

## NEW MINERAL NAMES\*

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### Babkinite\*

I.A. Bryzgalov, E.M. Spiridonov, I.V. Petrova, M.S. Sakharova (1996) Babkinite  $\text{Pb}_2\text{Bi}_2(\text{S,Se})_3$ —A new mineral. Doklady Akad. Nauk, 346(5), 656–659 (in Russian).

Electron microprobe analyses (average and range of 23) gave Bi 42.02 (38.91–46.42), Pb 42.58 (36.10–45.97), Ag 0.13 (trace–0.42), Sb 0.08 (trace–0.21), S 5.80 (5.44–7.81), Se 10.60 (9.91–11.37), sum 101.21 wt%, corresponding to  $(\text{Pb}_{1.99}\text{Ag}_{0.01})_{\Sigma 2.00}(\text{Bi}_{1.95}\text{Sb}_{0.01})_{\Sigma 1.96}(\text{S}_{1.75}\text{Se}_{1.30})_{\Sigma 3.05}$ , ideally  $\text{Pb}_2\text{Bi}_2(\text{S,Se})_3$ . The mineral forms aggregates, up to 2 mm across, of randomly oriented tablets a few hundredths to a few tens of millimeters across. Silvery gray color, metallic luster, gray streak, perfect {001} cleavage,  $H = \sim 2$ ,  $VHN_{10} = 82$  (71–91; perpendicular to cleavage),  $VHN_{10} = 100$  (90–112; parallel to cleavage),  $D_{\text{calc}} = 8.096 \text{ g/cm}^3$  for  $Z = 3$ . In reflected light, white with a yellowish cast, no internal reflection, birefractance almost absent, weakly pleochroic in pale bluish brown tints, distinct anisotropism. Reflectance percentages (WTiC standard, air) parallel and perpendicular to the cleavage are 49.7, 48.5 (470), 48.4, 47.4 (546), 47.9, 46.8 (589), and 47.0, 46.2 (650). The X-ray powder pattern is similar to those of layered Bi-Pb sulfoselenides and corresponds to a 21-layer structure and the formula  $\text{Me}_4\text{S}_3$ . Indexing of the powder pattern indicated hexagonal symmetry, probable space group  $P\bar{3}$  or  $P\bar{3}m$ ,  $a = 4.191(2)$ ,  $c = 39.60(3) \text{ \AA}$ . Strongest lines in the pattern (30 lines given) are 3.42(50,104), 3.04(100,107), 2.096(80,110), 1.806(60,1.0.19), 1.725(50,207,1.1.13), 1.298(70,1.1.24), and 1.233(60,2.1.14,1.1.26).

The mineral occurs in the Nevskoye deposit in north-eastern Russia, 400 km northwest of Magadan, 25 km northwest of Omsukchan village, and 35 km southwest of the Dukat Au-Ag deposit. Associated minerals, which formed late in the paragenesis, are arsenopyrite, stannite, tetrahedrite, wittite, laitakarite, and selenian cosalite. The deposit is in Lower Cretaceous clastic sediments near their contact with a granite intrusion. The new name is for P.V. Babkin (1929–1977), who was the first to study the mineralogy of the Nevskoye deposit. Type material is in the Fersman Mineralogical Museum, Moscow. **E.S.G.**

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

### Halurgite

S. Gehör, K. Laajoki, T.C. Devaraju (1996) Halurgite—The missing member of the Mn-Mg-Fe pyroxene quadrilateral. J. Geol. Soc. India, 47, 629–630.

The average of six electron microprobe analyses gave  $\text{Na}_2\text{O}$  0.04,  $\text{CaO}$  2.38,  $\text{MgO}$  9.72,  $\text{MnO}$  17.63,  $\text{FeO}$  19.00,  $\text{ZnO}$  0.04,  $\text{TiO}_2$  0.02,  $\text{Al}_2\text{O}_3$  0.05,  $\text{V}_2\text{O}_5$  0.01,  $\text{SiO}_2$  49.86, sum 98.76 wt%, corresponding to  $\text{Ca}_{0.110}\text{Mn}_{0.624}\text{Fe}_{0.664}\text{Mg}_{0.611}\text{Si}_2\text{O}_6$ . The composition plots in the Mn-Fe-rich portion of the previously vacant enstatite-ferrosilite-donpeacorite quadrilateral. The mineral occurs in the granulite-facies iron formations of southern Karnataka, India.

**Discussion.** An incomplete description, reproduced from the IMA 16th General Meeting, 1994. The name halurgite has not been submitted to the CNMMN for approval, and the name would be rejected because it already applies to the compound  $\text{Mg}_2[\text{B}_4\text{O}_5(\text{OH})_4]_2 \cdot \text{H}_2\text{O}$ , a mineral in good standing. **J.L.J.**

### Nafertisite\*

A.P. Khomyakov, G. Ferraris, G. Ivaldi, G.N. Nechelyustov, S.V. Soboleva (1995) Nafertisite  $\text{Na}_3(\text{Fe}^{2+}, \text{Fe}^{3+})_6[\text{Ti}_2\text{Si}_{12}\text{O}_{34}](\text{O,OH})_7 \cdot 2\text{H}_2\text{O}$ —A new mineral with a new type of banded silicate radical. Zapiski Vseross. Mineral. Obshch., 124(6), 101–107 (in Russian).

G. Ferraris, G. Ivaldi, A.P. Khomyakov, S.V. Soboleva, E. Belluso, A. Pavese (1996) Nafertisite, a layer titanosilicate member of a polysomatic series including mica. Eur. J. Mineral., 8(2), 241–249.

