American Mineralogist, Volume 87, pages 996–999, 2002

NEW MINERAL NAMES*

JOHN L. JAMBOR[1,†] **AND ANDREW C. ROBERTS**[2]

[1]Department of Earth and Ocean Sciences, University of British Columbia, Vancouver, British Columbia V6T 1Z4, Canada
[2]Geological Survey of Canada, 601 Booth Street, Ottawa K1A 0E8, Canada

COBALTTSUMCORITE*

W. Krause, H.-J. Bernhardt, H. Effenberger, M. Martin (2001) Cobalttsumcorite and nickellotharmeyerite, two new minerals from Schneeberg, Germany: description and crystal structure. Neues Jahrb. Mineral. Mon., 558–576.

The mineral occurs as brown to yellow rosette-like aggregates, up to 2 mm across, in which individual crystals are tabular on $\{\bar{2}01\}$, elongate [010], and up to 0.3 mm long. Electron microprobe analysis gave NiO 5.20 (4.28–5.89), CoO 9.10 (8.27–9.72), ZnO 0.52 (0.25–0.65), PbO 34.23 (33.07–34.95), Al_2O_3 0.29 (0.09–1.36), Fe_2O_3 8.47 (7.38–9.98), P_2O_5 0.06 (0.03–0.12), As_2O_5 36.49 (35.81–37.24), SO_3 0.09 (0.02–0.13), H_2O (calc.) 4.65, sum 99.10 wt%, corresponding to $Pb_{0.97}(Co_{0.77}Fe_{0.67}Ni_{0.44}Zn_{0.04}Al_{0.04})_{\Sigma 1.96}(AsO_4)_{2.01}[(H_2O)_{1.32}(OH)_{0.64}]_{\Sigma 1.96}$, simplified as $Pb(Co,Fe)_2(AsO_4)_2(H_2O,OH)_2$. Transparent, adamantine luster, brittle, light brown streak, conchoidal fracture, good {001} cleavage, $H = 4½$, nonfluorescent, morphological forms $\{\bar{2}01\}$, {001}, and $\{\bar{1}11\}$, D_{calc} = 5.31 g/cm^3 for $Z = 2$, soluble in warm dilute HCl. Optically biaxial positive, α (calc.) = 1.92, β = 1.94(1), γ = 1.98(2), $2V$ = 70(5)°, strongly pleochroic, X = light brown, Y = red-brown, Z = yellow; orientation, $Y = b$, $X \wedge c = 15°$ in the acute β. Single-crystal X-ray structure study (R = 0.027) indicated monoclinic symmetry, space group $C2/m$; a = 9.097(2), b = 6.313(2), c = 7.555(3) Å, β = 115.08(2)° as refined from a powder pattern (diffractometer, Cu$K\alpha$ radiation) with strongest lines of 4.656(87,11$\bar{1}$), 4.462(96,$\bar{2}$01), 3.243(100,11$\bar{2}$), 3.010(58,201), 2.868(50,021), and 2.733 (47,31$\bar{1}$).

The mineral is associated with quartz, mawbyite, cobaltolotharmeyerite, galena, arseniosiderite, and plumbogummite in dump material from an oxidation zone in the mining area “Am Roten Berg”, about 4.8 km southwest of the center of Schneeberg. The new mineral name is in recognition of the chemical and structural relationship to tsumcorite. Type material is in the Geoscientific Collections at the Freiberg University of Mining and Technology, Saxony, Germany. **J.L.J.**

FLUORO-MAGNESIOHASTINGSITE

M. Gaeta, C. Freda (2001) Strontian fluoro-magnesiohastingsite in Alban Hills lavas (Central Italy): constraints on crystallization conditions. Mineral. Mag., 65, 787–795.

The average of 11 listed electron microprobe analyses is K_2O 1.78, Na_2O 1.80, BaO 0.44, SrO 1.46, CaO 11.65, MnO 0.46, MgO 10.45, FeO 14.49, Fe_2O_3 2.51, Cr_2O_3 0.01, Al_2O_3 11.20, TiO_2 1.37, SiO_2 39.24, F 2.94, Cl 0.08, O ≡ F,Cl 1.26, sum 98.62 wt%, which for 23 O corresponds to $(Na_{0.54}K_{0.35}Sr_{0.08}Ba_{0.03})(Ca_{1.94}Sr_{0.06})(Mg_{2.43}Fe^{2+}_{1.89}Fe^{3+}_{0.29}Al_{0.17}Ti_{0.16}Mn_{0.06})(Si_{6.11}Al_{1.89})O_{22}(F_{1.45}OH_{0.53}Cl_{0.02})$. The mineral occurs as anhedral to subhedral prisms, up to 500 μm long, in the groundmass of Quaternary ultrapotassic lavas in the Alban Hills volcanic district of central Italy.

