ANORTHOMINASRAGRITE*

The mineral forms blue-green crusts and spherical granular aggregates, up to ~1 mm across, wherein individual crystals are <0.1 mm. Electron microprobe analysis gave VO 33.93, SO 30.78, H 2O (calc.) 35.52, sum 100.23 wt%, corresponding to \( V^6 \)\( \text{O}(\text{SO}_4)/(\text{H}_2\text{O})_8 \), ideally VO(\text{SO}_4)/(\text{H}_2\text{O})_8. Individual grains are pale blue, vitreous luster, no cleavage or parting, white streak, \( H = 1.574(2) \), \( 2\beta = 94.9(1)° \); strongest lines are 7.053(80,010), 6.617(90,010), 3.712(80,121), 3.206(70,221), and 2.934(50,112,010).

The mineral is the triclinic polymorph of orthominasragrite (orthorhombic) and minasragrite (monoclinic), and is associated with calcite, pyrite, quartz, mordenite, heulandite-Ca, and stilbite-Ca that form a hydrothermal assemblage at the Levoberezhnye “Iceland spar” deposit near the Nizhnyaya Tunguska River, Evenkiya, Siberia, Russia. Type material is in the Geoscientific Collections of the Freeberg University of Mining and Technology, Germany. J.L.J.

FEROSSAPONITE*

Electron microprobe analysis (H 2O by TGA; Fe 2+:Fe 3+ by Mössbauer spectroscopy) gave Na 2O 0.21, K 2O 0.07, CaO 3.31, MgO 6.62, FeO 21.23, Fe 3O 8.78, Al 2O 3 9.95, SiO 2 33.15, H 2O 17.92, sum 101.24 wt%, corresponding to Ca 0.3Na 0.01K 0.04(Fe 2+ 0.98Mg 0.02Fe 3+ 0.02) 32.02[(Si 2.5Al 0.5Fe 3+ 0.02) 3O 10(Fe 2+ 0.01Al 2+ 0.04Fe 3+ 0.01Ti 0.01)] 0.52(OH) 2.4H 2O, simplified as in the title. The mineral occurs as spherulites, up to 2 mm in diameter, and as radial columnar aggregates within calcite. Translucent, vitreous luster, dark green color gradually turning brownish by oxidation of Fe 2+, green streak, \( H = 2 \), perfect {001} cleavage, \( D_{\text{meas}} = 2.49(5) \), \( D_{\text{calc}} = 2.435 \) g/cm 3 for \( Z = 2 \). Optically biaxial negative, \( \alpha_{\text{calc}} = 1.448 \), \( \beta = 1.641(2) \), \( \gamma = 1.642(2) \), \( 2\beta_{\text{calc}} = 5(3)° \), brownish pleochroism, \( Z > Y \). The IR spectrum is similar to that of saponite. Indexing of the X-ray powder pattern (86 mm camera, Fe radiation) gave a monoclinic cell with \( a = 5.365(2) \), \( b = 9.337(4) \), \( c = 14.65(2) \), \( \alpha = 94.9(1)° \); strongest lines are 7.37(90,002), 4.72(90,020), 3.03(100,031), 2.585(90,201), 2.429(90,066), and 1.549(90,060); the first line at 14.61 (40,001) expands to 17.9 Å after glyceration.

The mineral, which is the Fe 2+-dominant analog of saponite and is named accordingly, had been reported to occur at other localities (e.g., Am. Mineral., 73, p. 445, 1988), but had not been named. The type mineral is associated with calcite, pyrite, quartz, mordenite, heulandite-Ca, and stilbite-Ca that form a hydrothermal assemblage at the Levoberezhnye “Iceland spar” deposit near the Nizhnyaya Tunguska River, Evenkiya, Siberia, Russia. Type material is in the Geosciences Collections of the Freeberg University of Mining and Technology, Germany. J.L.J.

FLUORONYBÖITE*
R. Oberti, M. Boiocchi, D.C. Smith (2003) Fluoronyböite from Jiantchang (Su–Lu, China) and nyböite from Nybö (Nordfjord, Norway): a petrological and crystal-chemical comparison of these two high-pressure amphiboles. Mineral. Mag., 67, 769–782.

