

NEW MINERAL NAMES*

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Belloite*

J. Schlüter, K.-H. Klaska, G. Gebhard (2000) Belloite, Cu(OH)Cl, a new mineral from Sierra Gorda, Antofagasta, Chile. Neues Jahrb. Mineral. Mon., 67–73.

Electron microprobe and CHN analysis gave CuO 68.84, Cl 26.35, H₂O 7.47, O ≡ Cl 5.96, sum 96.70 wt%, corresponding to Cu_{1.05}(OH)_{1.00}O_{1.10}Cl_{0.90}. The mineral occurs as yellowish green to olive-green incrustations and masses in which individual grains are up to 100 μm. Vitreous luster, transparent to translucent, soft, yellowish green streak, nonfluorescent, $D_{\text{calc}} = 3.79 \text{ g/cm}^3$ for the empirical formula and $Z = 4$. Unstable in non-desert conditions, and converts in water to botallackite and atacamite. In transmitted light, weakly pleochroic from yellowish green to pale yellowish green, $n_{\text{calc}} = 1.85$ for the ideal formula and the Gladstone–Dale relationship. The X-ray powder pattern is in good agreement with that of the synthetic analog, which is monoclinic, space group $P2_1/a$; calculated dimensions from the powder pattern of the mineral (diffractometer, CuK α radiation) are $a = 5.552(3)$, $b = 6.668(2)$, $c = 6.124(2)$ Å, $\beta = 115.00(3)^\circ$, and strongest lines are 5.553(100,001), 2.758(52,11 $\bar{2}$,12 $\bar{1}$), 2.516(18,200), 2.241(27,12 $\bar{2}$) and 1.851(21,21 $\bar{3}$,003).

The mineral is associated with nitratine and paratacamite in quartz-feldspar-tourmaline rock from an abandoned mine at Sierra Gorda, near Antofagasta, Chile. The new mineral name is for Andrés Bello (1780–1865), founder and first rector of the Universidad de Chile. Type material is in the Mineralogical Museum of the University of Hamburg, Germany. **J.L.J.**

Edgarite*

A.Y. Barkov, R.F. Martin, Y.P. Men'shikov, Y.E. Savchenko, Y. Thibault, K.V.O. Laajoki (2000) Edgarite, FeNb₃S₆, first natural niobium-rich sulfide from the Khibina alkaline complex, Russian Far North; evidence for chalcophile behavior of Nb in a fenite. Contrib. Mineral. Petrol., 138, 229–236.

The mineral occurs as individual platy crystals, up to 0.15 mm in the longest dimension, and rarely as platy aggregates to about 0.5 mm across. The average of four listed electron mi-

croprobe analyses is Nb 52.87, Fe 10.12, V 0.36, Mn 0.10, Ti 0.04, S 35.86, sum 99.35 wt%, corresponding to (Fe_{0.96}V_{0.04}Mn_{0.01})_{Σ1.01}Nb_{3.03}S_{5.95}, ideally FeNb₃S₆. Dark gray color, perfect basal cleavage, opaque, $VHN_5 = 135$, $VHN_{10} = 205$, $D_{\text{calc}} = 4.99 \text{ g/cm}^3$ for $Z = 2$ and the empirical formula. In reflected light, similar to molybdenite; distinctly bireflectant and pleochroic, from gray to light gray with a bluish tint; strongly anisotropic, from almost white to dark brown. Reflectance percentages are given in 20 nm steps in air and in oil from 400 to 700 nm; representative values in air for R_1 and R_2 are 28.1, 40.2 (470 nm), 27.4, 39.3 (546), 27.0, 38.5 (589), and 27.0, 36.9 (650). The X-ray powder pattern is in good agreement with that of the synthetic analog (PDF 22–350); by analogy, the mineral is hexagonal, space group $P6_322$, $a = 5.771(1)$, $c = 12.190(6)$ Å. Strongest lines of the powder pattern (114 mm Debye–Scherrer) are 6.11(80,002), 2.606(80,112), 2.096(100,114), and 1.665(80,300).

