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NEW MINERAL NAMES*

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DASHKOVAITE*

N.V. Chukanov, D.I. Belakovsky, S.V. Malinko, N.I. Organova (2000) Dashkovaite $Mg(HCO_3)_2·2H_2O$ — A new formate mineral. Zapiski Vseross. Mineral. Obshch., 129(6), 49–53 (in Russian, English abs.).

Chemical analysis gave C 16.2, H 3.9, Mg 16.4, Mn (by electron microprobe) 0.2, O (by difference) 63.3, sum 100 wt%, corresponding to $Mg_{1.00}Mn_{0.01}H_{5.74}C_{2.00}O_{5.87}$, ideally $Mg(HCO_3)_2 · 2H_2O$. The mineral occurs as white, fibrous aggregates in hydrothermal veinlets, up to 1 mm in width, wherein the fibers are up to 3 mm long and 0.01 mm wide. Soft and porous, H = 1, D_{calc} = 1.74 g/cm^3 for Z = 4. Microscopically colorless, biaxial positive, $\alpha = 1.465(3)$, $\beta = 1.486(3)$, $\gamma = 1.516(3)$, $2V_{calc}$ = 81(5)°, X parallel to the elongation. By analogy with the synthetic analog, indexing of the X-ray powder pattern gave a monoclinic cell, space group $P2_1/c$, a = 8.64(1), b = 7.15(1), c = 9.38(1) Å, β = 98.0(1)°; strongest lines of the pattern (57 mm camera, Fe$K\alpha$ radiation) are 4.90(90,$11\bar{1}$), 4.64(80,002), 4.30(70,200), 3.68(80,210), and 3.40(100,112). The IR spectrum is similar to that of the synthetic compound.

The mineral occurs with shabynite, iowaite, ekaterinite, korshunovskite, halite, hydromagnesite, and serpentine in dolomite marble at the Korshunovskoye boron deposit in the Irkutsk district, Siberia. The new mineral name is for E.R. Dashkova (1744–1810), former Director of the Saint Petersburg Academy of Sciences (1783–1796) and President of the Russian Academy of Sciences. Type material is in the Fersman Mineralogical Museum, Moscow, Russia. **J.L.J.**

FLUORANNITE*

Ganfu Shen, Qi Lu, Jinsha Xu (2000) Fluorannite: A new mineral of the mica group from the western suburb of Suzhou City. Acta Petrologica Mineral., 19(4), 355–362 (in Chinese, English abs.).

The mineral occurs as euhedral to subhedral sheets and tabular crystals to more than 6 mm across, but predominantly 2–4 mm long and 1–3 mm wide. Iron-black color, submetallic luster, perfect {001} cleavage, sectile, gray streak, VHN = 109 (93.4–132), D_{meas} = 3.15–3.20, D_{calc} = 3.23 g/cm^3 for Z = 2. Optically biaxial negative, $\alpha = 1.596$, $\beta = \gamma = 1.648$, $2V_{meas}$ = ~0º, $2V_{calc}$ = 0º, $Y = b$; strongly pleochroic, X = pale brown, Y = dark green, Z = reddish brown. Electron microprobe and wet-chemical analyses gave K_2O 8.73, Na_2O 0.19, Rb_2O 0.42, CaO 0.02, BaO 0.44, SrO 0.01, FeO 26.19, Fe_2O_3 7.86 (Fe partitioned by Mössbauer spectroscopy), MgO 1.49, MnO 0.68, Li_2O 0.47, TiO_2 1.29, ZnO 0.27, NiO 0.01, SiO_2 34.12, Al_2O_3 13.89, H_2O 0.91, F 3.91, O ≡ F 1.65, sum 99.25 wt%, corresponding to $(K_{0.92}Na_{0.03}Rb_{0.02}Ba_{0.01})_{\Sigma 0.98}(Fe^{2+}_{1.82}Fe^{3+}_{0.49}Al_{0.19}Mg_{0.18}Li_{0.16}Ti_{0.08}Mn_{0.05}Zn_{0.02})_{\Sigma 2.99}(Si_{2.83}Al_{1.17})_{\Sigma 4.00}(F_{1.03}OH_{0.50}\square_{0.47})_{\Sigma 2.00}$, simplified as $KFe^{2+}_3AlSi_3O_{10}F_2$, which is the F analog of annite. Single-crystal X-ray structure study indicated monoclinic symmetry, space group $C2/m$, $1M$ polytype, a = 5.369(8), b = 9.289(3), c = 10.153(8) Å, β = 100.49(1)°. Strongest lines of the powder pattern (diffractometer, Cu$K\alpha$ radiation) are 10.09(100,001), 5.02(13,002), 3.336(56,003), and 2.507(14,131,004).

