New Mineral Names*

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BRODTKORBITE*

W.H. Paar, D. Topa, A.C. Roberts, A.J. Criddle, G. Amann, R.J. Sureda (2002) The new mineral species brodtkorbite, Cu_2HgSe_2, and the associated selenide assemblage from Tuminico, Sierra de Cacho, La Rioja, Argentina. Can. Mineral., 40, 225–237.

Electron microprobe analyses gave Cu 26.2, Hg 40.7, Se 32.9, sum 99.8 wt%, corresponding to $Cu_{2.00}Hg_{0.98}Se_{2.02}$, ideally Cu_2HgSe_2. The mineral occurs as dark gray individual anhedral grains, up to 50×100 µm, and as aggregates to 150×250 µm. Metallic luster, brittle, dark gray streak, no cleavage or parting, uneven fracture, $H = 2^{1}/_2$–3, $VHN_{10} = 91.4$–131, $D_{calc} = 7.77$ g/cm^3 for $Z = 2$ and the ideal formula. White in reflected light, weakly to moderately pleochroic from pinkish to bluish white, weak to strong bireflectance and anisotropy, rotation tints yellowish gray to mauve-gray. Reflectance percentages (WTiC standard) for R_1 and R_2 in air and in oil are, respectively, 29.60, 37.10, 15.15, 22.00 (470 nm), 27.40, 35.10, 13.30, 20.15 (546), 26.60, 34.60, 12.70, 19.80 (589), and 26.10, 34.10, 12.30, 19.25 (650). Single-crystal X-ray study indicated monoclinic symmetry, space group $P2_1/n$; $a = 7.492(5)$, $b = 4.177(1)$, $c = 7.239(4)$ Å, $\beta = 114.20(5)°$ as refined from a powder pattern (114 Debye–Scherrer, Cu radiation), with strongest lines of 3.991(70,101), 3.576(50,110), 3.534(50,011), 3.414(50,200), 2.730(100, $\bar{1}$12), 2.223(70,211), and 2.072(50, $\bar{1}$13, $\bar{3}$12).

The mineral occurs in intergrowths with berzelianite, tiemannite, umangite, and clausthalite within calcite veins at the Tuminico selenium deposit, about 30 km southwest of the village of Bajo Jagüe in the district of Sierra de Cacho, La Rioja, Argentina. The new mineral name is for Argentinian geology Prof. Milka K. de Brodtkorb (b. 1932). Type material is in the Institute of Mineralogy at the University of Salzburg, Austria, and in The Natural History Museum, London, England. **J.L.J.**

DECRESPIGNYITE-(Y)*

K. Wallwork, U. Kolitsch, A. Pring, L. Nasdala (2002) Decrespignyite-(Y), a new copper yttrium rare earth carbonate chloride hydrate from Paratoo, South Australia. Mineral. Mag., 66, 181–188.

The mineral occurs as blue crusts, to 5 mm thickness, and as coatings, globules, and fillings in thin fissures. The globules consist of pseudohexagonal platelets, up to 50 µm across and <0.5 µm thick. Electron microprobe analysis gave Y_2O_3 42.2, La_2O_3 0.3, Pr_2O_3 0.1, Nd_2O_3 1.3, Sm_2O_3 1.0, Gd_2O_3 4.8, Tb_2O_3 0.4, Dy_2O_3 3.7, Ho_2O_3 2.6, Er_2O_3 2.5, CaO 0.5, CuO 10.9, Cl 3.0, CO_2 (CHN) 19.8, H_2O (CHN) 10.8, $O \equiv Cl$ 0.7, sum 103.2 wt%, corresponding to $(Y_{3.08}Gd_{0.22}Dy_{0.16}Ho_{0.11}Er_{0.10}Nd_{0.06}Sm_{0.05}Tb_{0.02}La_{0.02}Pr_{0.01}Ca_{0.08})_{\Sigma3.91}Cu_{1.12}(CO_3)_{3.7}Cl_{0.7}(OH)_{5.79} \cdot 2.4H_2O$, simplified as $(Y,REE)_4Cu(CO_3)_4Cl(OH)_5 \cdot 2H_2O$. Transparent, vitreous to pearly luster, pale blue streak, $H = {\sim}4$, no cleavage observed, nonfluorescent, effervescent in dilute HCl, $D_{meas} = 3.64(2)$, $D_{calc} = 3.645$ g/cm^3 for the empirical formula and $Z = 4$. Pale blue in transmitted light, biaxial negative, $\alpha = 1.604(4)$, $\gamma = 1.638(3)$, small $2V$, medium-strong pleochroism, $X =$ pale blue, Y, $Z =$ bluish with a greenish tint, $Z \approx Y \gg X$. Electron diffraction patterns and indexing of the X-ray powder pattern (100 mm Guinier–Hägg, Cr$K\alpha_1$ radiation) indicated monoclinic symmetry, space group $P2_1$, Pm, or $P2/m$, $a = 8.899(6)$, $b = 22.77(2)$, $c = 8.589(6)$ Å, $\beta = 120.06(5)°$. Strongest lines are 22.79(30,010), 7.463(30,001), 7.086(50,011), 6.241(100,021), 4.216(30, $\bar{1}$12), 3.350(40,022), 3.336(30,032), and 2.143(30,222, $\bar{4}$01).