The mineral occurs in a feldspar-rich fenitized xenolith, approximately 0.2 km across, in foyaite at the Khibina alkaline complex, Kola Peninsula, Russia. Associated sulfides are pyrrhotite, marcasite, pyrite, and alabandite. The pyrrhotite contains up to 4 wt% Ti, and the alabandite has up to 7.7 wt% Fe. The new mineral name is for petrologist Alan D. Edgar (1935–1998) of the University of Western Ontario. Type material is in the Royal Ontario Museum, Toronto, Canada. **J.L.J.**

Hydroxylclinohumite*

V.M. Gekimiyants, E.V. Sokolova, E.M. Spiridonov, G. Ferraris, N.V. Chukanov, M. Prencipe, V.N. Avdonin, Yu.A. Polenov (1999) Hydroxylclinohumite Mg₉(SiO₄)₄(OH,F)₂ — a new mineral of the humite group. Zapiski Vseross. Mineralog. Obshch., 128(5), 64–70 (in Russian).

Wet-chemical analysis (water by Penfield method), confirmed by electron microprobe analysis, gave SiO₂ 38.97, TiO₂ 0.67, FeO 0.70, MnO 0.12, MgO 57.56, H₂O⁺ 2.72, F 0.49, O ≡ F₂ 0.23, sum 101.00 wt%, corresponding to (Mg_{8.82}Fe_{0.06}Mn_{0.01}Ti_{0.05})_{Σ8.94}[Si_{4.00}O_{15.98}](OH_{1.86}F_{0.16})_{Σ2.02}. Occurs as oval, elongate [001] grains to 3 mm in diameter, and as aggregates to 2 cm associated with spinel as inclusions in calcite. Crystal faces are absent. Pale yellow to orange-yellow or almost colorless; transparent, or translucent in larger grains, vitreous to dull luster, $H = 6.5$, $VHN_{60} = 732$ –747, no cleavage, uneven to conchoidal fracture, white streak, $D_{\text{meas}} = 3.13$, $D_{\text{calc}} = 3.14 \text{ g/cm}^3$ for $Z = 2$. The infrared pattern is similar to those of the humite-

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

group minerals, with strong absorption bands at 987, 960, 724, 610, and 530 cm^{-1} , plus 3560, 3580, and 3385 cm^{-1} . Optically biaxial positive, $\alpha = 1.631$, $\beta = 1.641$, $\gamma = 1.664$, $2V_{\text{meas}} = 70$, $2V_{\text{calc}} = 68^\circ$, $Z \wedge c = 11^\circ$, weak dispersion, pleochroism $X = \text{yellow}$, $Z = \text{colorless}$. Single-crystal X-ray study ($R = 0.027$) showed the mineral to be monoclinic, space group $P2_1/b$, $a = 4.7480(3)$, $b = 10.2730(7)$, $c = 13.6894(2)$ Å, $\alpha = 100.72(1)^\circ$. Strongest lines of the powder pattern (diffractometer, Co radiation, 53 lines given) are 3.72(95,022), 2.772(91,13 $\bar{1}$), 2.516(93,13 $\bar{3}$), 2.269(100,12 $\bar{5}$), and 2.259(95,14 $\bar{1}$).

The mineral, which is associated with ferroan spinel, occurs in Mg-skarn (calciphyric) rims around dolomitic marble xenoliths in gabbroic rocks and associated Fe-Ti ores at the Zelentsovskaya mine on the southern slopes of the western Urals, Russia. The new name is for the composition and relationship to clinohumite. Type material is in the Mining Geological Museum at Ekaterinburg, Russia, and in the Mineralogy Museum of Saint Petersburg University, Russia. **J.P.**

Lemleinite*

A.P. Khomyakov, G.N. Nechelyustov, R.K. Rastsvetaeva, G.I. Dorokhova (1999) Lemleinite $\text{NaK}_2(\text{Ti,Nb})_2\text{Si}_4\text{O}_{12}(\text{O,OH})_2 \cdot 2\text{H}_2\text{O}$ — a new mineral of the labuntsovitenadkevichite family. *Zapiski Vseross. Mineralog. Obsch.*, 128(5), 54–63 (in Russian, English abs.).

