; opaque
Biaxial (+), α 1.725, β 1.730, γ 1.787, 2*V*(calc.) 33.8°
9.13(100), 7.09(26), 5.511(22), 4.566(80), 3.443(17), 3.367(15), 3.046(26)

IMA No. **2000–020**
$Fe_4[AsO_3OH]_5[AsO_2(OH)_2]_2\cdot 20\ H_2O$

Orthorhombic
a 10.676, *b* 19.027, *c* 10.012 Å
White-beige; aggregates are earthy; opaque
n 1.615 (calc.)
9.50(100), 9.31(85), 6.81(24), 5.45(23), 4.221(35), 3.586(39), 3.302(24)

IMA No. **2000–021**
$Ca_3(Si,Fe^{3+},Al)[SO_4][B(OH)_4](OH,O)_6\cdot 12H_2O$ Ettringite group
Trigonal (pseudo-hexagonal): *P*31*c* (by analogy)
a 11.14, *c* 20.99 Å
Light grey with violet shade; vitreous, earthy in aggregates; translucent
Uniaxial (+), ω 1.523, ε 1.532
9.70(8), 3.85(6), 3.040(8), 2.736(6), 2.596(10), 2.374(6), 2.121(9)

IMA No. **2000–022**
$Ca_2Mn^{2+}Fe^{3+}Si_4O_{12}(OH)(H_2O)_2$ Four-membered silicate rings
Triclinic: $P\bar{1}$ structure determined
a 9.960, *b* 13.875, *c* 6.562 Å, α 133.19, β 101.50, γ 66.27°
Dark brown (clusters), light brown (thinner crystals); vitreous
Biaxial (–), α 1.667, β 1.679, γ 1.690, 2*V*(meas.) 89°, 2*V*(calc.) 87°
9.07(100), 8.24(90), 5.00(30), 3.192(30), 3.126(70), 3.095(70), 2.781(60)

IMA No. **2000–023**
$Ba_6Fe^{3+}{}_3Si_8O_{23}(CO_3)_2Cl_3\cdot H_2O$ Unique structure

Trigonal: *P*3*m*1
a 10.740, *c* 7.0950 Å
Jet black to a dirty grey-brown; vitreous to adamantine; opaque to translucent
Uniaxial (–), ω 1.723, ε 1.711
3.892(100), 3.148(40), 2.820(90), 2.685(80), 2.208(40), 2.136(40), 1.705(35)

IMA No. **2000–024**
$Na_2BeSi_4O_{10}•4H_2O$ Four-membered and eight-membered silicate rings
Orthorhombic: $P2_12_12_1$ structure determined
a 9.722, *b* 10.142, *c* 12.030 Å
Colorless, whitish; vitreous; transparent
Biaxial (+), α 1.499, β 1.507, γ 1.511, 2*V*(meas.) 65°, 2*V*(calc.) 70°
6.11(80), 5.97(100), 5.07(35), 3.46(45), 3.09(70), 3.06(50), 2.988(60)

IMA No. **2000–025**
$(Sr,Ca)_2Na[Al_5Si_5O_{20}]•7H_2O$ Thomsonite-series zeolite
Orthorhombic: *Pcnn* structure determined
a 13.050, *b* 13.123, *c* 13.241 Å
Colorless; vitreous; transparent
Biaxial (+), α 1.528, β 1.532, γ 1.540, 2*V*(meas.) 62°, 2*V*(calc.) 71°
6.63(7), 4.66(8), 3.49(9), 3.19(8), 2.960(10), 2.860(10), 2.691(10)

IMA No. **2000–026**
$(Mn,Li)_4(Ta,Sn)_4(Ta,Nb)_8O_{32}$ Wodginite group

Monoclinic: *C*2/*c*
a 9.5104, *b* 11.5196, *c* 5.1179 Å, β 91.221(48)°
Reddish brown; vitreous; translucent
$n > 2.0$
3.644(46), 2.976(100), 2.966(95), 2.465(36), 1.767(17), 1.715(23), 1.455(18)

IMA No. **2000–027**
$Sr_4TiTi_4Si_4O_{22}$ Perrierite group

Monoclinic: $P2_1/a$ (pseudo-*C*2/*m*)structure determined
a 13.848, *b* 5.626, *c* 11.878 Å, β 114.19°
Grey with a blue tint; adamantine; transparent
Pale green with a yellow tint in thin section
3.62(60), 3.16(70), 3.09(95), 3.01(90), 2.96 (95), 2.71(100), 2.17(90)