The mineral is a rock-forming species in the upper part of an A-type granite at Suzhou, near Shanghai, eastern China. Type material is in the Geology and Mineral Resources Institute in Chengdu, and in the Geological Museum of China, at Beijing. **J.L.J.**

FLUORO-MAGNESIO-ARFVEDSONITE*

A.G. Bazhenov, I.L. Nedosekova, T.V. Krinova, A.B. Mironov, P.V. Kvorov (2000) Fluormagnesioarfvedsonite $NaNa_2(Mg,Fe^{2+})_4Fe^{3+}[Si_8O_{22}](F,OH)_2$ — A new mineral species of the amphibole group (Ilmen-Vishnevye Mountains alkaline massif, south Urals). Zapiski Vseross. Mineral. Obshch., 129(6), 28–35 (in Russian, English abs.).

The mineral occurs as light gray, short prismatic grains in albite-microcline fenite in the contact zone of the Ilmen alkaline massif. Wet-chemical analysis gave SiO_2 56.76 TiO_2 0.51, Al_2O_3 1.47, Fe_2O_3 5.76, FeO 0.79, MnO 0.29, MgO 20.10, CaO 2.86, Na_2O 7.50, K_2O 1.62, H_2O^+ 0.84, F 2.80, O ≡ F 1.18, sum 100.12 wt%, corresponding to $(Na_{0.44}K_{0.29})_{\Sigma 0.73}(Na_{1.57}Ca_{0.43})_{\Sigma 2.00}(Mg_{4.14}Mn_{0.03}Fe^{2+}_{0.09}Fe^{3+}_{0.60}Ti_{0.05}Al_{0.09})_{\Sigma 5.00}[(Si_{7.85}Al_{0.15})_{\Sigma 8.00}O_{22}](F_{1.22}OH_{0.78})_{\Sigma 2.00}$, which is the F analog of magnesio-arfvedsonite. Brittle, $H = 5^1/_2$, {110} cleavage, D_{meas}= 3.09, D_{calc} = 3.04 g/cm^3 for Z = 2. Optically biaxial positive, $\alpha = 1.618$, $\beta = 1.629$, $\gamma = 1.632$, $2V_{meas}$ = 50–70°, c:Z = 15–16°, optic-axis plane (010), pleochroism X = yellowish, almost colorless, Y = lilac, Z = greenish blue, $Z > Y > X$. Indexing of the X-ray powder diffractogram (Fe$K\alpha$ radiation) gave a monoclinic cell with a

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*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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= 9.81(9), b = 18.01(3), c = 5.28(1) Å, β = 103.8(2)°, probable space group $C2/m$. Strongest lines are 8.42(34,110), 3.264(23,240), 3.129(100,310), 2.804(28,330), and 2.708(17,151).

The mineral is associated with perthite, microcline, albite, phlogopite, quartz, and accessory titanite, rutile, apatite, pyrite, and zircon. Type material is in the Natural Science Museum of the Ilmen State Preserve at Miass, and in the Mineralogy Department of the Saint Petersburg Mining Institute, Russia.

Discussion. Although it is written as "fluormagnesioarfvedsonite" in both the English abstract and the Russian version of the publication, the new mineral name should be fluoro-magnesio-arfvedsonite to conform to the CNMMN-approved nomenclature system for the amphiboles. **J.L.J.**

KAPITSAITE-(Y)*

L.A. Pautov, P.V. Khvorov, E.V. Sokolova, G. Ferraris, G. Ivaldi, L.F. Bazhenova (2000) Kapitsaite-(Y) $(Ba,K)_4(Y,Ca)_2Si_8(B,Si)_4O_{28}F$ — A new mineral. Zapiski Vseross. Mineral. Obshch., 129(6), 42–49 (in Russian, English abs.).