Electron microprobe analysis (average of four; H_2O by thermal analysis) gave Na_2O 5.30, K_2O 14.92, CaO 0.02, SrO 0.02, MnO 0.06, FeO 0.04, Al_2O_3 0.06, SiO_2 39.78, TiO_2 18.42, Nb_2O_5 13.52, Ta_2O_5 0.16, H_2O 7.23, sum 99.53 wt%, corresponding to $(\text{Na}_{1.033}\text{Ca}_{0.002})_{\Sigma 1.035}(\text{K}_{1.914}\text{Sr}_{0.001})_{\Sigma 1.915}(\text{Ti}_{1.392}\text{Nb}_{0.614}\text{Mn}_{0.005}\text{Ta}_{0.004}\text{Fe}_{0.004})_{\Sigma 2.019}(\text{Si}_{3.999}\text{Al}_{0.007})_{\Sigma 4.006}\text{O}_{13.65}(\text{OH})_{0.35} \cdot 2.25\text{H}_2\text{O}$, ideally $\text{NaK}_2(\text{Ti,Nb})_2\text{Si}_4\text{O}_{12}(\text{O,OH})_2 \cdot 2\text{H}_2\text{O}$. TGA gave a loss of 6.33 wt% from 190–600 °C, and 0.90 wt% from 600–800 °C. The mineral forms pseudo-orthorhombic, spindle-like crystals, elongate [001] to 1 mm, and up to 5 mm in intergrowths. The habit is due to (40 $\bar{1}$) and polysynthetic (001) twinning of monoclinic crystals. Observed forms are {100}, {041}, {20 $\bar{1}$ }, and narrow {001}. Colorless, transparent to translucent, vitreous luster, conchoidal fracture, $H = 5$, $D_{\text{meas}} = 2.80(5)$, $D_{\text{calc}} = 2.86 \text{ g/cm}^3$, nonfluorescent, insoluble in water and acids at room temperature. Optically biaxial positive, $\alpha = 1.667(2)$, $\beta = 1.677(2)$, $\gamma = 1.802(5)$, $2V = 32(1)^\circ$, $X = b$, $Y \wedge c = 27^\circ$, $Z = a$, strong dispersion $r > v$. The infrared pattern has absorption bands at 3510, 3280, 3195, 1655, 1118, 1080, 1053, 1035, 961, 924, 766, 685, 672, 575, 458, and 439 cm^{-1} . Single-crystal and powder X-ray study showed the mineral to be monoclinic, space group $C2/m$, $a = 14.39(3)$, $b = 13.900(6)$, $c = 7.825(9)$ Å, $\beta = 117.6(1)^\circ$, $Z = 4$. Strongest lines of the powder pattern (68 lines given) are 6.94(61,202), 6.39(43, broad, 20 $\bar{1}$), 3.186(100, 40 $\bar{2}$), and 2.600(28, double, broad, 24 $\bar{2}$, 20 $\bar{3}$, 241, 202).

The mineral, which belongs to the nenadkevichite-labuntsovite group, occurs in ultraaluminous pegmatites in apatite-nepheline ores at Mount Koashva, Khibina alkaline massif, Kola Peninsula, Russia. Associated minerals are sodalite, natrolite, aegirine, K-feldspar, pectolite, alkali amphibole, lamprophyllite, lomonosovite, sphalerite, sitinakite, catapleite,

rhabdophane-(Ce), and intergrowths of sazykinaite. The new name is for Georgy Glebovich Lemlein (1901–1962), Russian mineralogist and crystallographer. Type material is in the Fersman Mineralogical Museum, Moscow, Russia.

Discussion. A report on the structure of the then-unnamed mineral was abstracted in *Am. Mineral.*, 83, p. 188, 1998, **J.P.**

Lulzacite*

Y. Moëlo, B. Lasnier, P. Palvadeau, P. Léone, F. Fontan (2000) Lulzacite, $\text{Sr}_2\text{Fe}^{2+}(\text{Fe}^{2+},\text{Mg})_2\text{Al}_4(\text{PO}_4)_4(\text{OH})_{10}$, a new strontium phosphate (Saint-Aubin-des-Châteaux, Loire-Atlantique, France). *C.R. Acad. Sci. Paris, Earth Planet. Sci.*, 330, 317–324 (in French, abridged English).