The mineral is a supergene product associated with caysichite-(Y), donnayite-(Y), malachite, kamphaugite-(Y), nontronite, calcite, gypsum, and Fe oxyhydroxides at the Paratoo copper mine near Yunta, Olary district, South Australia. The new mineral name is for Robert James Champion de Crespigny (b. 1950), who is prominent in the mining industry and is Chancellor of the University of Adelaide. Type material is in the South Australian Museum, Adelaide. **J.L.J.**

DICKTHOMSSENITE*

J.M. Hughes, F.E. Cureton, J. Marty, R.A. Gault, M.E. Gunter, C.F. Campana, J. Rakovan, A. Sommer, M.E. Brueseke (2001) Dickthomssenite, $Mg(V_2O_6) \cdot 7H_2O$, a new mineral species from the Firefly–Pigmay mine, Utah: descriptive mineralogy and arrangement of atoms. Can. Mineral., 39, 1691–1700.

Electron microprobe analysis gave MgO 15.38, FeO 0.46, V_2O_5 73.92, H_2O (by difference) 10.24, sum 100 wt%, corresponding to $(Mg_{0.94}Fe_{0.02})_{\Sigma0.96}V_2O_6 \cdot 1.4H_2O$, ideally $Mg(V_2O_6) \cdot 7H_2O$. Rapid decomposition under the electron beam accounts for the low H_2O, which in the ideal formula is 36.21 wt%. The mineral occurs as radial groups, to 5 mm long, consisting of acicular to platy prismatic crystals, the latter up to 0.5×1.5 mm and with basal termination. Light golden brown color, translucent,

vitreous luster, white streak, brittle, hackly fracture, perfect {100} cleavage, $H = 2^{1}/_{2}$, nonfluorescent, D_{meas} was determined to lie between 1.96 and 2.09, $D_{calc} = 2.037$ g/cm³ for $Z = 16$. Optically biaxial negative, $\alpha = 1.6124(3)$, $\beta = 1.6740$, $\gamma = 1.7104(4)$, $2V_{meas} = 74(1)$, $2V_{calc} = 72.7°$, dispersion $r < v$, $Z = b$, $c \wedge Y = 17°$. Single-crystal X-ray structure study ($R = 0.0645$) indicated monoclinic symmetry, space group $C2/c$, $a = 38.954(2)$, $b = 7.2010(4)$, $c = 16.3465(9)$ Å, $\beta = 97.602(1)°$; a subcell with $a/2$ and $b/2$ is present. Strongest lines of the powder pattern (114 mm Gandolfi, Cu$K\alpha$ radiation) are 9.704(100, 400), 8.117(60,002), 5.843(100,402), 3.139(90, $\overline{1}2.0.2$), and 2.920(60,804).

The mineral occurs as coatings, thought to be post-mining, on a sandstone wall at the Firefly–Pigmay mine, which is 16 km east of La Sal, San Juan County, Utah, and which ceased production of U-V ore in 1956. Pascoite, sherwoodite, and native selenium are present in close proximity to the dickthomssenite occurrence. The new mineral name is for geological consultant Richard (Dick) W. Thomssen (b. 1933) of Dayton, Nevada. Type material has been deposited (F. Cureton, written comm. 2002) in the Smithsonian Institution, Washington, DC. **J.L.J.**

FEKLICHEVITE*

I.V. Pekov, I.A. Ekimenkova, N.V. Chukanov, R.K. Rastsvetaeva, N.N. Kononkova, N.A. Pekova, A.E. Zadov (2001) Feklichevite, $Na_{11}Ca_9(Fe^{3+},Fe^{2+})_2Zr_3Nb[Si_{25}O_{73}](OH,H_2O,Cl,O)_5$, a new mineral of the eudialyte group from the Kovdor massif, Kola Peninsula. Zap. Vseross. Mineral. Obshch., 130(3), 55–65 (in Russian, English abs.).

Electron microprobe analysis gave Na₂O 11.45, CaO 15.55, SrO 0.28, MnO 0.49, FeO 0.28, Fe₂O₃ 3.20 (by wet chemistry), La₂O₃ 0.11, Ce₂O₃ 0.16, SiO₂ 50.35, ZrO₂ 11.65, HfO₂ 0.62, TiO₂ 0.12, Nb₂O₅ 2.41, H₂O (Penfield method) 1.72, F 0.12, Cl 0.61, O ≡ F,Cl 0.19, sum 100.73 wt%, corresponding to $Na_{10.80}(Ca_{2.35}Na_{0.33}Sr_{0.08}Ce_{0.03}La_{0.02})_{\Sigma2.81}Ca_6(Fe^{3+}_{1.21}Fe^{2+}_{0.87})_{\Sigma2.08}$ $(Zr_{2.85}Hf_{0.09}Ti_{0.05})_{\Sigma2.99}[Nb_{0.55}(Si_{25.25}Mn_{0.21})_{\Sigma25.46}O_{73}][(H_2O)_{1.67}$ $(OH)_{1.12}O_{0.26}]_{\Sigma3.05}[(OH)_{1.29}Cl_{0.52}F_{0.19}]_{\Sigma2.00}$, ideally $Na_{11}Ca_9$ $(Fe^{3+},Fe^{2+})_2Zr_3Nb[Si_{25}O_{73}][(OH),H_2O,Cl,O]_5$. The mineral occurs as euhedral, equant to thick-tabular crystals, and as grains to 2.5 cm. Morphological forms are {001}, {110}, {100}, {101}, {104}, {012}, {021}, and {267}. Dark brown to almost black color, brown to slightly pinkish brown in splinters, translucent, vitreous luster, brittle, brown streak, perfect {001} cleavage, stepped to uneven fracture, $H = 5½$, $D_{meas} = 2.87(1)$, $D_{calc} = 2.869$ g/cm³ for $Z = 3$. Optically uniaxial negative, $\omega = 1.620(1)$, $\epsilon = 1.616(1)$. Single-crystal X-ray structure study ($R = 0.057$) indicated trigonal symmetry, space group $R3m$, $a = 14.255(1)$, $c = 30.170(2)$ Å. Strongest lines of the powder pattern (diffractometer, Co$K\alpha$ radiation) are 4.31(69,205), 3.218(56,208), 3.036(42,119,042), 2.977(81,135), 2.854(100,404), and 2.602(44,039).