Electron microprobe analysis gave Na 2O 8.40, K 2O 0.32, CaO 3.03, MgO 12.07, MnO 0.09, FeO 7.47, ZnO 0.05, Al 2O 3 12.35, Fe 2O 3 2.94, Cr 2O 3 0.02, SiO 2 50.15, TiO 2 0.13, H 2O (calc.) 0.88, F 2.58, O = F 1.09, sum 99.39 wt%, corresponding to \( (\text{Na}_{0.78}K_{0.06})\Sigma_{2.00}(\text{Na}_{1.53}\text{Ca}_{0.47})\Sigma_{2.00}(\text{Mg}_{2.55}\text{Fe}_{3.05}\text{Mn}_{0.01}\text{Zn}_{0.01} \Sigma_{0.84})\Sigma_{2.00}(\text{Al}_{1.32}\text{Ti}_{0.01})\Sigma_{2.00}\Sigma_{2.00}(\text{Si}_{1.14}\text{Al}_{0.86})\Sigma_{2.00}\Sigma_{2.00}(\text{Fe}_{1.06}(\text{OH})_{0.84})\Sigma_{2.00}\Sigma_{2.00}\Sigma_{2.00} \Σ_{2.00}. Ideally NaNa 2(Al,Mg)(Si,Al)O 2F 2. Bluish gray color, grain size and habit not given, translucent, vitreous luster, brittle, \( D_{\text{calc}} = 3.18 \) g/cm 3; reported as similar to nyböite, which has a poor {110} cleavage and \( H = 6 \). Optically biaxial negative, 2V medium, measured R.I. not given, pleochroism presumably like that of nyböite, \( X = \) colorless, \( Y = \) pale brownish pink, \( Z = \) pale bluish green. Single-crystal X-ray structure study (\( R = 0.013 \)) indicated monoclinic symmetry, space group \( \text{C}2/m \), \( a = 9.666(4) \), \( b = 17.799(6) \), \( c = 5.311(2) \), \( \alpha = 104.10(3)° \). Strongest lines of the calculated X-ray powder pattern are 8.307(64,110), 4.729(90,102), 3.057(100,020), 2.583(90,201), 2.429(90,066), and 1.549(90,060).}

* Before publication, minerals marked with an asterisk were approved by the Commission on New Minerals and Mineral Names, International Mineralogical Association.
† E-mail: JLJambor@aol.com

0003-004X/04/0203–467S05.00

American Mineralogist, Volume 89, pages 467–471, 2004

New Mineral Names*

JOHN L. JAMBOR1† AND ANDREW C. ROBERTS2

1Department of Earth and Ocean Sciences, University of British Columbia, Vancouver, British Columbia
V6T 1Z4, Canada
2Geological Survey of Canada, 601 Booth Street, Ottawa K1A 0E8, Canada
3.382(42,131), 3.079(58,310), 2.691(100,151,331), and 2.532(47,202).

The new mineral, which is named in accordance with the CNMMN-approved nomenclature system for amphiboles, occurs as relics in association with clinoxyroxene, garnet, rutile, apatite, paragonite, plagioclase, and other amphiboles in a kyanite-bearing eclogite from the Jianchang eclogite pod in the Jiangsu and Shandong provinces of eastern China. Type material is in the Museo di Mineralogia, Dipartimento di Scienze della Terra, Università di Pavia, Italy.

Discussion. A description is also given for nyböite, which although entrenched in the literature as an improved mineral and name, had not been fully described. J.L.J.