Discussion. The new species and name have not been submitted for a vote by the CNMMN. **J.L.J.**

LANMUCHANGITE*

Daiyan Chen, Guanxnment Wang (2001) A new mineral—lanmuchangite. Acta Mineral. Sinica, 21(3), 271–277 (in Chinese, English abs.).

The mineral occurs as 2–10 mm aggregates of anhedral grains, each 40–90 μm across; less commonly columnar, to 65 μm in diameter. Electron microprobe analyses gave Tl_2O 33.25, K_2O 0.35, CaO 0.08, MgO 0.06, FeO 0.04, Al_2O_3 8.07, SiO_2 0.10, SO_3 25.19, H_2O (TGA) 33.46, sum 100.60 wt%, corresponding to $(Tl_{1.00}K_{0.05})_{\Sigma 1.05}(Al_{1.01}Si_{0.02}Ca_{0.01}Mg_{0.01}Fe_{0.01})_{\Sigma 1.06}(SO_4)_{2.02}\cdot 11.86H_2O$, ideally $TlAl(SO_4)\cdot 12H_2O$. Light yellow to white color, vitreous luster, transparent, white streak, H = 3–3½, VHN = 94–124, D_{meas} = 2.22 g/cm^3, soluble in water. TGA shows that the water loss occurs by 243 °C; the DTA curve has a strong endothermic effect at 101 °C, and a moderate one at 135 °C. The IR spectrum has strong to moderate absorption bands at 3374, 3147, and 1655–1648 cm^{-1} (H_2O), and at 1131 and 605 cm^{-1} (SO_4). Optically isotropic, n = 1.495. Indexing of the X-ray powder pattern (diffractometer, Cu$K\alpha$ radiation), which is in good agreement with data for the synthetic analog, conforms to cubic symmetry, space group $Pa3$, a = 12.212(5) Å, Z = 4. Strongest lines are 7.03(54,111), 6.11(27,200), 4.314(100,220), 2.801(70,331), and 2.731(35,420).

The mineral, which is a Tl- and Al-dominant member of the alum group, is associated with melanterite, pickeringite, jarosite, gypsum, sulfur, potassium alum, and arsenolite in the

---

* 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/02/0007–996\$05.00

oxidation zone of the Lanmuchang Tl-Hg deposit, Xinren County, Guizhou Province, China. The new mineral name is for the locality. Type material is in the Geological Museum of China in Beijing. **J.L.J.**

NATROLEMOYNITE*

A.M. McDonald, G.Y. Chao (2001) Natrolemoynite, a new hydrated sodium zirconosilicate from Mont Saint-Hilaire, Quebec: description and structure determination. Can. Mineral., 39, 1295–1306.

The mineral occurs as compact radial aggregates and spheres, to 4 mm across, consisting of bladed to prismatic crystals that are up to 2 mm long and 1 mm wide, elongate [001], showing mainly {100}, {010}, and {001}. Colorless to white, vitreous to subadamantine luster, transparent to translucent, white streak, brittle, uneven fracture, perfect {100} and {010} and poor {001} cleavages, $H = 3$, nonfluorescent, $D_{meas} = 2.47(1)$, $D_{calc} = 2.50$ g/cm^3 for $Z = 2$. Optically biaxial negative, $\alpha = 1.533(1)$, $\beta = 1.559(1)$, $\gamma = 1.567(1)$, $2V_{meas} = 63(1)°$, $2V_{calc} = 57(1)°$, weak crossed dispersion, $X = b$, $Z \wedge a = 40°$ in the obtuse angle β, nonpleochroic. Electron microprobe analysis gave Na_2O 7.47, K_2O 1.29, CaO 0.37, MnO 0.12, Al_2O_3 0.04, SiO_2 54.51, TiO_2 0.38, ZrO_2 21.97, Nb_2O_5 1.01, H_2O (calc.) 14.72, sum 101.88 wt%, which for 10 (Si + Al) corresponds to $(Na_{2.66}K_{0.30}Ca_{0.07}Mn_{0.02})_{\Sigma 3.05}(Zr_{1.96}Nb_{0.08}Ti_{0.05})_{\Sigma 2.09}(Si_{9.99}Al_{0.01})_{\Sigma 10}O_{25.79}\cdot 9H_2O$; despite the apparently low occupancy of the alkali site, the ideal formula is $Na_4Zr_2Si_{10}O_{26}\cdot 9H_2O$. Single-crystal X-ray structure study ($R = 0.046$) indicated monoclinic symmetry, space group $C2/m$, $a = 10.5150(2)$, $b = 16.2534(4)$, $c = 9.1029(3)$ Å, $\beta = 105.462(2)°$. Strongest lines of the powder pattern (114 mm Debye–Scherrer, Cu$K\alpha$ radiation) are 8.132(100,020), 5.975(40,021), 3.974 (35,201), 3.564(40,221), and 3.490(35,$\bar{2}22$).