The mineral occurs as a pale pink, sheaf-like aggregate, 1 × 3 cm. The average of seven listed electron microprobe analyses (REE titrometrically, B colorimetrically, and Be by atomic absorption) is SiO_2 34.98, Al_2O_3 0.04, FeO 0.01, MnO 0.05, CaO 3.12, K_2O 0.87, Na_2O 0.46, PbO 1.95, BaO 38.18, Y_2O_3 7.93, La_2O_3 0.01, Ce_2O_3 0.09, Pr_2O_3 0.03, Nd_2O_3 0.32, Sm_2O_3 0.36, Gd_2O_3 0.64, Dy_2O_3 0.70, Ho_2O_3 0.14, Er_2O_3 0.36, Yb_2O_3 0.20, B_2O_3 8.68, BeO <0.02, F 1.40, Cl 0.01, O ≡ F 0.59, sum 99.94 wt%, corresponding to $(Ba_{3.54}K_{0.26}Pb_{0.12}Na_{0.07})_{\Sigma 3.99}(Y_{1.00}Ca_{0.78}Na_{0.15}REE_{0.22})_{\Sigma 2.15}(Si_{7.99}Al_{0.01})_{\Sigma 8.00}(B_{3.55}Si_{0.31})_{\Sigma 3.86}O_{27.98}F_{1.05}$, simplified as $(Ba,K)_4(Y,Ca)_2Si_8(B,Si)_4O_{28}F$. Semitransparent to transparent, vitreous luster, white streak, no cleavage, conchoidal fracture, $H = 5^1/_2$, pale pink luminescence in shortwave ultraviolet light, D_{meas} = 3.74(3), D_{calc} = 3.79 g/cm^3 for Z = 2. Optically biaxial positive, α = 1.624(3), β = 1.628(2), γ = 1.637(2), $2V_{meas}$ = 69(4), $2V_{calc}$ = 68°, moderate dispersion $r < v$. X-ray structure study (*Am. Mineral.*, 86, p. 768, 2001) indicated triclinic symmetry, space group $I\overline{1}$, a = 11.181(4), b = 10.850(7), c = 10.252(4) Å, α = 90.64(6), β = 90.05(4), γ = 89.97(7)°. Strongest lines of the powder pattern (diffractometer, Fe$K\alpha$ radiation) are 7.80(70, $\overline{11}0$), 3.77(100,202), 3.73(70, $\overline{3}00$), 3.24(75,013), 2.93(80,321, $\overline{23}1$), and 2.90(90, $\overline{3}12$).

The mineral, which is the Y analog of hyalotekite, is associated with quartz, reedmergnerite, leucosphenite, polylithionite, pectolite, pyrochlore, turkestanite, and aegirine in a boulder of peralkaline pegmatite in the moraine of the Dari-i-Pioz glacier, Alayskiy Range, Garm region, northern Tajikistan. The new name is for Russian physicist P.L. Kapitsa (1894–1984). Type material is in the Fersman Mineralogical Museum, Moscow, Russia.

Discussion (by E.S. Grew, written communication). Sokolova et al. (2000; see *Am. Mineral.*, 86, p. 768, 2001) gave a crystal-chemical formula $(Ba_{3.68}K_{0.12}Pb_{0.20})(Y_{1.00}Ca_{0.66}REE_{0.34})[Si_8B_2(B_{1.70}Si_{0.30})O_{28}F]$, which results in an excess positive charge of 0.52. Unless there is significant substitution of alkalis for divalent cations, e.g., 0.26 K and 0.22 Na in the type material, charge balance is not possible for (Y,REE) > Ca and B <4; that is, the only charge-balanced, alkali-free end-member for a Y analog of hyalotekite is $Ba_4(YCa)[Si_8B_4O_{28}F]$. **J.L.J.**

KRETTNICHITE*

J. Brugger, T. Armbruster, A. Criddle, P. Berlepsch, S. Graeser, S. Reeves (2001) Description, crystal structure, and paragenesis of krettnichite, $PbMn^{3+}_2(VO_4)_2(OH)_2$, the Mn^{3+} analogue of mounanaite. Eur. J. Mineral., 13, 145–158.

