New Mineral Names*

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

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

CARBOKENTBROOKSITE*, ZIRSILITE-(CE)*

A.P. Kohmyakov, V.D. Dusmatov, G. Ferraris, A. Gula, G. Ivaldi, G.N. Nechelyustov (2003) Zirsilite-(Ce), $(Na,\square)_{12}(Ce,Na)_3$ $Ca_6Mn_3Zr_3Nb(Si_{25}O_{73})(OH)_3(CO_3)\cdot H_2O$, and carbokentbrooksite $(Na,\square)_{12}(Na,Ce)_3Ca_6Mn_3Zr_3Nb(Si_{25}O_{73})(OH)_3(CO_3)\cdot H_2O$ —two new eudialyte-group minerals from the Dara-i-Pioz alkaline massif, Tajikistan. Zapiski Vseross. Mineral. Obshch., 132(5), 40–51 (in Russian, English abs.).

The minerals occur as zoned rhombohedral crystals, up to 2 cm across, wherein yellow carbokentbrooksite forms the core and creamy zirsilite-(Ce) forms the rim. Both minerals are transparent, vitreous luster, brittle, white streak, no cleavage or parting, conchoidal fracture, $H = 5$, nonfluorescent, forms {101}, {102}, {010}, and {001}. Electron microprobe analyses (H_2O and CO_2 by wet chemistry) gave for carbokentbrooksite and zirsilite-(Ce), respectively, Na_2O 10.17, 9.54, K_2O 0.51, 0.45, CaO 10.61, 10.52, SrO 1.42, 1.35, FeO 2.22, 1.89, MnO 5.41, 5.67, La_2O_3 1.79, 2.31, Ce_2O_3 2.97, 3.78, Pr_2O_3 0.24, 0.28, Nd_2O_3 0.76, 0.82, Y_2O_3 0.43, 0.47, SiO_2 45.55, 45.63, TiO_2 0.41, 0.45, ZrO_2 11.07, 10.48, Nb_2O_5 3.55, 3.76, Cl 0.29, 0.32, H_2O 1.18, 1.52, CO_2 0.78, 0.58, $O \equiv Cl$ 0.06, 0.07, sum 99.30, 99.75 wt%, with empirical formulas calculated for Si = 25.

Carbokentbrooksite

Empirical formula $(Na_{9.43}Ca_{0.90}K_{0.36})_{\Sigma10.69}[Na_{1.39}(Ce_{0.60}La_{0.36}$ $Nd_{0.15}Pr_{0.05})_{\Sigma1.16}Sr_{0.45}]_{\Sigma3}(Ca_{5.34}Mn_{0.54}Y_{0.12})_{\Sigma6}(Mn_{1.98}Fe_{1.02})_{\Sigma3}(Zr_{2.96}$ $Ti_{0.04})_{\Sigma3}(Nb_{0.88}Ti_{0.13})_{\Sigma1.01}Si_{25}H_{4.32}O_{77.64}(CO_3)_{0.58}Cl_{0.27}$, idealized as in the title. $D_{meas} = 3.14(2)$, $D_{calc} = 3.10$ g/cm³ for $Z = 3$. Optically uniaxial negative, $\omega = 1.645(2)$, $\varepsilon = 1.637(2)$. Single-crystal X-ray structure study ($R = 0.026$) gave trigonal symmetry, space group $R3m$; $a = 14.237(2)$, $c = 30.033(5)$ Å as refined from a diffractometer pattern (Cu$K\alpha$ radiation) with strongest lines $3.204(38,\overline{2}28)$, $3.155(35,\overline{2}37)$ $3.019(34,\overline{1}29)$, $2.970(83,\overline{3}45)$, $2.849(100,\overline{4}44)$, and 2.590(30,039).

Zirsilite-(Ce)

Empirical formula $(Na_{9.01}Ca_{0.82}K_{0.32})_{\Sigma10.15}[(Ce_{0.76}La_{0.47}Nd_{0.16}$ $Pr_{0.06})_{\Sigma1.45}Na_{1.12}Sr_{0.43}]_{\Sigma3}(Ca_{5.36}Mn_{0.50}Y_{0.14})_{\Sigma6}(Mn_{2.13}Fe_{0.87})_{\Sigma3}(Zr_{2.80}$ $Ti_{0.18})_{\Sigma2.98}Nb_{0.93}Si_{25}H_{5.54}(CO_3)_{0.43}Cl_{0.30}$, idealized as in the title

and indicating REE > Na (with Ce predominant) for the N4 site, whereas in carbokentbrooksite Na > REE. $D_{meas} = 3.15(2)$, $D_{calc} = 3.10$ g/cm³ for $Z = 3$. Uniaxial negative, $\omega = 1.648(2)$, $\varepsilon = 1.637(2)$. Single-crystal X-ray structure study ($R = 0.026$) gave trigonal symmetry, space group $R3m$; $a = 14.29(1)$, $c = 30.02(4)$ Å as calculated from a diffractometer pattern (Cu$K\alpha$ radiation) with strongest lines of $4.32(51,\overline{2}25)$, $3.975(37,\overline{2}34)$, $3.220(100, \overline{2}28)$ $3.166(56,\overline{2}37)$, $2.979(95, \overline{3}45)$, and $2.857(66, \overline{4}44)$.

The two new eudialyte-group minerals are associated with quartz, microcline, aegirine, stillwellite-(Ce), ekanite, polylithionite, pyrochlore, fluorite, calcite, and galena that occur in the quartz core of a zoned pegmatite in the Dara-i-Pioz alkaline massif of northern Tajikistan. The new name carbokentbrooksite alludes to the compositional relationship to kentbrooksite, and zirsilite-(Ce) is a new root name (*zir*conium *sil*icate) within the eudialyte group. Type material is in the Fersman Mineralogical Museum, Moscow, Russia. **J.L.J.**

EMILITE*

T. Balić-Žunić, D. Topa, E. Makovicky (2002) The crystal structure of emilite, $Cu_{10.7}Pb_{10.7}Bi_{21.3}S_{48}$, the second 45 Å derivative of the bismuthinite–aikinite solid-solution series. Can. Mineral., 40, 239–245.

Electron microprobe analysis of the crystal used in the structure determination gave Cu 7.68, Pb 25.4, Bi 49.9, S 17.59, sum 100.6 wt%, corresponding to $Cu_{2.68}Pb_{2.72}Bi_{5.30}S_{12.18}$. Single-crystal X-ray structure study ($R_1 = 0.066$) indicated orthorhombic symmetry, space group $Pmc2_1$, $a = 4.0285(8)$, $b = 44.986(9)$, $c = 11.599(2)$ Å, $D_{calc} = 7.025$ g/cm³ for $Z = 4$. Tin-white color, metallic luster, opaque, no internal reflection, moderate anisotropy; R_{min} and R_{max} percentages in air are, respectively, 39.52, 46.88 (460 nm), 39.26, 48.06 (540), 39.02, 48.34 (580), and 38.51, 47.35 (640). Strongest lines of the X-ray powder pattern are 4.04(49), 3.656(100), 3.605(49), 3.567(81), 3.174(71), 3.152(78), and 2.852(95). The mineral is associated with other Cu-Pb-Bi sulfosalts in the metamorphosed scheelite deposit of Felbertal, Austria.

Discussion. The new mineral, whose name presumably is for Emil Makovicky of the University of Copenhagen, corresponds to that of mineral IMA No. 2001–015 (*Can. Mineral.*, 40, p. 982, 2002), from which much of the data for the abstract have been taken. **J.L.J.**

GALGENBERGITE-(CE)*

C.E. Hollerer (1998) $Ca(REE)_2(CO_2)_4\cdot H_2O$, a new mineral from Steiermark, Austria. Mitteil. Österr. Mineral. Ges., 143, 200–201 (in German).

---

* Before publication, minerals marked with an asterisk were approved by the Commission on New Minerals and Mineral Names, International Mineralogical Association.
† E-mail: JLJambor@aol.com

J.A. Mandarino (2004) New minerals. Can. Mineral., 42, 215–246.

The mineral occurs as colorless to white rosettes of about 1 mm diameter in which the crystals are euhedral, ~0.6 mm long, tabular on {001}, showing {001}, {101}, and {010}. Electron microprobe analysis gave CaO 9.22, Ce_2O_3 28.11, La_2O_3 11.36, Nd_2O_3 11.52, Pr_2O_3 3.38, CO_2 (calc.) 29.13, H_2O (calc.) 2.98, sum 95.70 wt%, corresponding to $Ca_{0.99}(Ce_{1.04}La_{0.42}Nd_{0.41}Pr_{0.12})_{\Sigma1.99}(CO_3)_4 \cdot H_2O$. Vitreous luster, transparent to translucent, white streak, H not determinable, splintery fracture, perfect {001} cleavage, D_{calc} = 3.99 g/cm³ for Z = 2. Optically biaxial negative, α = 1.635, β = 1.725, γ = 1.750, $2V_{calc}$ = 53°. Single-crystal X-ray structure study indicated triclinic symmetry, space group $P\bar{1}$ a = 6.388, b = 6.386, c = 12.388 Å, α = 96.54, β = 100.85, γ = 100.51°. Strongest lines of the powder pattern are 5.901(59,0$\bar{1}$1), 5.049(100,101), 3.899(49,$\bar{1}$12), 3.125(45,0$\bar{2}$1), and 3.0051(65,004).