The mineral is associated with microcline, lemoynite, lepidocrocite, galena, sphalerite, calcite, and pyrite in altered pegmatites, and with biotite, microcline, albite, magnetite, chlorite, zircon, and other minerals in unaltered pegmatites that cut nepheline syenite at the Poudrette quarry, Mont Saint-Hilaire, Quebec. The name natrolemoynite alludes to the Na dominance and polymorphic relationship to lemoynite. Type material is in the Canadian Museum of Nature in Ottawa. **J.L.J.**

NICKELLOTHARMEYERITE*

W. Krause, H.-J. Bernhardt, H. Effenberger, M. Martin (2001) Cobalttsumcorite and nickellotharmeyerite, two new minerals from Schneeberg, Germany: description and crystal structure. Neues Jahrb. Mineral. Mon., 558–576.

The mean of 11 electron microprobe analyses, and an analysis of a nearly Bi-free sample, are CaO 9.29, 12.51, NiO 12.86, 16.98, CoO 3.83, 4.68, CuO 0.11, <0.05, ZnO 0.62, 0.36, PbO 0.90, 0.14, Fe_2O_3 12.88, 10.15, Bi_2O_3 8.56, 0.13, P_2O_5 0.23, 0.11, As_2O_5 45.32, 49.88, SO_3 0.12, <0.05, H_2O (calc.) 5.35, 6.53, sum 100.07, 101.47 wt%, corresponding to $(Ca_{0.83}Bi_{0.18}Pb_{0.02})_{\Sigma 1.03}(Ni_{0.86}Fe_{0.81}Co_{0.26}Zn_{0.04})_{\Sigma 1.97}[(AsO_4)_{1.98}(PO_4)_{0.02}]_{\Sigma 2.00}[(OH)_{1.01}(H_2O)_{0.98}]_{\Sigma 1.99}$ and $Ca_{1.03}(Ni_{1.05}Fe^{3+}_{0.59}Co_{0.29}Zn_{0.02})_{\Sigma 1.95}[(AsO_4)_{2.01}(PO_4)_{0.01}]_{\Sigma 2.02}[(H_2O)_{1.40}(OH)_{0.56}]_{\Sigma 1.96}$, simplified as $Ca(Ni,Fe)_2(AsO_4)_2(H_2O,OH)_2$. The mineral occurs as crusts and as 0.5 mm aggregates in which crystals are up to 100 μm, tabular on {$\bar{1}01$}, elongate [010]. Transparent, subadamantine luster, brown to yellow color, brittle, light brown to yellow streak, no cleavage, conchoidal fracture, $H = 4½$, nonfluorescent, only slowly soluble in warm dilute HCl, $D_{calc} = 4.45$ g/cm^3 for $Z = 2$. Optically biaxial positive, $\alpha = 1.80$ (calc.), $\beta = 1.81(1)$, $\gamma = 1.87(2)$, $2V = 40(5)°$, strong pleochroism, X = yellow, Y = brown, Z = pale yellow; orientation $Y = b$, $X \approx c$. Single-crystal X-ray structure study ($R = 0.042$) indicated monoclinic symmetry, space group $C2/m$; $a = 9.005(1)$, $b = 6.205(1)$, $c = 7.411(1)$ Å, $\beta = 115.31(1)°$ by refinement of a powder pattern (diffractogram, Cu$K\alpha$ radiation) with strongest lines of 3.393(55,$20\bar{2}$), 3.182(76,$11\bar{2}$), 2.962(100,201), 2.816(66,021), 2.703(66,$31\bar{1}$), and 2.538(75,$22\bar{1}$).