The mineral occurs as radiating aggregates, to 3 cm diameter, of dark brown platy (001) crystals, as <1 mm acicular to prismatic black crystals, and as brownish pseudorhombohedral crystals showing {001}, {111}, {332}, and {331}. Adamantine luster, brown streak, $H = 4^1/_2$, excellent {001} cleavage and a distinct one at a high angle to it, nonfluorescent, D_{meas} = >4.04, D_{calc} = 4.51–4.81 g/cm^3 for Z = 2. Electron microprobe analysis gave CaO 0.60, BaO 0.90, SrO 1.48, PbO 32.66, CuO 0.42, CoO 2.22, NiO 0.04, Al_2O_3 0.04, Fe_2O_3 1.25, Mn_2O_3 24.03, As_2O_5 2.92, V_2O_5 29.26, H_2O (calc.) 3.54, sum 99.43 wt%, corresponding to $(Pb_{0.83}Sr_{0.08}Ca_{0.06}Ba_{0.03})_{\Sigma 1.00}(Mn^{3+}_{1.73}Co_{0.17}Fe_{0.09}Cu_{0.03}Al_{0.01})_{?2.03}(V_{1.83}As_{0.14})_{\Sigma 1.97}O_{7.71}(OH)_{2.23}$, ideally $PbMn_2(VO_4)_2(OH)_2$. In transmitted light, only thin (001) plates are transparent. Reddish brown color, distinct pleochroism towards orange; n_{calc} from reflectance measurements at 590 nm are 2.21 for R_1 and 2.39 for R_2. Single-crystal X-ray structure study gave monoclinic symmetry, space group $C2/m$; a = 9.275(7), b = 6.284(3), c = 7.682(2) Å, β = 117.97(4)° as refined from a diffractometer powder pattern (Cu$K\alpha$ radiation) with strongest lines of 3.388(95,002), 3.270(100, $\overline{1}12$), 2.946(51,201), 2.850(49,021), 2.4910(93,112,220), and 1.6962(83,004).

The mineral, which is a new member of the tsumcorite group, occurs in the waste-rock dumps of a hydrothermal manganite-quartz vein, also containing barite, ankerite, mottramite, brackebuschite, and pyrobelonite, at Krettnich, Saarland, Germany. The new name is for the locality. Type material is in the Musée Cantonal de Géologie, Lausanne, Switzerland, and at the Natural History Museum, London, U.K. **J.L.J.**

LEVINSONITE-(Y)*, ZUGSHUNSTITE-(Ce)*

R.C. Rouse, D.R. Peacor, E.J. Essene, T.D. Coskren, R.J. Lauf (2001) The new minerals levinsonite-(Y) $[(Y,Nd,Ce)Al(SO_4)_2(C_2O_4)\cdot 12H_2O]$ and zugshunstite-(Ce) $[(Ce,Nd,La)Al(SO_4)_2(C_2O_4)\cdot 12H_2O]$: Coexisting oxalates with different structures and differentiation of LREE and HREE. Geochim. Cosmochim. Acta, 65, 1101–1115.

The minerals form part of the sulfate-rich supergene assemblage, predominantly epsomite and halotrichite-group minerals, that formed by weathering of pyritiferous phyllite at Alum Cave Bluff, Great Smoky Mountains Park, Tennessee.