The mineral is associated with K-feldspar, cancrinite, aegirine-diopside, pectolite, titanite, hematite, and pyrrhotite in a pegmatoidal cancrinite syenite vein at the Kovdor phlogopite mine, Kovdor massif, Kola Peninsula, Russia. Distinctive features are the high content and ordered distribution of Ca, the predominance of Fe^{3+} over Fe^{2+}, and Nb in M3. The new

mineral name is for Russian mineralogist V.G. Feklichev (1933–1999). Type material is in the Fersman Mineralogical Museum, Moscow. **J.L.J.**

KANONEROVITE*

V.I. Popova, V.A. Popov, E.V. Sokolova, G. Ferraris, N.V. Chukanov (2002) Kanonerovite, $MnNa_3P_3O_{10} \cdot 12H_2O$, first triphosphate mineral (Kazennitsa pegmatite, Middle Urals, Russia). Neues Jahrb. Mineral. Mon., 117–127.

The mineral occurs as a snow-white crust consisting of aggregates, to 1.2 mm, in which crystals are platy prismatic and a few tenths of a millimeter in length. Electron microprobe analysis gave Na₂O 14.80, K₂O 0.05, CaO 0.20, MgO 0.14, MnO 11.20, FeO 0.15, P₂O₅ 35.23, H₂O (value for the ideal formula) 36.46, sum 98.23 wt%, corresponding to $(Mn_{0.95}$ $Mg_{0.02}Fe_{0.01})_{\Sigma0.98}(Na_{2.86}Ca_{0.02}K_{0.01})_{\Sigma2.89}P_{2.98}O_{9.87} \cdot 12.13H_2O$, ideally $MnNa_3P_3O_{10} \cdot 12H_2O$. Crystals are elongate [001], platy {100}, also showing {010}, {001}, {023}, {423}, and {210}. Transparent, vitreous luster, brittle, white streak, $H = 2^{1}/_{2}$–3, poor {010} cleavage, no parting, uneven fracture, nonfluorescent, $D_{meas} = 1.91(2)$, $D_{calc} = 1.90$ g/cm³ for $Z = 4$. Optically biaxial negative, $\alpha = 1.453(2)$, $\gamma = 1.459(2)$, $\alpha \wedge c = 0$–7°. Indexing of the X-ray powder pattern (114 mm Debye–Scherrer, Fe$K\alpha$ radiation) by comparison with the synthetic analog, for which the crystal structure is known, gave monoclinic symmetry, space group $P2_1/n$, $a = 14.71(1)$, $b = 9.33(1)$, $c = 15.13(2)$ Å, $\beta = 89.8(1)°$. Strongest lines are 10.50(75,101, $\overline{1}01$), 7.36(100,200), 6.95(90,111, $\overline{1}11$), 3.316(60,411+), and 2.889(60).

The crust occurs on quartz, topaz, and cassiterite, and is locally coated by muscovite and stellerite, in the vuggy, microcline-albite-quartz-muscovite central zone of a pegmatite vein in the Alabashka pegmatite field, Middle Urals (57° 47′ N, 61° 03′ E), Russia. The new mineral name is for mining historian Kanonerov Anatol'evich (b. 1955). Type material is in the Mineralogical Museum, Ilmen Natural Reserve, Miass, Russia. **J.L.J.**

LABUNTSOVITE GROUP*

N.V. Chukanov, I.V. Pekov, A.P. Khomyakov (2002) Recommended nomenclature for labuntsovite-group minerals. Eur. J. Mineral., 14, 165–173.

The rules for the naming of members of the labuntsovite group of Ti-Nb silicates are presented. Orthorhombic members have a unit cell approximating $a = 7.4$, $b = 14.2$, $c = 7.1$ Å, and the cell for monoclinic members approximates $a = 14.3$, $b = 13.8$, $c = 7.8$ Å, $\beta = 117°$. New species with a doubled unit cell are distinguished by the prefix "para."

Discussion. Table 1 is an attempt to summarize the current nomenclature and ideal formulas ($Z = 1$). Comparison of the empirical versus ideal or simplified formulas for the labunstovite-group minerals abstracted in this issue will show that the nomenclature scheme is considerably more complex and non-standard than is suggested by the summary. **J.L.J.**

LABUNTSOVITE-Fe*, LABUNTSOVITE-Mg*

A.P. Khomyakov, G.N. Nechelyustov, G. Ferraris, A. Gula, G. Ivaldi (2001) Labuntsovite-Fe, $Na_4K_4(Ba,K)_2(Fe,Mg,Mn)_{1+x}$