The mineral, named to indicate the chemical and structural relationship to lotharmeyerite, is associated with quartz, mawbyite, ferrilotharmeyerite, arseniosiderite, zeunerite, bariumpharmocosiderite, and lukrahnite in dump material from the oxidation zone at the Pucher shaft, Schneeberg–Neustädtel, Saxony, Germany. Type material is in the Staatliches Museum für Mineralogie und Geologie, Dresden, Germany. **J.L.J.**

ORTHOMINASRAGRITE*

F.C. Hawthorne, M. Schindler, J.D. Grice, P. Haynes (2001) Orthominasragrite, $V^{4+}O(SO_4)(H_2O)_5$, a new mineral species from Temple Mountain, Emery County, Utah, U.S.A. Can. Mineral., 39, 1325–1331.

The mineral forms crusts and efflorescences consisting of rounded aggregates, to 200 μm across, of irregular, blue grains. Vitreous luster, pale blue streak, no cleavage, $H = \sim 1$, nonfluorescent, $D_{calc} = 2.001$ g/cm^3 for $Z = 2$. Optically biaxial positive, $\alpha = 1.529(2)$, $\beta = 1.534(2)$, $\gamma = 1.534(2)$, $2V_{meas} = 2°$, $2V_{calc} = 0°$, nonpleochroic, orientation $X = b$, $Y = c$, $Z = a$. Electron microprobe analysis gave VO_2 33.88, SO_3 31.97, H_2O (calc.) 36.30, sum 102.15 wt%, corresponding to $V_{1.01}S_{0.99}O_5(H_2O)_5$, ideally $VO(SO_4)(H_2O)_5$. Single-crystal X-ray structure study ($R = 0.044$) indicated orthorhombic symmetry, space group $Pmn2_1$; $a = 7.246(4)$, $b = 9.333(6)$, $c = 6.210(4)$ Å as refined from a Gandolfi pattern (114 mm, Cu$K\alpha$ radiation) with strongest lines of 4.699(100B,101,020), 3.322(50,121), 2.865(40,220), and 2.602(30,221,131,022). Synthetic $VO(SO_4)(H_2O)_5$ forms three polymorphs, two of which correspond to minasragrite (monoclinic) and orthominasragrite.

The mineral occurs in a pyritiferous silicified tree in the Triassic Shinarump conglomerate at the North Mesa mine group, Emery County, Utah. Oxidation has resulted in the formation of various Fe sulfates, native sulfur, minasragrite, orthominasragrite, and an unidientified sulfate of V. The new mineral name is in reference to the relationship to minasragrite. Type material is in the Canadian Museum of Nature, Ottawa. **J.L.J.**

PARARSENOLAMPRITE*

S. Matsubara, R. Miyawaki, M. Shimizu, T. Yamanaka (2001) Pararsenolamprite, a new polymorph of native As, from the

Mukuno mine, Oita Prefecture, Japan. Mineral. Mag., 65, 807–812.

Electron microprobe analysis gave As 91.89, Sb 7.25, S 0.48, sum 99.62 wt%, corresponding to $As_{0.94}Sb_{0.05}S_{0.01}$, ideally As. The mineral occurs as parallel to radial aggregates of bladed crystals, flattened (001) and elongate [100] to 0.8 mm. Lead-gray color, metallic luster, opaque, black streak, sectile, VHN_{25} = 66–91, H = 2–2½, D_{meas} = 5.88(5), D_{calc} = 6.01 g/cm^3 for Z = 18. In reflected light, white with a slight greenish blue tint; bireflectant, from creamy (parallel to the elongation) to brown, gray, green (perpendicular to the elongation). More strongly anisotropic than arsenolamprite, with dark brown and greenish gray polarization colors. Representative reflectance percentages for R_1 and R_2 in air and in oil, respectively, are 49.0, 44.0, 33.6, 29.3 (470 nm), 47.0, 42.1, 31.5, 28.0 (546), 44.8, 39.9, 29.7, 26.9 (589), and 44.9, 40.3, 29.2, 26.0 (650). Single-crystal X-ray study of a multiple grain, and indexing of the powder pattern, indicated orthorhombic symmetry, space group $Pmn2_1$ or $P2_1nm$; a = 3.3633(2), b = 10.196(2), c = 10.314(2) Å as refined from a diffractometer pattern (Cu$K\alpha$ radiation) with strongest lines of 5.17(100,002), 4.60(24,012), 3.259(58,013), 2.840(27,032), 2.580(22,004), 2.299(23,024), and 1.794(26,105).