The mineral is associated with calcite, siderite, pyrite, and kaolinite in small fissures in an albite–chlorite schist at the Galgenberg railroad tunnel between Leoben and St. Michael in Styria, Austria. The new mineral name alludes to the type locality and the predominant REE. Type material is presumably at the Institut für Mineralogie–Kristallographie und Petrologie, Graz, Austria. **J.L.J.**

GANTERITE*

S. Graeser, C.J. Hetherington, R. Gieré (2003) Ganterite, a new barium-dominant analogue of muscovite from the Berisal complex, Simplon region, Switzerland. Can. Mineral., 41, 1271–1280.

Electron microprobe analysis gave BaO 15.54, CaO 0.03, Na_2O 1.91, K_2O 3.02, MgO 0.86, FeO 0.69, MnO 0.03, Al_2O_3 36.5, SiO_2 37.47, TiO_2 0.73, H_2O (TGA) 3.90, sum 100.68 wt%, corresponding to $(Ba_{0.44}K_{0.28}Na_{0.27})_{\Sigma0.99}(Al_{1.84}Mg_{0.09}Fe_{0.04}Ti_{0.04})_{\Sigma2.01}[Si_{2.72}Al_{1.28}O_{10}](OH)_{1.89}$, which is simplified as $[Ba_{0.5}(Na+K)_{0.5}]Al_2(Si_{2.5}Al_{1.5}O_{10})(OH)_2$ because the mineral does not have a simple binary solid-solution relationship with muscovite. The mineral forms light gray to silvery, flexible laminae, typically 0.5 × 0.15 × 0.01 mm; vitreous luster, white streak, perfect {001} cleavage, H = 4–4½, nonfluorescent, D_{calc} = 3.11 g/cm³ for Z = 4. Optically biaxial negative, α = 1.600 (calc.), β = 1.619, γ = 1.622, $2V_{meas}$ = 42–45°, weak dispersion, nonpleochroic. Single-crystal X-ray study indicated monoclinic symmetry, probable space group $C2/c$, $2M_1$ polytype; a = 5.212(1), b = 9.046(2), c = 19.978(4) Å, β = 95.80° as refined from a Guinier–Hägg powder pattern (Cu$K\alpha$ radiation) with strongest lines of 4.481(71,110), 3.887(76,$\bar{1}$13), 3.737(77,023), 3.495(71,$\bar{1}$14), 2.602(95,130,$\bar{1}$31), 2.571(100,$\bar{2}$02,131), and 1.5054(91,060,2.0.10).

The mineral occurs in layers and lenses, up to 10 cm thick, as part of a rock-forming white-mica schist, and also in a leucocratic zoisite–celsian gneiss that are part of the crystalline basement rocks of the Berisal complex, Simplon region, Switzerland. Associated minerals are muscovite, zoisite, quartz, plagioclase, apatite, zircon, and amphibole in the schist, and zoisite, celsian, quartz, margarite ± armenite in the gneiss. The new mineral name is derived from Gantertal, a valley in the Simplon region in which the mica occurs. Type material is in the Naturhistorisches

Museum, Basel, and in the Mineralogical Institute, University of Basel, Switzerland. **J.L.J.**

GRAMACCIOLIITE-(Y)*

P. Orlandi, M. Pasero, N. Rotiroti, F. Olmi, F. Demartin, Y. Moëlo (2004) Gramaccioliite-(Y), a new mineral of the crichtonite group from Stura Valley, Piedmont, Italy. Eur. J. Mineral., 16, 171–175.

The crichtonite group has the general formula $ABC_{18}T_2O_{38}$, and the new mineral has the simplified formula $(Pb,Sr)(Y,Mn)(Ti,Fe^{3+})_{18}Fe^{3+}_2O_{38}$. Electron microprobe analysis gave K_2O 0.01, PbO 7.53, BaO 0.19, SrO 1.56, ZnO 0.99, MnO 1.45, CaO 0.12, Fe_2O_3 24.14, Y_2O_3 3.03, La_2O_3 0.14, Ce_2O_3 0.70, Nd_2O_3 0.20, UO_2 0.33, TiO_2 59.47, Nb_2O_5 0.32, V_2O_5 0.22, sum 100.40 wt%, corresponding to $(Pb_{0.61}Sr_{0.27}Ba_{0.02}U_{0.02})_{\Sigma0.93}(Y_{0.49}Mn_{0.37}Ce_{0.08}Ca_{0.04}Nd_{0.02}La_{0.02})_{\Sigma1.01}(Ti_{13.53}Fe_{5.49}Zn_{0.22}V_{0.04}Nb_{0.04})_{\Sigma19.33}O_{38}$. The mineral occurs as thin tabular crystals with a hexagonal outline, up to 3 mm across. Black color and streak, opaque, metallic luster, brittle, conchoidal fracture, no cleavage, hardness uncertain, D_{calc} = 4.66 g/cm³ for Z = 3. Weakly anisotropic in reflected light, low bireflectance, reflectance percentages in air and in oil (SiC standard): 19.2, 6.7 (470 nm), 17.9, 5.9 (546), 17.6, 5.7 (589), and 17.4, 5.8 (650). Single-crystal X-ray structure study (R_1 = 0.0861) indicated trigonal symmetry, space group $R\bar{3}$, a = 10.411(3), c = 20.97(3) Å as refined from a powder pattern (114 mm Gandolfi camera, Fe$K\alpha$ radiation) with strongest lines of 3.002(100,300), 2.892(70,116), 2.258(70,134), 1.809(60,318), and 1.606(95,1.3.10).

The mineral is associated with quartz, albite, muscovite, anatase, brookite, rutile, fluorapatite, xenotime, pyrite, senaite, dessauite-(Y), and others in hydrothermal quartz veins in a biotitic gneiss at Sambuco, Stura Valley, Piedmont, Italy. The new mineral name is for Prof. Carlo M. Gramaccioli (b. 1935) of the University of Milano, Italy. Type material is in the Museo di Storia Naturale e del Territorio, Università di Pisa, Italy. **J.L.J.**

IKRANITE*, RASLAKITE*

N.V. Chukanov, I.V. Pekov, A.E. Zadov, V.V. Korovushkin, I.A. Ekimenkova, R.K. Rastsvetaeva (2003) Ikranite, $(Na,H_3O)_{15}(Ca,Mn,REE)_6Fe^{3+}_2Zr_3(\square,Zr)(\square,Si)Si_{24}O_{66}(O,OH)_6Cl \cdot nH_2O$ and raslakite $Na_{15}Ca_3Fe_3(Na,Zr)_3Zr_3(Si,Nb)(Si_{25}O_{73})(OH,H_2O)_3(Cl,OH)$—new eudialyte-group minerals from the Lovozero massif, Kola Peninsula. Zapiski Vseross. Mineral. Obshch., 132(5), 22–33 (in Russian, English abs.).

Ikranite

The mineral forms yellow to brownish yellow tabular grains, up to 1 × 2 cm. Vitreous luster, transparent, white streak, conchoidal fracture, imperfect cleavage, H = 5, D_{meas} = 2.82(1), D_{calc} = 2.83 g/cm³ for Z = 3. Optically uniaxial positive, ω = 1.612(1), ε = 1.615(2), with some grains anomalously biaxial. Electron microprobe analysis gave Na_2O 7.95, K_2O 0.44, CaO 6.29, SrO 1.61, MnO 3.40, FeO and Fe_2O_3 (wet chemistry) 0.38 and 4.80, La_2O_3 0.62, Ce_2O_3 1.53, Nd_2O_3 0.19, SiO_2 48.91, TiO_2 0.37, ZrO_2 13.94, HfO_2 0.28, Nb_2O_5 0.28, F 0.10, Cl 0.89, H_2O (TGA) 7.70, O ≡ F,Cl 0.24, sum 99.44 wt%, CO_3 not detectable

in the infrared spectrum; empirical formula $Na_{7.56}(H_3O)_{6.64}K_{0.27}$ $Ca_{3.31}Sr_{0.46}Ce_{0.27}La_{0.11}Nd_{0.03}Mn^{2+}_{1.41}Fe^{2+}_{0.16}Fe^{3+}_{1.77}Zr_{3.33}Ti_{0.14}Hf_{0.04}$ $Nb_{0.06}Si_{24}O_{72}Cl_{0.74}\cdot2.64H_2O$, ideal formula as in the title and with $n = 2–3$. Single-crystal X-ray structure study ($R = 0.037$; *Am. Mineral.*, 86, p. 200, 2001) indicated trigonal symmetry, space group $R3m$, $a = 14.167(2)$, $c = 30.081(2)$ Å. Strongest lines of the powder pattern (diffractometer, CuKα radiation) are 6.41(41,104), 4.30(91,205), 3.521(57,027), 3.205(44,208), 2.963(92,315), and 2.841(100,404). The mineral is associated with aegirine, microcline, lorenzenite, nepheline, lamprophyllite, murmanite, and arfvedsonite in the aegirine zone of an agpaitic pegmatite at the Mt. Karnasurt loparite deposit, Lovozero alkaline massif, Kola Peninsula, Russia. The new mineral name is derived from the Russian acronym IKRAN, for the Institut Kristallografii Rossiiskoy Akademii Nauk.

