

## New Mineral Names\*

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### BOBJONESITE\*

M. Schindler, F.C. Hawthorne, D.M.C. Huminicki, P. Haynes, J.D. Grice, H.T. Evans Jr. (2003) Bobjonesite,  $V^{4+}O(SO_4)(H_2O)_3$ , a new mineral species from Temple Mountain, Emery County, Utah, U.S.A. *Can. Mineral.*, 41, 83–90.

The mineral occurs as blue-green crusts and efflorescences of intergrown <<1 mm crystals that have a vitreous luster and pale blue color. Synthetic material has a pale blue streak,  $H = \sim 1$ , no cleavage or parting, nonfluorescent,  $D_{\text{calc}} = 2.28 \text{ g/cm}^3$  for  $Z = 4$ , stable only at low humidity. Synthetic material is optically biaxial positive,  $\alpha = 1.555(2)$ ,  $\beta = 1.561(1)$ ,  $\gamma = 1.574(2)$ ,  $2V_{\text{meas}} = 72(1)$ ,  $2V_{\text{calc}} = 69^\circ$ ,  $X = b$ ,  $Y \approx a$ ,  $Z \wedge c = \sim 19^\circ$  in  $\beta$  obtuse, nonpleochroic. Single-crystal X-ray structure study ( $R = 0.036$ ) of natural material showed it to be monoclinic, space group  $P2_1/n$ ,  $a = 7.404(3)$ ,  $b = 7.420(3)$ ,  $c = 12.080(7)$  Å,  $\beta = 106.56(5)^\circ$ , and to correspond to  $V^{4+}O(SO_4)(H_2O)_3$ . Strongest lines of the powder pattern (diffractometer,  $CuK\alpha$  radiation) are 5.795(100,002), 5.403(37,101), 4.564(20,012), 3.887(48,103) and 3.498(90,112).

The mineral occurs in fractures in a silicified log within the Triassic Shinarump Conglomerate. Oxidation of pyrite within the log has formed ferricropiapite, kornelite, rozenite, szomolnokite, and native sulfur, and oxidation of montroseite is the probable source of the associated V sulfates, among them minasragrite, orthominasragrite, and bobjonesite, which are various hydrates of  $VO(SO_4)(H_2O)_n$ . The new mineral name is for Robert (Bob) Jones (b. 1926) of Arizona, senior editor of *Rocks and Gems*. Type material is in the Canadian Museum of Nature, Ottawa. **J.L.J.**

### CHLORBARTONITE\*

V.N. Yakovenchuk, Y.A. Pakhomovsky, Y.P. Men'shikov, G. Yu. Ivanyuk, S.V. Krivovichev, P.C. Burns (2003) Chlorbartonite,  $K_6Fe_{24}S_{26}(Cl,S)$ , a new mineral species from a hydrothermal vein in the Khibina massif, Kola Peninsula, Russia: description and crystal structure. *Can. Mineral.*, 41, 503–511.

The mineral, which is the Cl-dominant analog of bartonite, occurs as roundish, equant, brown-black grains up to 2 cm across. Electron microprobe analysis gave K 9.62, Fe 54.09,

Co 0.04, Cu 0.57, Cl 0.99, S 33.84, sum 99.15 wt%, corresponding to  $K_{6.08}(Fe_{23.93}Cu_{0.22}Co_{0.01})_{\Sigma 24.16}S_{26.00}(Cl_{0.69}S_{0.07})_{\Sigma 0.76}$ , ideally  $K_6Fe_{24}S_{26}(Cl,S)$ . Opaque, submetallic luster, brittle, black streak, conchoidal fracture, no cleavage or parting,  $H = 4$ ,  $VHN_{40} = 207$  (203–212), weakly magnetic,  $D_{\text{meas}} = 3.70$ ,  $D_{\text{calc}} = 3.65 \text{ g/cm}^3$  for the empirical formula and  $Z = 2$ , barely soluble in hot, concentrated HCl. Yellowish brown in reflected light, no internal reflection, isotropic; representative reflectance percentages (Si standard, air) are 10.2 (460 nm), 13.1 (540), 14.0 (560), 14.8 (580), and 17.1 (640). Single-crystal X-ray structure study ( $R_1 = 0.020$ ) indicated tetragonal symmetry, space group  $I4/mmm$ ,  $a = 10.3810(8)$ ,  $c = 20.614(2)$  Å. Strongest lines of the powder pattern (diffractometer,  $CuK\alpha$  radiation) are 5.97(65,112), 3.121(45,312), 2.986(100,224), 1.834 (51,440), and 1.830(82,408).

The mineral occurs with sodalite, natrolite, djerfisherite, and rasvumite in a microcline-pectolite-sodalite-aegirine hydrothermal vein within apatite-nepheline rock at Mount Koashva, Khibina massif, Kola Peninsula, Russia. Type material is in the Gorny Museum of the Saint Petersburg Mining Institute, Russia, in The Natural History Museum, London, U.K., and elsewhere. The mineral is also known to occur sparingly with bartonite at Coyote Peak, Humboldt County, California (*Am. Mineral.*, 66, 369–375, 1981). **J.L.J.**

### FERROKENTBROOKSITE\*

O. Johnsen, J.D. Grice, R.A. Gault (2003) Ferrokentbrooksit, a new member of the eudialyte group from Mont Saint-Hilaire, Quebec, Canada. *Can. Mineral.*, 41, 55–60.