GRAULICHITE-(Ce)*


The mineral, which is the Fe-dominant analog of arsenoflorencite-(Ce), occurs as spherical aggregates, up to 50 µm in diameter, consisting of rhombohedral crystals, some of which are isolated euhedra up to 50 µm long, showing {102} modified by {101}. Electron microprobe analysis gave CaO 0.03, SrO 0.24, BaO 3.95, PbO 0.07, La2O3 15.73, Nd2O3 0.08, Al2O3 3.05, SO4 0.65, SO3 0.06, PbO 0.03, As2O5 31.20, H2O (calc.) 8.37, sum 97.79 wt%, corresponding to (Ca1.89S0.01 [As1.89S0.01 (Ca1.89S0.01 O1.92) O2.00]O2.00) (OH)0.57 (H2O)0.43 (2000) on the basis of six cations [Σ = 6.06], and 6(OH2,H2O), ideally CeFe3(AsO6)2(OH)4. Light green to brownish color, transparent, resinous luster, brown-red streak, brittle, cleavage not observed, uneven fracture, irregular zones up to 200 µm long, and as concentric zones up to 200 µm thickness within zincicollinite.

HILLITE*


The mineral occurs as doubly terminated euhedral crystals up to 200 µm in thickness within zincicollinite. Electron microprobe analysis gave Na2O 0.11, CaO 30.36, MgO 4.34, ZnO 14.79, FeO 0.04, P2O5 40.85, H2O (calc.) 10.23, sum 100.72 wt%, corresponding to (Ca1.91Na0.01)2.92[Zn6.66Mg0.38]2.16P2.07O3.20H0.02O4.00H2O, simplified as Ca2(Zn,Mg)[PO4]2·2H2O. The electron microprobe compositions indicate a complete solid solution from 64 mol% Zn to collinite and fairfieldite. Greenish or bluish to colorless, transparent to translucent, vitreous to silky luster, H = 3½, perfect {101} and {001} cleavages, D = 3.16(2), D = 3.18 180 cm³/m for Z = 1, very slowly soluble in HCl, weak greenish yellow fluorescence in short-wave ultraviolet light. Optically biaxial positive, α = 1.635(5), β = 1.650(5), γ = 1.667(3), 2V = 83.4°. Single-crystal X-ray structure study (R = 0.0378) indicated triclinic symmetry, space group PT; a = 5.736(1), b = 6.767(2), c = 5.462(1) Å, α = 97.41(2), β = 108.59(2), γ = 107.19(2)° as refined from a diffractometer powder pattern (CuKα radiation) with strongest lines of 6.24(34,010), 3.230(22,120), 3.130(37,020), 3.038(40,101), 2.690(100,201,121,102), and 1.668(22,123).

The mineral occurs on the prism faces of scholzite, as concentric zones within collinite, and as clusters of crystals on crusts of collinite in a small gossan on Precambrian argillaceous siltstone at Reapook Hill, Flinders Ranges, South Australia. Other phosphates in the gossan are tarbuttite, parahopite, switerzie, and phosphophyllite. The new mineral name is for Roderick Hill (b. 1949) of CSIRO at Melbourne, Australia, who described the mineral in 1973 and recognized it as a potentially new species. Type material is in the Museum of Victoria at Melbourne. J.L.J.

MAGNESIOTANTALITE*


The mineral occurs as black, opaque, irregular flattened grains up to 0.4 mm, and as segregations to 0.7 mm. One of four listed electron microprobe analyses has MgO 5.27, FeO 6.71, MnO 0.82, TiO2 0.38, Nb2O5 41.19, Ta2O5 61.86, sum 99.23 wt%, corresponding to (Mg,Fe)2(Ta,Nb)O6. The mineral forms a continuous solid-solution series with ferrotantalite and ferrocolumbite. Semi-metallic to metallic luster, brown-red streak, brittle, cleavage not observed, uneven fracture, H = 5½, VHN50 = 489(5), D = 4.73(3), Dcalc = 6.79 g/cm³ for Z = 4. Light gray in reflected light, weakly anisotropic, brown-red internal reflection. Reflectance values in air are tabulated in 10-nm steps from 400 to 700 nm; representative values for Rmax and Rmin are 15.20, 14.02 (400), 13.75. 12.95 (470), 13.47, 13.28 (550), 14.58, 14.25 (590), and 15.55, 15.15 (650). Laue and oscillation photographs indicated orthorhombic symmetry, space group Pbcn by analogy with other members of the group; indexing of the powder pattern (57 mm Debye–Scherrer, FeKα radiation) gave a = 14.335(2), b = 5.735(1), c = 5.058(1) Å. Strongest lines are 3.67(60,310,111), 2.96(100,311), 1.774(60,330), 1.728(70,621), and
Magnetite intergrown with ferrotantalite, ferrocolumbite, and mirolitite occurs as replacement rims on magnetanotonite crystals within nests of calcite and sodic plagioclase that formed along the axial part of a desilicated granite pegmatite at the Lipovka pegmatite field, Rezh district, Central Urals, Russia. The new mineral name is for the composition and relationship to ferrotantalite and magnetanotonite. Type material is in the Fersman Mineralogical Museum, Moscow, Russia. J.L.J.