Raslakite

The mineral occurs as brownish red, equant grains to 3 cm. Vitreous luster, white streak, brittle, conchoidal fracture, no cleavage, $H = 5$, $D_{meas} = 2.95$, $D_{calc} = 2.945$ g/cm³ for $Z = 3$. Optically uniaxial positive, $\omega = 1.608(1)$, $\varepsilon = 1.611(1)$. Electron microprobe analysis gave Na_2O 15.97, K_2O 0.48, CaO 5.64, SrO 0.69, MgO 0.28, MnO 2.01, FeO 5.02, Al_2O_3 0.26, La_2O_3 0.44, Ce_2O_3 0.87, Nd_2O_3 0.42, SiO_2 49.10, TiO_2 0.37, ZrO_2 15.07, HfO_2 0.43, Nb_2O_5 0.71, Cl 1.34, H_2O (TGA) 1.35, $O \equiv Cl$ 0.30, sum 100.15 wt%, empirical formula $Na_{16.02}K_{0.32}Ca_{3.13}$ $Sr_{0.21}Mg_{0.22}Fe_{2.17}Mn_{0.88}Ce_{0.16}La_{0.08}Nd_{0.08}Ti_{0.14}Zr_{3.80}Hf_{0.06}Nb_{0.17}Al_{0.16}$ $Si_{25.40}Cl_{1.18}H_{4.66}O_{76.465}$, idealized as in the title. Single-crystal X-ray structure study ($R = 0.037$) indicated trigonal symmetry, space group $R3$, a 14.229(7), c 30.019(15) Å. Strongest lines of the powder pattern (diffractometer, CuKα radiation) are 4.311(66,205), 3.209(58,208), 3.023(40,119), 2.974(86,315), and 2.853(100,404). The mineral is associated with microcline, aegirine, nepheline, lamprophyllite, kazakovite, terskite, and fluorcaphite in an agpaitic pegmatite at Kedykverpakhk Mt., Loverzero alkaline massif; the new mineral name refers to the nearby Raslak cirque. Type ikranite and raslakite are in the Fersman Mineralogical Museum, Moscow, Russia. **J.L.J.**

KUANNERSUITE-(CE)*

H. Friis, T. Balić-Žunić, I.V. Pekov, O.V. Petersen (2004) Kuannersuite-(Ce), $Ba_6Na_2REE_2(PO_4)_6FCl$, a new member of the apatite group, from the Ilímaussaq alkaline complex, South Greenland: description and crystal chemistry. Can. Mineral., 42, 95–106.

The mineral occurs as light rose-colored prismatic crystals up to 1½ mm long, showing {100}. Electron microprobe analysis gave Na_2O 3.9, K_2O 0.09, CaO 0.03, SrO 0.9, BaO 50.6, La_2O_3 2.4, Ce_2O_3 9.6, Pr_2O_3 0.12, Nd_2O_3 4.3, Sm_2O_3 0.5, ThO_2 0.3, SiO_2 0.5, P_2O_5 25.1, SO_3 0.04, F 1.9, Cl 1.2, $O \equiv F,Cl$ 1.10, sum 100.38 wt%, corresponding to $(Ba_{5.61}Sr_{0.15}K_{0.03})_{\Sigma5.79}Na_{2.14}(Ce_{1.00}$ $Nd_{0.43}La_{0.25}Sm_{0.05}Th_{0.02}Pr_{0.01})_{\Sigma1.76}(P_{6.02}Si_{0.14})_{\Sigma6.16}O_{23.72}(F_{1.70}Cl_{0.58})_{\Sigma2.28}$ for 26 anions; the ideal formula is given as $Ba_6Na_2REE_2(PO_4)_6FCl$ to emphasize that Cl occupies only one of the two independent sites for F. Vitreous luster, translucent, brittle, white streak, uneven fracture, poor {100} and {001} cleavages, $H = 4½–5½$, nonfluorescent, $D_{calc} = 4.51$ g/cm³ for $Z = 1$. Optically uniaxial

negative, $\omega = 1.694(1)$, $\varepsilon = 1.669(1)$, but shows an anomalously biaxial character with $2V = 10–20°$, $r > v$. Single-crystal X-ray structure study ($R = 0.0279$) indicated trigonal symmetry, space group $P\bar{3}$, $a = 9.9097(6)$, $c = 7.4026(6)$ Å. Strongest lines of the powder pattern (114 mm Gandolfi, CuKα radiation) are 4.077(40,111), 3.693(40,201), 2.969(100,211,112), 2.867(60,300,031), 2.212(40,113), 2.058(40,401,222), 1.965(80,320,213), and 1.863(60,410,303,402).

The mineral is associated with aegirine, analcime, beryllite, chkalovite, galena, gmelinite, and others that occur in albite-lined cavities in albite veins that cut syenite on the Kuannersuit Plateau at the Ilímaussaq alkaline complex, South Greenland. The new mineral name is for the locality and the predominant REE. Type material is in the Geological Museum at Copenhagen, Denmark, and at the Geological Faculty, Moscow State University, Moscow, Russia. **J.L.J.**

KUKHARENKOITE-(LA)*

I.V. Pekov, N.V. Chukanov, N.N. Kononkova, A.E. Zadov, S.V. Krivovichev (2003) Kukharenkoite-(La), $Ba_2(La,Ce)(CO_3)_3F$, a new mineral from Khibiny massif, Kola Peninsula. Zapiski Vseross. Mineral. Obshch., 132(3), 55–64 (in Russian, English abs.).

S.V. Krivovichev, T. Armbruster, I.V. Pekov (2003) Cation frameworks in the structure of natural fluorcarbonates of barium and rare-earth elements: Crystal structure of kukharenkoite-(La), $Ba_2(La,Ce)(CO_3)_3F$. Zapiski Vseross. Mineral. Obshch., 132(3), 65–72 (in Russian, English abs.).

Electron microprobe analysis gave Na_2O 0.23, K_2O 0.27, CaO 0.99, SrO 2.38, BaO 44.10, La_2O_3 11.18, Ce_2O_3 5.36, Pr_2O_3 0.87, Nd_2O_3 0.76, ThO_2 9.41, CO_2 (calc.) 21.30, F 3.38, $O \equiv F$ 1.42, sum 98.81 wt%, corresponding to $(Ba_{1.78}Sr_{0.14}K_{0.04})_{\Sigma1.96}$ $(La_{0.43}Th_{0.22}Ce_{0.20}Ca_{0.11}Na_{0.05}Pr_{0.03}Nd_{0.03})_{\Sigma1.07}(CO_3)_3F_{1.10}$, ideally $Ba_2(La,Ce)(CO_3)_3F$. The mineral forms white, pale green, or colorless crystals, flattened prismatic to acicular and up to 0.5 mm long, showing {010} and {$\bar{2}$01}, with {100} and {001} terminations; interpenetration twinning on the [$\bar{2}$01] axis leads to open-work intergrowths. Transparent, vitreous luster, brittle, white streak, uneven fracture, no cleavage, $H = 4$, $D_{calc} = 4.65$ g/cm³ for $Z = 2$. Optically biaxial negative, $2V_{meas} = 5(3)°$, $\alpha = 1.581(3)$, $\beta \approx \gamma = 1.715(5)$, orientation $Y = b$, $Z \wedge c \approx 26°$. The IR spectrum is like that of kukharenkoite-(Ce) and shows the absence of OH. Single-crystal X-ray structure study ($R_1 = 0.025$) indicated monoclinic symmetry, pseudorhombohedral, space group $P2_1/m$, $a = 13.396(4)$, $b = 5.111(1)$, $c = 6.672(2)$ Å, $\beta = 106.628(4)°$. Strongest lines of the powder pattern (57 mm Debye–Scherrer, Fe radiation) are 4.01(100,11$\bar{1}$,201), 3.27(100,310,40$\bar{1}$,20$\bar{2}$), 2.54(50,020,112), 2.14(80,221,51$\bar{2}$,600), and 1.998(80,42$\bar{1}$,22$\bar{2}$,511,31$\bar{3}$).

The mineral, which is the La-dominant analog of kukharenkoite-(Ce), occurs in cavities in two pegmatites at the Kirovsky mine, Mt. Kukisvumchorr, Khibiny alkaline massif, Kola Peninsula, Russia. In the Hilairitovoye pegmatite (holotype), associated minerals are microcline, albite, calcite, nenadkevichite, hilairite, catapleiite, strontianite, and others. In the other

occurrence the mineral is Th-free and the association is with a vein of pectolite, aegirine, and microcline. Type material is in the Fersman Mineralogical Museum, Moscow, Russia. **J.L.J.**

KUPČÍKITE*

D. Topa, E. Makovicky, T. Balić-Žunić, W.H. Paar (2003) Kupćíkite, $Cu_{3.4}Fe_{0.6}Bi_5S_{10}$, a new Cu–Bi sulfosalt from Felbertal, Austria, and its crystal structure. Can. Mineral., 41, 1155–1166.

