

**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(*l*)]

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. 2000-002	
<p>IMA No. 2000-001 Cu₂Fe³⁺(As⁵⁺O₄)(As³⁺O₂)(OH)₂•H₂O Orthorhombic: <i>Pnma</i> <i>a</i> 9.553, <i>b</i> 13.099, <i>c</i> 8.0640 Å Pistachio green; vitreous; transparent Biaxial (–), α 1.80(5), β 1.84(5), γ 1.86(5), 2<i>V</i>(meas.) = 65(5)°, 2<i>V</i>(calc.) = 69(3)° 6.88(25), 6.161(90), 3.861(20), 3.231(40), 3.080(100), 2.700(25), 2.211(25)</p>	<p>New structure-type</p>	<p>NaCu₄(AsO₄)₃ Alluaudite–wylleite group structure determined Monoclinic: <i>C2/c</i> <i>a</i> 12.051, <i>b</i> 12.434, <i>c</i> 7.2662 Å, β 117.94° Dark-blue; strong vitreous; translucent Biaxial (–), α 1.76, β 1.92, γ 1.96, 2<i>V</i>(calc.) 49.5° 6.22(13), 3.60(21), 3.43(100), 3.21(35), 2.791(24), 2.696(18), 2.683(30)</p>	

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IMA No. **2000-003**

$\text{Ba}_3[(\text{Si},\text{Al})_4\text{O}_8]\text{OCl}[\text{Cl},(\text{H}_2\text{O})]_4$ 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**

$\text{Bi}(\text{OH})\text{SO}_4 \cdot \text{H}_2\text{O}$ 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**

$\text{Ca}_2\text{Mn}_3\text{O}_2(\text{AsO}_4)_2(\text{CO}_3) \cdot 3\text{H}_2\text{O}$ 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, $\beta \approx \gamma > 1.80$, $\Delta_{\beta,\gamma} = 0.004$, $2V(\text{meas.}) \sim 32^\circ$

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**

$\text{Mg}(\text{HCO}_2)_2 \cdot 2\text{H}_2\text{O}$ 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, $2V(\text{calc.})$ 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**

$(\text{Mn},\text{Mg})_{25.5}[(\text{V},\text{As})\text{O}_4]_3(\text{SiO}_4)_3\text{O}_5(\text{OH})_{20}$ Similar to mcgovernite structure determined

Trigonal: $R\bar{3}c$

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, $2V(\text{meas.})$ 51°, $2V(\text{calc.})$ 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**

$(\text{Na},\text{H}_3\text{O})_{15}(\text{Ca},\text{Mn},\text{REE})_6\text{Fe}^{3+}_2\text{Zr}_3(\square,\text{Zr})(\square,\text{Si})\text{Si}_{24}\text{O}_{66}(\text{O},\text{OH})_6\text{Cl} \cdot n\text{H}_2\text{O}$ ($2 < n < 3$) 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**

$\text{KCaCu}_5(\text{AsO}_4)_4[\text{As}(\text{OH})_2\text{O}_2]_2 \cdot \text{H}_2\text{O}$ Polymorph of calcioandryobertsite structure determined

Orthorhombic: $Pnma$

a 19.576, b 10.0536, c 9.921 Å

Intense blue; vitreous; transparent

Biaxial (-), α 1.715, β 1.730, γ 1.735, $2V(\text{meas.})$ 55°, $2V(\text{calc.})$ 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**

$\text{Bi}_2\text{Fe}^{3+}(\text{Co},\text{Fe}^{3+})(\text{O},\text{OH})_2(\text{OH})_2(\text{AsO}_4)_2$ Co-dominant analogue of neustädteite structure determined

Triclinic: $P\bar{1}$

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, $2V(\text{meas.})$ 65°
8.757(55), 3.752(100), 3.552(55), 3.507(44), 2.901(96), 2.750(39), 2.667(72)

IMA No. 2000-014Pd₃Pb₂S₂Related to parkerite, Ni₃Bi₂S₂Monoclinic: *C2/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**Na₃Sr(La,Ce)FeSi₆O₁₇

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}Ti₂O₅

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**Na₁₁Ca₉(Fe³⁺,Fe²⁺)₂Zr₃Nb[Si₂₅O₇₃](OH,H₂O,Cl,O)₅

Eudialyte group

Trigonal: *R3m**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. 2000-018VOSO₄(H₂O)₅Polymorph of minasragrite
structure determinedOrthorhombic: *Pmn2₁**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. 2000-019Cu₅(UO₂)₆(SO₄)₃(OH)₁₆•14H₂OSecond natural
uranyl sulfateTriclinic: *P1* or *P1̄**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**Fe₄[AsO₃OH]₅[AsO₂(OH)₂]₂•20 H₂O