Electron microprobe analyses of five grains (supplemented by wet-chemical determinations of  $\text{Fe}^{2+}/\text{Fe}^{3+}$  ratio and  $\text{H}_2\text{O}$ ) gave  $\text{Na}_2\text{O}$  4.78,  $\text{K}_2\text{O}$  1.64,  $\text{MgO}$  1.28,  $\text{MnO}$  0.79,  $\text{FeO}$  21.04,  $\text{Fe}_2\text{O}_3$  14.53,  $\text{Al}_2\text{O}_3$  1.32,  $\text{SiO}_2$  38.92,  $\text{TiO}_2$  8.32,  $\text{Nb}_2\text{O}_5$  0.33,  $\text{H}_2\text{O}$  7.85, sum 100.80 wt%, corresponding to  $(\text{Na}_{2.47}\text{K}_{0.56})_{\Sigma 3.03}(\text{Fe}_{4.68}^{2+}\text{Fe}_{1.27}^{3+}\text{Mg}_{0.51}\text{Mn}_{0.18})_{\Sigma 6.64}(\text{Ti}_{1.67}\text{Al}_{0.41}\text{Nb}_{0.04})_{\Sigma 2.12}(\text{Si}_{10.36}\text{Fe}_{1.64}^{3+})_{\Sigma 12}\text{O}_{35.02}(\text{OH})_2 \cdot 5.97\text{H}_2\text{O}$ , which simplifies to  $(\text{Na,K})_3(\text{Fe}^{2+}, \text{Fe}^{3+})_6[\text{Ti}_2(\text{Si,Fe}^{3+})_{12}\text{O}_{30}(\text{O,OH})_4](\text{OH,O})_7 \cdot 2\text{H}_2\text{O}$ . Absorption bands in the infrared spectrum are at 3640, 3585, 3370, 1660, 1629, 1057, 998, 924, 690, 659, 564, and 431  $\text{cm}^{-1}$ . The mineral forms asbestiform aggregates up to 15 mm across; individual fibers are 0.01–0.1 mm thick, bounded by {010} and {001} cleavages, flattened along (001), and elongate [100]. Dark grass-green color, vitreous to silky luster, fibrous fracture,  $H = 2$ –3, perfect {010} and {001} cleav-

ages, nonfluorescent,  $D_{\text{meas}} = 2.7(1)$ ,  $D_{\text{calc}} = 2.74 \text{ g/cm}^3$  for  $Z = 2$ . Optically biaxial negative,  $\alpha = 1.627(2)$ ,  $\beta = 1.667(2)$ ,  $\gamma = 1.693(2)$ ,  $2V_{\text{meas}} = 75(2)$ ,  $2V_{\text{calc}} = 76^\circ$ , moderate dispersion  $r < v$ ;  $Z \approx a$ ,  $Y = b$ ,  $X \wedge c = 5^\circ$  in obtuse angle  $\beta$ . Fibers have positive elongation and straight extinction; pleochroism  $X = \text{reddish brown}$ ,  $Y = \text{green}$ ,  $Z = \text{dark green}$ ,  $Z > Y \gg X$ . Single-crystal X-ray study indicated monoclinic symmetry, space group  $A2/m$ ,  $a = 5.353(4)$ ,  $b = 16.176(12)$ ,  $c = 21.95(2) \text{ \AA}$ ,  $\beta = 94.6(2)^\circ$ . Strongest lines of the powder pattern (34 lines given) are 13.00(30,001), 10.94(100,002), 4.44(15,120), 2.728(25,008,151,144), 2.641(20,202), 2.547(15,153), and 2.480(15,137,202,146). The structure is inferred to belong to a polysomatic series with bafertisite and astrophyllite.

The mineral occurs interstitially to potassium feldspar in ultra-agpaitic pegmatite in a drill-core intersection at 224 m depth at Mt. Kukisvumchorr, Khibina massif, Kola Peninsula, Russia. The pegmatite also contains alkali amphibole, aegirine, nepheline, sodalite, cancrinite, pectolite, eudialyte, mosandrite, calcite, burbankite, ewaldite, villiamite, and molybdenite. The new name is for the composition and the close relationship to bafertisite. Type material is in the Fersman Mineralogical Museum, Moscow, and in the Regional Museum of Natural History, Turin, Italy. **E.S.G.**

#### Noélbensonite\*

Y. Kawachi, D.S. Coombs, H. Miura (1996) Noélbensonite, a new BaMn silicate of the lawsonite structure type, from Woods mine, New South Wales, Australia. *Mineral. Mag.*, 60, 369–374.