The mineral occurs as grayish green aggregates up to several centimeters long. Electron microprobe analysis gave SrO 21.79, BaO 1.20, FeO 16.13, MgO 2.97, Al_2O_3 19.16, P_2O_5 28.50, V_2O_5 0.64, H_2O (TGA) 10.29, sum 100.68 wt%, which for Fe + Mg + Al = 7 corresponds to $(\text{Sr}_{2.18}\text{Ba}_{0.08})_{\Sigma 2.26}(\text{Fe}_{2.23}\text{Mg}_{0.77})_{\Sigma 3.00}\text{Al}_{3.90}(\text{P}_{4.17}\text{V}_{0.08})_{\Sigma 4.25}\text{O}_{27.60}\text{H}_{11.88}$. Grains are typically anhedral, rarely euhedral to 4 mm; vitreous luster, no cleavage, $H = 5\frac{1}{2}$ –6, slightly soluble in hot HNO_3 but inert in HCl, $D_{\text{meas}} = 3.55$, $D_{\text{calc}} = 3.58 \text{ g/cm}^3$ for $Z = 1$ and the crystal-structure formula $(\text{Sr}_{0.96}\text{Ba}_{0.04})_2\text{Fe}(\text{Fe}_{0.63}\text{Mg}_{0.37})_2\text{Al}_4[(\text{P}_{0.98}\text{V}_{0.02})\text{O}_4]_4(\text{OH})_{10}$. Optically biaxial negative, $\alpha = 1.654$, $\beta = 1.674$, $\gamma = 1.684$, $2V_{\text{meas}} = 45$ – 65° , distinct dispersion $r < v$; distinct pleochroism, from brown-yellow to pale blue-violet. Single-crystal X-ray structure study indicated triclinic symmetry, space group $P\bar{1}$, $a = 5.457(1)$, $b = 9.131(2)$, $c = 9.769(2)$ Å, $\alpha = 108.47(3)$, $\beta = 91.72(3)$, $\gamma = 97.44(3)^\circ$; strongest lines of the powder pattern (diffractometer, $\text{CuK}\alpha$ radiation) are 3.591(50,111), 3.218(100,12 $\bar{2}$), 3.132(62,120), 3.016(56,12 $\bar{2}$) and 2.8119(58,113).

The mineral is associated mainly with siderite, pyrite, goyazite, and apatite in quartz veinlets, a few centimeters thick, that occur at the contact between Ordovician quartzite and limestone in a quarry 8 km west of Châteaubriant, Loire-Atlantique region, France. The new mineral name is for geologist Y. Lulzac, who discovered the mineral. Lulzacite is isotypic with jemesite. Type material is in the Mineralogical Museum of the École des Mines in Paris, in the Museum national d'histoire naturelle in Paris, and in the Collection de minéralogie de la Sorbonne (Paris University). **J.L.J.**

Saimaite

Renkui Song, Kuishou Ding, Zhe Li (1999) Site occupancies of iron in saimaite and chevkinite. *Chinese Sci. Bull.*, 44(24), 2274–2276.

The mineral occurs as black, non-metamict grains in the Saima alkalic complex in Liaoning Province, China. Single-crystal X-ray study gave monoclinic symmetry, space group $C2/m$, $a = 13.8934$, $b = 5.6703$, $c = 11.9120$ Å, $\beta = 114.083^\circ$. Electron microprobe analyses indicate a general formula $(\text{Sr,REE})_4\text{Fe}(\text{Ti,Zr})_2\text{Ti}_2\text{Si}_4\text{O}_{22}$.

Discussion. The approved name is strontio-chevkinite. **J.L.J.**

Stoppaniite*

G. Della Ventura, P. Rossi, G.C. Parodi, A. Mottana, M. Raudsepp, M. Prencipe (2000) Stoppaniite, $(\text{Fe,Al,Mg})_4(\text{Be}_6\text{Si}_{12}\text{O}_{36}) \cdot (\text{H}_2\text{O})_2(\text{Na},\square)$ a new mineral of the beryl group from Latium (Italy). *Eur. J. Mineral.*, 12, 121–127.

Electron microprobe analysis gave SiO_2 59.13, Al_2O_3 1.80, Fe_2O_3 18.36, Sc_2O_3 0.08, TiO_2 0.11, MgO 2.21, MnO 0.41, SnO_2 0.03, Na_2O 2.47, K_2O 0.08, Cs_2O 0.19, BeO 14.59, H_2O (calc.) 2.98, sum 102.44 wt%, which for 36 O corresponds to $(\text{Na}_{0.94}\text{Cs}_{0.02}\text{K}_{0.02})_{\Sigma 0.98}(\text{Fe}_{2.70}^{3+}\text{Mg}_{0.64}\text{Al}_{0.42}\text{Mn}_{0.06}\text{Ti}_{0.02}\text{Sc}_{0.02})_{\Sigma 3.86}\text{Be}_{6.00}(\text{Si}_{11.60}\text{Be}_{0.88})_{\Sigma 12.48}$ for the anhydrous part of the formula. The mineral occurs as light blue, euhedral prismatic crystals up to 0.5 mm long. Transparent, vitreous luster, white streak, H not reported, $\{001\}$ parting, $D_{\text{meas}} = 2.79(3)$, $D_{\text{calc}} = 2.811 \text{ g/cm}^3$ for the empirical formula and $Z = 2$. Optically uniaxial negative, $\epsilon = 1.619(3)$, $\omega = 1.625(3)$. Hexagonal, space group $P6/mcc$, $a = 9.346(3)$, $c = 9.213(6) \text{ \AA}$ as calculated from a Gandolfi powder pattern (114 mm, $\text{CuK}\alpha$ radiation) with strongest lines (I_{calc} , I_{obs} , hkl) of 8.12(65,S,010), 4.00(38,m,012), 3.278(100,vS,122), and 2.903(64,S,131).