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. 2000-021Ca₃(Si,Fe³⁺,Al)[SO₄][B(OH)₄](OH,O)₆•12H₂O

Ettringite group

Trigonal (pseudo-hexagonal): *P31c* (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. 2000-022Ca₂Mn²⁺Fe³⁺Si₄O₁₂(OH)(H₂O)₂Four-membered
silicate rings

structure determined

Triclinic: *P1̄**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. 2000-023Ba₆Fe³⁺Si₈O₂₃(CO₃)₂Cl₃•H₂O

Unique structure

Trigonal: *P3m1**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**Na₂BeSi₄O₁₀•4H₂OFour-membered and
eight-membered silicate rings
structure determinedOrthorhombic: *P*₂*1*₂*1*₂*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[Al₅Si₅O₂₀]•7H₂OThomsonite-series
zeolite
structure determinedOrthorhombic: *P**c**mn**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)₈O₃₂

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 > 2.03.644(46), 2.976(100), 2.966(95), 2.465(36), 1.767(17),
1.715(23), 1.455(18)IMA No. **2000-027**Sr₄Ti₄Si₄O₂₂

Perrierite group

Monoclinic: *P*₂*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**Na₂₇K₈Ca₁₂Fe₃Zr₆Si₅₂O₁₄₄(O,OH,H₂O)₆Cl₂ Eudialyte
groupTrigonal: *R**3**m**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**Cu₅Cl₂(OH)₈(H₂O)₂Similar to atacamite
structure determinedMonoclinic: *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**CaMg₃(Al₅Mg)(Si₆O₁₈)(BO₃)₃(OH)₃(OH) Tourmaline
groupTrigonal: *R**3**m**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**K₂Mn(Nb,Ti)₄(Si₄O₁₂)₂(OH)₄•6H₂O Labuntsovite
groupMonoclinic: *C**2*/*m**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**Mg₃(PO₄)₂•22H₂O-1A2

Synthetic equivalent

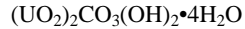
Triclinic: *P* $\bar{1}$ *a* 6.932, *b* 6.925, *c* 16.154 Å, α 82.21, β 89.70, γ
119.51°

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)₄O₁₀(OH)₂ Mica groupMonoclinic: *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)

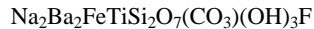
IMA No. **2000-034**

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, $2V(\text{calc.})$ 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**

Unique structure

Triclinic: $P1$

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

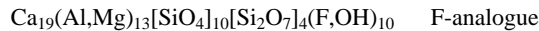
Biaxial (+), α 1.671, β 1.694, γ 1.734, $2V(\text{meas.})$ 71°, $2V(\text{calc.})$ 76°
3.910(44), 3.186(100), 3.055(38), 2.797(29), 2.738(62),
2.695(32), 2.677(29)IMA No. **2000-036**

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**F-analogue
of vesuvianite
structure determinedTetragonal: $P4/nnc$

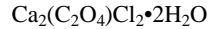
a 15.510, c 11.779 Å

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**Isostructural with rhodarsenide
structure determinedOrthorhombic: $Pnma$

a 5.748, b 3.548, c 6.661 Å

Light straw-yellow; metallic; opaque

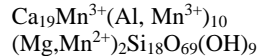
In reflected light: creamy with no internal reflections, anisotropy distinct. R_{\min} and R_{\max} : 36.8–46.7% (460 nm), 39.2–48.2% (540 nm), 40.7–49.6% (580 nm), 43.0–51.9% (640 nm)
2.238(100), 2.120(80), 2.073(70), 1.884(50), 1.843(40),
1.788(40), 1.774(40), 1.758(40)IMA No. **2000-039**

New structure-type

Monoclinic: $I2/m$

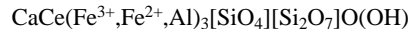
a 6.933, b 7.372, c 7.446 Å, β 94.5°

Colorless; vitreous; transparent

Biaxial (-), α 1.565, β 1.645, γ 1.725, $2V(\text{meas.})$ 88°, $2V(\text{calc.})$ 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**Mn-dominant analogue
of vesuvianite
structuredeterminedTetragonal: $P4/n$ or $P4nc$
(or both)