The mineral forms gray, opaque, elongate aggregates, to 0.5 mm, with a metallic luster. Brittle, uneven fracture, no cleavage or parting, $VHN_{50} = 192$ (179–210), $H = 3$, $D_{calc} = 6.42$ g/cm³ for $Z = 2$. Grayish white in reflected light, no internal reflection, bireflectance perceptible in air, moderate in oil; pleochroism white with bluish tints, and enhanced in oil; anistropy moderate in air, strong in oil, with rotation tints dark bluish gray to yellowish brown. Reflectance percentages for R_1 and R_2 (in air, WTiC standard) are given in 20 nm steps from 400 to 700 nm; representative values are 33.55, 40.56 (470 nm), 33.92, 41.14 (546), 34.16, 41.35 (589), and 34.20, 41.32 (650). Electron microprobe analysis gave Cu 13.02, Fe 2.23, Ag 0.11, Cd 0.30, Bi 64.21, Sb 0.12, S 20.10, sum 100.09 wt%, corresponding to $(Cu_{3.29}Fe_{0.64})_{\Sigma 3.93}(Bi_{4.94}Ag_{0.01}Sb_{0.01}Cd_{0.04})_{\Sigma 5.00}S_{10.07}$ for 19 atoms per formula unit, simplified as $Cu_{3.4}Fe_{0.6}Bi_5S_{10}$. Single-crystal X-ray structure study ($R = 0.041$) indicated monoclinic symmetry, space group $C2/m$, $a = 17.512(2)$, $b = 3.9103(4)$, $c = 12.869(1)$ Å, $\beta = 108.56(1)°$. Strongest lines of the calculated X-ray powder pattern are 6.028(42,201), 3.596(68,401), 3.213(44,$\overline{2}$04), 3.128(100,112), 3.071(70,$\overline{3}$12), and 2.683(48,113). The mineral is the $N = 1$ member of a cuprobismutite homologous series and corresponds to the structure of synthetic $Cu_4Bi_5S_{10}$.

The new mineral name is for Prof. Vladimir Kupćík (1934–1990) of the University of Bratislava and the University of Göttingen. The mineral is associated with chalcopyrite, pyrrhotite, sphalerite, molybdenite, native bismuth, and intergrown makovickyite, cupromakovickyite, hodrushite, cuprobismutite, and derivatives of the bismuthinite–aikinite series that occur in quartz at the Felbertal scheelite deposit, Austrian Alps. Type material is in the Geological Institute and Geological Museum, University of Copenhagen, Denmark, and in the Mineralogical Institute, University of Salzburg, Austria. **J.L.J.**

LABUNTSOVITE GROUP

K.A. Rozenberg, R.K. Rastsvetaeva, I.V. Pekov, N.V. Chukanov, I.A. Verin (2003) Crystal structure of Sr-rich tsepinite. Dokla-dy Akad. Nauk, 393, 784–787 (in Russian).

K.A. Rozenberg, R.K. Rastsevetaeva, N.V. Chukanov, V.V. Subo-tin (2002) Acentric niobium-rich analogue of labuntsovite-Fe: crystal structure and microtwinning. Crystallogr. Reports, 47, 408–411.

The Sr-dominant analog of the tsepinite members of the labuntsovite group occurs as colorless to white prismatic grains, to 2 mm, in cavities in hydrothermally altered pegmatite at Mount Eveslogchorr, Khibiny alkaline massif, Kola Peninsula, Russia. Single-crystal X-ray structure study ($R = 0.066$) gave monoclinic symmetry, space group Cm, $a = 14.490(3)$, $b = 14.23(1)$, $c =$ 7.881(3) Å, $\beta = 117.28(2)°$. For $Z = 1$, $D_{calc} = 2.47$ g/cm³ and the structure-derived formula is $[Sr_{0.9}K_{0.8}Na_{0.4}Ca_{0.4}Ba_{0.3}][(H_2O)_{0.8}Sr_{0.4}][Ti_{5.6}Nb_{2.4}(OH,O)_8(Si_4O_{12})_4]\cdot 8.3H_2O$.

The Nb-rich analog of labuntsovite-Fe occurs as brown prismatic crystals, up to 3 mm long, in the Vuoriyarvi carbonatite massif of northern Karelia, Russia. Single-crystal X-ray structure study ($R = 0.066$) gave monoclinic symmetry, space group Cm, $a = 14.450(6)$, $b = 13.910(6)$, $c = 7.836(4)$ Å, $\beta = 117.42(1)°$, $D_{calc} = 2.76$ g/cm³ for $Z = 1$; the structure-derived formula is $[Na_{2.4}K_{1.6}][K_{2.2}(H_3O)_{0.8}]\{[K_{0.72}Ba_{0.48}][(H_2O)_{2.2}Fe_{0.66}Mg_{0.44}]\}[Ti_{4.8}Nb_{3.2}][Si_4O_{12}]_4(OH)_{5.27}O_{2.73}\cdot 2.92H_2O$.

Discussion. The analog of labuntsovite-Fe corresponds to IMA mineral No. 2002–007, for which the simplified formula is given as $NaK_3Fe(Ti,Nb)_4(Si_4O_{12})_2(O,OH)_4\cdot 6H_2O$. **J.L.J.**

MAGNESIOSADANAGAITE*

Y. Banno, R. Miyawaki, S. Matsubara, K. Makino, M. Bunno, S. Yamada, T. Kamiya (2004) Magnesiosadanagaite, a new member of the amphibole group from Kasuga-mura, Gifu Prefecture, central Japan. Eur. J. Mineral., 16, 177–183.

The name magnesiosadanagaite was approved by the CNMMN more than two decades ago, but subsequent development of the classification scheme currently in use for the amphiboles resulted in a name change and redefinition as potassic-magnesiosadanagaite because of the high K content. Consequently, the compositional block for the low-K analog was not occupied by a formally approved mineral, a situation that is rectified with the current description.

The mineral occurs as prismatic crystals, up to 3 mm long, in which the core of most crystals consists of pargasite and the typically sharply bounded rim, apparently ~150 μm thick, consists of magnesiosadanagaite. One of eight listed electron microprobe analyses has SiO_2 37.1, TiO_2 2.70, Al_2O_3 20.9, Cr_2O_3 0.01, FeO (total Fe) 6.76, MnO 0.18, MgO 13.4, CaO 12.5, Na_2O 3.33, K_2O 0.49, F 0.29, Cl 0.02, O ≡ F,Cl 0.12, H_2O (calc.) 1.92, Fe_2O_3 and FeO partitioned as 0.60 and 6.22, sum 99.5 wt%, corresponding to $(Na_{0.909}K_{0.091})_{\Sigma 1.000}(Ca_{1.948}Na_{0.030}Mg_{0.022})_{\Sigma 2.000}$ $(Mg_{2.883}Fe^{2+}_{0.756}Fe^{3+}_{0.066}Mn_{0.022}Cr_{0.001}Ti_{0.295}Al_{0.977})_{\Sigma 5.000}(Si_{5.395}Al_{2.605})_{\Sigma 8.000}$ $O_{22}(OH)_{1.862}F_{0.133}Cl_{0.005}$, ideally $NaCa_2[Mg_3(Al,Fe^{3+})_2]Si_5Al_3O_{22}$ $(OH)_2$. Brownish black color, brittle, brown streak with a reddish tint, uneven fracture, perfect {110} cleavage, $H = 5½–6$, $D_{calc} = 3.179$ g/cm³ for $Z = 2$. Optically biaxial positive, $\alpha = 1.674(2)$, $\beta_{calc} = 1.683$ for $2V$ of 85°, $\gamma = 1.694(2)$, $2V_{meas} = 80–90°$, $Z \wedge c = 20°$, $Y = b$; pleochroism X = pale yellow, Y = yellowish brown, Z = reddish brown. Single-crystal X-ray structure study ($R_1 = 0.042$) gave monoclinic symmetry, space group $C2/m$; $a = 9.875(9)$, $b = 17.92(1)$, $c = 5.314(6)$ Å, $\beta = 105.55(7)°$ as refined from a 114 mm Gandolfi pattern (Cu radiation) with strongest lines of 8.38(100,110), 3.11(80,310), 2.70(80,151), 2.58(75,061), 2.56(90,$\overline{2}$01), 2.34(80,$\overline{3}$51,$\overline{4}$21), and 1.587(70,600,$\overline{1}$53).

The mineral is associated with titanite, pargasite, phlogopite, calcite, pyrrhotite, and chalcopyrite in a contact aureole consisting predominantly of calcareous rocks adjacent to granite at Kasuga-mura, Gifu Prefecture, central Japan. Occurrences in the eastern Alps and in Yunnan Province, China, are also known. Type material is in the National science Museum, Tokyo, and in

the Geological Museum, Geological Survey of Japan, Tsukuba, Japan. **J.L.J.**

MAIKAINITE*, OVAMBOITE*

E.M. Spiridonov (2003) Maikainite $Cu_{20}(Fe,Cu)_6Mo_2Ge_6S_{32}$ and ovamboite $Cu_{20}(Fe,Cu,Zn)_6W_2Ge_6S_{32}$: New minerals in massive sulfide base metal ores. Doklady Earth Sci., 393A, 1329–1332.

