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NEW MINERAL NAMES*

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Alluaivite*

A.P. Khomyakov, G.N. Netschelyustov, R.K. Rastsvetaeva (1990) Alluaivite $Na_{19}(Ca,Mn)_6(Ti,Nb)_3Si_{26}O_{74}Cl \cdot 2H_2O$—A new titanosilicate of eudialyte-like structure. Zapiski Vses. Mineralog. Obshch., 119(3), 117–120 (in Russian).

Microprobe analysis (average of three grains, H_2O by coulometry) gave Na_2O 18.6, K_2O 0.2, CaO 8.6, SrO 1.0, BaO 0.6, MnO 3.6, La_2O_3 0.2, Ce_2O_3 0.8, SiO_2 53.3, TiO_2 6.0, ZrO_2 0.2, Nb_2O_5 3.9, Cl 0.8, H_2O 1.7, $O \equiv Cl_2$ 0.2, sum 99.3 wt%, corresponding to $(Na_{17.47}K_{0.12}Sr_{0.28}Ba_{0.11}La_{0.03}Ce_{0.14})_{\Sigma 18.15}(Ca_{4.46}Mn_{1.47})_{\Sigma 5.93}(Ti_{2.18}Nb_{0.85}Zr_{0.05})_{\Sigma 3.08}Si_{25.82}O_{73.26}Cl_{0.66} \cdot 2.75\ H_2O$. The mineral slowly leaches in 10% HCl, lowering refraction indices. Occurs as irregular accumulations up to 1 mm, closely intergrown with eudialyte. Transparent, colorless, in places weak pink-brownish tint, vitreous luster, conchoidal fracture, brittle, $H = 5–6$, $D_{meas} = 2.76(5)$, $D_{calc} = 2.78$ g/cm³ with $Z = 6$. Vivid red-orange fluorescence in ultraviolet light. Optically uniaxial positive, $\omega = 1.618(2)$, $\epsilon = 1.626(2)$. The infrared pattern is similar to that of eudialyte, with weak extinctions at 1600 and 3400–3500 cm⁻¹. Single-crystal X-ray study showed trigonal symmetry, space group $R\bar{3}m$, $a = 14.046(2)$, $c = 60.60(2)$ Å. Groups of $[Si_3O_9]$ and two types of $[Si_{10}O_{28}]$ are present in the structure. The powder pattern is almost identical to that of eudialyte; strongest lines (35 given) are: 7.14(80,110), 2.960(100,315), 2.825 (100,404), and 1.762(80,440).

The mineral occurs in ultra-agpaitic pegmatites at Alluaiv Mountain, Lovozero alkaline massive, Kola Peninsula, USSR. The pegmatites consist of nepheline, sodalite, and potassium feldspar plus arfvedsonite, aegirine, a cancrinite-like mineral of composition $Na_7Al_5Si_7O_{24}(CO_3)$, alkaline silicates, and Ti-, Nb-, and Zr-silicates. The name is for the place of occurrence. Type material is at the Fersman Mineralogical Museum, Moscow, USSR.

Discussion. The X-ray structural study is reported in *Doklady Akad. Nauk SSSR,* 312(6), 1379–1383, 1990. **J.P.**

Belkovite*

A.V. Voloshin, V.V. Subbotin, Ya.A. Pakhomovskii, A.Yu. Bakhchisaraitsev, N.A. Yamnova, D.Yu. Pushcharovskii (1991) Bekovite—A new barium-niobium silicate from carbonatites of the Vuoriyarvi massif (Kola Peninsula, USSR). Neues Jahrb. Mineral. Mon., 23–31.

One of four electron-microprobe analyses gave Na_2O 0.20, K_2O 0.55, CaO 0.05, BaO 30.30, Al_2O_3 0.14, Fe_2O_3 1.78, SiO_2 17.80, TiO_2 5.60, ZrO_2 1.20, Nb_2O_5 42.20, Ta_2O_5 0.15, sum 99.97 wt%, corresponding to $(Ba_{2.74}K_{0.16}Na_{0.09}Ca_{0.01})_{\Sigma 3.00}(Nb_{4.41}Ti_{0.97}Fe_{0.31}Zr_{0.13}Al_{0.04}Ta_{0.01})_{\Sigma 5.87}Si_{4.12}O_{24.90}$, ideally $Ba_3(Nb,Ti)_6(Si_2O_7)_2O_{12}$. The mineral occurs as thin rims on barian pyrochlore and as crystals up to 1.0 mm long showing {110} and {001}; commonly barrel shaped by combination of several prisms and pinacoidal termination. Color brown, transparent, white streak, adamantine luster, $H = 6–7$, $VHN_{40} = 970$ (900–1030), $D_{meas} = 4.16(3)$, $D_{calc} = 4.25$ g/cm³ with the empirical formula and $Z = 1$. Optically uniaxial positive, colorless, $\omega = 1.928(2)$ $\epsilon = 2.002(5)$; some grains show biaxial figures with $2V$ up to 10°. X-ray single-crystal structural study ($R = 0.040$) gave hexagonal symmetry, space group $P62m$; the X-ray powder pattern (diffractometer, $CuK\alpha$ radiation) has strongest lines of 7.81 (35,001,010), 3.888 (51,002,111,020), 3.481 (24,012,021), 2.937 (100,112,120), 2.750 (25,022,121), and 1.948 (26,123,222,040), from which $a = 8.996(3)$, $c = 7.799(3)$ Å.

The mineral occurs with magnetite, pyrochlore, phlogopite, chlorite, pyrite, pyrrhotite, apatite, barite, alstonite, and nenadkevichite in dolomite-calcite carbonatites of the Vuoriyarvi alkaline-ultramafic massive, Kola Peninsula, USSR. The new name is for Soviet mineralogist I. V. Belkov (1917–1989). Type material is in the Fersman Mineralogical Museum, Moscow, USSR.