The mineral occurs in miarolitic cavities in a pyroclast at Capranica (Viterbo), Latium, Italy. The new name is for mineral collector Francesco Saverio Stoppani (b. 1947). Type material is in the Museo di Mineralogie, Università di Roma, La Sapienza, and in the Museum national d'histoire naturelle, Paris.

Discussion. The new name was introduced in the 1998 description of the crystal structure (*Am. Mineral.*, 84, p. 1687, 1999). **J.L.J.**

Tatyanaite*

A.Y. Barkov, R.F. Martin, G. Poirier, M. Tarkian, Y.A. Pakhomovskii, Y.P. Men'shikov (2000) Tatyanaite, a new platinum-group mineral, the Pt analogue of taimyrite, from the Noril'sk complex (northern Siberia, Russia). *Eur. J. Mineral.*, 12, 391–396.

Electron microprobe analyses gave an average and range of Pt 45.38 (41.9–48.04), Pd 19.53 (16.63–21.83), Cu 10.62 (9.59–11.35), Fe 0.03 (0.0–0.9), Ni 0.15 (0.12–0.20), Sn 23.02 (22.11–24.03), Sb 0.27 (0.09–0.49), sum 99.00 wt%, corresponding to $[(\text{Pt}_{4.76}\text{Pd}_{3.75})_{\Sigma 8.51}\text{Cu}_{0.48}]_{\Sigma 8.99}(\text{Cu}_{2.94}\text{Ni}_{0.05}\text{Fe}_{0.01})_{\Sigma 3.00}(\text{Sn}_{3.96}\text{Sb}_{0.05})_{\Sigma 4.01}$; the X-ray powder pattern is similar to that of synthetic taimyrite, $\text{Pd}_9\text{Cu}_3\text{Sn}_4$. The mineral occurs as the central portion of grains that are zoned in Pt-Pd and are elongate, to ~1 mm; also occurs as aggregates of smaller, irregular or platy grains. Ductile, $VHN_{20} = 327$ (292–348), $H = 3\frac{1}{2}$ –4, $D_{\text{calc}} = 13.55 \text{ g/cm}^3$ for $Z = 1$ and the empirical formula, no cleavage or internal reflection observed. Pink with a lilac tinge in reflected light, weakly to distinctly birefractant, brownish pink to pinkish lilac reflection pleochroism, distinct to moderate anisotropy in which polarization colors are light brown to dark blue; shred-like or mosaic-like texture, and polysynthetically twinned. Reflectance percentages (WTiC standard) are given in 20 nm steps from 400 to 700 nm; representative values for

R_1 and R_2 are 42.8, 44.1 (470 nm), 49.5, 50.0 (546), 51.8, 54.6 (589), and 55.6, 56.8 (650). By analogy with synthetic taimyrite, indexing of the X-ray powder pattern (57 mm Debye–Scherrer, $\text{FeK}\alpha$ radiation) gave orthorhombic symmetry, probable space group $Pmmm$, $Pmm2$, or $P222$, $a = 7.89(1)$, $b = 4.07(1)$, $c = 7.73(1) \text{ \AA}$; strongest lines are 2.283(100,212), 2.163(40,203), 2.030(20,020), 1.369(30,323), 1.218(20,405,232), and 1.143(20,424).

The mineral, which is the Pt-dominant member of the solid-solution series with taimyrite, is most closely associated with chalcopyrite, Ag-Au alloy, and atokite-rustenbergite in massive sulfide ore at the Oktyabr'sky deposit at Noril'sk, Siberia, Russia. The new mineral name is for Russian mineralogist Tatyana L. Evstigneeva (or Yestigneeva) (b. 1945). Type material is in the Museum at the University of Hamburg, Germany. **J.L.J.**

Pd₃Au₂

A.B. Makeev, V.N. Filippov (1999) Metallic films on natural diamond crystals (Ichet'yu deposit, Middle Timan). *Doklady Earth Sci.*, 369(8), 1161–1165.