TABLE 1. Nomenclature and idealized formulas ($Z = 1$) of the labuntsovite group

Orthorhombic		
Nenadkevichite subgroup (*Pbam*)	$a = 7.4$, $b = 14.2$, $c = 7.1$ Å	
nanadkevichite	$Na_{8-x}Nb_4(Si_4O_{12})_2(O,OH)_4 \cdot 8H_2O$	
korobitsynite	$Na_{8-x}Ti_4(Si_4O_{12})_2(O,OH)_4 \cdot 8H_2O$	
Monoclinic		
Vuoriyarvite subgroup (*Cm*)	$a = 14.7$, $b = 14.2$, $c = 7.9$ Å, $\beta = 118°$	
vuoriyarvite-K	$(K,Na)_{12-x}Nb_8(Si_4O_{12})_4(O)_8 \cdot nH_2O$	$x = 0$–6, $n = 12$–16
tsepinite-Na	$Na(Na,H_3O,K,Sr,Ba)_{12-x}Ti_8(Si_4O_{12})_4(OH,O)_8 \cdot nH_2O$	$x = 0$–6, $n = 12$–16
Kuzmenkoite subgroup (*C2/m*)	$a = 14.4$, $b = 13.9$, $c = 7.8$ Å, $\beta = 117°$	
kuzmenkoite-Mn	$K_4Mn_2Ti_8(Si_4O_{12})_4(OH)_8 \cdot nH_2O$	$n = 10$–12
kuzmenkoite-Zn	$K_4Zn_2Ti_8(Si_4O_{12})_4(OH)_8 \cdot nH_2O$	$n = 12$–14
karupmöllerite-Ca	$(Na,Ca,K)_4Ca_2Nb_8(Si_4O_{12})_4(O,OH)_8 \cdot 14H_2O$	
Lemmleinite subgroup (*C2/m*)	$a = 14.3$, $b = 13.8$, $c = 7.8$ Å, $\beta = 117°$	
lemmleinite-K	$Na_4K_4K_4Ti_8(Si_4O_{12})_4(O,OH)_8 \cdot 8H_2O$	
lemmleinite-Ba	$Na_4K_4Ba_{2+x}Ti_8(Si_4O_{12})_4(O,OH)_8 \cdot 8H_2O$	
Labuntsovite subgroup (*C2/m*)	$a = 14.3$, $b = 13.8$, $c = 7.8$ Å, $\beta = 117°$	
labuntsovite-Mn	$Na_4K_4Mn_2Ti_8(Si_4O_{12})_4(O,OH)_8 \cdot nH_2O$	$n = 10$–12
labuntsovite-Mg	$Na_4K_4Mg_2Ti_8(Si_4O_{12})_4(O,OH)_8 \cdot nH_2O$	$n = 10$–12
labuntsovite-Fe	$Na_4K_4Fe_2Ti_8(Si_4O_{12})_4(O,OH)_8 \cdot nH_2O$	$n = 10$–12
Gutkovaite subgroup (*Cm*)	$a = 14.3$, $b = 13.9$, $c = 7.8$ Å, $\beta = 118°$	
gutkovaite-Mn	$Ca_2K_4Mn_2Ti_8(Si_4O_{12})_4O_8 \cdot nH_2O$	$n \approx 10$
Paralabuntsovite subgroup (*I2/m*)	$a = 15.6$, $b = 13.8$, $c = 7.8$ Å, $\beta = 117°$	
paralabuntsovite-Mg	$Na_8K_8Mg_8Ti_{16}(Si_4O_{12})_8(O,OH)_{16} \cdot nH_2O$	$n = 20$–24
Organovaite subgroup (*C2/m*)	$a = 14.5$, $b = 14.0$, $c = 15.7$ Å, $\beta = 118°$	
organovaite-Mn	$K_8Mn_4Nb_{16}(Si_4O_{12})_8O_{16} \cdot nH_2O$	$n = 20$–28
organovaite-Zn	$K_8Zn_4Nb_{16}(Si_4O_{12})_8O_{16} \cdot nH_2O$	$n = 20$–28
parakuzmenkoite-Fe	$(K,Ba)_8Fe_4Ti_{16}(Si_4O_{12})_8(OH,O)_{16} \cdot nH_2O$	$n = 20$–28

Name changes: vuoriyarvite renamed vuoriyarvite-K; kuzmenkoite becomes kuzmenkoite-Mn; lemmleinite becomes lemmleinite-K; labuntsovite becomes labuntsovite-Mn.

$Ti_8(Si_4O_{12})_4(O,OH)_8 \cdot 10H_2O$, and labuntsovite-Mg, $Na_4K_4(Ba,K)(Mg,Fe)_{1+x}Ti_8(Si_4O_{12})_4(O,OH)_8 \cdot 10H_2O$, two new labuntsovite group minerals from the Khibiny and Kovdor alkaline massifs, Kola Peninsula. Zap. Vseross. Mineral. Obshch., 130(4), 36–45 (in Russian, English abs.).

LABUNTSOVITE-Fe

The mineral occurs as orange, anhedral grains, to 2 mm across, and as aggregates to 0.5 cm across. Electron microprobe analysis gave Na_2O 5.45, K_2O 8.54, SrO 0.10, BaO 8.02, FeO 2.41, MgO 0.30, MnO 0.23, Al_2O_3 0.04, SiO_2 39.66, TiO_2 25.61, ZrO_2 0.05, Nb_2O_5 1.11, H_2O (TGA) 8.20, sum 99.72 wt%, corresponding to $Na_4(K_{3.74}Na_{0.26})_{\Sigma4.00}[(H_2O)_{2.14}$ $Ba_{1.27}K_{0.65}Sr_{0.02}](\square_{0.93}Fe_{0.81}Mg_{0.18}Mn_{0.08})_{\Sigma2}(Ti_{7.76}Nb_{0.20}$ $Zr_{0.01})_{\Sigma7.97}$ $(Si_{15.98}Al_{0.02})_{\Sigma16.00}O_{48}[O_{5.43}(OH)_{2.57}]_{\Sigma8.00} \cdot 7.66H_2O$, simplified as $Na_4K_4(Ba,K)_2(Fe,Mg,Mn)_{1+x}Ti_8(Si_4O_{12})_4(O,OH)_8 \cdot 10H_2O$. Vitreous luster, translucent to transparent, $H = 5$, $D_{meas} = 2.94$, D_{calc} = 2.93 g/cm³ for the empirical formula and $Z = 1$. Optically biaxial positive, $\alpha = 1.686(2)$, $\beta = 1.696(2)$, $\gamma = 1.835(3)$, $2V_{meas}$ = 32(1)°; orientation $a = Z$, $b = Y$, $c \wedge X = 27°$ in obtuse β; pleochroism X, Z = pale yellow; Y = orange. Single-crystal X-ray structure study indicated monoclinic symmetry, space group $C2/m$, $a = 14.249(6)$, $b = 13.791(6)$, $c = 7.777(2)$ Å, $\beta = 116.82(3)°$. Strongest lines of the powder pattern (diffractometer, Cu$K\alpha$ radiation) are 6.95(56,001), 3.169(100, 400,40$\bar{2}$, 42$\bar{1}$), 3.100(62,022,041), 3.032(53,240, 24$\bar{1}$), and 2.585(58,241,24$\bar{2}$).