The mineral occurs as reddish brown to red, pseudo-octahedral crystals to >1 cm across, and as larger aggregates. Electron microprobe analysis gave  $Na_2O$  11.96,  $K_2O$  0.44,  $CaO$  7.99,  $MnO$  3.88,  $FeO$  5.08,  $SrO$  0.45,  $Al_2O_3$  0.11,  $Y_2O_3$  0.58,  $La_2O_3$  1.51,  $Ce_2O_3$  2.51,  $Nd_2O_3$  0.53,  $Sm_2O_3$  0.11,  $Gd_2O_3$  0.17,  $SiO_2$  44.70,  $TiO_2$  0.09,  $ZrO_2$  11.20,  $HfO_2$  0.17,  $Nb_2O_5$  2.51,  $Ta_2O_5$  0.16, F 0.40,  $H_2O$  (calc.) 0.35,  $O \equiv F, Cl$  0.38, sum 95.45 wt%, corresponding to  $(Na_{13.05}REE_{0.99}K_{0.32}Ca_{0.23}Sr_{0.15})_{\Sigma 14.74}(Ca_{4.59}Mn_{1.24}Y_{0.17})_{\Sigma 6.00}(Fe_{2.39}Mn_{0.61})_{\Sigma 3.00}(Zr_{3.00}Ti_{0.04}Hf_{0.03})_{\Sigma 3.07}(Nb_{0.64}Si_{0.23}Zr_{0.07}Ta_{0.02})_{\Sigma 0.96}(Si_{24.93}Al_{0.07})_{\Sigma 25.00}O_{73}(O,OH,H_2O)_{\Sigma 2.47}(Cl_{0.89}F_{0.71}OH_{0.40})_{\Sigma 2.00}$ , ideally  $Na_{15}Ca_6(Fe,Mn)_3Zr_3NbSi_{25}O_{73}(O,OH,H_2O)_3(Cl,F,OH)_2$ . Crystals have {001}, {101}, and {012} dominant, with minor {021} and {110}. Vitreous luster, transparent, brittle, uneven to conchoidal fracture, no cleavage or parting, white streak,  $H = 5-6$ , nonfluorescent,  $D_{\text{meas}} = 3.06(3)$ ,  $D_{\text{calc}} = 3.06 \text{ g/cm}^3$  for  $Z = 3$ . Optically uniaxial negative,  $\omega = 1.6221(3)$ ,  $\epsilon = 1.6186(3)$ , some grains anomalously biaxial with  $2V$  about  $5^\circ$ , nonpleochroic. Single-crystal X-ray structure study ( $R_1 = 0.042$ ) indicated trigo-

\*Before publication, minerals marked with an asterisk were approved by the Commission on New Minerals and Mineral Names, International Mineralogical Association.

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nal symmetry, space group  $R3m$ ;  $a = 14.2099(7)$ ,  $c = 30.067(2)$  Å as refined from a diffractometer pattern (CuK $\alpha$  radiation) with strongest lines of 5.694(50,202), 4.300(43,205), 3.391(51,131), 2.968(100,315), and 2.847(98,404).

The mineral is the Fe<sup>2+</sup>-dominant analog of kentbrooksitite in the eudialyte group. The holotype is associated with microcline, nepheline (partly altered to natrolite), fluorite, fluorapatite, natrolite, gonnardite, aegirine, and other minerals in a pegmatite at the Poudrette quarry, Mont Saint-Hilaire, Rouville County, Quebec. Numerous occurrences in other pegmatites and various rock types at Mont Saint-Hilaire are known, and the mineral has also been identified from the Narssârssuk pegmatite in southwestern Greenland, and from localities in Norway and Russia. The holotype specimen is in the Canadian Museum of Nature, Ottawa. **J.L.J.**

### GJERDINGENITE-Fe\*

G. Raade, G. Ferraris, A. Gula, G. Ivaldi (2002) Gjerdingenite-Fe from Norway, a new mineral species in the labuntsovite group: description, crystal structure and twinning. *Can. Mineral.*, 40, 1629–1639.