The Ichet'yu deposit is a diamondiferous gravel layer, 0.4–0.6 m thick, in Middle Devonian sandstone in the northern Vol'sk-Vym Ridge of Middle Timan, Russia. Curved-face diamond crystals examined by SEM showed the presence of various minerals on the crystal surfaces, and about 40% of the crystals have metallic films, 0.1 to 0.5 μm thick. Eight normalized analyses are listed for films corresponding to Pd_3Au_2 . Other analyses are given for native Au, Fe, Sn, Pb, and various Au-Ag, Ag, and Fe-Cr (possible chromferide) compounds, as well as for Cu_3Sn and Cu_3Zn_2 . Also noted were $10 \times 20 \mu\text{m}$ spots of the pure metals of Bi, Ti, and Ta. **J.L.J.**

Cu(I,S)

V.R. Silaev, V.N. Filippov, M.Yu. Sokerin (1999) Copper halogen-sulfides in manganous paleolaterites: A case study of the hypergenic rearrangement of material. *Doklady Earth Sci.*, 369(8), 1166–1169.

Eighteen electron microprobe analyses are listed for Mn-bearing Cu-dominant iodide sulfides, wherein I varies from 0 to 55.82 wt%. The last four analyses, referred to as belonging to "phase 3", have an average composition of $(\text{Cu}_{1.04}\text{Mn}_{0.05})_{\Sigma 1.09}(\text{I}_{0.78}\text{S}_{0.22})$. "Phase 2", represented by seven analyses, averages $(\text{Cu}_{1.35}\text{Mn}_{0.11}\text{Hg}_{0.01})_{\Sigma 1.47}(\text{S}_{0.79}\text{I}_{0.21})$, wherein substitution of I for S in the formula varies from 10 to 35%. The minerals occur as framboids and polyframboidal aggregates, typically 0.2–3 μm but also as single grains to 30 μm , on micropore walls and rarely as replacements of Co and Cu sulfides hosted by rhodnite from a Mn ore occurrence in the Polar Urals. No X-ray diffraction data are given. **J.L.J.**

α -PbO₂-type TiO₂

Shyh-Lung Hwang, Pouyan Shen, Hao-Tsu Chu, Tzen-Fu Yui (2000) Nanometer-size α -PbO₂-type TiO₂ in garnet: a thermobarometer for ultrahigh-pressure metamorphism. *Science*, 288, 321–324.

Porphyroblastic almandine-rich garnet from diamondiferous quartzofeldspathic rocks of the Saxonian Erzgebirge, Germany, contains inclusions of rutile. Sandwiched between the two units of a twinned grain of rutile is an epitaxial growth, about 8 nm thick and 125 nm long, of TiO₂ that is of the α -PbO₂ structure type. SAED patterns indicate an orthorhombic cell, space group *Pbcn*, $a = 4.59$, $b = 5.44$, $c = 4.94$ Å, in good agreement with data for the synthetic analog. **J.L.J.**

Ba-rich analog of lamprophyllite

R.K. Rastsvetaeva, N.V. Chukanov (1999) Crystal structure of a new Ba-rich analog of lamprophyllite with a primitive cell. *Doklady Akad. Nauk*, 368(4), 492–495 (in Russian).

Electron microprobe results (not listed) correspond to (Na_{3.05}Ba_{1.34}K_{0.17}Mn_{0.13}Mg_{0.07}Al_{0.07}Fe_{0.08}Ca_{0.03})_{Σ4.94}Ti_{2.95}Si_{4.06}O₁₆(OH)_{2.3}F_{0.53}. Single-crystal X-ray structure study ($R = 0.11$) indicated monoclinic symmetry, space group *P2/m*, $a = 19.741(5)$, $b = 7.105(4)$, $c = 5.408$ Å, $\beta = 96.67(3)^\circ$, $D_{\text{meas}} = 3.68$, $D_{\text{calc}} = 3.6$ g/cm³ for $Z = 2$. The symmetry is lowered from a *C* cell to a *P* cell because of the ordered distribution of Na, Ba, and trace elements. **J.L.J.**

Ca-rich eudialyte

R.K. Rastsvetaeva, I.A. Ekimenkova, I.V. Pekov (1999) Crystal structure of a new Ca-rich analog of eudialyte. *Doklady Akad. Nauk*, 368(5), 636–638 (in Russian).