The mineral occurs in K-feldspar-natrolite-calcite veinlets with pectolite, fluorite, and aegirine in hydrothermally altered urtite at Mount Kukisvumchorr, Khibiny alkaline massif, Kola Peninsula, Russia. The new name refers to the Fe dominance as a member of the labuntsovite subgroup of the labuntsovite group. Type material is in the Fersman Mineralogical Museum, Moscow.

LABUNTSOVITE-Mg

The mineral occurs as prismatic crystals to 3 mm long, elongate [010], and in radial aggregates. Colorless to white, rarely yellowish, pink, or light orange, vitreous luster, transparent to translucent, $H = 5$, stepped fracture, imperfect cleavage on {001} and another plane, nonfluorescent, $D_{meas} = 2.88(2)$, D_{calc} = 2.89 g/cm³ for $Z = 1$. Optically biaxial positive, $\alpha = 1.688(2)$, $\beta = 1.698(2)$, $\gamma = 1.802(3)$, $2V_{meas} = 37(1)°$; orientation and pleochroism as for labuntsovite-Fe, with colorless varieties nonpleochroic. Electron microprobe analysis gave Na_2O 4.61, K_2O 8.57, CaO 0.03, SrO 0.01, BaO 6.23, FeO 1.49, MgO 1.22, MnO 0.01, Al_2O_3 0.30, SiO_2 39.70, TiO_2 23.96, Nb_2O_5 3.65, H_2O (calc.) 9.24, sum 99.02 wt%, corresponding to $(Na_{3.57}\square_{0.42}Ca_{0.01})_{\Sigma4}K_4[(H_2O)_{2.18}Ba_{0.97}\square_{0.48}K_{0.37}]_{\Sigma4}(\square_{0.91}Mg_{0.73}Fe_{0.36}^{2+})_{\Sigma2}(Ti_{7.20}$ $Nb_{0.66}Fe_{00.14}^{3+})_{\Sigma8.00}(Si_{15.86}Al_{0.14})_{\Sigma16.00}O_{48}[O_{4.46}(OH)_{3.54}]_{\Sigma8.00} \cdot 8.35H_2O$, simplified as $Na_4K_4(Ba,K)(Mg,Fe)_{1+x}Ti_8(Si_8O_{12})_4(O,OH)_8 \cdot 10H_2O$. Single-crystal X-ray structure study indicated monoclinic symmetry, space group $C2/m$, $a = 14.292(4)$, $b = 13.750(4)$, $c = 7.792(2)$ Å, $\beta = 117.03(1)°$. Strongest lines of the X-ray powder pattern (diffractogram, Cu$K\alpha$ radiation) are 6.94(51,001), 3.175(100,400,40$\bar{2}$, 42$\bar{1}$), 3.093(57,022), 3.083(55,041) 3.024(51,240,24$\bar{1}$), and 2.576(48,241,24$\bar{2}$).

The mineral, which is the Mg-dominant analog of labuntsovite-Fe, occurs with catapleiite and anatase in cavities within dolomitic carbonatite at the Kovdor massif, Kola Peninsula, Russia. Type material in is the Fersman Mineralogical Museum, Moscow. **J.L.J.**

LEMMLEINITE-Ba*

N.V. Chukanov, I.V. Pekov, R.K. Rastsvetaeva, A.E. Zadov, V.V. Nedel'ko (2001) Lemmleinite-Ba, $Na_2K_2Ba_{1+x}Ti_4$ $(Si_4O_{12})_2(O,OH)_4 \cdot 5H_2O$, a new mineral of the labuntsovite group. Zap. Vseross. Mineral. Obshch., 130(3), 36–43 (in Russian, English abs.).