Maikainite

The mineral occurs as oval particles, to 45 μm, and rarely as crystals resembling octahedra or rhombododecahedra; also occurs as rounded grains to 150 μm, as disseminated grains that form emulsion textures, as overgrowths on colusite, and at the cores of zoned crystals gradational to ovamboite. One of three listed electron microprobe analyses has Cu 42.55, Fe 6.35, Zn 0.56, Mo 5.21, W 1.24, V 0.12, Ge 10.86, Ga 0.15, As 2.28, S 31.40, sum 100.72 wt%, corresponding to $(Cu_{21.91}Fe_{3.72}Zn_{0.28})_{\Sigma25.91}$ $(Mo_{1.79}W_{0.22}V_{0.08})_{\Sigma2.09}(Ge_{4.90}Ga_{0.07}As_{0.99})_{\Sigma5.96}S_{\Sigma32.04}$, simplified as in the title. Bright yellow to grayish yellow in reflected light, isotropic, no cleavage or internal reflection, $VHN_{30} = 305$ (275–345), $D_{calc} = 4.453$ g/cm³ for $Z = 1$. Reflectance percentages in air are 23.4 (460 nm), 25.5 (546), 25.7 (589), and 25.6 (650). Indexing of the X-ray powder pattern (114 mm Debye–Scherrer, Fe$K\alpha$ radiation, 8 lines listed) gave $a = 10.64(1)$ Å; strongest lines are 3.07(100,222), 2.66(20,400), 1.884(80,440), 1.603(40,622), and 1.220(20,662).

The mineral occurs within sphalerite and bornite among aggregates of barite in the Maikain polymetallic massive sulfide deposit, Kazakhstan, and in the base-metal ore of the Tsumeb deposit, Namibia. The new mineral name refers to the Maikain locality.

Ovamboite

The mineral occurs in the Tsumeb deposit as round segregations, to 100 μm, as disseminated emulsion-texture grains in germanite containing gallite lamellae, and as the outer zones of maikainite overgrowths on germanocolusite. One of four listed electron microprobe analyses has Cu 39.85, Fe 4.75, Zn 3.34, Mo 1.01, W 9.83, Sn 0.04, V 0.09, Ge 10.01, Ga 0.48, As 2.58, S 29.65, sum 101.63 wt%, corresponding to $(Cu_{21.41}Fe_{2.91}$ $Zn_{1.74})_{\Sigma26.06}(W_{1.83}Mo_{0.36}V_{0.06}Sn_{0.01})_{\Sigma2.26}(Ge_{4.70}As_{1.17}Ga_{0.24})_{\Sigma6.11}S_{31.57}$, simplified as $Cu_{20}(Fe,Zn,Cu)_6W_2Ge_6S_{32}$. Whitish to pale yellow and pinkish gray in reflected light, isotropic, no cleavage or internal reflection, $VHN_{30} = 295$ (265–340), $D_{calc} = 4.736$ g/cm³ for $Z = 1$. Reflection percentages in air are 24.1 (460 nm), 24.3 (546), 24.4 (589), and 24.0 (650). Indexing of the X-ray powder pattern (114 mm Debye–Scherrer, Fe$K\alpha$ radiation, 10 lines listed) gave $a = 10.68(2)$ Å. The pattern, which is like those of maikainite, germanite, and colusite, has strongest lines at 3.08(100,222), 2.67(20,400), 1.887(70,440), and 1.612(50,622).

The new mineral name is derived from the location of the Tsumeb deposit, which is in the Ovamboland region of Namibia. Ovamboite and maikainite form a continuous W–Mo series and can be considered as analogs within the colusite group. Type material of both minerals is in the Fersman Mineralogical Museum, Moscow, and in the Mining Museum, St. Petersburg, Russia. **J.L.J.**

MALLESTIGITE*

I. Sima (1998) Mallestigite, $Pb_3Sb(SO_4)(AsO_4)(OH)_6\cdot3H_2O$, a new mineral from a dump of a former Cu-Pb-Zn mine northwest of the Mallisteger Mattagskogel in Westkarawanken, Corinthia, Austria. Mitteil. Österr. Mineral. Ges., 143, 225–227 (in German).

J.A. Mandarino (2003) New minerals. Can. Mineral., 41, 1309–1319.

The mineral forms elongate, colorless, euhedral to subhedral hexagonal prismatic crystals, up to 2 mm long and 0.4 mm wide, and radial aggregates to 3 mm in diameter. Crystals are elongate [001], showing {100} and {101}. Electron microprobe analysis gave PbO 65.67, Sb$_2$O$_5$ 14.68, As$_2$O$_5$ 9.71, SO$_3$ 8.64, H$_2$O (calc.) 10.38, sum 109.08 wt%, corresponding to $Pb_{3.06}Sb_{0.95}[(SO_4)_{1.12}(AsO_4)_{0.88}]_{\Sigma2.00}(OH)_{5.99}\cdot3.01H_2O$, ideally $Pb_3Sb(SO_4)(AsO_4)(OH)_6\cdot3H_2O$, which is the Sb-dominant analog of fleischerite. Transparent to translucent, adamantine luster, white streak, brittle, $H = 4$, splintery fracture, no cleavage, nonfluorescent, $D_{calc} = 4.91$ g/cm³ for $Z = 2$. Optically uniaxial positive, ε = 1.801(4), ω = 1.760(4). Single-crystal X-ray structure study indicated hexagonal symmetry, space group $P6_3$, $a = 8.938$, $c = 11.098$ Å. Strongest lines of the powder diffractogram are 7.74(25,100), 6.35(44,101), 3.655(100,201), 3.481(80,112), 3.175(31,202), 2.675(62,203), and 2.235(35,220). The structure study indicated a composition corresponding to $Pb_3Sb[(S_{0.95}As_{0.05})O_4][(As_{0.86}S_{0.14})O_4](OH)_6\cdot3H_2O$.

The mineral is associated with anglesite, brochantite, langite, linarite, and schultenite that formed by oxidation of galena- and tetrahedrite-bearing Cu-Pb-Zn ore in a mine dump near Mallestiger Mittagskogel, Carinthia, Austria. The new mineral name is for the locality.

Discussion. The same compound has been reported as a weathering product in a slag dump in the Harz Mountains, Germany (*Aufschluss*, 54(1), 42–44, 2003). **J.L.J.**

MARINELLITE*

E. Bonaccorsi, P. Orlandi (2003) Marinellite, a new feldspathoid of the cancrinite-sodalite group. Eur. J. Mineral., 15, 1019–1027.

Electron microprobe analysis gave K$_2$O 7.94, Na$_2$O 14.95, CaO 5.14, Al$_2$O$_3$ 27.80, SiO$_2$ 32.73, SO$_3$ 9.84, Cl 0.87, H$_2$O (by difference) 0.93, O ≡ Cl 0.20, sum 100 wt%, corresponding to $(Na_{31.86}K_{11.13}Ca_{6.06})_{\Sigma49.05}(Si_{35.98}Al_{36.02})_{\Sigma72}O_{144.60}(SO_4)_{8.12}Cl_{1.62}\cdot$ $3.41H_2O$, simplified as $(Na_{31}K_{11}Ca_6)_{\Sigma48}(Si_{36}Al_{36})_{\Sigma72}O_{144}(SO_4)_8$ $Cl_2\cdot6H_2O$. The mineral occurs as anhedral, transparent, colorless grains of unstated size [up to 2 mm across?]. Vitreous luster, white streak, brittle, conchoidal fracture, poor {001} cleavage, $H = 5\frac{1}{2}$, nonfluorescent, probable merohedral twinning on (001), $D_{meas} = 2.405(5)$, $D_{calc} = 2.40$ g/cm³. Optically uniaxial negative, ω = 1.495(1), ε = 1.497(1). Single-crystal X-ray structure study ($R = 0.098$) indicated trigonal symmetry, space group $P31c$; $a = 12.893(1)$, $c = 31.718(5)$ Å as refined from a Gandolfi pattern (Cu$K\alpha$ radiation) with strongest lines of 4.20(42,210), 3.725(100,214), 3.513(80,215), 3.089(40,217), and 2.150(40,330).

The mineral, which is a member of the cancrinite-sodalite group, is associated with giuseppettite, sanidine, nepheline, haüyne, biotite, and kalsilite in a specimen of volcanic ejecta from Sacrofano, Biacchella Valley, Latium, Italy. The new mineral name is for Giorgio Marinelli (1922–1993) of the Earth Science Department of the University of Pisa, at which type material is in the Museo di Storia Naturale e del Territorio. **J.L.J.**

MOSKVINITE-(Y)*

A.A. Agakhanov, L.A. Pautov, E.V. Sokolova, F.C. Hawthorne, V.Y. Karpenko (2003) Moskvinite-(Y), $Na_2K(Y,REE)[Si_6O_{15}]$, a new mineral. Zapiski Vseross. Mineral. Obshch., 132(6), 15–21 (in Russian, English abs.).

E. Sokolova, F.C. Hawthorne, A.A. Agakhanov, L.A. Pautov (2003) The crystal structure of moskvinite-(Y), $Na_2K(Y,REE)[Si_6O_{15}]$, a new silicate mineral with $[Si_6O_{15}]$ three-membered double rings from the Dara-i-Pioz moraine, Tien-Shan Mountains, Tajikistan. Can. Mineral., 41, 513–520.