Electron microprobe analysis gave Na₂O 10.24, SiO₂ 46.87, CaO 15.63, FeO 4.38, MnO 0.54, TiO₂ 0.11, ZrO₂ 11.46, Nb₂O₅ 2.52, Ce₂O₃ 0.15, La₂O₃ 0.10, Gd₂O₃ 0.13, Dy₂O₃ 0.05, HfO₂ 0.25, Cl 0.67, sum 92.94 wt%, corresponding to Na_{10.85}Ca_{9.15}REE_{0.08}Fe_{2.00}Mn_{0.25}Ti_{0.05}Zr_{3.05}Hf_{0.04}Nb_{0.62}Si_{25.61}O_{75.89}Cl_{0.21}. Single-crystal X-ray structure study ($R = 0.057$) indicated trigonal symmetry, space group *R3m*, $a = 14.255(1)$, $c = 30.170(2)$ Å, $D_{\text{calc}} = 2.9$ g/cm³ for $Z = 3$. The crystal-structure formula is Ca₁₈Zr₉[Si₃O₉]₆[Si₉O₂₇]₆(Si_{2.33}Mn_{0.67})(Nb_{1.74}Si_{1.26})[Fe_{3.78}(Fe_{2.55}Ti_{0.15}Zr_{0.15}Hf_{0.15})]Ca₉(Na_{32.04}Ca_{0.45}REE_{0.24})(O,OH)_{12.45}Cl_{0.63}·9.15H₂O. The mineral occurs in pegmatitic cancrinite syenite at the Kovdor massif, Kola Peninsula, Russia. **J.L.J.**

Mn-rich eudialyte

R.K. Rastsvetaeva, A.P. Komyakov, Yu.V. Nekrasov (1999) Crystal structure of a novel analogue of eudialyte with the *R3* sym-

metry. *Crystallogr. Reports*, 44(5), 765–769.

The mineral occurs as pale pink, anhedral grains, to 3 mm, in ultra-pegmatitic pegmatites at Alluaiv Mountain, Lovozero alkaline massif, Kola Peninsula, Russia. Single-crystal X-ray structure study ($R = 0.042$) gave trigonal symmetry, space group *R3*, $a = 14.182(7)$, $c = 30.37(1)$ Å, $D_{\text{calc}} = 2.85$ g/cm³ for $Z = 3$. Optically uniaxial positive, $\omega = 1.611$, $\epsilon = 1.614$. The electron microprobe composition (data not given) corresponds to Na₁₇K_{0.1}Ca₂Mn_{3.2}Sr_{0.5}Fe_{0.15}La_{0.3}Ce_{0.5}Nd_{0.2}Y_{0.1}Zr_{3.2}Hf_{0.05}Ti_{0.01}Nb_{0.4}Si_{25.6}F_{0.5}Cl_{0.3}·*n*H₂O, and the structural formula is (Na_{14.2}Sr_{0.45}REE_{0.75}K_{0.1})_{Σ15.00}{[Mn₃(Ca_{2.1}REE_{0.09})](Zr_{2.9}Ti_{0.1})[Si₃O₉]₂[Si₉O₂₇]₂}[Si_{1.6}Nb_{0.4}][Na_{1.8}(Mn_{0.6}Fe_{0.15})(Zr_{0.40}Hf_{0.05})](O,OH)_{3.35}F_{0.5}Cl_{0.3}·0.65H₂O.

Discussion. The composition differs somewhat from that of oneillite, which has similar cell dimensions and space group, and which is uniaxial negative, $\omega = 1.6450$, $\epsilon = 1.6406$. **J.L.J.**

Fe,Cl analog of kentbrooksitite

I.A. Ekimenkova, R.K. Rastsvetaeva, A.P. Khomyakov (2000) Crystal structure of the Fe,Cl-analog of kentbrooksitite. *Doklady Akad. Nauk*, 370(4), 477–480 (in Russian).

Electron microprobe analysis (data not given) corresponds to Na_{11.73}K_{0.24}Ca_{6.30}Sr_{0.71}Ba_{0.03}REE_{0.63}Y_{0.13}Fe_{2.55}Mn_{1.19}Ti_{0.05}Zr_{3.23}Hf_{0.04}Nb_{0.92}Ta_{0.01}Si_{25.25}O_{76.48}Cl_{1.11}F_{0.61}·1.4H₂O. Single-crystal X-ray structure study ($R = 0.0365$) indicated trigonal symmetry, space group *R3m*, $a = 14.262(2)$, $c = 29.949(4)$ Å, $D_{\text{calc}} = 3.11$ g/cm³. The mineral occurs in pegmatite at the Khibina alkaline massif, Kola Peninsula, Russia.