Discussion. Structural study of the then-unnamed mineral was abstracted in *Am. Mineral.,* 76, p. 671, 1991. **J.L.J.**

Bøgvadite*

H. Pauly, O.V. Petersen (1988) Bøgvadite, $Na_2SrBa_2Al_4F_{20}$, a new fluoride from the cryolite deposit, Ivigtut, S. Greenland. Bull. Geol. Soc. Denmark, 37, 21–30.

The average of electron-microprobe analyses of 11 crystals gave Na 5.57, Sr 7.03, Ba 32.17, Al 12.45, F 40–45, F_{calc} 42.85, sum 100.07 wt%, corresponding to $Na_{2.15}Sr_{0.71}Ba_{2.08}Al_{4.09}F_{20}$, ideally $Na_2SrBa_2Al_4F_{20}$. Crystals are 0.05 to 0.15 mm, blocky, somewhat rounded with strongly corroded faces, showing {110} and {010} terminated by {012}, slightly elongate [100]. Colorless, transparent, vit-

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

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reous luster, white streak, nonfluorescent, uneven fracture, $VHN_{25} = 300(50)$, $D_{\mathrm{meas}} = 3.85$, $D_{\mathrm{calc}} = 3.898$ g/cm³ with $Z = 2$. Optically biaxial negative, $\alpha = 1.4326(2)$, $\beta = 1.4360(2)$, $\gamma = 1.4389(2)$ for $\lambda = 589$ nm, $2V_{\mathrm{meas}} = 87(0.5)°$, $2V_{\mathrm{calc}} = 85(6)°$, $\alpha = c$, $\beta = a$, $\gamma = b$, optic-axis plane {010}. X-ray single-crystal studies gave orthorhombic symmetry, space group *Pnmn* or *Pn2n*, $a = 7.110(3)$, $b = 19.907(10)$, $c = 5.347(3)$ Å as refined from a Guinier-Hägg powder pattern ($CuK\alpha_1$ radiation) with strongest lines of 9.9681(40,020), 6.6886(40,110), 3.2403(100,141), 3.1945(50,051), 2.9241(50,211), 2.6681(40,002), 2.3758(40,251), and 2.1158(50,152,321,190).

The mineral occurs with jarlite, ralstonite, barite, K-mica, quartz, and a kaolinite-like mineral in the cryolite deposit at Ivigtut, Greenland. The new name is for Richard Bøgvad (deceased 1952), former chief geologist for the company that mines the cryolite deposit.

Discussion. A repository for type material is not given. **J.L.J.**

Calcian mottramite

K.A. Lazebnik, N.V. Zayakina (1989) Calcium mottramite, the first known representative of a new isomorphic mottramite-tangeite series. Doklady Akad. Nauk SSSR, 306(2), 434–438 (in Russian, English translation available).

The average of seven electron-microprobe analyses gave 4.82 wt% CaO (range 3.98–5.94 wt%) and the average formula $(Pb_{0.67}Ca_{0.31})_{\Sigma 0.98}(Cu_{1.01}Zn_{0.01})_{\Sigma 1.02}(V_{0.92}P_{0.08})_{\Sigma 1.00}O_4(OH)$. "The mineral . . . is an intermediate member of a new mottramite-tangeite series. Since our mineral is closer to mottramite, we designate it as calcium mottramite."

Discussion. The approved name for tangeite is calciovolborthite (*Am. Mineral.*, 75, p. 1214, 1990); the mineral described is calcian mottramite or, as the authors also state in their concluding paragraph, a calcic variety of mottramite. **J.L.J.**

Calcio-ancylite-(Nd)*

P. Orlandi, M. Pasero, G. Vezzalini (1990) Calcio-ancylite-(Nd), a new REE-carbonate from Baveno, Italy. Eur. J. Mineral., 2, 413–418.

Electron-microprobe and CO_2 analyses (H_2O by difference) gave La_2O_3 3.16, Ce_2O_3 14.18, Pr_2O_3 3.23, Nd_2O_3 20.23, Sm_2O_3 7.63, Eu_2O_3 not detected, Gd_2O_3 6.68, Dy_2O_3 1.74, Tm_2O_3 0.83, Y_2O_3 3.93, CaO 9.05, CO_2 23.47, H_2O 5.87, sum 100 wt%, corresponding to $(Nd_{0.90}Ce_{0.64}Sm_{0.33}Gd_{0.28}Y_{0.26}Pr_{0.15}La_{0.14}Dy_{0.07}Tm_{0.03})_{\Sigma 2.80}Ca_{1.20}(CO_3)_{3.98}(OH)_{2.84}\cdot 1.01H_2O$, ideally $(Nd,Ca)_3Ca(CO_3)_4(OH)_3\cdot H_2O$. Occurs as pine cone–like aggregates, up to 1 mm long, in which individuals have a dipyramidal pseudoorthorhombic habit; pale pink color, white streak, vitreous luster, $H = 4$–4.5, brittle, irregular fracture, nonfluorescent, $D_{\mathrm{meas}} = >4.02$, $D_{\mathrm{calc}} = 4.08$ g/cm³ with $Z = 1$. Optically biaxial negative, nonpleochroic, $\alpha = 1.660(1)$, $\beta = 1.725(1)$, $\gamma = 1.761(1)$, $2V_{\mathrm{meas}} = 70°$, $2V_{\mathrm{calc}} = 74°$, weak $r < v$ dispersion, $Z = c$. Single-crystal X-ray structural study ($R_w = 0.036$) showed monoclinic symmetry, space group *Pm*, $a = 4.976(2)$, $b = 8.468(2)$, $c = 7.212$ Å, $\beta = 90.04(3)°$. Strongest lines of a 114.6-mm Gandolfi powder pattern ($FeK\alpha$ radiation) are 5.49(60,011), 4.26(100,110), 3.67(70,111), 2.905(90,102), 2.320(70,131), 2.048(80,221), and 1.979(70,212).