Niigataite*


Electron microprobe analysis gave CaO 14.09, MgO 0.07, MnO 0.22, SrO 14.75, Al2O3 24.86, Fe2O3 7.08, TiO2 0.75, SiO2 35.49, H2O (calc) 1.77, sum 99.08 wt%, corresponding to Ca2Mn2Sr2Ca4Al8Fe24Ti6Mn2Sr22O62(OH)2(O)4(OH)(OH), simplified as in the title. The mineral occurs as transparent subhedral grains, to 0.5 mm across; vitreous luster, pale gray simplified formula is as given in the title. Vitreous luster, transparent anhedral grains, up to 0.5 mm across, with a greasy to resinous luster, white streak, H = 6, imperfect {001} cleavage, nonfluorescent, Dcalc = 5.21(1) g/cm3 for Z = 8. Optically uniaxial positive, α = 1.840(2), ε = 1.846(2), colorless. Single-crystal X-ray structure study (R = 0.047) indicated tetragonal symmetry, space group P41; a = 6.7805(8), c = 24.689(4) Å as refined from a diffractometer powder pattern (CuKα radiation) with strongest lines of 3.271(31,202), 3.135(27,203), 3.121(24,116), 3.084(100,008), 2.846(22,213), and 2.034(19,219). The structure is isotropic with that of β-Ca3P2O7.

The mineral was found in a museum specimen of cerite-iron ore, with subordinate magnetite, chloropyrite, and clinoamphibole, from the Bastnäs deposit, Skinnskatteberg district, Västmanland, Sweden. Close associates are cerite-(Ce), bastnäsite-(Ce), quartz, scheelite, and an unidentified REE–W–Mg silicate. The new mineral name is for Per Theodor Cleve (1840–1905), discoverer of holmium and thulium. Type material is in the Swedish Museum of Natural History, Stockholm. J.L.J.

Surkhobite*


The mineral forms reddish brown crystals, to 1 mm, and platy grains to 2 × 1 × 0.4 mm. Wet-chemical analysis gave Na2O 1.57, K2O 1.30, CaO 4.74, SrO 0.06, BaO 14.45, MnO 12.75, FeO 13.00, Fe2O3 3.47, Al2O3 1.10, SiO2 26.68, TiO2 0.75, CaO 0.10, sum 97.79 wt%, corresponding to Na2Sr2Ca4Al8Fe24Ti6Mn2Sr22O62(OH)2(O)4(OH)(OH)2 on the basis of additional analyses that gave Cs 2O 0.27, Ta2O5 0.09 wt%; the simplified formula is as given in the title. Vitreous luster, translucent, brittle, white streak, perfect {001} cleavage, uneven fracture, H = 4½, Dmeas = 3.84, Dcalc = 3.98 g/cm3 for the empirical formula and Z = 8, twinned on (001). Optically biaxial negative, αcalc = 1.790, β = 1.858(10), γ = 1.888(10), 2Vmeas = 65(5)°, strong dispersion < v, orientation X = b, a Z = 34°; pleochroism, X = yellow, Y = orange, Z = bright yellow, Y Z ≥ X. Single-crystal X-ray structure study (R = 0.047) indicated monoclinic symmetry, space group C2; a = 10.719(3), b = 13.838(8), c = 20.805(10) Å, β = 95.09(8)°, isostructural with perraultite. Strongest lines of the powder pattern (diffractometer, FeKα radiation) are 10.39(20,002), 3.45(100,006), 3.18(19,219), 2.86(22,213), and 2.034(19,219). Type material is in the National Science Museum in Tokyo, and in the Fossa Magna Museum, Itoigawa, Niigata, Japan. J.L.J.