Grains of the mineral are equant and up to 2 mm across. Colorless, transparent, brittle, white streak, no cleavage, uneven fracture, $H = 5$, $D_{meas} = 2.91$, $D_{calc} = 2.92$ g/cm³ for $Z = 4$, insoluble in 1:1 HCl. Optically biaxial negative, $\alpha = 1.555(2)$, $\beta = 1.558(2)$, $\gamma = 1.566(2)$, $2V_{meas} = 64$, $2V_{calc} = 63.8°$, moderate dispersion $r > v$. The average of six listed electron microprobe analyses is Na_2O 10.66, K_2O 7.50, Y_2O_3 14.63, Nd_2O_3 0.29, Sm_2O_3 0.54, Gd_2O_3 1.13, Tb_2O_3 0.43, Dy_2O_3 2.76, Ho_2O_3 0.66, Er_2O_3 1.17, SiO_2 60.34, sum 100.11 wt%, corresponding to $Na_{2.06}K_{0.95}(Y_{0.77}Dy_{0.09}Gd_{0.04}Er_{0.04}Ho_{0.02}Sm_{0.02}Nd_{0.01}Tb_{0.01})_{\Sigma 1.00}Si_6O_{15}$, ideally $Na_2K(Y,REE)Si_6O_{15}$. Single-crystal X-ray structure study ($R = 0.017$) indicated orthorhombic symmetry, space group $Ibmm$, $a = 10.623(2)$, $b = 14.970(2)$, $c = 8.553(1)$ Å. Strongest lines of the powder pattern (diffractometer, Fe radiation) are 4.98(100,121), 3.45(40,310), 3.26(85,141), 3.05(75,240,222), 2.753(42,103), and 2.490(45,251,060,242).

The mineral is associated with shibkovite, nordite-(Ce), leucophanite, microcline, albite, hyalotekite, and others within coarse-grained reedmergnerite pegmatite in the moraine of the Dara-i-Pioz glacier, Alai mountain ridge, Tien-Shan Mountains, northern Tajikistan. The new mineral name is for Russian geologist A.V. Moskvin (18897–1974). Type material is in the Fersman Mineralogical Museum, Moscow, Russia. **J.L.J.**

PAARITE*

E. Makovicky, D. Topa, T. Balić-Žunić (2001) The crystal structure of paarite, the newly discovered 56 Å derivative of the bismuthinite–aikinite solid-solution series. Can. Mineral., 39, 1377–1382.

Electron microprobe analysis gave Cu 4.79, Fe 0.08, Pb 16.7, Bi 60.8, S 17.83, sum 100.20 wt%, corresponding to $Cu_{1.62}Fe_{0.03}Pb_{1.74}Bi_{6.29}S_{11.9}$, ideally $Cu_{1.6}Pb_{1.6}Bi_{6.4}Si_{12}$. Tin-white color, metallic luster, opaque, $D_{calc} = 6.944$ g/cm³ for $Z = 5$. In reflected light, distinct anisotropy, no internal reflection. Maximum and minimum reflectance percentages are, respectively, 48.16, 38.32 (460 nm), 48.56, 37.42 (540), 48.09, 36.93 (580), and 46.69, 36.20 (640). Single-crystal X-ray structure study ($R = $

0.0517) indicated orthorhombic symmetry, space group $Pmcn$, $a = 4.007(1)$, $b = 55.998(8)$, $c = 11.512(2)$ Å. Strongest lines of the X-ray powder pattern are 4.01(56), 3.63(100), 3.58(55), 3.55(85), 3.155(57), 3.136(92), 2.836(93), and 2.560(41).

The mineral, a 56 Å derivative of the bismuthinite–aikinite series, occurs as individual grains and as a component of exsolution pairs with krupkaite in the metamorphosed scheelite deposit at Felbertal, Austria. The grain used for the crystal-structure study was 0.04–0.09 mm in diameter.

Discussion. Corresponds to IMA mineral No. 2001–16. **J.L.J.**

POTASSIC-CARPHOLITE*

K.T. Tait, F.C. Hawthorne, J.D. Grice, J.L. Jambor, W.W. Pinch (2004) Potassic-carpholite, a new mineral species from the Sawtooth batholith, Boise County, Idaho, U.S.A. Can. Mineral., 42, 121–124.

Electron microprobe analysis gave Na_2O 0.51, K_2O 4.07, Li_2O (calc.) 1.34, MgO 0.04, MnO 13.37, FeO 1.44, Al_2O_3 29.38, TiO_2 0.10, SiO_2 36.73, F 7.47, H_2O (calc.) 7.24, O ≡ F 3.14, sum 98.53 wt%, corresponding to $(K_{0.56}Na_{0.11}\square_{0.33})_{\Sigma 1}(Mn^{2+}_{1.26}Li_{0.60}Fe^{2+}_{0.13}Mg_{0.01})_{\Sigma 2.00}(Al_{3.85}Si_{0.08})_{\Sigma 3.93}Si_4O_{12}(OH)_4 (F_{2.63}\{OH\}_{1.37})_{\Sigma 4.00}$, ideal end-member $K(Mn^{2+},Li)_2Al_4Si_4O_{12}(OH)_4F_4$. The mineral occurs as irregular tufts, up to 2 mm across, of radiating crystals that are acicular to fibrous [100], generally 20–40 μm across and 500 μm long. White to straw-yellow color, silky luster, white streak, perfect {010} cleavage, $H = {\sim}5$, nonfluorescent, $D_{meas} = 3.08(2)$, $D_{calc} = 3.06$ g/cm³ for $Z = 4$. Optically biaxial negative, $\alpha = 1.578(2)$, $\beta = 1.592(2)$, $\gamma = 1.598(2)$, $2V_{meas} = 57$, $2V_{calc} = 66°$, orientation $X = b$, $Y = a$, $Z = c$, weakly pleochroic, $X = $ pale yellow, Y and Z colorless. Single-crystal X-ray structure study (*Am. Mineral.*, 74, 1084–1090, 1989) indicated orthorhombic symmetry, space group $Ccca$. Indexing of the X-ray powder pattern (114 mm Gandolfi, CuKα radiation) gave $a = 13.727(3)$, $b = 20.329(6)$, $c = 5.136(2)$ Å; strongest lines are 5.705(100,220), 3.819(80,221), 3.433(80,400), 3.048(90,331), 2.744(80,421), 2.613(100,351,261), 2.050(80,621), 1.467(80,173,5.11.1), and 1.452(80,0.14.0).

The mineral is known from several localities but was previously not accorded species status. The new mineral name refers to the composition and relationship to carpholite. The holotype is from the Sawtooth batholith near Centerville, Boise County, Idaho, where the occurrence is as a coating on microcline in miarolitic cavities; other associated minerals are quartz, albite, beryl, topaz, bertrandite, hellandite, zinnwaldite, fluorite, hematite, and apatite. Type material is in the Canadian Museum of Nature, Ottawa, **J.L.J.**

TASEQITE*

O.V. Petersen, O. Johnsen, R.A. Gault, G. Niedermayr, J.D. Grice (2004) Taseqite, a new member of the eudialyte group from the Ilímaussaq alkaline complex, South Greenland. Neues Jahrb. Mineral. Monatsh., 83–96.

The mineral forms individual platy {001} crystals, up to 0.5 × 3 mm, and clusters of crystals, some showing {001}, {00$\bar{1}$}, {110}, {100}, {010}, {101}, {012}, {01$\bar{1}$}, {10$\bar{2}$}, {021},

and $\{20\bar{1}\}$. Clove to yellowish brown color, less commonly lemon yellow; transparent, vitreous luster, brittle, white to light brown streak, uneven fracture, fair $\{001\}$ cleavage, $H = 5\frac{1}{2}$, nonfluorescent, $D_{meas} = 3.24(1)$, $D_{calc} = 3.20$ g/cm^3 for $Z = 3$. Optically uniaxial negative, $\varepsilon = 1.6378(5)$, $\omega = 1.6494(3)$. Electron microprobe analysis gave Na$_2$O 7.71, K$_2$O 0.23, CaO 8.19, SrO 13.98, MnO 3.02, FeO 3.92, Y$_2$O$_3$ 0.28, Ce$_2$O$_3$ 0.08, SnO$_2$ 0.13, ZrO$_2$ 9.89, HfO$_2$ 0.32, Nb$_2$O$_5$ 4.38, Ta$_2$O$_5$ 0.24, SiO$_2$ 41.64, Cl 1.91, H$_2$O (crystal structure analysis) 0.59, O$\equiv$Cl 0.43, sum 96.08 wt%, corresponding to $(Na_{8.81}Sr_{4.78}K_{0.17}Ce_{0.02})_{\Sigma13.78}$ $(Ca_{5.17}$ $Mn_{0.59}Y_{0.09})_{\Sigma5.85}(Fe_{1.93}Mn_{0.92})_{\Sigma2.85}(Zr_{2.84}Nb_{0.11}Hf_{0.05})_{\Sigma3.00}(Nb_{1.06}Ta_{0.04}$ $Sn_{0.03})_{\Sigma1.13}Si_{24.55}O_{73}(O_{1.65}OH_{0.75}(H_2O)_{0.74})_{\Sigma3.14}(Cl_{1.91}OH_{0.09})_{\Sigma2.00}$, ideally Na$_{12}Sr_3Ca_6Fe_3Zr_3$NbSi$_{25}O_{73}$(O,OH,H$_2$O)$_3Cl_2$. An IR spectrum confirmed the presence of OH and H$_2$O. Single-crystal X-ray structure study ($R = 0.037$) indicated trigonal symmetry, space group $R3m$; $a = 14.286(6)$, $c = 29.99(2)$ Å as refined from a Gandolfi pattern (114 mm, Cu$K\alpha$ radiation) with strongest lines of 11.49(50,101), 9.51(90,012), 3.43(90,131,223), 3.19(80,208), 2.98(100,315), and 2.86(100,404). The mineral is primarily distinguished from other members of the eudialyte group by the predominance of Sr in $N(4)$ and Nb in $M(3)$.