LEVINSONITE-(Y)

The mineral occurs as individual prismatic crystals, elongate [101] to 1.0 mm in length, and as randomly oriented groups of a few crystals. The crystals are flattened on (101), showing {101}, {010}, and {101} [{$10\overline{1}$}? — J.A. Mandarino]. Colorless, transparent, brittle, white streak, irregular fracture, perfect {101} cleavage, *H* not determinable, nonfluorescent, soluble in water, $D_{calc} = 2.181$ g/cm^3 for $Z = 2$. Optically biaxial positive, $\alpha = 1.48(1)$, $\beta = 1.49(1)$, $\gamma = 1.55(1)$, $2V_{meas} = 7(3)°$, orientation $Y \parallel b$, X nearly $\parallel c$, $Z \wedge c = 19°$. Single-crystal X-ray structure study ($R = 0.024$) indicated monoclinic symmetry, space group $P2/n$, $a = 10.289(1)$, $b = 9.234(1)$, $c = 11.015(1)$ Å, $\beta = 108.50(1)°$. Strongest lines of the X-ray powder pattern (114 mm Gandolfi) are 9.3(100,010), 6.28(90, $\bar{1}11$), 5.20(40,111), 4.89(60,200), and 4.09(50,$\bar{1}21$). Electron microprobe analysis gave Y_2O_3 5.72, La_2O_3 0.50, Ce_2O_3 3.02, Pr_2O_3 0.76, Nd_2O_3 5.94, Sm_2O_3 3.21, Eu_2O_3 0.54, Gd_2O_3 2.23, Dy_2O_3 1.15, Er_2O_3 0.29, Al_2O_3 7.83, SO_3 24.58, C_2O_3 (calc.) 11.05, H_2O (calc.) 33.18, [sum 100 wt%], corresponding to $(Y_{0.33}Nd_{0.23}Ce_{0.12}Sm_{0.12}Gd_{0.08}Dy_{0.04}La_{0.02}Eu_{0.02}Er_{0.01})_{\Sigma 1.00}Al(SO_4)_2(C_2O_4)\cdot 12H_2O$. The new name is for A.A. Levinson of the University of Calgary, who is the originator of the nomenclature system used for REE minerals.

ZUGSHUNSTITE-(CE)

The mineral is associated with levinsonite-(Y), and both may occur in the same hand specimen. Electron microprobe analysis gave La_2O_3 2.16, Ce_2O_3 13.17, Pr_2O_3 1.68, Nd_2O_3 6.50, Sm_2O_3 0.80, Eu_2O_3 0.27, Gd_2O_3 0.14, CaO 0.04, Al_2O_3 6.92, Fe_2O_3 1.11, SO_3 24.01, C_2O_3 (calc.) 10.80, H_2O (calc.) 32.41, [sum 100.01 wt%], corresponding to $(Ce_{0.54}Nd_{0.26}La_{0.09}Pr_{0.07}Sm_{0.03}Eu_{0.01}Gd_{0.01})_{\Sigma 1.01}Al(SO_4)_2(C_2O_4)\cdot 12H_2O$. Occurs as subparallel aggregates, to 1.5 mm in diameter, and as stubby individual crystals, to 1 mm in diameter, slightly elongate [100], with dominant {010} and {012}, and minor {111}. Pale pink under incandescent light, pale blue under fluorescent light, brittle, white streak, irregular fracture, poor {010} cleavage, *H* not determinable, nonfluorescent, soluble in H_2O, $D_{calc} = 2.121$ g/cm^3 for $Z = 4$. Optically biaxial positive, $\alpha = 1.455(5)$, $\beta = 1.485(2)$, $\gamma = 1.528(3)$, $2V_{meas} = 85(5)°$, medium dispersion $r > v$. Single-crystal X-ray structure study ($R = 0.026$) indicated monoclinic symmetry, space group $C2/c$, $a = 8.718(1)$, $b = 18.313(2)$, $c = 13.128(2)$ Å, $\beta = 93.90(1)°$; the structure differs from that of levinsonite-(Y). Strongest lines of the powder pattern (114 mm Gandolfi) are 7.9(100,110), 5.36(40,002), 5.01(40,130), and 3.93(70,023,220, $\bar{1}13$,132). The new name refers to the locality and is the anglicized version of the Cherokee Indian term for the Great Smoky Mountains.