The mineral was found atop pinkish orthoclase in a miarolitic cavity in granite in a quarry at Baveno, Piedmont, Italy. The repository for type material is not given. **J.L.J.**

Grechishchevite*

V.I. Vasil'ev, L.V. Usova, N.A. Pal'chik (1989) Grechishchevite—$Hg_3S_2(Br,Cl,I)_2$—A new supergene mercury sulfohalide. Geol. Geophys., 30(7), 61–69 (In Russian, English translation available).

The average of 11 electron-microprobe analyses (nine for material from the Arzak deposit, two from Kadyrel) gave Hg 73.00, Br 9.85, Cl 2.05, I 5.86, S 7.83, Se 0.02, sum 98.61 wt%, corresponding to $Hg_{3.05}S_{2.04}(Br_{1.03}Cl_{0.49}I_{0.39})_{\Sigma 1.91}$, ideally $Hg_3S_2(Br,Cl,I)_2$. Occurs on fracture walls as films consisting of minute prisms and groups of equant to slightly elongate grains to 0.2 mm (Arzak deposit); also as powdery masses and as concretions of short prismatic crystals to 0.3 mm (Kadyrel occurrence). Color variably bright or dark orange, slowly darkening to brown-orange, then black. Streak deep yellow to yellow with a slight orange tint, luster vitreous to adamantine, brittle, $H_{25} = 106$ (88–116) kg/mm² (Mohs ≈2.5), distinct cleavage parallel to prism elongation. Fragments blacken in 40% KOH; unaffected by HCl or HNO_3. In transmitted light, transparent, parallel extinction, uniaxial positive, refractive indices >2, pleochroic from straw-yellow (*E*) to yellow (*O*). Gray-white and anisotropic in reflected light, distinctly bireflectant from gray-white (R'_e) to gray (R'_o) with corresponding reflectance values (nm, %) 436, 22.8, 19.2; 460, 24.5, 22.2; 500, 21.4, 18.9; 546, 19.8, 17.3; 590, 18.8, 16.5; 620, 18.9, 16.7; 656, 18.1, 15.9. Strong light orange and orange internal reflection. The X-ray powder pattern is in good agreement with results from pyrosynthetic material for which single-crystal study indicated tetragonal symmetry, space groups $P\bar{4}2m$ (given as $P42m$), $P4m2$, $P4mm$, or $P4/mmm$. Strongest lines of the mineral from the Arzak deposit (57.3-mm camera, Cu radiation) are 3.95(60,112), 3.02(60,132), 2.65(100,023,340,050), 2.60(40,123,150), 2.341(40,440), 2.180(30, wide, diffuse, 043), and 1.873(30,253,550); calculated cell dimensions are $a = 13.208(6)$, $c = 6.698(9)$ Å. For synthetic material with $a = 13.225$, $c = 8.685$, and the composition $Hg_3S_2(Br_{1.0}Cl_{0.5}I_{0.5})_{\Sigma 2.0}$, $D_{\mathrm{calc}} = 7.23$ g/cm³ with $Z = 8$. $D_{\mathrm{meas}} = 7.16$ g/cm³ was obtained for synthetic material.

The mineral occurs in mercury ores at the Arzak deposit and Kadyrel occurrence, Tuva, ASSR. The new name is for Oleg K. Grechishchev, who has studied the Tuva mercury deposits extensively. The mineral occurs sporadically in oxidized cinnabar ores at the Arzak deposit and less frequently in leached voids at Kadyrel, in association with numerous other mercury minerals that include calomel, kuzminite, cordierite, kadyrelite, lavrentievite, and eglestonite. Specimens containing grechishchevite have been deposited in the Central Siberian Geological Museum of the Institute of Geology and Geophysics, Novosibirsk, and at the Institute's Mining Museum in Leningrad.

Discussion. The new name is for the mineral with Br > Cl, but the authors note that two of the analyses show Cl > Br [the maximum is $(Cl_{0.82}Br_{0.75}I_{0.39})$]. The mineral is susceptible to decomposition under the microprobe beam, and the authors express the opinion that the "average" analytical results with Br > Cl > I best express the composition in view of the analytical uncertainties. The mineral apparently is the tetragonal polymorph of arzakite. **J.L.J.**

Lintisite*

A.P. Khomyakov, L.I. Polezhaeva, S. Merlino, M. Pazero (1990) Lintisite $Na_3LiTi_2Si_4O_{14}\cdot 2H_2O$—A new mineral. Zapiski Vses. Mineralog. Obshch., 119(3), 76–80 (in Russian).