The mineral is associated with albite, aegirine, analcime, ancylite-(La), calcite, dolomite, catapleiite, fluorapatite, pectolite, and other minerals that occur in a cavity in a late-stage hydrothermal albitite vein in the Ilímaussaq alkaline complex. The occurrence is in the northern part of the complex, at Taseq slope, to which the new mineral name alludes. Type material is in the Geological Museum, Copenhagen, Denmark, and other repositories. **J.L.J.**

Tuite*

Xiande Xie, M.E. Minitti, Ming Chen, Ho-kwang Mao, Deqiang Wang, Jinfu Shu, Yingiwei Fei (2003) Tuite, γ-Ca$_3$(PO$_4$)$_2$: a new mineral from the Suizhou L6 chondrite. Eur. J. Mineral., 15, 1001–1005.

A description of the then-unnamed mineral, which is a high-pressure polymorph of whitlockite, was abstracted in *Am. Mineral.*, 88, p. 478 (2003). The mineral has a vitreous luster, white streak, and $D_{calc} = 3.447$ g/cm^3 for $Z = 3$. Trigonal symmetry, space group $R\bar{3}m$; $a = 5.258(1)$, $c = 18.727(3)$ Å. Strongest lines of the X-ray powder pattern are 2.891(80,105), 2.628(100,110), 1.945(47,205), 1.730(25,0.1.10), and 1.567(22,125), in good agreement with data for the synthetic analog, which is uniaxial positive, $\varepsilon = 1.706(3)$, $\omega = 1.701(4)$. The new mineral name is for Guangzhi Tu, the founding director of the Institute of Geochemistry, Chinese Academy of Sciences (CAS). Type material is in the Geological Museum of the Guangzhou Institute of Geochemistry, CAS, in Wushan, China. **J.L.J.**

Vasilyevite*

A.C. Roberts, M.A. Cooper, F.C. Hawthorne, J.A.R. Stirling, W.H. Paar, C.J. Stanley, G.E. Dunning, P.C. Burns (2003) Vasilyevite, $(Hg_2)_{10}^{2+}O_6I_3Br_2Cl(CO_3)$, a new mineral species from the Clear Creek claim, San Benito County, California. Can. Mineral., 41, 1161–1172.

M.A. Cooper, F.C. Hawthorne (2003) The crystal structure of vasilyevite, $(Hg_2)_{10}^{2+}O_6I_3Br_2Cl(CO_3)$. Can. Mineral., 41, 1173–1181.

The mineral forms anhedral microcrystalline aggregates, <0.5 mm in size, and a partly hollow spheroidal mass, 0.3 mm in diameter, whose shell thickness is ~30 μm. Silvery gray, black, or red-black color, adamantine to metallic luster, opaque to translucent (thin edges), $H = \sim 3$, brittle, red-brown streak, no cleavage, uneven fracture, nonfluorescent, $D_{calc} = 9.57$ g/cm^3 for $Z = 2$. In reflected light, weakly bireflectant, nonpleochroic, moderate to strong anisotropy, rotation tints of green, blue, and gray; orange-red to blood-red internal reflection. Representative reflectance percentages for R_1 and R_2 (air, WTiC standard) are 28.6, 29.5 (470 nm), 26.2, 27.1 (546), 24.6, 25.7 (589), and 22.8, 24.0 (650). Electron microprobe analysis gave Hg$_2$O 89.1, I 7.0, Br 2.5, Cl 0.6, S 0.1, CO$_2$ (calc.) 0.8, O$\equiv$I + Br + Cl + S 0.88, sum 99.22 wt%, corresponding to $Hg_{20.82}^{1+}O_{6.85}I_{2.69}(Br_{1.52}Cl_{0.82})[(CO_3)_{0.89}$ $S_{0.15}^{2-}]_{\Sigma1.04}$, idealized as in the title. Single-crystal X-ray structure study ($R_1 = 0.089$) indicated triclinic symmetry, space group $P\bar{1}$; $a = 9.250(5)$, $b = 10.629(4)$, $c = 18.182(6)$ Å, $\alpha = 93.06(4)$, $\beta = 90.35(5)$, $\gamma = 115.16(4)°$ as refined from an X-ray powder pattern (114 mm Debye–Scherrer, Cu$K\alpha$ radiation) with strongest lines of 7.645(60,$\bar{1}1\bar{1}$), 4.205(80,01$\bar{4}$), 3.296(50,$\bar{1}$15,105), 3.132(90,12$\bar{3}$),$\bar{1}3\bar{3}$), 2.722(80,124), and 2.629(50,130,$\bar{1}$40).

The mineral occurs in quartz-lined vugs in a quartz–magnesite breccia in dumps at the former Clear Creek mercury mine, New Idria district, San Benito County, California. Most vugs are monomineralic, and adjacent ones contain native mercury, eglestonite, montroydite, cinnabar, and an unidentified Hg oxyhalide. The new mineral name is for Russian mineralogist Vladimir Ivanovich Vasilyev (b. 1929), the discoverer of numerous new Hg minerals. Type material is in the Systematic Reference Series housed at the Geological Survey of Canada, Ottawa. **J.L.J.**

Fe^{3+} Phosphate

U. Kolitsch (2004) The crystal structures of kidwellite and "laubmannite," two complex fibrous iron phosphates. Mineral. Mag., 68, 147–165.

"Laubmannite" was formally discredited in 1990 (*Am. Mineral.*, 75, 1197–1199), and a mineral previously ascribed to "laubmannite" (*Am. Mineral.*, 55, 135–169, 1970) was concluded to be a new but undefined species known from several localities. Single-crystal X-ray structure study ($R_1 = 0.0314$) of the unnamed species gave orthorhombic symmetry, space group *Pbcm*, $a = 5.172(1)$, $b = 13.999(3)$, $c = 31.083(6)$ Å, similar to the results reported in 1970 for material from a different locality. The structure solution gave the idealized formula (Fe^{3+}, Fe^{2+}, $M)_{8+x}$(OH,H$_2$O)$_9$(H$_2$O)$_2$(PO$_4$)$_5$, where M = Fe^{3+}, Cu^{2+} or other metal cation, and $x \approx 0.1$. Whereas type "laubmannite" was appropriately discredited as a mixture of known mineral species, some specimens previously described as "laubmannite" contain the as-yet-unnamed phosphate. **J.L.J.**

Gd Silicate, Oxides

O.A. Bogatikov, A.V. Mokhov, P.M. Kartashov, L.O. Magazina, E.V. Koporulina, N.A. Ashikhmina, A.I. Gorshkov (2004) Selectively Gd-enriched micro- and mono-sized minerals in the lunar regolith from Crisium Mare. Doklady Earth Sci., 394, 39–41.

Results are listed for six normalized microbeam analyses obtained from six particles, each 500 nm to 5 μm, of lunar regolith. The results are interpreted to correspond to the simplified formulas $GdFe^{2+}AlSiO_6$, $Ca_2GdFe_5ZrO_{15}$, $CaGd_3ThAlTi_3Zr_3O_{21}$, $(Gd,Th,La)_3Th_3Al_3Ti_3Zr_2O_{25}$, $(Gd,Ce)_4Zr_4Al_2O_{17}$, and Gd_2ZrTiO_7. A seventh listed analysis of a micrometer-size particle, from the fumarole exhalations of Kudryavyi Volcano on Iturup Island (Kuril Islands) is interpreted to be that of $GdTi_2O_{5.5}$. **J.L.J.**

$MnC_2O_4 \cdot 2H_2O$

K. Walenta (2003) Oxalate minerals from the Black Forest. Erzgräber, 17(1), 9–16 (in German, English abs.).

The mineral forms crusts of anhedral grains, brownish with a light yellow tint, $\alpha = 1.434$, $\gamma = 1.662$. The grains are associated with humboldtine on iron oxides from an occurrence in Ortenberg near Offenburg in the Black Forest, Germany. The principal cation is Mn, and the X-ray powder pattern (18 lines listed) is in good agreement with that of synthetic $MnC_2O_4 \cdot 2H_2O$, which is a monoclinic polymorph of the Mn analog of humboldtine. Other occurrences of the Mn oxalate are known, but their natural origin is less certain. **J.L.J.**

(NA,CA) HEXALUMINOSILICATE

P. Beck, P. Gillet, L. Gautron, I. Daniel, A. El Goresy (2004) A new natural high-pressure (Na,Ca)-hexaluminosilicate $[(Ca_xNa_{1-x})Al_{3+x}Si_{3-x}O_{11}]$ in shocked Martian meteorites. Earth Planet. Sci. Lett., 219, 1–12.