Levinsonite-(Y) and zugshunstite-(Ce) occur in cavities and embedded within mixtures of epsomite and fibrous halotrichite-group minerals. The REE are thought to have been derived from the weathering of monazite and xenotime in the pyritiferous phyllite. Type specimens of the two new minerals are in the National Museum of Natural History, Washington, DC, and in the collections of the University of Michigan. **J.L.J.**

RAADEITE*

C. Chopin, G. Ferraris, M. Prencipe, F. Brunet, O. Medenbach (2001) Raadeite, $Mg_7(PO_4)_2(OH)_8$: a new dense-packed phosphate from Modum (Norway). Eur. J. Mineral., 13, 319–327.

Electron microprobe analyses gave MgO 55.35, FeO 0.25, MnO 0.30, CaO 0.02, P_2O_5 28.23, As_2O_5 0.40, SO_3 0.05, SiO_2 0.05, H_2O (calc.) 14.34, sum 98.99 wt%, which for 12 O on an anhydrous basis corresponds to $(Mg_{6.90}Fe_{0.02}Mn_{0.02})_{\Sigma 6.94}(P_{2.00}As_{0.02})_{\Sigma 2.02}O_{12}$; the crystal-structure determination gave $(Mg_{6.78}Fe_{0.02}Mn_{0.02})_{\Sigma 6.82}(P_{1.96}As_{0.02})_{\Sigma 1.98}H_{8.42}O_{16}$, ideally $Mg_7(PO_4)_2(OH)_8$. The mineral, which has been observed only in thin section, occurs as anhedral inclusions in holtedahlite, as veinlets a few tens of micrometers wide that cut althausite crystals, and as a part of fibrous coronae that replaced heneuite. Colorless, transparent, white streak, pearly luster, $D_{calc} = 2.806$ g/cm^3 for $Z = 2$. Optically biaxial negative, $\alpha = 1.5945(5)$, $\beta = 1.6069(5)$, $\gamma = 1.6088(5)$, $2V_{meas} = 45.6(1)°$, $2V_{calc} = 43°$, strong dispersion $r > v$, $Y = b$. Single-crystal X-ray structure study ($R = 0.021$) indicated monoclinic symmetry, space group $P2_1/n$, $a = 5.250(1)$, $b = 11.647(2)$, $c = 9.655(2)$ Å, $\beta = 95.94(1)°$, isostructural with allactite. Strongest lines of the X-ray powder pattern (114 mm Gandolfi, Cu$K\alpha$ radiation) are 4.436(75, $\bar{1}11$), 3.521(80,$\bar{1}22$, 121), 3.145(70,$\bar{1}22$), 3.087(70,013), 2.905(100,131), 2.794(75,023,041), and 2.199(80,142,202).

The mineral occurs in nodules rich in apatite and Mg phosphates within a serpentinite body near Tingelstadtjern in the Modum district of southern Norway. Formation is interpreted to be late metamorphic, under relatively low pressure and temperature. The new name is for Gunnar Raade, minerals curator at the Natural History Museum, Oslo. Type material is in the Museum national d'histoire naturelle, Paris, and in the Institute für Mineralogie, Ruhr-Universität Bochum, Germany. **J.L.J.**

SCHIAVINATOITE*

F. Demartin, V. Diella, C.M. Gramaccioli, F. Pezzotta (2001) Schiavinatoite, (Nb,Ta)BO_4, the Nb analogue of behierite. Eur. J. Mineral., 13, 159–165.

The mineral occurs as a small portion of one tetragonal dipyramidal crystal, about 4 mm across, that is modified by a second dipyramid and a tetragonal prism. Sixteen of the 54 electron microprobe analyses listed, with boron calculated assuming B/(Nb + Ta) = 1, average Nb_2O_5 33.08 (31.65–34.50), Ta_2O_5 50.37 (48.76–51.96), B_2O_3 16.60 (15.97–16.96), sum 100.05 wt%, corresponding to $(Nb_{0.52}Ta_{0.48})BO_4$, which is the Nb analog of behierite. Grayish pink color, vitreous luster, white streak, $H = \sim 8$, no cleavage, nonfluorescent, $D_{calc} = 6.548$ g/cm^3 for $Z = 4$. Colorless in thin section, uniaxial positive $n = \sim 2.30$. Single-crystal X-ray structure study ($R = 0.011$) indicated tetragonal symmetry, space group $I4/amd$, $a = 6.219(5)$, $c = 5.487(5)$ Å. Strongest lines of the calculated X-ray powder pattern are 4.115(100,101), 3.110(84,200), 2.481(36,211), 2.328(49,112), and 1.598(42,312).