Electron microprobe analysis gave BaO 29.08, SrO 1.51, CaO 0.31, Na<sub>2</sub>O 0.14, Mn as Mn<sub>2</sub>O<sub>3</sub> 34.76, Fe as Fe<sub>2</sub>O<sub>3</sub> 0.19, TiO<sub>2</sub> 0.01, Al<sub>2</sub>O<sub>3</sub> 0.17, SiO<sub>2</sub> 26.02, H<sub>2</sub>O (calc.) 7.87, sum 100.06 wt%, which for O = 8 corresponds to  $(\text{Ba}_{0.868}\text{Sr}_{0.067}\text{Ca}_{0.025}\text{Na}_{0.021})_{\Sigma 0.981}(\text{Mn}_{2.016}\text{Fe}_{0.011})_{\Sigma 2.027}(\text{Si}_{1.983}\text{Al}_{0.015})_{\Sigma 1.998}$ , ideally  $\text{BaMn}_2^+\text{Si}_2\text{O}_7(\text{OH})_2 \cdot \text{H}_2\text{O}$ . Occurs as mosaics of anhedral to elongate blocky grains, up to 100  $\mu\text{m}$  long, in aggregates up to 1 mm in diameter, and in veinlets to 0.25 mm width. Rarely euhedral, mainly showing {100} and {011}. Dark brown color, earthy to vitreous luster, yellow-brown streak, brittle, irregular fracture,  $H = 4$ , no cleavage or twinning,  $D_{\text{calc}} = 3.87 \text{ g/cm}^3$ . Optically biaxial negative,  $\alpha = 1.82(1)$ ,  $\beta_{\text{calc}} = 1.835$ ,  $\gamma = 1.85(1)$ ,  $2V_{\text{meas}} = 46(3)^\circ$ , strong dispersion  $r > v$ ;  $X = c$ ,  $Y = b$ ,  $Z = a$ ; pleochroism  $\alpha = \text{orange yellow}$ ,  $\beta = \text{orange}$ ,  $\gamma = \text{brownish orange}$ ,  $\gamma > \beta > \alpha$ . Indexing of the X-ray powder pattern by analogy with data for hennomartinite gave orthorhombic symmetry, probable space group  $Cmcm$ ,  $a = 6.325(1)$ ,  $b = 9.120(1)$ ,  $c = 13.618(1) \text{ \AA}$ . Strongest lines of the pattern (CuK $\alpha$  radiation) are 4.85(100,111), 4.322(59,021), 3.416(77,113,004), 2.869(80,202), and 2.729(82,024).

The mineral occurs as a replacement of amphibole, namansilite, and serandite, and as veinlets containing quartz

and potassium feldspar, at the Woods rhodonite mine near Tamworth, New South Wales; also reported to occur with namansilite and pectolite at the Cerchiara mine, northern Apennines, Italy. The new name is for William Noél Benson (1885–1957). Type material is in the Smithsonian Institution, Washington, in the Museum of Victoria, Australia, and in the Geology Department, University of Otago. The mineral is the Na-Mn analog of lawsonite and the Sr analog of hennomartinite. **J.L.J.**

#### Oulankaite\*

A.Yu. Barkov, Y.P. Men'shikov, V.D. Begizov, A.I. Lednev (1996) Oulankaite, a new platinum-group mineral from the Lukkulaivaara layered intrusion, northern Karelia, Russia. *Eur. J. Mineral.*, 8, 311–316.

The mean of three electron microprobe analyses gave Pd 41.60, Pt 2.85, Cu 17.53, Fe 2.51, Sn 9.73, Te 21.32, S 4.84, sum 100.38 wt%, corresponding to  $(\text{Pd}_{4.86}\text{Pt}_{0.18})_{\Sigma 5.04}(\text{Cu}_{3.43}\text{Fe}_{0.56})_{\Sigma 3.99}\text{Sn}_{1.02}\text{Te}_{2.08}\text{S}_{1.88}$ , ideally  $(\text{Pd,Pt})_5(\text{Cu,Fe})_4\text{SnTe}_2\text{S}_2$ . Occurs as platy subhedral to euhedral inclusions, up to  $0.1 \times 0.2 \text{ mm}$ , in chalcopyrite. Opaque,  $VHN_{20-40} = 221$  (156–334),  $D_{\text{calc}} = 10.27 \text{ g/cm}^3$  for  $Z = 2$ . In reflected light, distinctly to strongly birefractant and pleochroic from yellowish rose to violet rose. Strongly anisotropic, from yellowish white to bluish gray. Reflectance percentages in air and in oil are given in 20 nm steps from 400 to 700 nm; representative values for  $R_1$  and  $R_2$  in air are 41.6, 36.2 (470), 48.7, 41.0 (546), 51.7, 43.1 (589), and 54.0, 44.6 (650); equivalent values in oil are 29.1, 23.5 (470), 35.2, 29.5 (546), 37.1, 30.8 (589), and 39.4, 33.8 (650). Indexing of the X-ray powder pattern indicated tetragonal symmetry,  $a = 9.044(3)$ ,  $c = 4.937(3) \text{ \AA}$  as refined from a 57 mm Debye-Scherrer pattern (FeK $\alpha$  radiation) with strongest lines of 2.472(100,311,002), 2.260(90,400), 2.022(60,420), 1.213(50,641,114), 1.205(50,513,721), and 1.129(50,800,533,651).

The mineral is associated with chalcopyrite, bornite, millerite, pentlandite, and various PGMs in sulfide-rich (up to 25 vol%) pegmatitic pyroxenite in the Proterozoic Lukkulaivaara mafic-ultramafic layered intrusion, part of the Oulanka complex in northern Karelia, Russia, near the border with Finland. The new name refers to the Oulanka River, which is near the deposit. Type material is in the Fersman Mineralogical Museum, Moscow.

**Discussion.** Corresponds to the unnamed mineral abstracted in *Am. Mineral.*, 79, p. 390, 1994. **J.L.J.**

#### Sphaerobismoite\*

K. Walenta (1995) Sphaerobismoite, a new mineral of the composition Bi<sub>2</sub>O<sub>3</sub> from the Black Forest. *Aufschluss*, 46, 245–248 (in German).

Electron microprobe analysis gave Bi<sub>2</sub>O<sub>3</sub> 98.40, As<sub>2</sub>O<sub>3</sub> 1.78, sum 100.18 wt%, corresponding to  $(\text{Bi}_{0.96}\text{As}_{0.04})_2\text{O}_3$ .