The mineral occurs as aggregates in which prismatic crystals are up to 2 cm, showing {001}, {100}, {010}, {$\bar{2}$01}, {$\bar{4}$01}. Orange to a light coffee-color, transparent, vitreous luster, white streak, imperfect cleavage, $D_{meas} = 3.03(1)$, $d_{calc} = 3.05(1)$ g/cm^3. Optically biaxial positive, $\alpha = 1.683(1)$, $\beta = 1.690(2)$, $\gamma = 1.820(5)$, $2V_{meas} = 37(10)$, $2V_{calc} = 27(6)°$, medium dispersion $r > v$, pleochroism X, Z = colorless, Y = light brown; orientation $Y = b$, $Z = a$, $X \wedge c = 27°$. Single-crystal X-ray structure study ($R = 0.0368$) indicated monoclinic symmetry, space group $C2/m$, $a = 14.216(2)$, $b = 13.755(3)$, $c = 7.767(5)$ Å, $\beta = 116.7(1)°$. Strongest lines of the X-ray powder pattern (diffractometer, Co$K\alpha$ radiation) are 6.93(26,001), 6.31(28,20$\bar{1}$), 3.55(24,40$\bar{1}$), 3.16(100,4$\bar{2}$1, 40$\bar{2}$), 3.09(24,022,041), 3.02(25,240), and 2.577(25, 20$\bar{3}$, 241). Electron microprobe analysis gave Na$_2$O 5.32, K$_2$O 6.96, SrO 0.11, BaO 12.63, MgO 0.39, MnO 1.58, FeO 0.38, ZnO 0.09, Al$_2$O$_3$ 0.03, SiO$_2$ 38.00, ZrO$_2$ 0.11, TiO$_2$ 25.12, Nb$_2$O$_5$ 0.43, H$_2$O (TGA) 8.02, sum 99.17 wt%, which for $Z = 1$ corresponds to Na$_{4.34}$K$_{3.74}$(Ba$_{2.08}$Sr$_{0.03}$)$_{\Sigma 2.11}$($\square_{1.07}$Mn$_{0.56}$Mg$_{0.24}$-Fe$_{0.13}$)$_{\Sigma 2}$[(Ti$_{7.94}$Nb$_{0.08}$Zr$_{0.02}$)$_{\Sigma 8.04}$O$_{6.40}$(OH)$_{1.60}$][Si$_4$O$_{12}$]$_4$·10.46H$_2$O. The simplified formula ($Z = 2$) is Na$_2$K$_2$Ba$_{1+x}$Ti$_4$(Si$_4$O$_{12}$)$_2$ (O,OH)$_4$·5H$_2$O.

The mineral occurs with calcite, strontianite, aegirine, microcline, and nepheline in alkaline pegmatites at Mt. Kukisvumchorr (type locality), Khibiny alkaline massif, Kola Peninsula; similarly with kuzmenkoite-Mn, aegirine, mangan-neptunite, chabazite, nontronite, and other minerals at Mount Karnasurt, and with microcline and aegirine at Maly Punkaruaiv Mountain, Lovozero massif, Kola Peninsula, Russia. The name alludes to the chemical composition and the relationship to the lemmleinite subgroup of the labuntsovite group. Type material is in the Fersman Mineralogical Museum, Russia. **J.L.J.**

ORGANOVAITE-Mn*

N.V. Chukanov, I.V. Pekov, A.E. Zadov, S.V. Krivovichev, P.C. Burns, Yu. Schneider (2001) Organovaite-Mn, K$_2$Mn(Nb,Ti)$_4$(Si$_4$O$_{12}$)$_2$(O,OH)$_4$·6H$_2$O, a new labuntsovite-group mineral from the Lovozero massif, Kola Peninsula. Zap. Vseross. Mineral. Obshch., 130(2), 46–53 (in Russian, English abs.).

The mineral occurs as stubby prismatic crystals, up to 0.3 × 0.2 mm, and as pseudomorphs after crystals of vuonnemite, up to 4 cm, at Mount Karnasurt (type locality), and as crystals to 0.5 mm at Flora Mountain, Lovozero alkaline massif, Kola Peninsula, Russia. Electron microprobe analysis gave Na$_2$O 0.51, K$_2$O 4.31, CaO 1.06, BaO 1.31, MnO 5.07, FeO 0.24, ZnO 2.04, Al$_2$O$_3$ 0.28, SiO$_2$ 38.36, TiO$_2$ 8.87, Nb$_2$O$_5$ 27.97, H$_2$O (TGA, separate sample) 10.40, sum 100.42 wt%, corresponding to (K$_{2.27}$Zn$_{0.62}$Ca$_{0.47}$Na$_{0.41}$Ba$_{0.21}$)$_{\Sigma 3.98}$ (Mn$_{1.77}$Fe$_{0.08}$)$_{\Sigma 1.85}$ (Nb$_{5.23}$Ti$_{2.76}$)$_{\Sigma 7.99}$[Si$_{15.86}$Al$_{0.14}$O$_{48}$][O$_{6.03}$(OH)$_{1.97}$]$_{\Sigma 8.00}$·12.80H$_2$O for $Z = 2$, ideally K$_2$Mn(Nb,Ti)$_4$(Si$_4$O$_{12}$)$_2$(O,OH)$_4$·6H$_2$O for $Z = 1$. Pinkish in various shades, rose-brown, yellow-brown, vitreous luster, transparent to translucent, white streak, brittle, no cleavage, uneven fracture, $H = 5$, $D_{meas} = 2.88(1)$, $D_{calc} = 2.92(1)$ g/cm^3. Optically biaxial positive, $\alpha = 1.683(2)$, $\beta = 1.692(3)$, $\gamma = 1.775(5)$, $2V_{calc} = 38°$, weak dispersion, pleochroism X, Z =

colorless, Y = light brown. Single-crystal X-ray structure study ($R = 0.049$) indicated monoclinic symmetry, space group $C2/m$, $a = 14.551(2)$, $b = 14.001(2)$, $c = 15.702(2)$ Å, $\beta = 117.584(2)°$. Strongest lines of the powder pattern (diffractometer, Mo$K\alpha_1$ radiation) are 6.99(100,020), 6.43(25,200,20$\bar{2}$), 4.936(28,022), 3.227(89, 42$\bar{2}$, 400, 40$\bar{4}$), 3.123(68,042,024), 2.607(25,24$\bar{4}$, 204, 20$\bar{6}$), and 2.520(29, 44$\bar{2}$, 402, 40$\bar{6}$).