One of several tabulated electron microprobe analyses and a hypothetical analysis have, respectively, Na<sub>2</sub>O 0.69, 0.93, K<sub>2</sub>O 6.03, 7.54, CaO 0.05, 0.09, MnO 2.90, 2.22, FeO 4.31, 3.45, Al<sub>2</sub>O<sub>3</sub> 0.37, 0.21, SiO<sub>2</sub> 36.00, 39.84, TiO<sub>2</sub> 9.75, 11.49, ZrO<sub>2</sub> 0.32, 0.26, Nb<sub>2</sub>O<sub>5</sub> 23.97, 23.84, H<sub>2</sub>O not determined, 10.13, sum 84.39, 100 wt%. Empirical formulas are not calculated for the analytical datasets; on the basis of Si + Al = 16 and crystal-structure data, the hypothetical composition corresponds to  $\{[(\text{H}_2\text{O})_{2.08}\text{K}_{1.20}\text{Na}_{0.72}]_{24}[\text{K}_{2.08}(\text{H}_2\text{O})_{1.92}]_{24}\}[(\text{H}_2\text{O})_{3.40}\text{K}_{0.56}\text{Ca}_{0.04}]_{24}(\text{Fe}_{0.95}\text{Mn}_{0.75}\square_{0.30})_{22}(\text{Nb}_{4.30}\text{Ti}_{3.45}\text{Fe}_{0.20}\text{Zr}_{0.05})_{28}(\text{Si}_{15.90}\text{Al}_{1.10})_{216}\text{O}_{48}[(\text{OH})_{4.16}\text{O}_{3.84}]_{28} \cdot 4\text{H}_2\text{O}$ , which for  $Z = 2$  is simplified as  $\text{K}_2[(\text{H}_2\text{O})_2(\text{Fe},\text{Mn})][(\text{Nb},\text{Ti})_4(\text{Si}_4\text{O}_{12})_2(\text{OH},\text{O})_4] \cdot 4\text{H}_2\text{O}$ . The mineral occurs as prisms or laths up to 1 mm long, and as aggregates to 3 mm. Crystals are elongate [010], flattened on {001}, showing {100}, {001}, {20 $\bar{1}$ }, {021}, and some with {010}. Pale yellow, brownish yellow, or orange-yellow color, translucent to transparent, vitreous to waxy luster, white to faint yellow streak, brittle, uneven fracture, no cleavage or parting,  $H = 5$ , nonfluorescent, twinned on {001},  $D_{\text{meas}} = 2.82$ ,  $D_{\text{calc}} = 2.830$  g/cm<sup>3</sup> for the crystal-chemical formula. Optically biaxial positive,  $\alpha = 1.6676(2)$ ,  $\beta = 1.7001(4)$ ,  $\gamma = 1.794(1)$ ,  $2V_{\text{meas}} = 58.5$ ,  $2V_{\text{calc}} = 63.7^\circ$ ,  $Y = b$ , nonpleochroic. Single-crystal X-ray structure study ( $R = 0.054$ ) indicated monoclinic symmetry, space group  $C2/m$ ;  $a = 14.54(1)$ ,  $b = 13.941(7)$ ,  $c = 7.844(4)$  Å,  $\beta = 117.59(4)^\circ$  as refined from a Guinier–de Wolff powder pattern (FeK $\alpha$  radiation) with strongest lines of 6.92(80,020,001), 6.42(50,200,201), 4.94(70,021), 3.225(100,421,400,402), 3.114(80,041,022), and 2.512(50,441,401,403).

The mineral is associated with quartz, albite, aegirine, kupletskite, lorenzenite, and others; locally, overgrowths on elpidite are present, and some grains have a coating of ralstonite. The assemblage occurs in miarolitic cavities in a sodic granite near Lake Gjerdingen (hence the new mineral name), about 30 km north of Oslo. The mineral belongs to the kuzmenkoite subgroup of the labuntsovite group. Type material is in the Geological Museum, University of Oslo, Norway.

**Discussion.** The authors point out that some of their analyses show Mn > Fe, thus permitting the introduction of a further new mineral name. **J.L.J.**

### GOLDQUARRYITE\*

A.C. Roberts, M.A. Cooper, F.C. Hawthorne, R.A. Gault, M.C. Jensen, E.E. Foord (2003) Goldquarryite, a new Cd-bearing phosphate mineral from the Gold Quarry mine, Eureka County, Nevada. *Mineral. Record*, 34, 237–240.

Electron microprobe analysis gave K<sub>2</sub>O 0.17, CaO 1.25, CuO 5.33, NiO 0.23, ZnO 0.05, CdO 26.24, Al<sub>2</sub>O<sub>3</sub> 15.22, V<sub>2</sub>O<sub>5</sub> 0.05, P<sub>2</sub>O<sub>5</sub> 28.04, F 3.63, H<sub>2</sub>O (calc.) 22.19, O  $\equiv$  F 1.53, sum 100.87 wt%, corresponding to  $(\text{Cu}_{0.66}\text{Ni}_{0.03}\text{Zn}_{0.01})_{\Sigma 0.70}(\text{Cd}_{2.00}\text{Ca}_{0.22}\text{K}_{0.04}\Sigma 2.26)(\text{Al}_{2.92}\text{V}_{0.01}\Sigma 2.93)(\text{PO}_4)_{3.88}\text{F}_{1.87}(\text{H}_2\text{O})_{12.06}$ , ideally  $\text{CuCd}_2\text{Al}_3(\text{PO}_4)_4\text{F}_2(\text{H}_2\text{O})_{10}(\text{H}_2\text{O})_2$ . The mineral occurs as isolated clusters of radiating crystals and as aggregates of parallel crystals, wherein the crystals are euhedral, up to 1.5 mm long and 0.1 mm across, showing {010} and {001}, with {100} termination. Blue to blue-gray color, vitreous luster, transparent, brittle, white streak, no cleavage, irregular fracture,  $H = 3\text{--}4$ , nonfluorescent, twinned on {001},  $D_{\text{meas}} = 2.78(1)$ ,  $D_{\text{calc}} = 2.81$  g/cm<sup>3</sup> for  $Z = 1$ . Optically biaxial positive,  $\alpha = 1.570$ ,  $\beta = 1.573$ ,  $\gamma = 1.578$ ,  $2V_{\text{meas}} = \sim 30$ ,  $2V_{\text{calc}} = 76^\circ$ , strong dispersion  $r < v$ , pleochroism deep blue parallel to the elongation and pale blue normal to it. Single-crystal X-ray structure study indicated triclinic symmetry, space group  $P\bar{1}$ ;  $a = 6.777(3)$ ,  $b = 9.081(4)$ ,  $c = 10.104(5)$  Å,  $\alpha = 101.40(4)$ ,  $\beta = 104.24(4)$ ,  $\gamma = 102.56(4)^\circ$  as refined from a Debye–Scherrer X-ray powder pattern (114 mm, CuK $\alpha$  radiation) with strongest lines of 9.433(100,001), 4.726(30,002), 3.700(30,022), 3.173(30B,122,113), 3.010(30,122,212), 2.896(30,211), and 2.818(50,022).