Occurs as spherulitic aggregates, to 0.5 mm in diameter, consisting of tabular crystals, 10–20  $\mu\text{m}$  long, occasionally with tetragonal outline. Color green, yellowish, or gray, adamantine to dull luster, conchoidal fracture, white streak, no cleavage,  $H = 4$ ,  $D_{\text{calc}} = 7.17 \text{ g/cm}^3$  for  $Z = 4$ . Optically uniaxial positive,  $\omega = 2.13(2)$ ,  $\epsilon = 2.18(2)$ . Converts to  $\delta\text{-Bi}_2\text{O}_3$  on heating to 600 °C. Indexing of the X-ray powder pattern indicated tetragonal symmetry,  $a = 8.08(2)$ ,  $c = 6.46(2)$  Å; strongest lines of the pattern are 5.73(70,110), 3.44(50,201), 3.16(100,211), 2.02(50,400,113), and 1.902(60,330,203).

The mineral occurs on quartz from mine dumps at Schmiedestollen-Holde in Wittichen, and at Neubulach, Germany, in association with limonite, barite, malachite, bismutite, and mixite that formed by oxidation of wittichenite and emplectite. The new name alludes to the form of the aggregates and the chemical composition. A repository for type material is not given. **J.L.J.**

#### $(\text{Ni,Fe,Cu})_2(\text{Ir,Rh})\text{S}_3$ , Pt-Fe alloys

J. Torres-Ruiz, G. Garuti, M. Gozzoti, F. Gervilla, P. Fenoll Hach-Ali (1996) Platinum-group minerals in chromitites from the Ojen lherzolite massif (Serranía de Ronda, Betic Cordillera, southern Spain). *Mineral. Petrology*, 56, 25–50.

Several platinum-group minerals occur in podiform chromitites from the Ojen massif, typically as grains <10  $\mu\text{m}$ , and rarely as grains >20  $\mu\text{m}$ .

#### $(\text{Ni,Fe,Cu})_2(\text{Ir,Rh})\text{S}_3$

Electron microprobe analyses (representative of four of the five listed) gave, after correction for fluorescence effects and recalculation to 100 wt%, Fe 7.86, Ni 21.27, Cu 5.74, Os 0.29, Ir 31.14, Ru 0.10, Rh 7.48, S 25.91, As 0.22, corresponding to (at%) Ni 22.08, Fe 8.58, Cu 5.50, Ir 9.87, Rh 4.43, Os 0.09, Ru 0.06, S 49.22, As 0.18. The fifth analysis gave Fe 12.06, Ni 10.94, Cu 3.42, Ir 35.71, Rh 10.35, S 27.52 wt%, corresponding to Fe 13.14, Ni 11.65, Cu 3.37, Ir 11.60, Rh 6.28, S 53.62 at%. The general formula roughly corresponds to  $(\text{Ni,Fe,Cu})_2(\text{Ir,Rh})\text{S}_3$ , with Ir > Rh.

#### Pt-Fe alloys

Four analyses were given for Pt-Fe alloys containing up to 2.89 wt% Cu. The results are interpreted to correspond to PtFe, Pt<sub>2</sub>Fe, and Pt<sub>3</sub>Fe<sub>2</sub>.

**Discussion.** The PtFe alloy could be tetraferroplatinum, and the Pt<sub>3</sub>Fe<sub>2</sub> composition could be interpreted to be Pt<sub>4</sub>(Fe,Cu)<sub>3</sub>; more data are needed. The four analyses of the  $(\text{Ni,Fe,Cu})_2(\text{Ir,Rh})\text{S}_3$  grains have  $(\text{Ni,Fe,Cu}):(\text{Ir,Rh})\text{S}$  formula ratios variable from 1.81:1:3 to 2.50:1:3; the ratio for the Fe-dominant mineral is 1.60:1:3. These minerals are probably the same as the  $(\text{Rh-Ir,Ni-Fe})_{1-3}\text{S}$  minerals referred to in *Am. Mineral.*, 80, p. 1330, 1995, and *Am. Mineral.*, 81, p. 519, 1996. **J.L.J.**

#### Cu-Sb selenides

Luming Chen, Deren Li, Guangxing Wang, Qifa Zhang (1995) A study of two unnamed selenide minerals. *Acta Mineral. Sinica*, 15(4), 418–421 (in Chinese, English abs.).

The minerals occur in U-Se-bearing calcite veins in a U-Hg-Mo polymetallic deposit in Guizhou, China. Electron microprobe analysis of one mineral (average of 12 determinations) gave Cu 17.42, Hg 1.65, Ni 0.02, Fe 0.05, Se 45.80, S 0.11, Sb 34.08, As 0.58, sum 99.71 wt%, corresponding to  $(\text{Cu}_{0.95}\text{Hg}_{0.03})_{\Sigma 0.98}(\text{Sb}_{0.97}\text{As}_{0.03})_{\Sigma 1.00}(\text{Se}_{2.01}\text{S}_{0.01})_{\Sigma 2.02}$ , ideally  $\text{CuSbSe}_2$ . Occurs as opaque grains to  $12 \times 80 \mu\text{m}$ ,  $H = 159.7 \text{ kg/mm}^2$ . In reflected light, white with a yellowish hue and distinctly anisotropic. Reflectance percentages in air are given in 10 nm steps from 420 to 700 nm; representative values for  $R'_x$  and  $R'_y$  are 34.1, 22.9 (470), 36.2, 26.8 (550), 36.5, 27.2 (590), and 34.8, 26.5 (650).