The mineral, which is a member of the labuntsovite group, has a compositional range in which analytical results extend to formula Ti > Nb. Among the associated minerals are microcline, albite, aegirine, arfvedsonite, eudialyte, sodalite, natrolite, elpidite, cristobalite, steenstrupine-(Ce), rhabdophane-(Ce), and yofortierite at Mount Karnasurt, and calciohilairite, natrolite, albite, aegirine, vuoriyarvite-K, and kuzmenkoite-Mn at Flora Mountain. The new mineral name is for crystallographer Natalia Ivanovna Organova (b. 1929). Type material is in the Fersman Mineralogical Museum, Moscow. **J.L.J.**

TSEPINITE-Na*

Z.V. Shlyukova, N.V. Chukanov, I.V. Pekov, R.K. Rastsvetaeva, N.I. Organova, A.E. Zadov (2001) Tsepinite-Na, (Na,H$_3$O,K,Sr,Ba)$_2$(Ti,Nb)$_2$[Si$_4$O$_{12}$](OH,O)$_2$·3H$_2$O, a new mineral of the labuntsovite group. Zap. Vseross. Mineral. Obshch., 130(3), 43–50 (in Russian, English abs).

Electron microprobe analysis of the Khibiny mineral gave Na$_2$O 5.48, K$_2$O 1.58, CaO 0.18, SrO 2.32, BaO 2.60, ZnO 0.04, Fe$_2$O$_3$ 0.25, SiO$_2$ 40.38, TiO$_2$ 14.17, Nb$_2$O$_5$ 20.69, H$_2$O (TGA) 13.18, sum 100.87 wt%, corresponding to H$_{34.83}$(Na$_{4.21}$K$_{0.80}$Sr$_{0.54}$Ba$_{0.41}$Ca$_{0.08}$Zn$_{0.01}$)$_{\Sigma 6.05}$(Ti$_{4.22}$Nb$_{3.71}$Fe$^{3+}_{0.07}$)$_{\Sigma 8.00}$Si$_{16}$O$_{70.78}$ for $Z = 1$, ideally (Na,H$_3$O,K,Sr,Ba)$_2$(Ti,Nb)$_2$[Si$_4$O$_{12}$](OH,O)$_2$·3H$_2$O for $Z = 4$. Occurs as colorless, white, and light brown radial aggregates, and as prismatic crystals up to 1 cm long, showing {001}, {010}, {100}, and {$\bar{2}$01}, with some modified by {012} and {$\bar{2}$41}. Vitreous luster, transparent to translucent, white streak, brittle, $H = 5$, no cleavage, uneven fracture, $D_{meas} = 2.74(2)$, $D_{calc} = 2.72(1)$ g/cm^3. Optically biaxial positive, $\alpha = 1.658(1)$, $\beta = 1.668(1)$, $\gamma = 1.770(5)$ (Khibiny); $\alpha = 1.655(2)$, $\beta = 1.661(2)$, $\gamma = 1.770(5)$ (Lovozero); $2V_{meas} = 19–31°$, nonpleochroic. Single-crystal X-ray structure study ($R = 0.055$) indicated monoclinic symmetry, space group Cm, $a = 14.604(7)$, $b = 14.274(8)$, $c = 7.933(2)$ Å, $\beta = 117.40(3)°$. Strongest lines of the powder pattern (114 mm Debye–Scherrer, Fe radiation) are 7.09(100,020,001), 4.98(60,021), 3.24(90,42$\bar{1}$, 400, 40$\bar{2}$) 3.15(80,041,022,24$\bar{1}$), 2.63(60,24$\bar{2}$,20$\bar{3}$), 2.54(70,44$\bar{1}$, 401,40$\bar{3}$), and 2.06(60,441,44$\bar{3}$). The IR spectrum includes absorption bands that have been assigned to H$_3$O.

The mineral is associated with, among others, microcline, aegirine, analcime, natrolite, catapleiite, apophyllite, and labuntsovite-Mn at Khibinpakhchorr Mountain, Khibiny alkaline massif, Kola Peninsula, Russia; also at Lepkhe-Nelm Mountain, Lovozero massif, Kola Peninsula, in association with microcline, aegirine, magnesio-arfvedsonite, natrolite, eudialyte, lamprophyllite, neptunite, polylithionite, and other minerals. The new name is for Russian microprobe analyst Anatoliy I. Tsepin (b. 1946). Type material is in the Fersman Mineralogical Museum, Moscow. **J.L.J.**

PARAKUZMENKOITE-Fe*

N.V. Chukanov, I.V. Pekov, E.I. Semenov, A.E. Zadov, S.V. Krivovichev, P.C. Burns (2001) Parakuzmenkoite-Fe, $(K,Ba)_2Fe(Ti,Nb)_4[Si_4O_{12}]_2(O,OH)_4 \cdot 7H_2O$, a new labunstovite-group mineral. Zap. Vseross. Mineral. Obshch., 130(6), 63–67 (in Russian, English abs.).