Microprobe analysis combined with flame spectrophotometry (Li) and IR spectroscopy/DTG (H_2O) gave SiO_2 44.03, TiO_2 27.68, Nb_2O_5 1.10, FeO 0.28, MnO 0.05, Na_2O 16.72, K_2O 0.03, Li_2O 2.68, H_2O 6.55, sum 99.12 wt%, corresponding to $(Na_{2.970}K_{0.003})_{\Sigma 3.000}Li_{0.988}(Ti_{1.907}Nb_{0.046}Fe^{2+}_{0.022})_{\Sigma 1.975}Si_{4.033}O_{14.000}\cdot 2.001H_2O$. All iron was assumed to be divalent. Readily dissolves in 10% HCl, leaving a siliceous residuum. Forms fibrous or parallel-columnar aggregates, 0.1–0.5 mm thick and 1–5 mm long, that replaced lorenzenite on cleavages and crystal surfaces. Individual crystals are elastic, acicular, up to 0.1 × 0.5 × 5 mm, elongate [001] and flattened on {100}; macroscopically similar to vinogradovite. Colorless or pale-yellow, transparent, luster vitreous on fracture and pearly on cleavage surfaces, twinned on {100}, excellent {100} and perfect {010} cleavages, splintery fracture, $H = 5$–6, $D_{meas} = 2.77(5)$, $D_{calc} = 2.825$ g/cm³ with $Z = 4$. Weak yellow fluorescence in ultraviolet light. Optically biaxial negative, $2V_{meas} = 85(1)°$, strong dispersion $r < v$, $\alpha = 1.672(2)$, $\beta = 1.739(2)$, $\gamma_{calc} = 1.802$, positive elongation, $Z\Lambda\gamma = 2°$, $Y = \beta$. Extinction straight to very slightly oblique as result of flattening of the needles on {100}. The infrared spectrum shows absorption bands at 412, 435, 507, 538, 583, 630, 700, 920, 960, 1015, 1060, 1130, and 1645 cm⁻¹. Loss during heating is 6.55 wt% (half gradually between 150–550 °C, half between 550–600 °C). Melting temperature 900–950 °C. Material dehydrated at 600 °C gives an X-ray powder pattern of lorenzenite. Single-crystal X-ray study showed the mineral to be monoclinic, $a = 28.583(4)$, $b = 8.600(1)$, $c = 5.219(1)$ Å, $\beta = 91.03(2)°$, space group $C2/c$. Strongest lines of the X-ray pattern (21 lines given) are 14.29 (strong,200), 6.39 (med.,310), 4.77 (med.,600, 510), 3.69 (med.,710), 2.996 (strong,421), 2.744 (med., $\bar{6}21$), 2.709 (med.,621), and 1.650 (med.,242,550, 13.3.1).

The mineral occurs in pegmatites of nepheline-sodalite syenite at Alluaiv Mountain in the Lovozero alkaline massive, Kola Peninsula, USSR. Associated minerals are lorenzenite, nepheline, sodalite, potassium feldspar, arfvedsonite, aegirine, and eudialyte. The name is for the composition [Li, Na (natrium), Ti, silicium). Type material is at the Fersman Mineralogical Museum, Moscow, USSR. **J.P.**

Magnesium zinnwaldite

E.I. Semenov, B.M. Shmakin (1988) Composition of glimmerites in exocontacts of rare-metal pegmatites from the Bastar area (India). Doklady Akad. Nauk SSSR, 303(1), 199–202 (in Russian, English translation available).

Chemical analyses of a yellow mica and a brown one gave, respectively, SiO_2 43.98, 41.57, TiO_2 0.08, –, Al_2O_3 24.43, 19.60, Fe_2O_3 2.18, 1.72, FeO 3.07, 5.12, MnO 0.16, 0.14, MgO 6.22, 9.80, CaO 1.36, 1.50, Li_2O 1.06, 1.76, Na_2O 0.54, 0.40, K_2O 8.00, 11.00, Rb_2O 0.70, 1.82, Cs_2O 0.01, 0.26, H_2O 5.35, 2.64, F 3.96, 5.14, O ≡ F 1.66, 2.16, sum 99.44, 100.31 wt%, corresponding to $(K_{0.724}Na_{0.074}Rb_{0.032})_{\Sigma 0.830}Li_{0.302}(Mg_{0.657}Fe^{2+}_{0.182}Fe^{3+}_{0.116}Ca_{0.013}Mn_{0.010}Ti_{0.004})_{\Sigma 1.072}Al_{1.160}[Al_{0.882}Si_{3.118}O_{10}](OH_{1.112}F_{0.888})_{\Sigma 2.000}$ and $(K_{1.016}Na_{0.056}Rb_{0.085}Cs_{0.008})_{\Sigma 1.165}Li_{0.511}(Mg_{1.057}Fe^{2+}_{0.310}Fe^{3+}_{0.093}Ca_{0.117}Mn_{0.008})_{\Sigma 1.585}Al_{0.683}[Al_{0.990}Si_{3.010}O_{10}](OH_{0.821}F_{1.179})_{\Sigma 2.000}$, ideally $KLiMgAl_2Si_3O_{10}F_2$. Properties (given only in a single table, without amplification) are $D = 2.90$ g/cm³, refractive indices $\alpha = 1.532$, $\gamma = 1.568$, cell dimensions $a = 5.22$, $b = 9.02$, $c = 10.04$ Å, $\beta = 100°$, *1M* polytype. The mineral occurs at the outer contact of rare-metal pegmatites in the Eastern Ghats mountains at the border between the states of Madhya Pradesh and Orissa, India.

Discussion. Requires additional data and submission to the CNMMN. **J.L.J.**

Pengzhizhongite-*6H**

Jingzhong Chen, Guangming Yang, Zhaolu Pan, Nicun Shi, Peng Zhizhong (1989) Discovery and study of pengzhizhongite-*6H*—A new mineral. Acta Mineral. Sinica, 9(1), 20–24 (in Chinese, English abstract).