IMA No. **2000–028**
$Na_{27}K_8Ca_{12}Fe_3Zr_6Si_{52}O_{144}(O,OH,H_2O)_6Cl_2$ Eudialyte group
Trigonal: *R*3*m* structure determined
a 14.249, *c* 60.969 Å
Pink; vitreous; transparent
Uniaxial (+), ω 1.598, ε 1.600
6.48(47), 4.345(81), 3.565(41), 3.249(57), 2.987(100), 2.861(70), 2.695(40)

IMA No. **2000–029**
$Cu_5Cl_2(OH)_8(H_2O)_2$ Similar to atacamite structure determined
Monoclinic: *C*2/*m*
a 10.301, *b* 6.758, *c* 8.835 Å, β 111.53°
Pale blue; vitreous; transparent
Biaxial (–), α 1.724, β 1.745, γ 1.750, 2*V*(meas.) 33°, 2*V*(calc.) 52°
8.20(100), 5.52(100), 5.03(40), 2.883(80), 2.693(40), 2.263(40), 2.188(50), 1.767(40)

IMA No. **2000–030**
$CaMg_3(Al_5Mg)(Si_6O_{18})(BO_3)_3(OH)_3(OH)$ Tourmaline group
Trigonal: *R*3*m* structure determined
a 15.954, *c* 7.214 Å
Orange; vitreous; transparent
Uniaxial (–), ω 1.646, ε 1.624
6.38(50), 4.981(50), 4.596(50), 4.234(90), 3.978(100), 3.491(70), 2.969(80), 2.582(90)

IMA No. **2000–031**
$K_2Mn(Nb,Ti)_4(Si_4O_{12})_2(OH)_4•6H_2O$ Labuntsovite group
Monoclinic: *C*2/*m* structure determined
a 14.551, *b* 14.001, *c* 15.702 Å, β 117.6°
Brown to pink; vitreous; translucent
Biaxial (+), α 1.683, β 1.692, γ 1.775, 2*V*(meas.) 40°, 2*V*(calc.) 38°
6.99(100), 6.43(25), 4.936(28), 3.227(89), 3.123(68), 2.607(25), 2.520(29)

IMA No. **2000–032**
$Mg_3(PO_4)_2•22H_2O$–1*A*2 Synthetic equivalent

Triclinic: $P\bar{1}$
a 6.932, *b* 6.925, *c* 16.154 Å, α 82.21, β 89.70, γ 119.51°
Colorless; vitreous; transparent
Biaxial (–), α 1.459, β 1.470, γ 1.470, 2*V*(meas.) 25°, 2*V*(calc.) 0°
7.98(100), 5.32(63), 3.19(45), 2.896(33), 2.867(30), 2.728(32), 2.658(37)

IMA No. **2000–033**
$(Ba,Na,K)(Al,Mg)_2(Si,Al)_4O_{10}(OH)_2$ Mica group

Monoclinic: *C*2/*c*
a 5.2068, *b* 9.027, *c* 19.963 Å, β 95.87°
Light grey to silver; glassy; transparent
Biaxial (–), α(calc.) 1.600, β 1.619, γ 1.622, 2*V*(meas.) 43°
4.471(22), 4.302(21), 3.879(26), 3.730(27), 3.487(23), 2.596(46), 2.566(100), 1.504(63)

IMA No. **2000–034**
$(UO_2)_2CO_3(OH)_2•4H_2O$ Unique composition

Monoclinic: $P2_1/c$
a 4.1425, *b* 14.098, *c* 18.374 Å, β 103.62°
Canary yellow; vitreous; transparent
Biaxial (–), α 1.583, β 1.669, γ 1.712, 2*V*(calc.) 67.4°
8.95(65), 7.54(63), 4.546(96), 4.262(60), 3.463(62), 3.322(100), 3.029(85), 2.273(62)

IMA No. **2000–035**
$Na_2Ba_2FeTiSi_2O_7(CO_3)(OH)_3F$ Unique structure

Triclinic: *P*1
a 5.399, *b* 7.016, *c* 16.254 Å, α 102.44, β 93.18, γ 90.10°
Yellowish brown; vitreous or pearly; translucent
Biaxial (+), α 1.671, β 1.694, γ 1.734, 2*V*(meas.) 71°, 2*V*(calc.) 76°
3.910(44), 3.186(100), 3.055(38), 2.797(29), 2.738(62), 2.695(32), 2.677(29)