The mineral is associated with opal, carbonate-fluorapatite, and hewettite as a supergene product on and between silicified jasperoid fragments in breccia at the Gold Quarry open-pit gold mine near Carlin, Eureka County, Nevada. The source of the Cd is undetermined, but greenockite also occurs in the deposit. The new mineral name is for the locality. Type material is in the National Mineral Collection of Canada, Ottawa. **J.L.J.**

### MATSUBARAITE\*

H. Miyajima, R. Miyawaki, K. Ito (2002) Matsubaraite, Sr<sub>4</sub>Ti<sub>5</sub>(Si<sub>2</sub>O<sub>7</sub>)<sub>2</sub>O<sub>8</sub>, a new mineral, the Sr-Ti analogue of perrierite in jadeite from the Itoigawa–Ohmi district, Niigata Prefecture, Japan. *Eur. J. Mineral.*, 14, 1119–1128.

The mineral occurs as euhedral to subhedral prismatic crystals, commonly hollow and in fan-shaped aggregates, with the crystals up to 0.3 mm long. Transparent, gray color with a blue tint, adamantine luster, white streak, no cleavage,  $H = 5\frac{1}{2}$ ,  $VHN_{100} = 681\text{--}743$ ,  $D_{\text{calc}} = 4.13$  g/cm<sup>3</sup> for  $Z = 2$ . Optically biaxial positive, refractive indices higher than those of titanite. Electron microprobe analysis gave SrO 38.84, TiO<sub>2</sub> 39.06, SiO<sub>2</sub> 22.60, sum 100.50 wt%, corresponding to  $\text{Sr}_{3.92}\text{Ti}_{5.11}\text{Si}_{3.93}\text{O}_{22}$ , ideally  $\text{Sr}_4\text{Ti}_5\text{Si}_4\text{O}_{22}$ . Single-crystal X-ray structure study ( $R = 0.0372$ ) indicated monoclinic symmetry, space group  $P2_1/a$ , pseudo space group  $C2/m$ ;  $a = 13.848(7)$ ,  $b = 5.626(2)$ ,  $c = 11.878(6)$  Å,  $\beta = 114.19(4)^\circ$  as refined from a powder pattern

(114 mm Gandolfi, CuK $\alpha$  radiation) with strongest lines of 3.62(60,003), 3.16(70,400), 3.09(95,403), 3.01(90,313), 2.96(95,204,311), 2.71(100,021,004,203), 2.17(90,315,421,422), 1.950(95,024,406,223), and 1.731(60,404,803).

The mineral, which is in the perrierite-chevkinite group, occurs in a boulder of jadeitite from the bed of the Kotakigawa River at Itoigawa City, central Japan. Associated minerals are jadeite, natrolite, lamprophyllite, titanite, zircon, rutile, tausonite, and renegeite. The new mineral name is for Satoshi Matsubara of the National Science Museum, Tokyo; it and the Fossa Magna Museum at Itoigawa, Niigata, are repositories for type material. **J.L.J.**

#### MONAZITE-(SM)\*

M. Masau, P. Černý, M.A. Cooper, R. Chapman, J.D. Grice (2002) Monazite-(Sm), a new member of the monazite group from the Annie claim no. 3 granitic pegmatite, southeastern Manitoba. *Can. Mineral.*, 40, 1649–1655.