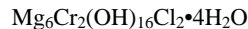
a 15.575, c 11.824 Å

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** Fe^{3+} -analogue of allanite-(Ce)
structure determinedMonoclinic: $P2_1/m$

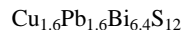
a 8.962, b 5.836, c 10.182 Å, β 115.02°

Black; vitreous to resinous; opaque to translucent

Biaxial (-), α 1.825, β 1.855, γ 1.880, $2V(\text{calc.})$ 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**Hydrotalcite group
structure determinedTrigonal: $R\bar{3}m$

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**Bismuthinite–aikinite derivative
structure determinedOrthorhombic: $Pmc2_1$

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,H₃O,K,Sr,Ba)₂(Ti,Nb)₂[Si₄O₁₂](OH,O)₂•3H₂OLabuntsovite group
structure determinedMonoclinic: *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. 2000-047Mg(V⁵⁺₂O₆)•7H₂OStructural relationships
to munirite and rossiteMonoclinic: *C2/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. 2000-048K₆Fe₂₄S₂₆(Cl,S) Cl-dominant analogue of bartonite
structure determinedTrigonal: *I4/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. 2000-049NaCa₂Mg₅(Si₇Al)O₂₂F₂Amphibole group
structure determinedMonoclinic: *C2/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. 2000-050KCdCu₇O₂(SeO₃)₂Cl₉Similarity to ilinskite
structure determinedHexagonal: *P6₃/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. 2000-051Ca₂ScSn(Si₂O₇)(Si₂O₆OH)

Unique structure

Triclinic: *C1**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**Ba₂Na(La,Ce)₂Fe²⁺Ti₂Si₈O₂₆(OH,O,F)•H₂O Joaquinite
groupOrthorhombic: probably *Ccmm**a* 10.539, *b* 9.680, *c* 22.345 Å

Brown; silky; transparent

Biaxial (+), α 1.754, β 1.760, γ 1.797, 2*V*(meas.) 40°, 2*V*(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[PO₃OH,CO₃](CO₃)(OH)₆•12H₂O Ettringite
groupHexagonal: *P6₃* 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(Fe²⁺,Fe³⁺,Mg)₁₁(PO₄)₂O₂(OH)₁₆•4H₂O New
structure-typeMonoclinic: *P2₁/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,Fe²⁺)
(Cr,Fe³⁺)₂(Ti,Nb)₂Si₄O₂₂ Cr-dominant analogue
of chevkinite-(Ce)
structure determinedMonoclinic: *C2/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**

$\text{Na}_4\text{K}_4[\text{Ba}_2(\text{H}_2\text{O},\text{OH})_2]$ Labuntsovite group
 $\text{Mg}[\text{Ti}_8(\text{Si}_4\text{O}_{12})_4(\text{O},\text{OH})_8]\cdot 8\text{H}_2\text{O}$ structure determined

Monoclinic: $C2/m$

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, $2V(\text{meas.})$ 37°, $2V(\text{calc.})$ 36°

6.94(51), 3.175(100), 3.093(57), 3.083(55), 3.024(51), 2.576(48)

IMA No. **1998-051**

$\text{Na}_4\text{K}_4[\text{Ba}_2(\text{H}_2\text{O},\text{OH})_2]\text{Fe}[\text{Ti}_8(\text{Si}_4\text{O}_{12})_4(\text{O},\text{OH})_8]\cdot 8\text{H}_2\text{O}$
 Labuntsovite group
 structure determined

Monoclinic: $C2/m$

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, $2V(\text{meas.})$ 32°, $2V(\text{calc.})$ 32°

6.95(56), 6.35(34), 3.169(100), 3.100(53), 3.032(53), 2.585(58)

IMA No. **1998-052**

$\text{Na}_2\text{K}_2\text{Ba}_{1-x}\text{Ti}_4(\text{Si}_4\text{O}_{12})_2(\text{O},\text{OH})_4\cdot 5\text{H}_2\text{O}$ Labuntsovite group
 structure determined

Monoclinic: $C2/m$

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, $2V(\text{meas.})$ 37°, $2V(\text{calc.})$ 28°

6.93(26), 6.31(28), 3.16(100), 3.09(24), 3.02(25), 2.577(25)

IMA No. **1997-016**

$\text{MnNa}_3\text{P}_3\text{O}_{10}\cdot 12\text{H}_2\text{O}$

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, $2V$ 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**

$\text{Bi}_{8-x}(\text{Se},\text{Te},\text{S})_{7+x}$ Tetradymite group

Trigonal: $P\bar{3}m1$, $P3m1$, $P321$

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)