Electron microprobe analysis of another mineral, mainly several tens of micrometers and up to >100  $\mu\text{m}$ , gave (average and range of 10 analyses listed) Cu 17.79 (15.07–22.34), Hg 21.63 (17.18–25.50), Ni 0.03 (0.02–0.05), Fe 0.15 (0.03–0.25), Se 38.89 (34.73–41.53), S 1.65 (0.21–4.89), Sb 19.45 (17.26–21.32), As 0.33 (0.19–0.37), sum 99.92 (99.24–100.43) wt%, corresponding to  $(\text{Cu,Hg})_{0.65-0.75}\text{Sb}_{0.27-0.33}(\text{Se,S})_{0.96-1.01}$ , and simplified as  $(\text{Cu,Hg})_{1-x}\text{Sb}_x(\text{Se,S})$ . White with a yellowish hue in reflected light, anisotropism not detected,  $H = 273.3 \text{ kg/mm}^2$ . Reflectance percentages, given in 10 nm steps as for the preceding mineral, are 33.9, 32.3 (470), 34.3, 32.4 (550), 34.7, 33.5 (590), and 34.6, 34.4 (650). **J.L.J.**

#### $\text{Ni}_3\text{As}_3(\text{S,Se})_4$

Jiajun Liu, Minghua Zhang, Jianming Liu (1995) Description of a possibly new Ni-As-S-Se mineral phase. *Acta Mineral. Sinica*, 15(4), 425–427 (in Chinese, English abs.).

The mineral occurs as anhedral grains, <10  $\mu\text{m}$ , associated with tiemannite, clausenthalite, antimonselite, lautite, famatinite, native gold, quartz, and barite in the Laerma-Qiongmo Au-Cu-U deposit, Si-Qin-Ling, central China. Two microprobe analyses (reported to three decimal places) gave Ni 24.1, 29.4, As 27.6, 33.9, Hg 7.6, 5.4, S 13.9, 15.6, Se 14.2, 12.7, Cu 0.3, 0.5, Fe 0.2, 0.2, Ag 0.1, 0.1, Co <0.1, 0.0, sum 88.0, 97.8 wt%, with the latter corresponding to  $(\text{Ni}_{3.12}\text{Hg}_{0.17})_{\Sigma 3.29}\text{As}_{2.82}(\text{S}_{3.03}\text{Se}_{1.00})_{\Sigma 4.03}$ , ideally  $\text{Ni}_3\text{As}_3(\text{S,Se})_4$ . White in reflected light, no birefractance, isotropic. Reflectance percentages (SiC standard, air) are given in 10 nm steps from 400 to 700 nm; representative values are 43.02 (470), 44.80 (550), 45.88 (590), and 46.82 (650). **J.L.J.**

#### Pb sulfantimonide

C.H. Lee, H.-I. Park (1995) Some Pb-Bi-Sb-S minerals from the Dunjeon gold mine, northern Taebaegsan mining district, Korea. *Resource Geol.*, 45, 323–329.

The average and range of five electron microprobe analyses gave Pb 47.9 (47.5–48.1), Sb 12.2 (12.0–12.4), Bi 17.6 (17.2–17.8), Ag 1.0 (0.9–1.0), Cu 1.7 (1.6–1.8), Fe 1.5 (1.3–1.8), S 17.7 (17.3–18.0), sum 99.6 (99.1–99.9) wt%, corresponding to  $Pb_{2.12}(Sb_{0.93}Bi_{0.76})_{\Sigma 1.69}(Cu_{0.25}Ag_{0.08})_{\Sigma 0.33}Fe_{0.25}S_5$ . The composition is similar to that of synthetic phase Y (Chang et al., *Econ. Geol.*, 75, 317–328, 1980). The mineral occurs with cosalite, heyrovskyite, lillianite, and boulangerite associated with a base-metal assemblage at the Dunjeon mine, about 20 km northwest of the city of Taebaeg, eastern Korea. **J.L.J.**

### Ba mica

V.V. Ryabokon', I.B. Shcherbakov, V.V. Zyl'itsle, V.S. Kostyuchenko (1994) Barium mineralization of the Golovanev suture zone of the Ukrainian Shield. *Mineral. Zhurnal*, 16(2), 67–78 (in Russian).

Chemical analysis of barian mica in two samples gave  $SiO_2$  28.20, 27.80,  $TiO_2$  1.68, 3.30,  $Al_2O_3$  17.60, 17.30,  $Fe_2O_3$  0.10, 0.40, FeO 2.80, 2.90, MnO 0.04, trace, MgO 22.38, 19.80, CaO 0.68, 1.25, BaO 17.52, 17.50,  $Na_2O$  0.76, 0.32,  $K_2O$  3.02, 2.88,  $CO_2$  –, 2.00,  $H_2O$  0.21, 0.20, LOI 2.48, 2.35, F 4.00, 2.90, Cl –, 0.22, O = F + Cl 1.68, 1.33, sum 99.79, 99.79 wt%, corresponding to  $(Ba_{1.09}K_{0.61}Na_{0.23}Ca_{0.12})_{\Sigma 2.06}(Mg_{5.3}Fe_{0.37}Mn_{0.01}Ti_{0.01})_{\Sigma 5.70}[(Si_{4.49}Al_{3.30}Ti_{0.20}Fe_{0.01})_{\Sigma 8.00}O_{15.36}](OH_{2.63}F_{2.01})_{\Sigma 4.64}$  and to  $(Ba_{1.12}K_{0.60}Na_{0.23}Ca_{0.22})_{\Sigma 2.05}(Mg_{4.84}Fe_{0.40}Ti_{0.36})_{\Sigma 5.60}[(Si_{4.56}Al_{3.34}Ti_{0.05}Fe_{0.05})_{\Sigma 8.00}O_{15.93}](OH_{2.57}F_{1.50})_{\Sigma 4.07}$ . The mineral forms hexagonal tablets, elongated platelets, and flakes, 1–3 mm across. Colorless to pale yellow for analysis 1, weakly pleochroic, biaxial negative,  $\gamma \approx \beta = 1.615(1)$ ,  $2V_{meas} = 9^\circ$ ,  $r < v$ ,  $D_{meas} = 3.31 \text{ g/cm}^3$ ; for analysis 2, red-orange color, more markedly pleochroic (in reddish hues),  $\gamma \approx \beta = 1.633(1)$ . Cell parameters for the two samples are, respectively,  $a = 5.308, 5.312$ ,  $b = 9.197, 9.168$ ,  $c = 10.173, 10.139 \text{ \AA}$ ,  $\beta = 100.27, 100.12^\circ$ . The mineral occurs in Archean rocks of the Bug Series in the Yatran block, southern part of the Tarasov structure, Ukrainian Shield, Ukraine. The host rock is a calc-silicate marble containing calcite, dolomite, serpentine (pseudomorphs of forsterite), diopside, apatite, barite, and magnetite. The marble is interlayered with two-pyroxene granulite, biotite-clinopyroxene granulite, migmatite-enderbite, and granite. Metamorphic conditions are inferred to be hornblende-granulite facies.