The mineral occurs as yellowish tabular crystals,  $\leq 0.4$  mm in diameter. Electron microprobe analysis gave CaO 2.75, PbO 2.14, Y<sub>2</sub>O<sub>3</sub> 1.29, La<sub>2</sub>O<sub>3</sub> 2.10, Ce<sub>2</sub>O<sub>3</sub> 10.04, Pr<sub>2</sub>O<sub>3</sub> 1.58, Nd<sub>2</sub>O<sub>3</sub> 6.03, Sm<sub>2</sub>O<sub>3</sub> 13.02, Gd<sub>2</sub>O<sub>3</sub> 12.06, Tb<sub>2</sub>O<sub>3</sub> 1.14, Dy<sub>2</sub>O<sub>3</sub> 1.18, Yb<sub>2</sub>O<sub>3</sub> 0.02, Lu<sub>2</sub>O<sub>3</sub> 0.05, ZrO<sub>2</sub> 0.71, ThO<sub>2</sub> 1.14, UO<sub>2</sub> 0.62, SiO<sub>2</sub> 1.53, P<sub>2</sub>O<sub>5</sub> 27.48, sum 100.01 wt%, corresponding to (Sm<sub>0.18</sub>Gd<sub>0.16</sub>Th<sub>0.15</sub>Ce<sub>0.15</sub>Ca<sub>0.12</sub>Nd<sub>0.09</sub>La<sub>0.03</sub>Y<sub>0.03</sub>Pr<sub>0.02</sub>Pb<sub>0.02</sub>Tb<sub>0.02</sub>Dy<sub>0.02</sub>Zr<sub>0.02</sub>U<sub>0.01</sub>) $\Sigma_{1.01}$ (P<sub>0.94</sub>Si<sub>0.06</sub>)O<sub>4</sub>, ideally SmPO<sub>4</sub>. Transparent to translucent, vitreous to greasy luster, brittle, white streak, one good cleavage, uneven fracture, nonfluorescent,  $D_{\text{calc}} = 5.48$  g/cm<sup>3</sup> for the empirical formula and  $Z = 4$ . Optically biaxial positive,  $\alpha = 1.768(5)$ ,  $\beta = 1.771(3)$ ,  $\gamma = >1.808$ ,  $\gamma_{\text{calc}} = 1.818$ ,  $2V_{\text{meas}} = 29(8)^\circ$ ,  $X = b$ ,  $Z \wedge c = 9^\circ$  ( $\beta$  obtuse). Single-crystal X-ray data indicated monoclinic symmetry, space group  $P2_1/n$ ;  $a = 6.739(3)$ ,  $b = 6.951(3)$ ,  $c = 6.462(3)$  Å,  $\beta = 104.03(4)^\circ$  as refined from a Gandolfi powder pattern (114 mm, CuK $\alpha$  radiation) with strongest lines of 4.647(60,011), 4.164(80,111), 3.264(70,200), 3.065(100,120), and 2.857(90,112,012).

The mineral is associated with quartz, albite, lithian muscovite, and manganocolumbite in a granitic pegmatite near Greer Lake, close to the Winnipeg River, southeastern Manitoba. The new mineral name indicates that the mineral is the Sm-dominant analog of monazite-(Ce), monazite-(La), and monazite-(Nd). Type material is in the R.B. Ferguson Museum of Mineralogy at the University of Manitoba, Winnipeg. **J.L.J.**

#### NIKISCHERITE\*

D.M.C. Huminicki, F.C. Hawthorne, J.D. Grice, A.C. Roberts, J.L. Jambor (2003) Nikischerite, a new mineral from the Huanuni tin mine, Dalence Province, Oruro Department, Bolivia. *Mineral. Record*, 34, 155–158.

D.M.C. Huminicki, F.C. Hawthorne (2003) The crystal structure of nikischerite, NaFe<sub>2</sub><sup>+</sup>Al<sub>3</sub>(SO<sub>4</sub>)<sub>2</sub>(OH)<sub>18</sub>(H<sub>2</sub>O)<sub>12</sub>, a mineral of the shigaite group. *Can. Mineral.*, 41, 79–82.

Electron microprobe analysis gave Na<sub>2</sub>O 2.43, FeO 43.59, Al<sub>2</sub>O<sub>3</sub> 14.35, SO<sub>3</sub> 13.53, H<sub>2</sub>O (calc.) 35.06, sum 108.97 wt%, corresponding to Na<sub>0.85</sub>Fe<sub>2.55</sub>Al<sub>3.04</sub>S<sub>1.83</sub>O<sub>8</sub>(OH)<sub>18</sub>(H<sub>2</sub>O)<sub>12</sub>, ideally NaFe<sub>6</sub>Al<sub>3</sub>(SO<sub>4</sub>)<sub>2</sub>(OH)<sub>18</sub>(H<sub>2</sub>O)<sub>12</sub>. The mineral occurs as green to

grayish white micaceous {001} plates, to 4 mm, that form radiating, irregular aggregates and seams up to 1 cm across. Dull to greasy luster, pale grayish green streak,  $H = 2$ , perfect {001} cleavage, irregular fracture, nonfluorescent, no twinning,  $D_{\text{meas}} = 2.33(2)$ ,  $D_{\text{calc}} = 2.30$  g/cm<sup>3</sup> for  $Z = 3$  and the ideal formula. Colorless to grayish white in transmitted light, nonpleochroic, uniaxial negative,  $\omega = 1.560(1)$ ,  $\epsilon$  not determinable. Single-crystal X-ray structure study ( $R = 0.064$ ) indicated trigonal symmetry, space group  $R\bar{3}$ ;  $a = 9.352(7)$ ,  $c = 33.08(4)$  Å as refined from a Debye–Scherrer X-ray powder pattern (114 mm, CuK $\alpha$  radiation) with strongest lines of 10.980(100,003), 5.539(60,006), 2.624(25,033), 2.425(30,036), and 1.932(30,0.3.12).

The mineral, which is the Fe<sup>3+</sup> analog of shigaite and motukoreaitite, occurs on and within a clay matrix containing pyrite, pyrrhotite, siderite, cronstedtite, and vivianite in specimens from the Huanuni tin mine, Dalence Province, Oruro, Bolivia. The new mineral name is for mineral dealer Tony Nikischer (b. 1949), who discovered the mineral. Type material is in the Canadian Museum of Nature, Ottawa. **J.L.J.**

#### SANTABARBARAITE\*

G. Pratesi, C. Cipriani, G. Giuli, W.D. Birch (2003) Santabarbarite: a new amorphous phosphate mineral. *Eur. J. Mineral.*, 15, 185–192.