The mineral occurs as orange to reddish orange prismatic crystals, to 0.3×1 mm. Electron microprobe analysis gave Na_2O 0.43, K_2O 2.86, CaO 0.24, SrO 0.45, BaO 8.76, MgO 0.14, MnO 1.79, FeO 4.86, ZnO 0.21, SiO_2 37.35, TiO_2 13.74, Nb_2O_5 17.59, H_2O (TGA) 10.94, sum 99.36 wt%, corresponding to $(K_{1.56}Na_{0.36}Ba_{1.47}Sr_{0.11}Ca_{0.11}Zn_{0.07})_{\Sigma3.68}(Fe^{2+}_{1.58}Mn_{0.65}Mg_{0.09})_{\Sigma2.32}(Ti_{4.44}Nb_{3.41}Fe^{3+}_{0.16})_{\Sigma8.01}[Si_4O_{12}]_4[O_{6.40}(OH)_{1.60}]_{\Sigma8.00} \cdot 14.29H_2O$ for $Z = 2$, simplified as $(K,Ba)_2Fe(Ti,Nb)_4[Si_4O_{12}]_2(O,OH)_4 \cdot 7H_2O$ for $Z = 4$. Vitreous luster, translucent, white streak, imperfect cleavage, $H = 5$, $D_{meas} = 3.00(3)$, $D_{calc} = 3.07(1)$ g/cm^3. Optically biaxial positive, $\alpha = 1.687(1)$, $\beta = 1.689(2)$, $\gamma = 1.805(5)$, $2V_{meas} = 22(10)°$, pleochroism X, Z = colorless, Y = pale brown; orientation $X = b$, $Y = c$. Single-crystal X-ray structure study ($R = 0.047$) indicated monoclinic symmetry, space group $C2/m$, $a = 14.410(2)$, $b = 13.880(2)$, $c = 15.587(2)$ Å, $\beta = 117.53(1)°$. Strongest lines of the powder pattern are $6.91(100,020,002)$, $3.19(100,42\bar{2},400, 40\bar{4})$, $3.09(100,042, 024)$, $1.524(90,480,48\bar{4},426,4.2.\bar{1}0)$, and $1.422(80,$ several$)$.

The mineral is associated with microcline, aegirine, eudialyte, lorenzenite, sodalite, natrolite, elpidite, ranciéite, and halloysite in alkaline pegmatite at Kedykverpakhk Mountain, Lovozero massif, Kola Peninsula, Russia. The new mineral name indicates that the mineral is the Fe-dominant analog of kuzmenkoite-Mn and has a doubled c-axis length. Type material is in the Fersman Mineralogical Museum, Moscow. **J.L.J.**

$Cu_2Ag_xPb_{10–2x}Bi_{12+x}S_{29}$

Xiang-Ping Gu, M. Watanabe, M. Ohkawa, K. Hoshino, Y. Shibata (2001) Felbertalite and related bismuth sulfosalts from the Funiushan copper skarn deposit, Nanjing, China. Can. Mineral., 39, 1641–1652.

The average of three electron microprobe analyses is Pb 27.18, Cu 2.35, Fe 0.07, Ag 2.60, Bi 49.61, Sb 0.01, Se 1.79, Te 0.47, S 16.15, sum 100.23 wt%, corresponding to $Cu_{2.06}Ag_{1.34}Pb_{7.34}Bi_{13.29}S_{29.51}$ on the basis of 24 cations. The general formula is $Cu_2Ag_xPb_{10–2x}Bi_{12+x}S_{29}$ wherein $x = 1.23$ to 1.49, and the Ag-free member corresponds to $Cu_2Pb_{10}Bi_{12}S_{29}$. The mineral occurs as oriented, elongate patches, some >10 μm wide, within felbertalite that is associated with numerous Bi

sulfosalts in the Funiushan skarn deposit, about 25 km east of the city of Nanjing, Jiangsu Province, eastern China.

Discussion. The composition is similar to that of the unidentified sulfosalt reported in *Am. Mineral.*, 81, p. 1016 (1996). **J.L.J.**

$(Cu,Co,Ni)_7As_3Se_6$

W.H. Paar, D. Topa, A.C. Roberts, A.J. Criddle, G. Amann, R.J. Sureda (2002) The new mineral species brodtkorbite, Cu_2HgSe_2, and the associated selenide assemblage from Tuminico, Sierra de Cacho, La Rioja, Argentina. Can. Mineral., 40, 225–237.

Electron microprobe analysis gave Cu 21.4, Fe 0.3, Ni 4.5, Co 10.6, As 20.5, Se 41.4, sum 98.7 wt%, corresponding to $(Cu_{3.86}Co_{2.06}Ni_{0.88}Fe_{0.05})_{\Sigma6.85}As_{3.14}Se_{6.00}$. The mineral occurs as inclusions, typically less than 10×20 μm, in umangite in calcite veins. Two analyses are given for other inclusions that approximate $(Co,Ni,Cu)AsSe$, reported previously from an occurrence near Lake Athabasca, Saskatchewan (*Am. Mineral.*, 77, p. 447, 1992). **J.L.J.**

NEW DATA

RIMKOROLGITE

S.V. Krivovichev, S.N. Britvin, P.C. Burns, V.N. Yakovenchuk (2002) Crystal structure of rimkorolgite, $Ba[Mg_5(H_2O)_7(PO_4)_4]H_2O$, and its comparison with bakhchisaraitsevite. Eur. J. Mineral., 14, 397–402.

Single-crystal X-ray structure study ($R = 0.052$) of holotype rimkorolgite indicated monoclinic rather than orthorhombic symmetry, space group $P2_1/c$, $a = 8.3354(9)$, $b = 12.8304(13)$, $c = 18.313(2)$ Å, $\beta = 90.025(2)°$. The structure is closely related to, but differs from, that of bakhchisaraitsevite. **J.L.J.**

SATTERLYITE

U. Kolitsch, M. Andrut, G. Giester (2002) Satterlyite, $(Fe,Mg)_{12}(PO_3OH)(PO_4)_5(OH,O)_6$: crystal structure and infrared absorption spectra. Eur. J. Mineral., 14, 127–133.

Single-crystal X-ray structure study ($R = 0.0215$) of satterlyite from the only known locality, the Big Fish River area, Yukon Territory, Canada, confirmed the trigonal symmetry and established the space group as $P31m$, $a = 11.355(1)$, $c = 5.0394(5)$ Å. The structure determination indicated that satterlyite is isostructural with holtedahlite. **J.L.J.**