Percleveite-(Ce)*


Electron microprobe analysis of the mineral, ideally (Ce,La,Nd)2Si2O7, gave La2O3 14.66, Ce2O3 31.36, Pr2O3 3.41, Nd2O3 12.97, Sm2O3 2.69, Gd2O3 2.26, Dy2O3 0.53, Ho2O3 0.07, Er2O3 0.21, Yb2O3 0.04, Y2O3 2.93, Fe2O3 0.01, SiO2 26.55, CaO 0.10, sum 97.79 wt%, corresponding to (Ce0.87La0.41Nd0.35Y0.12Pr0.09Sm0.07Gd0.06Dy0.01Ca0.01)Σ2+21/2Σ1+2(Ce0.87La0.41Nd0.35Y0.12Pr0.09Sm0.07Gd0.06Dy0.01Ca0.01)Σ2+21/2Σ1+2Si2O7. The mineral occurs as yellowish gray to white anhedral grains, up to 0.5 mm across, with a greasy to resinous luster, white streak, H = 6, imperfect {001} cleavage, nonfluorescent, Dcalc = 5.21(1) g/cm3 for Z = 8. Optically uniaxial positive, α = 1.840(2), ε = 1.846(2), colorless. Single-crystal X-ray structure study (R = 0.047) indicated tetragonal symmetry, space group P41; a = 6.7805(8), c = 24.689(4) Å as refined from a diffractometer powder pattern (CuKα radiation) with strongest lines of 3.271(31,202), 3.135(27,203), 3.121(24,116), 3.084(100,008), 2.846(22,213), and 2.034(19,219). The structure is isotropic with that of β-Ca3P2O7.

The mineral was found in a museum specimen of cerite-iron ore, with subordinate magnetite, chloropyrite, and clinoamphibole, from the Bastnäs deposit, Skinnskatteberg district, Västmanland, Sweden. Close associates are cerite-(Ce), bastnäsite-(Ce), quartz, scheelite, and an unidentified REE–W–Mg silicate. The new mineral name is for Per Theodor Cleve (1840–1905), discoverer of holmium and thulium. Type material is in the Swedish Museum of Natural History, Stockholm. J.L.J.
The mineral is associated with aegirine, microcline, albite, quartz, amphibole, anite, bafertisite, astrophyllite, and others in a rare-metal syenite pegmatite at the Dara-i-Pioz massif, central Tajikistan. The new mineral name is for the locality, which is in the basin of the Surkhob River. Type material is in the Fersman Mineralogical Museum, Moscow, Russia. J.L.J.

WO₄·0.5H₂O

The mineral occurs as a white, microcrystalline powder associated with scheelite in a vug in quartz; both W minerals are thought to have formed by the oxidation of ferberite. Energy-dispersion analyses of the oxide indicated an absence of elements other than W. The X-ray powder pattern (data listed) contains admixed scheelite but is interpreted to be in good agreement with that of synthetic WO₄·0.5H₂O. J.L.J.

(CU₂Zn)₄(SO₄)(OH)₆·4H₂O

The mineral occurs as blue, less commonly bluish green, massive to earthy crusts and spherules consisting predominantly of anhedral grains; some grains are up to 20 µm across and 1 µm thick, and are flattened (001) with indistinct hexagonal outlines. Blue streak, vitreous luster, uneven fracture, no cleavage. Blue streak, vitreous luster, uneven fracture, no cleavage. Calc = 2.89(2) g/cm³ for (Cu, Zn)₄(SO₄)(OH)₆·4H₂O, which corresponds to that of synthetic WO₄·0.5H₂O. J.L.J.