Electron microprobe analysis of material from Italy and Australia gave, respectively, MgO 0.61, 0.69, CaO –, 2.93, Mn<sub>2</sub>O<sub>3</sub> 2.23, –, Fe<sub>2</sub>O<sub>3</sub> 43.97, 43.22 (Fe<sup>3+</sup> confirmed by XANES), P<sub>2</sub>O<sub>5</sub> 29.48, 28.60, H<sub>2</sub>O (TGA and LOI) 23.90, 23.05, sum 100.19, 98.49 wt%, corresponding to (Fe<sub>2.64</sub>Mn<sub>0.13</sub>Mg<sub>0.07</sub>) $\Sigma_{2.84}$ (PO<sub>4</sub>)<sub>2</sub>(OH)<sub>2.45</sub>·5.1H<sub>2</sub>O and (Fe<sub>2.69</sub>Ca<sub>0.26</sub>Mg<sub>0.08</sub>) $\Sigma_{3.03}$ (PO<sub>4</sub>)<sub>2</sub>(OH)<sub>2.75</sub>·5.0H<sub>2</sub>O, ideally Fe<sub>3</sub><sup>+</sup>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>3</sub>·5H<sub>2</sub>O. The mineral occurs as aggregates, to 3 mm across, of submillimetric pseudocrystals after vivianite (Italy), and as pseudomorphs of vivianite in clusters up to 9 cm across (Australia). Brown color, translucent, vitreous to greasy luster, brittle, amber streak, no cleavage, good parting along the {010} cleavage of the vivianite precursor, nonfluorescent,  $D_{\text{meas}} = 2.42$  g/cm<sup>3</sup>. Amber in transmitted light, isotropic,  $n = 1.695(5)$ , X-ray amorphous.

The mineral formed in cavities within concretionary nodules, up to 6 cm in diameter, that occur in Pliocene–Pleistocene clays in a clastic sequence at Valdarno Superiore, Upper Arno River Valley, Tuscany, Italy (holotype locality); also in clay underlying Tertiary basalt at Wannan Falls, about 7 km west of Hamilton, Victoria, Australia. The mineral formed by in-situ oxidation of Fe<sup>2+</sup> in vivianite, progressing through to metavivianite (still present in cores of some grains in the Italian occurrence), thence to santabarbarite. The new mineral name is for the locality, which is in the Santa Barbara mining district of Tuscany, and for Santa Barbara, the patron saint of miners. Holotype material is in Natural History Museum of the University of Florence, Italy. **J.L.J.**

#### SPHAEROBERTRANDITE\*

I.V. Pekov, N.V. Chukanov, A.O. Larsen, S. Merlino, M. Pasero, D. Yu. Pushcharovsky, G. Ivaldi, A.E. Zadov, V.G. Grishin, A. Åsheim, J. Taftø, N.I. Chistyakova (2003)

Sphaerobtrandite,  $\text{Be}_3\text{SiO}_4(\text{OH})_2$ : new data, crystal structure and genesis. *Eur. J. Mineral.*, 15, 157–166.

Sphaerobtrandite was named in 1957 but the mineral generally has not been regarded to be a valid species. Re-examination of holotype material from Mannekpakhk Mountain, Lovozero massif, Russia, and the recognition of other occurrences have resulted in CNMMN approval as a valid species. Chemical analysis of material from Sengischorr Mountain, Lovozero massif, gave  $\text{BeO}$  42.8,  $\text{SiO}_2$  (electron microprobe) 38.46,  $\text{H}_2\text{O}$  (TGA) 12.54, sum 96.88 wt%, in good agreement with earlier analyses and corresponding to  $\text{Be}_{2.97}\text{Si}_{1.03}\text{O}_{3.905}(\text{OH})_{2.25}$ , ideally  $\text{Be}_3\text{SiO}_4(\text{OH})_2$ . The mineral occurs mainly as spherulites, some as large as 2 mm across; crystals are flattened, prismatic, showing mainly {001}, modified by {012}, {102}, and {10 $\bar{2}$ }. Colorless, yellow, brownish, white, gray; transparent to translucent, vitreous luster, white streak, brittle,  $H = 5$ , perfect {001} cleavage and another parallel to {001} and at 45° to (010), uneven fracture, nonfluorescent,  $D_{\text{meas}} = 2.46\text{--}2.54$ ,  $D_{\text{calc}} = 2.52$  g/cm<sup>3</sup>. Optically biaxial negative,  $\alpha = 1.597(3)$ ,  $\beta = 1.607(4)$ ,  $\gamma = 1.616(3)$ ,  $2V_{\text{meas}} = 70(20)$ ,  $2V_{\text{calc}} = 86.5^\circ$ ,  $Z = c$ , no dispersion; colored varieties may be weakly pleochroic,  $X > Z$ . Single-crystal X-ray structure study ( $R = 0.090$ ) indicated monoclinic symmetry, space group  $P2_1/c$ , pseudomerohedral twinning;  $a = 5.081(3)$ ,  $b = 4.639(1)$ ,  $c = 17.664(9)$  Å,  $\beta = 106.09(5)^\circ$  as refined from a diffractometer pattern (CoK $\alpha$  radiation) with strongest lines of 4.885(90,100), 4.236(62,004), 3.161(100,111,113), 2.836 (70,104), and 2.318(90,020).