The mineral occurs both in miarolitic cavities containing quartz, K-feldspar, tourmaline, and rhodizite, and within the massive rock of a B-rich granitic pegmatite at Antsongombato, south of Betafo, Malagasy Republic. The new mineral name is for Italian mineralogist Giuseppe Schiavinato (1915–1996). Type material is in the Museo Civico di Storia Naturale at Milan, Italy. **J.L.J.**

TELLURONEVSKITE*

R.Řídkošil, R.Škála, Z. Johan, V. Šrein (2001) Telluronevskite, Bi_3TeSe_2, a new mineral. Eur. J. Mineral., 13, 177–185.

The average of four listed electron microprobe analyses is Bi 68.84, Pb 0.42, Se 15.41, Te 14.58, S 1.14, sum 100.39 wt%, corresponding to $Bi_{2.92}Pb_{0.02}Te_{1.01}Se_{1.73}S_{0.32}$, simplified as $(Bi,Te)_3Te(Se,S)_2$, ideally Bi_3TeSe_2. Occurs as irregular grains and poorly shaped laths and prisms, to 1 mm, and as massive aggregates to 2 mm. Steel-gray color, metallic luster, black streak, perfect {001} cleavage, commonly flattened along (001), flexible in thin plates, VHN_{10} = 100 (62.9–137.0), deformation lamellae common, D_{meas} = 8.1(2), D_{calc} = 8.08 g/cm^3 for Z = 2. White with a yellow tint in reflected light, bireflectance imperceptible in air but yellowish white to gray in oil; moderately anisotropic, with polarization colors of gray to bluish gray. Reflectance percentages in air (SiC standard) are given in 20 nm steps from 420 to 700 nm; representative values for R_{max} and R_{min} are 48.5, 46.6 (470), 51.1, 48.5 (546), 51.9 49.5 (589), and 52.8, 50.5 (650). Single-crystal X-ray study indicated trigonal symmetry, space group $P\bar{3}m1$, a = 4.264(6), c = 23.25(3) Å. Strongest lines of the powder pattern (76.4 mm Debye–Scherrer, Cu$K\alpha$ radiation) are 4.66(19,005), 3.12(100,104), 2.28(33,108), 1.935(16,115,0.0.12), and 1.355(18,214,1.0.16). Constrained structure refinement (R = 0.154) showed that the Te and S atoms are ordered.

The mineral, which is in the tsumoite subgroup of the tetradymite group, occurs in opal-quartz veinlets and as disseminated grains in ‘secondary quartzite’ that was formed by contact metamorphism or hydrothermal alteration of volcanic rocks in the Bihorlat Mountains near Košice in eastern Slovakia, Slovak Republic. The new mineral name alludes to the chemical relationship to nevskite. Type material is in the Museum of Bohemian Paradise in Turnov, Czech Republic, and in the Museum of Eastern Slovakia, Košice, Slovak Republic. **J.L.J.**

$AuSn_2$

N. Meisser, J. Brugger (2000) Alluvial native gold, tetraauricupride and $AuSn_2$ from western Switzerland. Schweiz. Mineral. Petrogr. Mitt., 80, 291–298.

A single particle, 20 × 65 μm and consisting of an aggregate of monocrystalline acicular domains about 1 μm in length, borders argentiferous native gold extracted from organic-rich sediment of the Boiron River near Yens, canton Vaud, Switzerland. White in reflected light, nonpleochroic; in oil, strongly anisotropic with blue to brown yellow tints. The average of three listed electron microprobe analyses is Au 55.57, Ag <0.05, Cu <0.05, Sn 43.05, sum 98.62 wt%, corresponding to $Au_{31.89}Sn_{68.11}$, or $AuSn_{2.19}$, ideally $AuSn_2$. The source heavy-mineral concentrates contain numerous grains of cassiterite, but also present are particles of metallic tin and Sn-Pb alloys that are considered to be of anthropogenic origin. Several reasons are given for concluding that the $AuSn_2$ is natural rather than anthropogenic. **J.L.J.**

New Data

ARMSTRONGITE

Yu.K. Kabalov, N.V. Zubkova, D.Yu. Pushcharovsky, J. Schneider, A.N. Sapozhnikov (2000) Powder Rietveld refinement of armstrongite, $CaZr[Si_6O_{15}]\cdot 3H_2O$. Zeits. Kristallogr., 215, 757–761.