The mineral is associated with quartz, stibnite, and commonly as overgrowths on colloform arsenic, in dump material from the Mukuno mine, a hydrothermal Sb-As-Ag-Au deposit at Yamaga-cho, Oita Prefecture, Kyushu, Japan. The new mineral name alludes to the polymorphic relationship with arsenolamprite. Type material is in the National Science Museum, Tokyo, Japan. **J.L.J.**

ROUAITE*

H. Sarp, R. Cerný, L. Guenee (2001) Rouaite, $Cu_2(NO_3)(OH)_3$, a new mineral: description and crystal structure. Riviéra Scientif., 85, 3–12 (in French, English abs.).

Electron microprobe and CHN analyses gave CuO 65.5, N_2O_5 21.64, H_2O 11.9, sum 99.04 wt%, corresponding to $Cu_{1.99}N_{0.97}H_{3.19}O_6$, ideally $Cu_2(NO_3)(OH)_3$. The mineral occurs as isolated crystals, flattened on (001), and as aggregates, to 0.5 mm across, in which the crystals are elongate [010] and flattened on (001), or are equidimensional and up to 0.1 mm across. Dark green color, vitreous luster, transparent, brittle, green streak, H not determinable, splintery fracture, perfect {001} cleavage, nonfluorescent, D_{meas} = 3.38(2), D_{calc} = 3.39 g/cm^3 for Z = 2, soluble in HCl and insoluble in water. Observed forms are {001}, {100}, {101}, {110}, and {011}; rare twinning on (100). Optically biaxial positive, α = 1.700(2), β = 1.715(2), γ = 1.738(2), $2V_{meas}$ = 81(2)°, $2V_{calc}$ = 79(1)°, strong dispersion $r < v$, orientation $a \wedge \alpha = 5°$, $b = \beta$, $c = \gamma$; pleochroic, α = dark green-blue, β = green-blue, γ = light green to colorless. Single-crystal X-ray structure study (R = 0.041) indicated monoclinic symmetry, space group $P2_1$, a = 5.596(2), b = 6.079(2), c = 6.925(3) Å, β = 94.67(2)°. Strongest lines of the powder pattern (114 mm Gandolfi, Cu$K\alpha$ radiation) are 6.91(100,001), 3.457(90,111,002), 2.669(80,120), and 2.462(80,121), in good agreement with data for the synthetic analog (PDF 15–0014).

The mineral, which is dimorphous with gerhardtite, occurs within geodes of cuprite at the old Cu mines of Roua, Alpes-Maritimes, southeastern France. Other associated minerals are native copper and silver, algodonite, domeykite, connellite, olivenite, malachite, theoparacelsite, and gerhardtite. The source of nitrate may be guano or organic material in host-rock pelites. The new mineral name is for the locality; a second occurrence is at the Sterling Hill mine at Ogdensburg, New Jersey. Holotype material is in the Muséum d'Histoire naturelle de Genève, Switzerland. **J.L.J.**

PtSnS

A.Y. Barkov, R.F. Martin, R.J. Kaukonen, T.T. Alapieti (2001) The occurrence of Pb–Cl–(OH) and Pt–Sn–S compounds in the Merensky Reef, Bushveld layered complex, South Africa. Can. Mineral., 39, 1397–1403.

One of four listed electron microprobe analyses has Pt 58.20, Sn 32.61, S 9.55, sum 100.36 wt%, corresponding to $Pt_{1.03}Sn_{0.95}S_{1.03}$. The mineral occurs as minute (≤4 μm) grains associated with hydrous silicates, and as inclusions in pentlandite within enstatite orthocumulate, at the Rustenberg mine, Bushveld complex. **J.L.J.**

AB_2O_6 ANALOGS

C. Aurisicchio, C. De Vito, V. Ferrini, P. Orlandi (2001) Nb-Ta oxide minerals from miarolitic pegmatites of the Baveno pink granite, NW Italy. Mineral. Mag., 65, 509–522.