Electron-microprobe analysis and an H_2O determination gave SnO_2 18.73, Al_2O_3 56.00, Fe_2O_3 8.38, MgO 8.03, MnO 0.40, ZnO 4.73, SiO_2 1.48, H_2O^+ 1.88, sum 99.63 wt%, corresponding to $(Mg_{1.93}Zn_{0.56}Fe_{0.22}Al_{0.99}Mn_{0.05}Si_{0.24})_{\Sigma 4.00}(Sn_{1.21}Fe_{0.79})_{\Sigma 2.00}(Al_{9.71}\square_{0.29})_{\Sigma 10.00}O_{22}(OH)_2$, simplified as $(Mg,Zn,Fe,Al)_4(Sn,Fe)_2(Al,\square)_{10}O_{22}(OH)_2$. Occurs as light yellowish brown to light yellow tabular crystals, occasionally colorless, 0.5–1.0 mm long, 0.4–0.8 mm wide, 0.02–0.2 mm thick; white streak, vitreous luster, transparent, $H \geq 8$, $D_{meas} = 4.22(3)$, $D_{calc} = 4.16$ g/cm³ for the chemical formula and $Z = 1$. Insoluble in hot HCl or hot

HNO_3. Optically uniaxial positive, $\omega = 1.802(2)$, $\epsilon = 1.814(2)$. X-ray single-crystal structural study ($R = 0.10$) indicated trigonal symmetry, space group $P\overline{3}m$, $a = 5.692(5)$, $c = 13.78(2)$ Å. Strongest lines of the X-ray powder pattern (15 lines listed) are 2.846(90,110), 2.423(100,021,113), 1.639(30,124), 1.545(40,033,125), 1.414(50,221,028), and 1.050(30).

The mineral formed with high-temperature, metasomatic tungsten ore in the Anhua area, Hunan Province, China. Associated minerals are quartz, scheelite, muscovite, magnetite, rutile, nigerite, cassiterite, zircon, and taaffeite. The new name is for Peng Zhizhong (one of the authors, since deceased), who initially determined the crystal structure of the mineral in 1981. The mineral is the magnesium analogue of nigerite-*6H*.

Discussion. No repository for type material is given. The authors report that penzhizhongite-*24R* also has been found and will be described separately. **J.L.J.**

Rorisite*

B.V. Chesnokov, T.P. Nishanbaev, L.F. Bazhenova (1990) Rorisite CaFCl—A new mineral. Zapiski Vses. Mineralog. Obshch., 119(3), 73–76 (in Russian).

Chemical analysis gave Ca 38.94, Mg 3.63, Cl 34.24, F 23.29, sum 100.10 wt%, corresponding to $(Ca_{0.89}Mg_{0.13})_{\Sigma 1.02}F_{1.00}(Cl_{0.88}F_{0.12})_{\Sigma 1.00}$. Soluble in H_2O, hygroscopic; in moist air colorless plates become turbid and coated with colorless drops of $CaCl_2$ solution; the turbid plates consist of fine-grained fluorite. Slowly soluble in HCl and HNO_3; dissolves glass when mixed with H_2SO_4. Fusibility 1.5; red flame coloration. In closed tube, fuses and forms a colorless liquid that crystallizes into a white transparent substance three seconds after removing the flame. The mineral forms tabular crystals up to 1 mm in diameter, flattened on {001}, with {111} and {110} and occasionally {100}. Some crystals have orthogonal or square shapes; most crystals have "fused" surfaces without well-expressed flat surfaces. Transparent, colorless, vitreous luster, white streak, $H = 2$, excellent {001} and perfect {110} cleavages, conchoidal fracture. Brittle, thin leaves exhibit little elasticity. $D_{meas} = 2.78(1)$, $D_{calc} = 2.94$ g/cm³. Optically uniaxial negative, $\omega = 1.668(2)$, $\epsilon = 1.635(2)$. Weak violet fluorescence in ultraviolet light (360 nm). X-ray powder study showed the mineral to be tetragonal, $a = 3.890(1)$, $c = 6.810(1)$ Å, $Z = 2$. The mineral is isostructural with matlockite (PbFCl), and the X-ray pattern is analogous to that of synthetic tetragonal CaFCl. Space group by analogy with the latter is $P4/nmm$. Strongest lines (21 given) are: 6.81(45,001), 2.557(100,102), 2.267(35,003), 2.138(32,112), and 1.560(32,104).

The mineral occurs within carbonatized wood fragments in old burnt dumps at Kopeysk, Chelyabinsk Coal Basin, Ural Mountains, USSR. Associated minerals are fluorite, periclase, and troilite. The name is from the Latin *roris* (dew), alluding to the transparent drops that cover the mineral in moist air. The type specimen is at the Fersman Mineralogical Museum, Moscow, USSR. **J.P.**

Szymańskiite*

A.C. Roberts, T.S. Ercit, R.C. Erd, R.L. Oscarson (1990) Szymańskiite, $Hg^{1+}_{16}(Ni,Mg)_6(CO_3)_{12}(OH)_{12}(H_3O)^{1+}_8 \cdot 3H_2O$, a new mineral species from the Clear Creek claim, San Benito County, California. Can. Mineral., 28, 703–707.

J.T. Szymański, A.C. Roberts (1990) The crystal structure of szymańskiite, a partly disordered $(Hg–Hg)^{2+}$, $(Ni,Mg)^{2+}$ hydronium-carbonate-hydroxide-hydrate. Can. Mineral., 28, 709–718.