IMA No. **2000–036**
$Zn_2Mg_2Fe_4Sb_2O_{14}(OH)_2$ Isostructural with nolanite

Hexagonal: $P6_3/mmc$, $P6_3mc$ or $P\bar{6}2c$
a 5.9899, *c* 9.353 Å
Black; submetallic; opaque
In reflected light: grey with no internal reflections, anisotropy moderate. R_{min} and R_{max}: 12.21–13.62% (460 nm), 11.78–12.92% (540 nm), 11.67–12.67% (580 nm), 11.39–12.25% (640 nm)
3.474(34), 2.994(43), 2.673(44), 2.522(100), 1.517(33), 1.497(54)

IMA No. **2000–037**
$Ca_{19}(Al,Mg)_{13}[SiO_4]_{10}[Si_2O_7]_4(F,OH)_{10}$ F-analogue of vesuvianite
Tetragonal: *P*4/*nnc* structure determined
a 15.510, *c* 11.779 Å
Colorless to silky white; vitreous; transparent
Uniaxial (–), ω 1.702, ε 1.699
3.465(30), 3.040(30), 2.945(35), 2.743(90), 2.589(50), 2.453(100)

IMA No. **2000–038**
$(Fe,Ni)_2P$ Isostructural with rhodarsenide structure determined
Orthorhombic: *Pnma*
a 5.748, *b* 3.548, *c* 6.661 Å
Light straw-yellow; metallic; opaque
In reflected light: creamy with no internal reflections, anisotropy distinct. R_{min} and R_{max}: 36.8–46.7% (460 nm), 39.2–48.2% (540 nm), 40.7–49.6% (580 nm), 43.0–51.9% (640 nm)
2.238(100), 2.120(80), 2.073(70), 1.884(50), 1.843(40), 1.788(40), 1.774(40), 1.758(40)

IMA No. **2000–039**
$Ca_2(C_2O_4)Cl_2•2H_2O$ New structure-type

Monoclinic: *I*2/*m*
a 6.933, *b* 7.372, *c* 7.446 Å, β 94.5°
Colorless; vitreous; transparent
Biaxial (–), α 1.565, β 1.645, γ 1.725, 2*V*(meas.) 88°, 2*V*(calc.) 86°
5.24(60), 3.670(30), 2.945(100), 2.905(50), 2.619(50), 2.516(40), 2.339(30), 2.323(30)

IMA No. **2000–040**
$Ca_{19}Mn^{3+}(Al, Mn^{3+})_{10}(Mg,Mn^{2+})_2Si_{18}O_{69}(OH)_9$ Mn-dominant analogue of vesuvianite structuredetermined
Tetragonal: *P*4/*n* or *P*4*nc* (or both)
a 15.575, *c* 11.824 Å
Deep maroon-red; vitreous; transparent
Uniaxial (–), ω 1.731, ε 1.719
2.956(100), 2.756(87), 2.756(94), 2.753(60), 2.604(67), 2.598(66), 2.598(62)

IMA No. **2000–041**
$CaCe(Fe^{3+},Fe^{2+},Al)_3[SiO_4][Si_2O_7]O(OH)$ Fe^{3+}-analogue of allanite-(Ce)
Monoclinic: $P2_1/m$ structure determined
a 8.962, *b* 5.836, *c* 10.182 Å, β 115.02°
Black; vitreous to resinous; opaque to translucent
Biaxial (–), α 1.825, β 1.855, γ 1.880, 2V(calc.) 48.2°
3.54(70), 2.93(100), 2.715(80), 2.637(70), 2.155(80), 1.908(70), 1.651(90)

IMA No. **2000–042**
$Mg_6Cr_2(OH)_{16}Cl_2•4H_2O$ Hydrotalcite group structure determined
Trigonal: $R\bar{3}m$
a 3.103, *c* 24.111 Å
Magenta to purple; vitreous to waxy; transparent
Uniaxial (–), ω 1.555, ε 1.535
8.04(100), 4.020(48), 2.624(3), 2.349(5), 2.007(6)

IMA No. **2000–044**
$Cu_{1.6}Pb_{1.6}Bi_{6.4}S_{12}$ Bismuthinite–aikinite derivative structure determined
Orthorhombic: $Pmc2_1$
a 4.007, *b* 44.81, *c* 11.513 Å
Grey; metallic; opaque
In reflected light: greyish white with no internal reflections, anisotropy distinct. R_{min} and R_{max}: 39.15–48.36% (470 nm), 38.26–47.65% (546 nm), 37.23–47.14% (589 nm), 36.55–45.71% (650 nm)
3.631(99), 3.586(55), 3.552(85), 3.156(59), 3.136(95), 2.836(100)