The mineral is known to occur in pegmatites at several sites, including with epididymite, beryllite, and eudidymite at Mannekpakhk Mountain, Lepkhe-Nelm Mountain, and Sengischorr Mountain of the Lovozero massif, and at the Khibiny massif, Kola Peninsula, Russia; with epididymite at Qeqertausaq in the Ilimaussaq complex of southern Greenland; with hambergite at two localities near Tvedalen, Larvik, Norway; a non-pegmatitic occurrence is in hydrothermally altered greisen-like rocks, with hsianghualite and bromellite at Hsianghualing, Hunan Province, China. The name sphaerobtrandite alludes to the typical spherulitic morphology and the similarity to bertrandite in the main chemical constituents. The holotype specimen is in the Fersman Mineralogical Museum, Moscow, Russia. **J.L.J.**

#### TILLMANNSITE\*

H. Sarp, D.Yu. Pushcharovsky, E.J. MacLean, S.J. Teat, N.V. Zubkova (2003) Tillmannsite,  $(\text{Ag}_3\text{Hg})(\text{V,As})\text{O}_4$ , a new mineral: its description and crystal structure. *Eur. J. Mineral.*, 15, 177–180.

The mineral occurs as aggregates, to 0.2 mm in diameter, consisting of red to brownish red pseudooctahedral crystals, 50  $\mu\text{m}$  in maximum dimension. Electron microprobe analysis gave Ag 49.82, Hg 30.40, V 5.32, As 4.23, O 9.90, sum 99.67 wt%, corresponding to  $\text{Ag}_{3.01}\text{Hg}_{0.99}\text{V}_{0.68}\text{As}_{0.36}\text{O}_{4.03}$ , ideally  $(\text{Ag}_3\text{Hg})(\text{V,As})\text{O}_4$ , in which Ag and Hg are disordered. Translucent, adamantine luster, brittle, brownish red streak, conchoidal fracture, no cleavage,  $H$  not determinable,

nonfluorescent, insoluble in HCl,  $D_{\text{calc}} = 7.769$  g/cm<sup>3</sup> for the empirical formula and  $Z = 2$ . Crystals show {111}, {110}, {100}, {101}, and minor {001}, with some twinned on (100). Optically uniaxial positive,  $\omega = \sim 2.3$ ,  $\epsilon = \sim 2.5$ , intense pleochroism,  $E = \text{red-orange}$ ,  $O = \text{orange-brown}$ ,  $E > O$ . Single-crystal X-ray structure study ( $R = 0.037$ ) indicated tetragonal symmetry, space group  $\bar{4}$ ,  $a = 7.731(2)$ ,  $c = 4.647(2)$  Å as refined from a Gandolfi powder pattern (114 mm, CuK $\alpha$  radiation) with strongest lines of 5.45(25,110), 2.772(100,211), 2.324(30,002), 2.54(20,301), 1.740(15,411), and 1.683 (15,312).

The mineral is associated with pecoraite, vésigniéite, olivenite, kolfanite, janggunitite, chlorargyrite, cuprite, native copper, native silver, domeykite, djurleite, and algodonite as a supergene product in small geodes in a calcite, dolomite, and aragonite gangue at the Roua copper deposit, Var Valley, Alpes-Maritimes department, France. The new mineral name is for Ekkhart Tillmanns (b. 1941) of the Institute of Mineralogy and Crystallography, Wien, Austria. Type material is in the Natural History Museum of Geneva, Switzerland. **J.L.J.**

#### VITIMITE\*

N.V. Chukanov, I.V. Pekov, S.V. Malinko, A.E. Zadov, V.T. Dubinchuk (2001) Vitimite,  $\text{Ca}_6\text{B}_{14}\text{O}_{19}[\text{SO}_4](\text{OH})_{14}\cdot 5\text{H}_2\text{O}$ , a new mineral, and conditions of its formation in the Solongo deposit, Buryatia. *Zap. Vseross. Mineral. Obsch.*, 131(4), 41–46 (in Russian, English abs.).

Electron microprobe analysis gave CaO 31.25, B<sub>2</sub>O<sub>3</sub> 43.51, SO<sub>3</sub> 7.16, H<sub>2</sub>O (TGA) 18.9, sum 100.82 wt%, corresponding to  $\text{Ca}_{6.23}\text{B}_{13.98}\text{O}_{19.24}(\text{SO}_4)(\text{OH})_{13.91}\cdot 4.78\text{H}_2\text{O}$ , simplified as  $\text{Ca}_6\text{B}_{14}\text{O}_{19}[\text{SO}_4](\text{OH})_{14}\cdot 5\text{H}_2\text{O}$ . The mineral forms compact aggregates of fibers, each up to 0.2 mm long. White color, vitreous luster, transparent, sectile,  $H = 1\frac{1}{2}$ ,  $D_{\text{meas}} = 2.29(3)$ ,  $D_{\text{calc}} = 2.24(3)$  g/cm<sup>3</sup> for  $Z = 4$ . Optically biaxial negative,  $\alpha = 1.532(3)$ ,  $\beta = 1.537(1)$ ,  $\gamma = 1.540(1)$ ,  $2V_{\text{meas}} = 75(15)$ ,  $2V_{\text{calc}} = 75^\circ$ , moderate dispersion  $r > v$ ,  $Z \wedge b = 5^\circ$ , nonpleochroic. Electron diffraction patterns indicated monoclinic symmetry, space group  $P2$ ,  $Pm$ , or  $P2/m$ ;  $a = 14.10(2)$ ,  $b = 19.53(1)$ ,  $c = 14.05(2)$  Å,  $\beta = 120.39^\circ$  as refined from a powder pattern (86 mm Debye camera, FeK $\alpha$  radiation) with strongest lines of 12.2(100,100,001), 3.45(50,333), 3.036(60,400,004), 2.720(70,171,170,071), and 1.992(50,541,304,417).