The average of three electron-microprobe analyses gave MgO 2.0, NiO 7.9, Hg_2O 75.8, CO_2 6.0–10.7 wt%. From the microprobe-determined Ni/Mg ratio of 2.125/1 and with CO_2 and H_2O derived from crystal-structural analysis, the formula is $Hg^{1+}_{16}(Ni_{4.08}Mg_{1.92})_{\Sigma 6.00}(CO_3)_{12}(OH)_{12}(H_3O)^{1+}_8 \cdot 3H_2O$, which requires MgO 1.67, NiO 6.57, Hg_2O 72.14, CO_2 11.42, H_2O 8.18 wt%. The infrared spectrum shows the presence of structural H_2O (1650 cm⁻¹), OH and H_2O (3308 cm⁻¹), and strong absorptions for carbonate groups (1094, 844, 1452, 1350, and 669 cm⁻¹). The anomalously high microprobe-determined values for Ni, Mg, and Hg are attributed to emission of H_2O and CO_2 as a consequence of heating by the microprobe electron beam. The mineral occurs as millimeter size sprays and disseminated euhedral crystals, up to 0.4 mm long and 0.05 wide, elongate [0001], showing major {10$\overline{1}$0} and minor {0001}; striated parallel to [0001] on {10$\overline{1}$0}. Transparent blue-gray to blue-green, darkening on long exposure to light. Pale blue streak, irregular to conchoidal fracture, poor {10$\overline{1}$0} cleavage, vitreous luster, brittle, nonfluorescent; whitens in cold dilute HCl and reacts similarly but with minor effervescence in concentrated HCl. $D_{calc} = 4.86$ g/cm³ for the ideal formula with Ni/Mg = 2.125/1 and $Z = 1$. Optically uniaxial negative, $\omega = 1.795(3)$, $\epsilon = 1.786(3)$, O = yellowish green, E = bluish green, $E > O$. X-ray single-crystal study ($R = 3.49\%$) showed hexagonal symmetry, space group $P6_3$; cell dimensions calculated from a 114.6-mm Debye-Scherrer pattern (Cu$K\alpha$ radiation) are $a = 17.415(5)$, $c = 6.011(4)$ Å. Strongest lines of the pattern are 14.9 (100,100), 5.60 (100,101), 3.299 (80,410), 3.201 (50,401), 2.704 (60,501), 2.665 (60,212), 2.476 (50,222), and 1.751 (50,702,532).

The mineral occurs in massive quartz at a prospect pit near the former Clear Creek mercury mine, New Idria district, San Benito County, California. Among the most closely associated minerals are cinnabar, montroydite, native mercury, and edgarbaileyite. The new name is for J. T. Szymański, of CANMET, Ottawa, Canada, who solved the crystal structure. Only three small specimens, containing an estimated 20 mg of the mineral, are known. Type material is in the Systematic Reference Series portion of the National Mineral Collection housed at the Geological Survey of Canada, Ottawa. **J.L.J.**

Yingjiangite*

Zhangru Chen, Zuzhu Huang, Xiaofa Gu (1990) A new uranium mineral—Yingjiangite. Acta Mineral. Sinica, 10(2), 102–105 (in Chinese, English abstract).

The average of four electron-microprobe analyses gave K_2O 2.46, CaO 1.57, Ce_2O_3 0.34, Y_2O_3 0.11, ThO_2 0.51, UO_3 76.54, P_2O_5 11.10, H_2O 7.37 (by difference?), sum 100.00 wt%, corresponding to $(K_{0.63}Ca_{0.34}REE_{0.03}Th_{0.02})_{\Sigma 1.02}(UO_2)_{3.21}(PO_4)_{1.88}(OH)_2 \cdot 4H_2O$, simplified as $(K_{1-x}Ca_x)(UO_2)_3(PO_4)_2(OH)_{1+x} \cdot 4H_2O$ where $x = 0.35$. Occurs as compact microcrystalline aggregates in which grain size is 0.01 to 0.015 mm. Golden yellow to yellow color, transparent to translucent, subadamantine to resinous luster, $H = 3–4$, $D_{meas} = 4.15$, $D_{calc} = 4.17$ g/cm³ with $Z = 8$. Weak yellowish green fluorescence in ultraviolet light. Optically biaxial negative, length slow, $\alpha = 1.669$ (almost colorless), $\beta = 1.692$ (light yellow), $\gamma = 1.710$ (yellow), $2V_{calc} = 83°$. The infrared spectrum shows strong absorptions from 3600–3200 cm^{-1} (H_2O and OH); absorptions at 1085, 1040, 990, 590, 540, and 260 cm^{-1} and beyond are attributed to PO_4 groups, and a peak at 910 cm^{-1} is attributed to $(UO_2)^{2+}$. The DTA curve shows major endothermal peaks at 190 and 269 °C related to evolution of H_2O. The X-ray powder pattern shows similarities to that of phosphuranylite, and by analogy the symmetry is orthorhombic, space group $C222_1$, $a = 13.73(1)$, $b = 15.99(1)$, $c = 17.33(2)$ Å. Strongest lines of the diffractometer pattern (Cu$K\alpha$ radiation) are 8.03(100,020), 5.90(40,022), 3.99(90,040), 3.88(40,223), 3.45(40,240), 3.17(70,025), 3.10(70,421), 2.886(60,006), 2.449(40,245), 2.172(40), 1.903(40), and 1.547(40).

The mineral is a secondary product in an oxidized zone containing uraninite and uranothorite in an occurrence at Tongbiguan Village, Yingjiang County, Yunnan Province, China. Associated minerals are studtite, calcurmolite, tengchongite, and autunite. The new name is for the locality. Type material is in the National Geological Museum [Beijing]. **J.L.J.**

Zanazziite*

P.B. Leavens, J.S. White, J.A. Nelen (1990) Zanazziite, a new mineral from Minas Gerais, Brazil. Mineral. Record, 21, 413–417.