Rietveld analysis (R_{wp} = 2.75) of type material of armstrongite from Mongolia gave monoclinic symmetry, space grup $C2$, a = 14.018(1), b = 14.133(1), c = 7.840(1) Å, β = 109.40(1)°. The structure refinement confirmed a previous indication that the formula contains $3H_2O$. **J.L.J.**

CALCYBEBOROSILITE-(Y)

I.V. Pekov, A.V. Voloshin, D.Yu. Pushcharovskii, R.K. Rastsvetaeva, N.V. Chukanov, D.I. Belakovskii (2000) New data on calcybeborosilite-(Y) $(REE,Ca)_2(B,Be)_2[SiO_4]_2(OH,O)_2$. Moscow Univ. Geol. Bull., 55(2), 62–70.

The mineral is known only from the Dara-i-Pioz massif on the southern slope of the Altai Range in Tajikistan. Electron microprobe analysis (Be by gravimetry) gave SiO_2 28.78, UO_2 2.29, ThO_2 0.62, Y_2O_3 19.82, La_2O_3 1.51, Ce_2O_3 3.92, Pr_2O_3 0.34, Nd_2O_3 1.08, Sm_2O_3 0.17, Gd_2O_3 0.34, Tb_2O_3 0.05, Dy_2O_3 0.94, Ho_2O_3 0.22, Er_2O_3 1.25, Tm_2O_3 0.23, Yb_2O_3 1.59, Lu_2O_3 0.17, B_2O_3 9.81, BeO 3.72, CaO 12.91, MnO 0.80, FeO 4.02, H_2O (calc.) 2.91, P_2O_5 0.04, F 0.57, O ≡ F 0.24, sum 97.86 wt%, corresponding to $(REE_{1.02}Ca_{0.96}U_{0.04}Th_{0.01})_{\Sigma 2.03}(\square_{0.67}Fe_{0.28}Mn_{0.05})(B_{1.18}Be_{0.62})_{\Sigma 1.80}[Si_2O_8](OH_{1.35}O_{0.52}F_{0.13})_{\Sigma 2.00}$, where Y makes up about 70% and Ce about 10% of the REE in the formula. The simplified formula is $(REE,Ca)_2\square(B,Be)_2[SiO_4]_2(OH,O)_2$ for Z = 2. Single-crystal X-ray structure study (*Am. Mineral.*, 81, 1516–1517, 1996) confirmed that the mineral is isostructural with the other members of the gadolinite group. Indexed X-ray powder data and the IR spectrum are given.

Discussion. In the previous report (*Am. Mineral.*, 81, 1516–1517, 1996), formula Ca was reported to exceed the sum of REE. In the new analyses, formula Ca is also reported to be the dominant cation, with Ca > Y > Ce; because B > Be, one might infer that calcybeborosilite-(Y) is yttrian datolite $(Ca,Y)_2B_2Si_2O_8(OH)_2$. The authors conclude, however, that calcybeborosilite-(Y) is an independent mineral species because both Ca and REE occupy the same site, and the sum of REE in the new analyses is greater than that of Ca. Hence, calcybeborosilite-(Y) is legitimately defined as a rare-earth mineral (*Am. Mineral.*, 73, 422–423, 1988), whereas datolite is not. According to CNMMN rules, a species name is given to a rare-earth mineral whenever the REE distribution has been determined. Calcybeborosilite-(Y) is reported in Nickel and Nichols (*Mineral Reference Manual*, 1991) to be an accepted species on the basis of “grandfathering”; the mineral, however, is not included as a valid species in *Fleischer’s Glossary of Mineral Species* (Mandarino 1999). **J.L.J.**