Various AB_2O_6-type minerals occur as 50–300 μm grains in miarolitic cavities in the Baveno granite, northwestern Italy. Electron microprobe analysis of an aeschynite sample showing complex zoning, with sharp changes in major and minor elements, gave compositions ranging from that of aeschynite-(Y) to that of the Nb-dominant analog. The latter has Na_2O 0.38, CaO 1.39, Fe_2O_3 1.60, UO_2 2.81, ThO_2 4.67, Y_2O_3 8.41, Ce_2O_3 2.19, Nd_2O_3 2.50, Gd_2O_3 0.97, Dy_2O_3 5.54, Er_2O_3 1.75, Yb_2O_3 1.84, Nb_2O_5 23.64, Ta_2O_5 10.43, TiO_2 9.46, WO_3 3.18, SiO_2 4.80, sum 85.57 wt%; infrared spectra indicate that considerable H_2O-OH is present. The results correspond to $(Y_{0.33}Ca_{0.11}Th_{0.08}U_{0.05}Na_{0.05}REE_{0.36})_{\Sigma 0.98}(Nb_{0.79}Ti_{0.53}Si_{0.35}Ta_{0.21}Fe^{3+}_{0.09}W_{0.06})_{\Sigma 2.03}O_6$, which is the Y-dominant analog of niobo-aeschynite-(Ce) and niobo-aeschynite-(Nd).

One of two microprobe analyses of a vigezzite-like mineral has CaO 5.29, FeO 0.69, Fe_2O_3 0.76 (assuming 50% partitioning), UO_2 3.49, ThO_2 4.27, Y_2O_3 5.87, Ce_2O_3 2.31, Nd_2O_3 3.71, Gd_2O_3 1.09, Dy_2O_3 2.76, Ho_2O_3 0.78, Er_2O_3 1.20, Yb_2O_3 0.93, Nb_2O_5 28.25, Ta_2O_5 4.08, TiO_2 19.60, WO_3 0.92, SiO_2 3.93, sum 89.93 wt%, corresponding to $(Ca_{0.36}Y_{0.20}Th_{0.06}U_{0.05}Fe^{2+}_{0.04}REE_{0.28})_{\Sigma 0.99}(Ti_{0.94}Nb_{0.81}Si_{0.25}Ta_{0.07}Fe^{3+}_{0.04}W_{0.02})_{\Sigma 2.13}O_6$, which is interpreted to be the Ti-dominant analog of vigezzite. **J.L.J.**

NEW DATA

ASTROPHYLLITE

Zhesheng Ma, Guowu Li, Nicheng Shi, Huyun Zhou, Danian Ye, D.Yu. Pushcharovsky (2001) Structure refinement of astrophyllite. Sci. China, Ser. D, 44(6), 508–516.

The results of a chemical analysis of monoclinic astrophyllite, for which other data were abstracted in *Am. Mineral.* 83, p. 1350 (1998) are SiO_2 37.98, TiO_2 12.18, Al_2O_3 1.11, Fe_2O_3 2.95, FeO 17.91, MnO 4.00, MgO 6.39, CaO 1.15, K_2O 7.28, Na_2O 5.38, H_2O^+ 3.44, F 0.45, sum 100.22 wt%. A chemical analysis and single-crystal X-ray structure study ($R = 0.057$) of astrophyllite from Eveslogchorr Mountain, Khibiny alkaline massif, Kola Peninsula, Russia, gave a triclinic unit cell, space group $P1$, $a = 5.359(2)$, $b = 11.614(4)$, $c = 11.861(4)$ Å, $\alpha = 113.16(2)$, $\beta = 103.04(2)$, $\gamma = 94.56(2)°$, $D_{calc} = 3.359$ g/cm^3 for $Z = 1$. The structural formula is $K_2Na(Fe,Mn,Mg,\square)_7[Ti_2(Si_4O_{12})_2 \mid O_3](OH,F)_4$ whereas that of monoclinic "astrophyllite" is $K_2NaNa(Fe,Mn)_4Mg_2Ti_2[Si_4O_{12}]_2(OH)_4(OH,F)_2$. Structural and compositional differences indicate that the monoclinic mineral is a separate species. **J.L.J.**

DELINDEITE

G. Ferraris, G. Ivaldi, D.Yu. Pushcharovsky, N.V. Zubkova, I.V. Pekov (2001) The crystal structure of delindeite, $Ba_2\{(Na,K,\square)_3(Ti,Fe)[Ti_2(O,OH)_4Si_4O_{14}](H_2O,OH)_2\}$, a member of the mero-plesiotype bafertisite series. Can. Mineral., 39, 1307–1316.