Electron-microprobe analysis (Be determined by AAS and H_2O by CHN analyses) gave CaO 10.65, MgO 11.66, FeO 9.63, MnO 1.77, SiO_2 0.36, Al_2O_3 1.54, Fe_2O_3 0.76, BeO 9.81, P_2O_5 39.27, H_2O 13.32, sum 98.77 wt% (Fe^{2+}:Fe^{3+} partitioned on the basis of titrimetric analysis); the results correspond to $(Ca_{1.97}Mn_{0.03})_{\Sigma 2.00}(Mg_{0.61}Fe_{0.40})_{\Sigma 1.01}(Mg_{2.38}Fe^{2+}_{1.08}Mn_{0.23}Al_{0.31}Fe^{3+}_{0.1})_{\Sigma 4.10}Be_4(P_{5.73}Be_{0.06}Si_{0.06})_{\Sigma 5.85}O_{24}(OH)_{3.4} \cdot 6.6H_2O$, ideally $Ca_2Me^{2+}Me^{2+}_4Be_4(PO_4)_6(OH)_4 \cdot 6H_2O$ where Me^{2+} indicates Mg > Fe^{2+}or Mn^{2+}. The mineral occurs as pale to dark olive-green, compositionally zoned, barrel-shaped crystals and crystal rosettes up to 4 mm. Crystals typically show major {100} and {110} with {001} irregular and rounded; less commonly bladed, showing major {100}, minor{110}, and irregular, rounded {001}. Streak white, luster vitreous to slightly pearly on cleavage surfaces, good {100} and distinct {010} cleavages, $H = 5$, nonfluorescent in ultraviolet light, $D_{meas} = 2.76$, $D_{calc} = 2.77$ g/cm³ with $Z = 2$. Optically biaxial positive, $\alpha = 1.606(2)$, $\beta = 1.610(2)$, $\gamma = 1.620(2)$, $2V_{meas} = 72°$, $2V_{calc} = 65°$, $X = b$, Z:[100] = 3° in obtuse β. X-ray single-crystal structural study indicated monoclinic symmetry, space group $C2/c$, $a = 15.874(4)$, $b = 11.854(3)$, $c = 6.605(1)$ Å, $\beta = 95.35(3)°$. A Gandolfi X-ray pattern (Cu$K\alpha$ radiation) is similar to the pattern of roscherite and gave strongest lines of 9.50(90,110), 5.91(100,020), 3.16(70,330), 3.05(50,510), 2.766(50,240), 2.682(40B,600), 2.20(40,15$\bar{1}$,710), and 1.642(50B) Å.

The new name is for Dr. Pier F. Zanazzi of the Universita delgi Studi di Perugia, who has studied the structural crystallography of many minerals, including that of zanazziite. The mineral occurs with colorless quartz, rose quartz crystals, and eosphorite in pockets in the Lavra da Ilha pegmatite near Taquaral, northeastern Minas Gerais, Brazil. Type material is in the Smithsonian Institution, Washington, DC.

Discussion. A microprobe analysis of Fe-dominant triclinic "roscherite" also is given. The formula differs substantially from that given for roscherite in Fleischer's *Glossary of Mineral Species* (1987); as is noted by the authors, details of the relationship of zanazziite to roscherite are uncertain, and the roscherite-group minerals require further study. The principal question seems to be "What exactly is roscherite?" **J.L.J.**

Znucalite*

P. Ondruš, F. Veselovský, R. Rybka (1990) Znucalite, $Zn_{12}(UO_2)Ca(CO_3)_3(OH)_{22} \cdot 4H_2O$, a new mineral from Příbram, Czechoslovakia. Neues Jahrb. Mineral. Mon., 393–400.

The average range of 15 electron-microprobe analyses (H_2O and CO_2 by thermal analyses) gave ZnO 56.75 (56.25–57.00), CaO 4.06 (3.83–4.13), UO_3 17.42 (17.18–17.66), CO_2 8.25 (7.0–9.5), H_2O 15.37 (14.8–16.1), sum 101.85 wt%, corresponding to $Zn_{11.83}(UO_2)_{1.03}Ca_{1.23}(CO_3)_{3.18}(OH)_{21.82} \cdot 3.57H_2O$. Occurs as porous coatings of saucer-shaped aggregates, up to 10 cm², some consisting of thin plates averaging 15 × 8 × 0.4 μm. Color white, light yellow, grayish yellow; translucent, silky luster, perfect {010} cleavage, yellow-green fluorescence in short- and long-wave ultraviolet light; readily soluble in acid, with evolution of CO_2; $D_{meas} = 3.01(3)$, $D_{calc} = 3.09$ g/cm³ with $Z = 4$. Optically biaxial negative, $\alpha = 1.563(2)$, $\beta = 1.621(2)$, $\gamma = 1.621(4)$, $2V_{calc} = \approx 0°$, negative elongation, extinction inclined about 9°. TG analysis shows losses of 2.1 wt% between 20 and 150 °C (absorbed H_2O), 16.05 wt% between 180 and 430 °C (H_2O and OH), and 7.68 wt% between 450 and 960 °C (CO_2). The infrared spectrum shows absorption bands typical of carbonate and H_2O. X-ray powder patterns show some variations in intensities, attributable to selective orientation of the plates. Strongest lines of a Guinier–de Wolff pattern (Co$K\alpha$ radiation) are 25.10(62,010), 6.141(78,210), 5.650($54,\bar{2}01,220$), 3.165($70,1\bar{4}3$), 2.728($90,281,\bar{1}82,2\bar{5}3$), 2.708(100,182), 2.682(56,$\bar{2}04$), 1.5820(77), 1.5600(62), and 1.5561(67). Triclinic cell dimensions calculated from the powder pattern are a = 12.692(4), b = 25.096(6), c = 11.685(3) Å, α = 89.08(2), β = 91.79(2), γ = 90.37(3)°.