IMA No. **2000–046**
$(Na,H_3O,K,Sr,Ba)_2(Ti,Nb)_2[Si_4O_{12}](OH,O)_2•3H_2O$ Labuntsovite group structure determined

Monoclinic: *Cm*
a 14.604, *b* 14.274, *c* 7.933 Å, β 117.40°
Colorless, white, light brown; vitreous; transparent to translucent
Biaxial (+), α 1.658, β 1.668, γ 1.770, 2*V*(meas.) 25°, 2*V*(calc.) 36°
7.01(44), 6.46(100), 4.991(28), 3.954(30), 3.236(98), 3.179(33), 3.160(38)

IMA No. **2000–047**
$Mg(V^{5+}{}_2O_6)•7H_2O$ Structural relationships to munirite and rossite

Monoclinic: *C*2/*c*
a 38.954, *b* 7.2010, *c* 16.3465 Å, β 97.602°
Light golden-brown; vitreous; translucent
Biaxial (–), α 1.612, β 1.674, γ 1.710, 2*V*(meas.) 78°, 2*V*(calc.) 73°
9.70(100), 8.12(60), 5.84(100), 4.061(50), 3.139(90), 2.920(60), 2.707(50)

IMA No. **2000–048**
$K_6Fe_{24}S_{26}(Cl,S)$ Cl-dominant analogue of bartonite structure determined

Tetragonal: *I*4/*mmm*
a 10.3810, *c* 20.614 Å
Black-brown; submetallic; opaque
In reflected light: yellowish-brown with no internal reflections, no anisotropy. R: 10.2% (460 nm), 13.1% (540 nm), 14.8% (580 nm), 17.1% (640 nm)
9.25(33), 5.97(65), 3.121(45), 2.986(100), 2.380(38), 2.374(57), 1.834(51), 1.830(82)

IMA No. **2000–049**
$NaCa_2Mg_5(Si_7Al)O_{22}F_2$ Amphibole group structure determined

Monoclinic: *C*2/*m*
a 9.8471, *b* 18.0171, *c* 5.2681 Å, β 104.845°
Intense yellow; vitreous to resinous; transparent
Biaxial (–), α 1.606, β 1.617, γ 1.625, 2*V*(calc.) 80.4°
8.40(57), 3.271(48), 3.125(100), 2.938(17), 2.807(33), 2.703(25), 1.894(18)

IMA No. **2000–050**
$KCdCu_7O_2(SeO_3)_2Cl_9$ Similarity to ilinskite structure determined

Hexagonal: $P6_3/mmc$
a 8.7805, *c* 15.521 Å
Dark red; vitreous to metalloid; opaque to translucent
No optical measurements possible, *n* (calc.) 1.804
7.78(100), 6.82(50), 4.391(80), 3.814(80), 3.066(70), 2.582(50), 2.501(60), 2.190(50)

IMA No. **2000–051**
$Ca_2ScSn(Si_2O_7)(Si_2O_6OH)$ Unique structure

Triclinic: *C*1
a 10.028, *b* 8.408, *c* 13.339 Å, α 90.01, β 109.10, γ 90.00°
Colorless to white; vitreous; transparent to translucent
n 1.74
5.18(53), 3.146(100), 3.089(63), 2.901(19), 2.595(34), 2.142(17)

IMA No. **2000–D**
$Ba_2Na(La,Ce)_2Fe^{2+}Ti_2Si_8O_{26}(OH,O,F)•H_2O$ Joaquinite group

Orthorhombic: probably *Ccmm*
a 10.539, *b* 9.680, *c* 22.345 Å
Brown; silky; transparent
Biaxial (+), α 1.754, β1.760, γ 1.797, 2V(meas.) 40°, 2V(calc.) 45°
5.58(67), 3.00(9), 2.95(17), 2.91(10), 2.80(100), 2.232(8), 1.596(13)

Proposals Approved in Previous Years

IMA No. **1999–033**
$(Ca,Y)_3Al[PO_3OH,CO_3](CO_3)(OH)_6•12H_2O$ Ettringite group

Hexagonal: $P6_3$ structure determined
a 10.828, *c* 10.516 Å
Colorless to white; vitreous; transparent
Uniaxial (–), ω 1.532, ε 1.503
9.38(100), 4.59(70), 3.77(50), 3.36(55), 2.491(80), 2.143(65)