The mineral has been identified in several Martian meteorites, wherein it is intergrown with stishovite, or with stishovite and Al-bearing silicate with the hollandite structure, which formed as pockets of shock melt of plagioclase composition. The sole area large enough to obtain a representative microprobe analysis gave Na_2O 6.96, K_2O 0.53, CaO 4.4, MgO 0.05, FeO 0.13, Al_2O_3 47.88, SiO_2 40.05, sum 100 wt%, corresponding to $(Na_{0.83}Ca_{0.29}K_{<0.04})Al_{2.91}Si_{2.95}O_{11}$, simplified end-member $NaAl_3Si_3O_{11}$. The Ca end-member has been synthesized in high-pressure experiments and is thought to have a hexagonal Ba ferrite structure. The Raman spectrum of the meteoritic mineral is slightly shifted but is otherwise in good agreement with the Ca-dominant synthetic compound. **J.L.J.**

NEW DATA

AERINITE

J. Rius, E. Elkaim, X. Torrelles (2004) Structure determination of the blue mineral pigment aerinite from synchrotron powder diffraction data: The solution of an old riddle. Eur. J. Mineral., 16, 127–134.

Examination of synchrotron powder-diffraction data for aerinite from the Camporrells-Estopanyà area of Huesca, Spain, confirmed the previously proposed hexagonal unit cell (*Am. Mineral.*, 84, p. 1467, 1999) and established the space group as $P3c1$. The revised structural formula is $(Ca_{5.1}Na_{0.5})(Fe^{3+}AlFe^{2+}_{1.7}Mg_{0.3})(Al_{5.1}Mg_{0.7})[Si_{12}O_{36}(OH)_{12}H] \cdot [(H_2O)_{12}(CO_3)_{1.2}]$, $Z = 1$, $D_{calc} = 2.52$ g/cm³. **J.L.J.**

KIDWELLITE

U. Kolitsch (2004) The crystal structures of kidwellite and "laubmannite," two complex fibrous iron phosphates. Mineral. Mag., 68, 147–165.

Single-crystal X-ray structure study ($R_1 = 0.0521$) of kidwellite from the Clara mine, Black Forest, Germany, gave monoclinic symmetry, new space group $P2/c$, $a = 20.117(4)$, $b = 5.185(1)$, $c = 13.978(3)$ Å, $\beta = 107.07(3)°$, $D_{calc} = 3.289$ g/cm³ for $Z = 2$. The revised simplified formula is $Na(Fe^{3+},M)_{9+x}(OH)_{11}(H_2O)_3(PO_4)_6$, where $M = Fe^{3+}$, Cu^{2+}, or other metal cation, and $x \approx 0.3$. **J.L.J.**

LINDACKERITE

J. Hybler, P. Ondruš, I. Císařová, V. Petříček, F. Veselovský (2003) Crystal structure of lindackerite, $(Cu,Co,Ni)Cu_4(AsO_4)_2(AsO_3OH)_2 \cdot 9H_2O$ from Jáchymov, Czech Republic. Eur. J. Mineral., 15, 1035–1042.

Single-crystal X-ray structure study ($R = 0.0529$) of lindackerite of composition $Cu_{0.89}Cu_{4.00}[(AsO_4)_{1.78}(AsO_3OH)_{2.22}] \cdot 8.01H_2O$ gave triclinic symmetry, space group $P\bar{1}$, $a = 6.415(1)$, $b = 8.048(1)$, $c = 10.332(1)$ Å, $\alpha = 85.41(1)$, $\beta = 79.50(1)$, $\gamma = 84.71(1)°$, $D_{calc} = 3.312$ g/cm³ for $Z = 1$. The number of H_2O molecules in the formula is ≈9, which is a slight revision from that determined previously (*Am. Mineral.*, 81, p. 1517, 1996). Substitution of Co and Ni for the first Cu in the formula is common, and the natural Co-dominant analog is known. **J.L.J.**

META-URANOCIRCITE

A.V. Barinova, R.K. Rastsvetaeva, G.A. Sidorenko, N.V. Chukanov, D.Yu. Pushcharovskii, M. Pasero, S. Merlino (2003) Crystal structure of metauranocircite $Ba(UO_2)_2(PO_4)_2 \cdot 6H_2O$. Doklady Chem., 398, 58–61.

Single-crystal X-ray structure study ($R = 0.11$) of meta-uranocircite from the Bota–Burum uraninite–sulfide deposit in southern Kazakhstan gave monoclinic symmetry, space group $P2_1$, $a = 6.965(3)$, $b = 6.964(2)$, $c = 17.65(1)$ Å, $\gamma = 90°$, $D_{calc} = 3.78$ g/cm³ for $Z = 2$. The unit-cell volume is half that previously reported for the synthetic analog (*Am. Mineral.*, 68, p. 472, 1983). **J.L.J.**

RADTKEITE

N.V. Pervukhina, V.I. Vasil'ev, D.Yu. Naumov, S.V. Borisov, S.A. Magarill (2004) The crystal structure of synthetic radtkeite, Hg_3S_2ClI. Can. Mineral., 42, 87–94.

Single-crystal X-ray structure study ($R = 0.0527$) of synthesized radtkeite, Hg_3S_2ICl, has revised the formerly proposed orthorhombic unit cell to a monoclinic one, space group $C2/m$, $a = 16.827(4)$, $b = 9.117(1)$, $c = 13.165(5)$ Å, $\beta = 130.17(2)°$, $D_{calc} = 7.130$ g/cm³ for $Z = 8$. **J.L.J.**

SEIDITE-(CE)

G. Ferraris, E. Belluso, A. Gula, S.V. Soboleva, A.P. Khomyakov (2003) The crystal structure of seidite-(Ce), $Na_4(Ce,Sr)_2$

{Ti(OH)$_2$Si$_8$O$_{18}$}}(O,OH,F)$_4$·5H$_2$O, a modular microporous titanosilicate of the rhodesite group. Can. Mineral., 41, 1183–1192.

The formula of seidite-(Ce) was originally idealized as Na$_4$SrCeTiSi$_8$O$_{22}$F·5H$_2$O (*Am. Mineral.*, 85, p. 627, 2000). A structure model based on the similarity of the unit-cell parameters and formula of miserite to those of seidite-(Ce) indicates that the ideal formula of seidite-(Ce) is Na$_4$(Ce,Sr)$_2${Ti(OH)$_2$(Si$_8$O$_{18}$)}(O,OH,F)$_4$·5H$_2$O, that of the Ce end-member would be Na$_4$Ce$_2${Ti(OH)$_2$(Si$_8$O$_{18}$)}O$_4$·5H$_2$O, and that of the Sr end-member would be Na$_4$Sr$_2${Ti(OH)$_2$(Si$_8$O$_{18}$)}O$_2$(OH,F)$_2$·5H$_2$O. **J.L.J.**

Shcherbakovite, "Noonkanbahite"

Y.A. Uvarova, E. Sokolova, F.C. Hawthorne, R.P. Liferovich, R.H. Mitchell (2003) The crystal chemistry of shcherbakovite from the Khibina massif, Kola Peninsula, Russia. Can. Mineral., 41, 1193–1201.

Single-crystal X-ray structure study ($R_1 = 0.032$) of shcherbakovite from Mount Rasvumchorr, Khibina massif, Russia, gave orthorhombic symmetry, space group *Imma*, $a = 8.1538(4)$, $b = 10.5569(5)$, $c = 13.9882(6)$ Å, $D_{calc} = 3.194$ g/cm^3 for $Z = 4$. The three interstial sites are [9]-, [8]-, and [6]-coordinated, and in shcherbakovite they are occupied by K, K, and Na, respectively. For the batisite–shcherbakovite solid-solution series, the end-members are BaNaNaTi$_2$O$_2$[Si$_4$O$_{12}$] and KKNaTi$_2$O(OH)[Si$_4$O$_{12}$]. The crystal structure of "noonkanbahite" has been determined, and although the mineral (named in 1965) has not been accepted as a valid species, the end-member formula corresponds to BaKNaTi$_2$O$_2$[Si$_4$O$_{12}$].

Discussion. The authors state that a proposal for the adoption of "noonkanbahite" as a new mineral has been submitted to the CNMMN. **J.L.J.**

Wycheproofite

U. Kolitsch (2003) The crystal structure of wycheproofite, NaAlZr(PO$_4$)$_2$(OH)$_2$·H$_2$O. Eur. J. Mineral., 15, 1029–1034.

Single-crystal X-ray structure study ($R_1 = 0.0418$) of wycheproofite from the only known locality (Wycheproof, Australia) indicated triclinic symmetry, space group $P\overline{1}$, and the new unit cell $a = 5.263(1)$, $b = 9.251(2)$, $c = 9.480(2)$ Å, $\alpha = 109.49(3)$, $\beta = 98.57(3)$, $\gamma = 90.09(3)°$, $D_{calc} = 2.93$ g/cm^3 for $Z = 2$. **J.L.J.**

ERRATUM

The formula for bergenite in *Am. Mineral.* 89, p. 252 (2004) should read Ca$_2$Ba$_4$[(UO$_2$)$_3$O$_2$(PO$_4$)$_2$]$_3$(H$_2$O)$_{16}$.