Discussion. Corresponds to mineral IMA 99-046, for which the simplified formula is given as Na₁₅Ca₆Fe₃Zr₃NbSi₂₅O₇₃(O,OH,H₂O)₃Cl₂. **J.L.J.**

NEW DATA

Bijvoetite-(Y)

Yaping Li, P.C. Burns, R.A. Gault (2000) A new rare-earth-element uranyl carbonate sheet in the structure of bijvoetite-(Y). *Can. Mineral.*, 38, 153–162.

Electron microprobe analyses and single-crystal X-ray structure study ($R = 0.0837$) of bijvoetite-(Y) from the type locality indicate that the formula is [(Y,REE)₈(H₂O)₂₅(UO₂)₁₆O₈(OH)₈(CO₃)₁₆](H₂O)₁₄, $D_{\text{calc}} = 3.86$ g/cm³ for $Z = 14$. The mineral is monoclinic (pseudo-orthorhombic), space group *B121*, $a = 21.234(3)$, $b = 12.958(2)$, $c = 44.911(6)$ Å, $\beta = 90.00(2)^\circ$. **J.L.J.**

Chenevixite, luethite

P.C. Burns, J.V. Smith, I.M. Steele (2000) Arizona porphyry copper/hydrothermal deposits I. The structure of chenevixite and

luethite. *Mineral. Mag.*, 64, 25–30.

Single-crystal X-ray structure study ($R = 0.084$) of chenevixite from the type locality gave monoclinic symmetry, space group $B12_11$, $a = 5.7012(8)$, $b = 5.1801(7)$, $c = 29.265(2)$ Å, $\beta = 89.99(1)^\circ$. The structural formula lacks H_2O and corresponds to $Cu_2M_2(AsO_4)_2(OH)_4$, wherein M is predominantly Fe^{3+} for chenevixite and Al for luethite. **J.L.J.**

LOPARITE-(CE)

R.H. Mitchell, P.C. Burns, A.R. Chakhmouradian (2000) The crystal structures of loparite-(Ce). *Can. Mineral.*, 38, 145–152.

Two electron microprobe analyses are listed for each of the three specimens examined, which are from Mt. Takhtarvumchorr, Khibina alkaline complex, Russia, from Mt. Selsurt, Lovozero alkaline complex, Russia, and from Pegmatite Peak, Bearpaw Mountains, Montana. For the general formula $A_2B_2O_6$, five of the analyses show a predominance of Na in A and Ti in B; one analysis has $Sr > Na$. Single-crystal X-ray structure study of the Khibina mineral ($R = 0.0336$) revealed it to be orthorhombic,

space group $Pbnm$, $a = 5.5108$, $b = 5.5084$, $c = 7.7964$ Å; the Lovozero mineral ($R = 0.0257$) is tetragonal, space group $I4/mcm$, $a = 3.893$, $c = 12.83$ Å, as is the Bearpaw Mountains mineral ($R = 0.0289$), $a = 3.892$, $c = 12.83$ Å. None of the A- or B-site cations is ordered. Loparite-(Ce) requires redefinition. **J.L.J.**

Pushcharovskite

D.Yu. Pushcharovsky, S.J. Teat, V.N. Zaitsev, N.V. Zubkova, H. Sarp (2000) Crystal structure of pushcharovskite. *Eur. J. Mineral.*, 12, 95–104.

Single-crystal structure study ($R = 0.054$) of type pushcharovskite showed the mineral to be triclinic, space group P with the new cell $a = 13.6164(7)$, $b = 15.6672(8)$, $c = 19.1869(9)$ Å, $\alpha = 106.933(2)$, $\beta = 91.531(2)$, $\gamma = 98.401(2)^\circ$, $D_{\text{meas}} = 3.35$, $D_{\text{calc}} = 3.235$ g/cm³ for $Z = 32$. The ideal formula is $CuAsO_3(OH) \cdot 1.5H_2O$. Strongest lines of the powder pattern are 18.30(25,001), 11.00(100,1 $\bar{1}$ 0), 5.79(15,1 $\bar{1}$ 3), 3.878(20,032), and 3.389(15,033). The mineral is structurally related to geminite, yvonite, and fluckite. **J.L.J.**