The mineral occurs in veinlets with calcite, priceite, federovskite, kurchatovite, ludwigite, magnetite, sphalerite, and pyrite in the boron ores of the Solongo deposit in Buryatia, Transbaikal region, Russia. The new mineral name is for the locality, which is at the southern part of the Vitim plateau. The mineral has also been identified in the Novofrolovskoe deposit, Polar Urals, in association with calcite, uralborite, and serpentine. Type material (Solongo) is in the Fersman Mineralogical Museum, Moscow, Russia. **J.L.J.**

#### WALKERITE\*

J.D. Grice, R.A. Gault, J. Van Velthuisen, A. Pratt (2002) Walkerite, a new borate mineral species in an evaporitic sequence from Sussex, New Brunswick, Canada. *Can. Mineral.*, 40, 1675–1686.

The mineral occurs as fibrous to acicular crystals,  $0.05 \times 2$  mm, commonly in bundles to 7 mm in length. Electron microprobe analysis (ICP-MS for Li and B) gave  $\text{Li}_2\text{O}$  0.12,  $\text{Na}_2\text{O}$  0.13,  $\text{K}_2\text{O}$  0.07,  $\text{CaO}$  23.05,  $\text{FeO}$  0.32,  $\text{MgO}$  0.58,  $\text{Cl}$  4.91,  $\text{B}_2\text{O}_3$  47.17,  $\text{H}_2\text{O}$  (TGA) 25.48,  $\text{O} \equiv \text{Cl}$  1.11, sum 100.72 wt%, corresponding to  $(\text{Ca}_{15.60}\text{Na}_{0.16}\text{K}_{0.06})_{\Sigma 15.82}(\text{Mg}_{0.55}\text{Li}_{0.31}\text{Fe}_{0.17})_{\Sigma 1.03}\text{B}_{51.43}\text{O}_{68}(\text{OH})_{48}[\text{Cl}_{5.26}(\text{OH})_{0.74}]_{\Sigma 6.00}\text{H}_{2.53} \cdot 28\text{H}_2\text{O}$ , ideally  $\text{Ca}_{16}(\text{Mg,Li,}\square)_2[\text{B}_{13}\text{O}_{17}(\text{OH})_{12}]_4\text{Cl}_6 \cdot 28\text{H}_2\text{O}$ . Crystals are elongate [001], showing {100}, {010}, and {001}, transparent to translucent, colorless to white, vitreous luster, brittle, white streak,  $H = 3$ , splintery fracture, no cleavage, nonfluorescent,  $D_{\text{meas}} = 2.07$ ,  $D_{\text{calc}} = 2.05$  g/cm<sup>3</sup> for  $Z = 1$ . Optically biaxial positive,  $\alpha = 1.516(2)$ ,  $\beta = 1.532(2)$ ,  $\gamma = 1.554(2)$ ,  $2V_{\text{meas}} = 82(3)$ ,  $2V_{\text{calc}} = 82^\circ$ , no dispersion, orientation  $X = a$ ,  $Y = b$ ,  $Z = c$ . Single-crystal X-ray structure study ( $R = 0.040$ ) indicated orthorhombic symmetry, space group  $Pba2$ ;  $a = 15.52(1)$ ,  $b = 22.74(1)$ ,  $c = 8.76(4)$  Å as refined from a Debye-Scherrer powder pattern (114 mm,  $\text{CuK}\alpha$  radiation) with strongest lines of 12.80 (100,110), 7.785(80,200), 6.319(40,121), 5.649(30,211), and 2.570(30,610,550).

The mineral is associated with halite, hydroboracite,

boracite, hilgardite, volkovskite, szaibelyite, and anhydrite in drill core from Mississippian evaporites in a potash mine near Penobsquis, Kings County, New Brunswick. The new mineral name is for Canadian geologist T.L. Walker (1867–1942). Type material is in the Canadian Museum of Nature, Ottawa. **J.L.J.**

## DISCREDITED MINERAL

### DUHAMELITE

W. Krause, U. Kolitsch, H.-J. Bernhardt, H. Effenberger (2003) Duhamelite discredited. *Neues Jahrb. Mineral. Mon.*, 75–96.

Duhamelite was originally described as  $\text{Cu}_4\text{Pb}_2\text{Bi}(\text{VO}_4)_4(\text{OH})_3 \cdot 8\text{H}_2\text{O}$  (*Am. Mineral.*, 67, p. 414, 1982), but a re-examination of type material and of specimens from other reported localities has shown that the formula is of the type  $\text{AB}(\text{XO}_4)(\text{OH})$ , and that the mineral belongs to the adelite-descloizite group. The type material is a Bi- and Ca-bearing mottramite corresponding to  $(\text{Pb,Bi,Ca})\text{Cu}(\text{VO}_4)(\text{OH},\text{O})$ . The CNMMN has approved the discreditation. **J.L.J.**