**Discussion.** Although the authors suggest that this mica is a Ba-rich analog of phlogopite, and is distinguished from kinoshitalite by the near absence of Mn, this element is not an essential component in the formula of kinoshitalite,  $(Ba,K)(Mg,Mn,Al)_3Si_2Al_2O_{10}(OH)_2$ . Thus, the described mineral is a potassian kinoshitalite. See also the discussion concerning the formula of phlogopite in the abstract of tetraferriphlogopite. **E.S.G.**

### $Na_6MnTiSi_{10}(O,OH)_{28} \cdot 4H_2O$

N.A. Yamnova, Yu.K. Egorov-Tismenko, A.P. Khomyakov (1996) Crystal structure of a new (Na,Mn,Ti) phyllosilicate. *Kristallografiya*, 41, 257–262 (in Russian).

The mineral occurs in pegmatite of the ultra-alkalic type at Mount Alluaiv, Lovozero alkaline massif, Kola Peninsula, Russia. Grains are anhedral, 1–2 mm across, pink to yellow,  $H = 3$ –4, perfect {100} cleavage,  $D_{meas} = 2.42$ ,  $D_{calc} = 2.43 \text{ g/cm}^3$  for  $Z = 4$ . Single-crystal X-ray structure study ( $R = 0.066$ ) indicated monoclinic symmetry, space group  $I2/m$ ,  $a = 13.033(6)$ ,  $b = 18.717(9)$ ,  $c = 12.264(6) \text{ \AA}$ ,  $\beta = 99.62(4)^\circ$ . Electron microprobe analysis (not given) led to the empirical formula  $(Na_{5.84}K_{0.42})_{\Sigma 6.26}(Mn_{0.94}Fe_{0.04}Ca_{0.02})_{\Sigma 1.00}(Ti_{0.75}Nb_{0.25})_{\Sigma 1.00}Si_{10}O_{24.5}(OH)_{3.5} \cdot 4 \cdot 5H_2O$ ; the structurally derived formula is  $(Na_{0.80}K_{0.45})Na_5Mn^{2+}(Ti_{0.75}Nb_{0.25})[Si_{10}O_{24}(OH)](O,OH)(OH)_2 \cdot 4H_2O$ . The new mineral has been approved by the CNMMN. **J.L.J.**

### New Data

#### Calcybeborosilite

R.K. Rastsvetayeva, D.Yu. Pushcharovskiy, I.V. Pekov, A.V. Voloshin (1996) The crystal structure of "calcybeborosilite" and its position in the isomorphic series datolite–gadolinite. *Kristallografiya*, 41(2), 235–239 (in Russian).

The average of six electron microprobe analyses (not given) corresponds to  $(Ca_{0.94}REE_{0.91}U_{0.03}Th_{0.01})(Fe_{0.25}^{2+}Mn_{0.05})(Be_{1.04}B_{0.96})[SiO_4]_2(OH)_{1.63}O_{0.33}F_{0.04}$ . The Be and  $H_2O$  were not measured but were calculated so that  $B + Be = 1$  and  $O + OH + F = 10$ , and the charges balanced. The presence of substantial Be was confirmed by spectral analyses, and Fe is presumed ferrous by analogy with gadolinite. Two electron microprobe analyses of the REEs (including Y) totalled 29.04 and 30.63 wt%  $REE_2O_3$ ; the relative percentages of REEs making up these totals are Y 70.6, 69.2, La 3.9, 1.9, Ce 10.5, 9.3, Pr 1.0, 1.2, Nd 3.2, 5.1, Sm 0.4, 1.3, Eu 0.0, 0.4, Gd 0.8, 1.6, Tb 0.1, 0.5, Dy 2.1, 3.3, Ho 0.4, 1.3, Er 2.9, 3.2, Tm 0.5, 0.3, Yb 3.2, 1.3, and Lu 0.4, 0.1. Single-crystal X-ray structure study ( $R = 0.062$ ) indicated monoclinic symmetry, space group  $P2_1/a$ ,  $a = 9.846(4)$ ,  $b = 7.600(2)$ ,  $c = 4.766(2) \text{ \AA}$ ,  $\beta = 90.11(3)^\circ$ ,  $D_{calc} = 3.8 \text{ g/cm}^3$  for  $Z = 4$ . The mineral is a member of the datolite–gadolinite group and is roughly intermediate in composition. The corresponding site assignments for datolite, "calcybeborosilite," and gadolinite are as follows: for T2, B,  $B_{0.5}Be_{0.5}$ , and Be; for M1, Ca,  $Y_{0.42}REE_{0.13}Ca_{0.45}$ , and Y; for M2, –,  $Fe_{0.25}^{2+}Mn_{0.05}$ , and  $Fe_{0.25}^{2+}$ . The mineral occurs in pegmatoidal granosyenite at Dara-i-Pioz, Tien Shan, Tajikistan. The

studied material is in the Fersman Mineralogical Museum, Moscow.