ANCYLITE

Rietveld refinements of X-ray powder data of ancylite specimens from a carbonatite and from hydrothermal deposits in alkaline massifs showed that ancylite from carbonatite has the space group Pmcn (Am. Mineral., 60, 280–284, 1975), whereas that of hydrothermal ancylite is Pmc2₁. The IR spectra differ, and weak X-ray diffraction peaks for 010 and 100, which negate space group Pmcn, are present in the pattern of hydrothermal ancylite. J.L.J.

BUTTGENBACHITE

The single-crystal X-ray structure refinement in space group P6₃/mmc for various specimens of the connellite–buttgenbachite series has shown that there are two sites for substitution of nitrate by chloride and water, and only one site for substitution of sulfate. Various amounts of water molecules, chloride, or hydronium can be accommodated in small channels. Thus, end-member compositions can vary, such as from Cu₃₆Cl₈(NO₃)₄(OH)₆₂·12H₂O, and to Cu₃₆Cl₈(NO₃)₂(OH)₅·14H₂O. The previously suggested formulas for connellite Cu₃₆Cl₈(SO₄)₂(OH)₆·6H₂O and buttgenbachite Cu₃₆Cl₈(NO₃)₄(OH)₆·4H₂O are incorrect, and it is noted that sulfate–nitrate substitution can only be one-for-one for structural reasons. J.L.J.

LAMPROPHYLITE

Single-crystal X-ray structure study of lamprophyllite-2M (R = 0.040) gave a = 19.215(5), b = 7.061(2), c = 5.3719(15)
Å, β = 96.797(4)°, space group c2/m; for lamprophyllite-2O, R = 0.084, a = 19.128(4), b = 7.0799(14), c = 5.3824(11) Å, space group Pnma. The compositions of the two polytypes studied are similar, and the revised simplified formula is (Sr,Ba)2Na3Ti2O7 (Si2O7)3(OH)12. J.L.J.

**SAHLINITE**


Single-crystal X-ray structure study (R = 0.071) of sahlinite from Långban, Sweden, gave a = 12.704(4), b = 22.576(5), c = 11.287(4) Å, β = 118.37(3)°, in good agreement with a previous study (Am. Mineral., 71, p. 231, 1986) and resolving the space group as C2/c. J.L.J.

**RATHITE**


Single-crystal X-ray structure study (R = 0.0367) of rathite from Lengenbach (Binntal, Valais, Switzerland) gave a = 8.496(1), b = 7.969(1), c = 25.122(3) Å, β = 100.704(2)°, space group P21/c. The results of electron microprobe analyses (four listed) and the structure study lead to a simplified formula Pb3Pb2(Tl2As2)3(As2S3)4, wherein substitution of Tl seems to be optional, but substitution by Ag seems to be essential. Rathite designated by various suffixes (such as rathite-I to rathite-V) corresponds to rathite, sensu stricto, and to dufrénoyite, liveingite, and sartorite. J.L.J.

**WICKENBURGITE**


Single-crystal X-ray structure study (R = 0.054) of wickenbergite from near Wickenburg, Maricopa County, Arizona, gave a = 8.555(2), c = 20.190(5) Å, space group P31c, Dcalc = 3.87 g/cm³, Z = 2, thus confirming a previous determination (Am. Mineral., 80, p. 850, 1995) in which the assigned formula was Pb3Al2CaSi3O7·3H2O. Electron microprobe analyses, DTA–TGA, and other new studies have indicated that the structure contains a fourth water molecule per formula unit. J.L.J.

**SOUZALITE–GORMANITE**


A specimen from Rapid Creek, Yukon, Canada, has the composition (Mg1.5Fe0.5)(As1.15Fe0.05)(PO4)0.5(OH)0.5·2H2O, which is at the boundary between souzalite (Mg dominant) and gormanite (Fe dominant). Rietveld refinement of powder data (Rbragg = 0.0515) indicated triclinic symmetry, space group P1, and the new unit cell a = 7.2223, b = 11.7801, c = 5.1169 Å, α = 90.158, β = 109.938, γ = 81.330°, Z = 1. J.L.J.