IMA No. **1998–011**
$(Fe^{2+},Fe^{3+},Mg)_{11}(PO_4)_2O_2(OH)_{16}•4H_2O$ New structure-type

Monoclinic: $P2_1/n$
a 16.950, *b* 11.650, *c* 6.2660 Å, β 90.000°
Dark green; vitreous; translucent
Biaxial (–), α 1.722, β 1.730, γ 1.737, 2*V*(meas.) > 50, 2*V*(calc.) 86°
9.61(53), 6.87(77), 5.83(89), 4.805(100), 3.787(62), 3.533(84), 2.868(66)

IMA No. **1998–029**
$(Ce,REE,Ca)_4(Mg,Fe^{2+})(Cr,Fe^{3+})_2(Ti,Nb)_2Si_4O_{22}$ Cr-dominant analogue of chevkinite-(Ce) structure determined

Monoclinic: *C*2/*m*
a 13.397, *b* 5.697, *c* 11.041 Å, β 100.53°
Black; resinous; translucent in thin fragments
In reflected light: grey with weak brown internal reflections, no anisotropy. R: 11.2% (470 nm), 10.9% (546 nm), 10.7% (589 nm), 10.3% (650 nm)
5.44(40), 3.62(35), 3.18(50), 3.15(40), 3.12(35), 2.849(40), 2.715(100), 2.160(45)

IMA No. **1998–050**
$Na_4K_4[Ba_2(H_2O,OH)_2]$ Labuntsovite group
$Mg[Ti_8(Si_4O_{12})_4(O,OH)_8]\cdot 8H_2O$ structure determined

Monoclinic: *C*2/*m*
a 14.292, *b* 13.750, *c* 7.792 Å, β 117.03°
Colorless, yellowish, pink or light orange; vitreous; translucent or transparent
Biaxial (+), α 1.688, β 1.692, γ 1.802, 2*V*(meas.) 37°, 2*V*(calc.) 36°
6.94(51), 3.175(100), 3.093(57), 3.083(55), 3.024(51), 2.576(48)

IMA No. **1998–051**
$Na_4K_4[Ba_2(H_2O,OH)_2]Fe[Ti_8(Si_4O_{12})_4(O,OH)_8]\cdot 8H_2O$
Labuntsovite group
Monoclinic: *C*2/*m* structure determined
a 14.249, *b*13.791, *c* 7.777 Å, β 116.82°
Orange; vitreous; translucent or transparent
Biaxial (+), α 1.686, β 1.696, γ 1.835, 2*V*(meas.) 32°, 2*V*(calc.) 32°
6.95(56), 6.35(34), 3.169(100), 3.100(53), 3.032(53), 2.585(58)

IMA No. **1998–052**
$Na_2K_2Ba_{1-x}Ti_4(Si_4O_{12})_2(O,OH)_4\cdot 5H_2O$ Labuntsovite group
Monoclinic: *C*2/*m* structure determined
a 14.216, *b* 13.755, *c* 7.767 Å, β 116.7°
Bright orange to reddish orange; vitreous; transparent
Biaxial (+), α 1.683, β 1.690, γ 1.820, 2*V*(meas.) 37°, 2*V*(calc.) 28°
6.93(26), 6.31(28), 3.16(100), 3.09(24), 3.02(25), 2.577(25)

IMA No. **1997–016**
$MnNa_3P_3O_{10}\cdot 12H_2O$

Monoclinic: $P2_1/n$
a 14.71, *b* 9.33, *c* 15.13 Å, β 89.8°
Colorless; vitreous; transparent
Biaxial (–), α 1.453, γ 1.459, 2*V* and β not measured
10.50(75), 7.36(100), 3.316(60), 3.162(50), 2.889(60), 2.391(48)

IMA No. **1988–047**
$Bi_{8-x}(Se,Te,S)_{7+x}$ Tetradymite group

Trigonal: $P\bar{3}m1$, *P*3*m*1, *P*321
a 4.292, *c* 87.18 Å
Steel-grey; metallic; opaque
In reflected light: light yellow, no internal reflections, anisotropy moderate. R_{min} and R_{max}: 49.9–52.9% (470 nm), 50.6–54.5% (546 nm), 51.0–54.6% (589 nm), 51.2–54.7% (650 nm)
7.35(27), 4.604(80), 3.354(18), 3.131(100), 2.291(29), 2.146(19), 2.112(18), 1.9377(43)