**Discussion.** For the formula given,  $Z$  should be 2, not 4. Another example of this mineral from Dara-i-Pioz was abstracted in *Am. Mineral.*, 49, 443–444, 1964, and data for a similar mineral from Latium, Italy, were abstracted in *Am. Mineral.*, 77, p. 673, 1992. The name calcybeborosilite was introduced by A.S. Povarennikh in 1966, but neither the mineral nor the name has been approved by the CNMMN. **E.S.G.**

### Epistilbite

P. Yang, T. Armbruster (1996) (010) disorder, partial Si,Al ordering, and Ca distribution in triclinic (C1) epistilbite. *Eur. J. Mineral.*, 8, 263–271.

Single-crystal X-ray structure study ( $R = 0.0383$ ) indicated that epistilbite has triclinic rather than monoclinic symmetry, space group C1,  $a = 9.083(1)$ ,  $b = 17.738(3)$ ,  $c = 10.209(1)$  Å,  $\alpha = 89.95(1)$ ,  $\beta = 124.58(1)$ ,  $\gamma = 90.00(1)^\circ$ . The lower symmetry results from partial Si-Al ordering accompanied by a preferred distribution of the channel cations close to the underbonded O atoms of the tetrahedral framework.

**Discussion.** A request for redefinition of the mineral has not been submitted to the CNMMN for a vote. **J.L.J.**

### Lindackerite,\* pradetite

H. Sarp, B. Dominik (1995) Redefinition of lindackerite: New chemical formula and new crystallographic and optical data. *Archs Sci. Genève*, 48(3), 239–250 (in French, English abs.).

Electron microprobe analyses of a mineral from the Cap Garonne mine (Var, France) and of lindackerite from the type specimen (Elias mine, Joachimstal, Czech Republic) gave, respectively, CuO 33.04, 36.47, CoO 3.39, 1.24, NiO –, 0.50, As<sub>2</sub>O<sub>5</sub> 44.64, 43.71, H<sub>2</sub>O (by difference) 18.93, 18.08 wt%, corresponding to (Cu<sub>4.36</sub>Co<sub>0.47</sub>)<sub>Σ4.83</sub>(AsO<sub>4</sub>)<sub>2.03</sub>[(AsO<sub>3</sub>)<sub>2.03</sub>(OH)<sub>1.55</sub>] $\cdot$ 10.2H<sub>2</sub>O and (Cu<sub>4.90</sub>Co<sub>0.18</sub>Ni<sub>0.07</sub>)<sub>Σ5.15</sub>(AsO<sub>4</sub>)<sub>2.02</sub>[(AsO<sub>3</sub>)<sub>2.03</sub>(OH)<sub>2.21</sub>] $\cdot$ 9.61H<sub>2</sub>O, ideally (Cu,Co)<sub>5</sub>(AsO<sub>4</sub>)<sub>2</sub>(AsO<sub>3</sub>·OH)<sub>2</sub> $\cdot$ 10H<sub>2</sub>O. Properties of the mineral from both localities are similar; for type material from Joachimstal, optically biaxial positive,  $\alpha = 1.632(2)$ ,  $\beta = 1.662(2)$ ,  $\gamma = 1.725(5)$ ,  $2V_{\text{meas}} = 74^\circ$ ,  $2V_{\text{calc}} = 72^\circ$ ,  $r < v$  strong; weak pleochroism from green ( $\gamma$ ) to colorless ( $\alpha = \beta$ );  $\beta \wedge a = 21.3^\circ$  on {010}, and  $34.4^\circ$  on {001}. Single-crystal X-ray study indicated triclinic symmetry, space group  $P1$  or  $\bar{P}1$ ,  $a = 8.035(2)$ ,  $b = 10.368(4)$ ,  $c = 6.453(2)$  Å,  $\alpha = 79.60(3)$ ,  $\beta = 84.83(3)$ ,  $\gamma = 86.17(3)^\circ$ ;  $D_{\text{meas}} = 3.35(2)$ ,  $D_{\text{calc}} = 3.37(1)$  g/cm<sup>3</sup> for  $Z = 1$ . Strongest lines of the X-ray powder pattern (114 mm Gandolfi, Cu radiation) are 10.2(100,010), 8.02(70,100), 4.001(40,121,200), 3.668(60,121,021,210), 3.154(60,211), 3.064(40,220,211,112), 2.665(50,300,111,122), and 2.613(40,212,310).

The authors note that CNMMN approval for the new name pradetite was received for the mineral from Cap Garonne; only subsequently was it recognized that some of the published data for the poorly defined mineral lindackerite were incorrect, and that pradetite and lindackerite were the same mineral. The CNMMN then voted to redefine lindackerite rather than discredit it.

**Discussion.** The authors give no references to indicate that the name pradetite had been published, and it is unfortunate that the name has been introduced to the literature at this point. **J.L.J.**

### Moganite

I. Petrovic, P.J. Heaney, A. Navrotsky (1996) Thermochemistry of the new silica polymorph moganite. *Phys. Chem. Minerals*, 23, 119–126.

Calorimetric results showed that the enthalpy of moganite at 298 K is about 3.4(7) kJ/mol higher than that of quartz, thus supporting previous studies indicating that moganite is a distinct mineral. The X-ray pattern of moganite shows several diffraction lines that are distinct from those of quartz.

**Discussion.** Moganite as a mineral name is not under consideration by the CNMMN because no proposal to validate the mineral has been made since 1984. **J.L.J.**

### Prismatine\*

E.S. Grew, M.A. Cooper, F.C. Hawthorne (1996) Prismatine: Revalidation for boron-rich compositions in the kornerupine group. *Mineral. Mag.*, 60, 483–491.