Single-crystal X-ray structure study ($R = 0.054$) of delindeite from the Kirovskii apatite mine, Khibiny alkaline complex, Kola Peninsula, Russia, gave $a = 5.327(2)$, $b = 6.856(2)$, $c = 21.51(3)$ Å, $\beta = 93.80(4)°$, space group $A2/m$. Electron microprobe analysis gave Na_2O 4.82, K_2O 1.04, CaO 0.04, SrO 0.29, BaO 34.46, MnO 0.37, ZnO 0.09, Fe_2O_3 2.93, Al_2O_3 0.48, SiO_2 26.10, TiO_2 23.01, Nb_2O_5 0.39, H_2O (by difference) 5.98, sum 100 wt%, which for Si + Al = 4 corresponds to $(Na_{1.40}K_{0.20}Sr_{0.02}Ca_{0.01})_{\Sigma 1.63}Ba_{2.02}(Ti_{2.60}Fe^{3+}_{0.33}Mn^{2+}_{0.05}Nb_{0.03}Zn_{0.01})_{\Sigma 3.02}(Si_{3.91}Al_{0.09})_{\Sigma 4.00}O_{15.26}(OH)_{2.74}\cdot 1.62H_2O$. The new ideal formula is as given in the title; $Z = 2$, $D_{calc} = 3.815$ g/cm^3. **J.L.J.**

NEYITE

E. Makovicky, T. Balić-Žunić, D. Topa (2001) The crystal structure of neyite, $Ag_2Cu_6Pb_{25}Bi_{26}S_{68}$. Can. Mineral., 39, 1365–1376.

Single-crystal X-ray structure study ($R = 0.037$) of neyite from the type specimen gave $a = 37.527(6)$, $b = 4.0705(6)$, $c = 43.701(7)$ Å, $\beta = 108.801(2)°$, space $C2/m$. New electron microprobe analyses approximate Bi 40.4, Pb 37.9, Cu 2.90, Ag 1.58, Sb 0.10, Cd 0.30, S 16.2, sum 99.4 wt%; for 127 atoms, the mean of the results corresponds to $Ag_{1.9}Cu_{6.1}Pb_{24.3}Cd_{0.4}Bi_{25.8}Sb_{0.01}S_{68.4}$. The new structural formula is $AgCu_3Pb_{12.5}Bi_{13}S_{34}$; $Z = 4$, $D_{calc} = 7.037$ g/cm^3. **J.L.J.**

PARISITE-(Ce) POLYTYPES

Dawai Meng, Xiuling Wu, Tao Mou, Douxing Li (2001) Determination of six new polytypes in parisite-(Ce) by means of high resolution electron microscopy. Mineral. Mag., 65, 797–806.

Dawai Meng, Xiuling Wu, Tao Mou, Douxing Li (2001) Microstructural investigation of new polytypes of parisite-(Ce) by high-resolution transmission electron microscopy. Can. Mineral., 39, 1713-1724.

In addition to the $4H$, $10H$, and $16H$ polytypes of parisite-(Ce) (*Am. Mineral.*, 79, p. 767, 1994; 80, p. 188, 1995; 81, p. 253, 1996), crystallographic data are presented for the $6R_2$, $18R$, $25R$, $30R$, $36R$, $42R$, $8H$, and $14H$ polytypes. All coexist with parisite-(Ce)-$6R_1$. **J.L.J.**

ULRICHITE

U. Kolitsch, G. Giester (2001) Revision of the crystal structure of ulrichite, $CaCu^{2+}(UO_2)(PO_4)_2\cdot 4H_2O$. Mineral. Mag., 65, 717–724.

Single-crystal X-ray structure study ($R = 0.088$) of twinned ulrichite gave monoclinic symmetry, space group $P2_1/c$ rather than $C2/m$, $a = 12.784(3)$, $b = 6.996(1)$, $c = 13.007(3)$ Å, $\beta = 91.92(1)°$, $Z = 4$. Crystals are optically length fast and are twinned parallel to (001) rather than (100). The slightly revised cell dimensions give $D_{calc} = 3.631$ g/cm^3. **J.L.J.**