D.A. Young (1995) Kornerupine-group minerals in Grenville granulite-facies paragneiss, Reading Prong, New Jersey. *Can. Mineral.*, 33, 1255–1262.

Reexamination of kornerupine and prismatine from their type localities has shown that the two minerals differ in B content. In the general formula ( $\square$ ,Mg,Fe)(Mg,Fe,Al)<sub>9</sub>(Si,Al,B)<sub>5</sub>(O,OH,F)<sub>22</sub>, the presence of >0.5 atoms of B per formula unit (p.f.u.) indicates B predominance in the T3 site of the structural formula ( $\square$ ,Fe,Mg)(Mg,Al,Fe)<sub>5</sub>Al<sub>4</sub><sup>T1</sup>Si<sub>2</sub><sup>T2</sup>(Si,Al)<sub>2</sub><sup>T3</sup>(B,Si,Al)(O,OH,F)<sub>22</sub>. Thus, reintroduction of the name prismatine has been approved for the mineral with B > 0.5 atoms p.f.u.; the name kornerupine is retained for minerals with B < 0.5 atoms p.f.u. of 22(O,OH,F) and for kornerupine-structure minerals with unknown B contents. The  $a$  and  $c$  cell parameters decrease with increasing B content and in principle could be used to distinguish kornerupine (sensu stricto) from prismatine. **J.L.J.**

### Tetraferriphlogopite

G. Cruciani, P.F. Zanazzi, S. Quartiera (1995) Tetrahedral ferric iron in phlogopite: XANES and Mössbauer com-

pared to single-crystal X-ray data. *Eur. J. Mineral.*, 7, 255–265.

Mössbauer spectroscopy, X-ray absorption near-edge structure spectroscopy, electron microprobe analyses, and single-crystal X-ray structure studies were used to determine the amount of tetrahedrally coordinated  $\text{Fe}^{3+}$  in several samples of mica, referred to as tetraferriphlogopite, from peralkaline host rocks. A mica from the Araxá carbonatite, Brazil, has the highest amount of tetrahedrally coordinated  $\text{Fe}^{3+}$  and has the composition  $(\text{K}_{0.883}\text{Na}_{0.050}\text{Ba}_{0.003}\text{Ca}_{0.001})(\text{Mg}_{2.820}\text{Fe}_{0.107}^{2+}\text{Ti}_{0.017}\text{Fe}_{0.050}^{3+}\text{Mn}_{0.004}\text{Cr}_{0.001}\text{Li}_{0.001})(\text{Si}_{2.974}\text{Al}_{0.588}\text{Fe}_{0.438}^{3+}\text{O}_{10.000}(\text{OH}_{1.917}\text{F}_{0.083}))$ .

**Discussion.** Tetraferriphlogopite is not an approved mineral name. The *Glossary of Mineral Species* (Fleischer and Mandarino, 1995), the *Mineral Reference Manual* (Nickel and Nichols, 1991), and *Hey's Mineral Index* (Clark, 1993) all indicate the following end-member compositions: biotite,  $\text{KMg}_3\text{AlSi}_3\text{O}_{10}(\text{OH},\text{F})_2$ ; phlogopite,  $\text{KMg}_3\text{AlSi}_3\text{O}_{10}(\text{F},\text{OH})_2$ ; annite,  $\text{KFe}_3^+\text{AlSi}_3\text{O}_{10}(\text{OH})_2$ ; ferriannite,  $\text{KFe}_3^+\text{Fe}^{3+}\text{Si}_3\text{O}_{10}(\text{OH})_2$ . Thus, the distinction between biotite and phlogopite is on F-OH rather than Mg-Fe contents. Accordingly, the composition for the mineral described as tetraferriphlogopite is that of ferrian biotite. **J.L.J.**

### Zinc-melanterite

Tiegeng Liu, Guohong Gong, Lin Ye (1995) Discovery and investigation of zinc-melanterite in nature. *Acta Mineral. Sinica* 15(3), 286–290 (in Chinese, English abs.).

Two chemical analyses gave ZnO 16.07, 16.63, FeO 8.41, 9.30, MgO 1.48, 1.31, CaO 0.28, –, CuO <0.01, <0.01,  $\text{SO}_3$  28.52, 28.8,  $\text{H}_2\text{O}$  44.98, 44.18, sum 99.74, 99.50 wt%, the average corresponding to  $(\text{Zn}_{0.566}\text{Fe}_{0.353}\text{Mg}_{0.097}\text{Ca}_{0.021})_{\Sigma 1.037}(\text{SO}_4)_{0.988} \cdot 6.88\text{H}_2\text{O}$ , ideally  $(\text{Zn},\text{Fe})\text{SO}_4 \cdot 7\text{H}_2\text{O}$ . Yellowish green to apple-green color, transparent, vitreous to resinous luster, white streak, uneven fracture,  $H = 2\frac{1}{2}$ ,  $D_{\text{meas}} = 2.03$ ,  $D_{\text{calc}} = 1.93 \text{ g/cm}^3$ . Single crystals are light yellow, up to 1.8 mm long. Optically biaxial positive,  $\alpha = 1.477(3)$ ,  $\beta = 1.487(4)$ ,  $\gamma = 1.489(4)$ ,  $2V_{\text{meas}} = 80^\circ$ ,  $2V_{\text{calc}} = 78.69^\circ$ . The X-ray powder pattern and cell dimensions calculated from it are in good agreement with data for the synthetic analog. The mineral occurs as short prismatic crystals and as stalactitic to crustiform granular aggregates in the oxidation zone of pyritic ore deposits in Leh-Yang County, southern Shaanxi Province, China.

**Discussion.** This constitutes the first complete description of a natural occurrence of this mineral. **J.L.J.**