The new name is derived from the main constituents: Zn-U-Ca. The mineral occurs with gypsum, hydrozincite, aragonite, sphalerite, galena, pyrite, and other minerals as an oxidation product on uraninite-bearing dump material from the Lill mine, which operated in the second half of the 19th century at Příbram, Central Bohemia, Czechoslovakia. Type material is at the National Museum and at the Mineralogical Museum of the Faculty of Natural Sciences of Charles University, both in Praha, and at The Regional Museum, Příbram, Czechoslovakia. **J.L.J.**

$FeRh_2S_4$, $Pd_3(Te,As)$, $Pd_5Rh_5As_4$

Z. Johan, E. Slansky, M. Ohnenstetter (1991) Isoferroplatinum nuggets from Milverton (Fifield, N.S.W., Australia): A contribution to the origin of PGE mineralization in Alaskan-type complexes. Compte Rendu Acad. Sci. Paris, Ser. II, 312, 55–60.

Platinum-group minerals (PGM) occur as nuggets about 2 mm in size in placers at Fifield, 380 km west-northwest of Sydney, Australia. The nuggets consist of isoferroplatinum with small inclusions of Os-Ir-Pt alloys, bowieite-kashinite, and unidentified minerals.

$FeRh_2S_4$. Electron-microprobe analysis of the only grain found, about 20 μm across, gave Rh 42.60, 41.95, Ir 10.44, 10.48, Pt 1.96, 1.73, Pd 0.20, 0.03, Fe 6.78, 7.04, Cu 7.38, 7.54, Co 0.10, 0.18, As –, 0.05, S 31.12, 32.14, sum 100.57, 101.19 wt%, corresponding to $(Rh_{1.77}Ir_{0.22}Pt_{0.04}Pd_{0.01})_{\Sigma 1.98}$-$(Fe_{0.50}Cu_{0.48}Co_{0.01})_{\Sigma 0.99}S_{4.02}$ and $(Rh_{1.66}Ir_{0.22}Pt_{0.04})_{\Sigma 1.92}$-$(Fe_{0.51}Cu_{0.48}Co_{0.01})_{\Sigma 1.00}S_{4.07}$, ideally $FeRh_2S_4$, which is the iron analogue of cuprorhodsite, $CuRh_2S_4$.

$Pd_3(Te,As)$. Electron-microprobe analyses of subhedral, elongate grains, 4–5 μm long and associated with iridosmine, gave Pd 71.42, 71.80, Pt 2.58, 2.43, Rh 1.08, 0.85, Ir 0.27, 0.03, Os 0.01, 0.10, Fe 0.08, 0.01, Ni 0.09, –, Cu 0.09, 0.01, Te 16.28, 16.30, As 6.63, 6.47, Sb 0.47, 0.38, S 0.02, –, sum 99.01, 98.37 wt%, corresponding to $(Pd_{2.92}Pt_{0.06}Rh_{0.05})_{\Sigma 3.03}(Te_{0.56}As_{0.39}Sb_{0.02})_{\Sigma 0.97}$ and $(Pd_{2.96}$-$Pt_{0.05}Rh_{0.03})_{\Sigma 3.04}(Te_{0.56}As_{0.38}Sb_{0.02})_{\Sigma 0.96}$, ideally Pd_3Te. Close in composition of keithconnite ($Pd_{3-x}Te$) and analogous to atheneite $(Pd,Hg)_3As$.

$Pd_5Rh_5As_4$. Electron-microprobe analyses of platy, euhedral crystals, up to 30 μm long, gave Pd 38.01, 37.12, Rh 36.17, 35.67, Pt 2.22, 2.28, Ir 0.17, 0.36, Fe 0.07, –, Cu 0.13, 0.05, As 20.10, 20.81, Te 2.38, 2.45, Sb 0.75, 0.74, sum 100.00, 100.49 wt%, the average corresponding to $(Rh_{2.399}Pd_{2.422}Ir_{0.010}Pt_{0.070}Cu_{0.006}Co_{0.003}Ni_{0.002})_{\Sigma 4.912}(As_{1.898}$-$Te_{0.130}Sb_{0.049}S_{0.002})_{\Sigma 2.079}$, ideally $(Pd,Rh)_{5-x}(As,Te)_2$ or $Rh_5Pd_5As_4$.

Discussion. A phase previously described as Pd_3Te in the synthetic Pd-Te system has been shown to be $Pd_{20}Te_7$ (Kim et al., *J. Less-Common Metals,* 162, 61–74, 1990). The simplified formula for $(Pd,Rh)_{5-x}(As,Te)_2$ is $Pd_{5-x}As_2$; Pd_5As_2 was reported previously in *Am. Mineral.,* 75, 1218–1219, 1990. **J.L.J.**

$Pb_4O_3(Cl,SO_4)_2$

R.C. Rouse, P.J. Dunn (1990) A new lead sulfate oxychloride related to the nadorite group from Brilon, Germany. Neues Jahrb. Mineral. Mon., 337–342.

The mineral occurs as pink, glassy blebs of 1–2 mm and aggregates intimately intergrown with mendipite partly altered to hydrocerussite on a specimen from the Kunibert mine near Brilon, Nordrhein-Westfalen, Germany. Electron-microprobe analysis gave PbO 92.2, SO_3 3.5, Cl 5.6, O ≡ Cl 1.3, sum 100.0 wt%, corresponding to $Pb_{4.13}S_{0.44}O_{4.64}Cl_{1.58}$. Normalized to 4Pb, the formula is $Pb_4O_{2.8}[Cl_{1.6}(SO_4)_{0.4}]_{\Sigma 2.00}$, ideally $Pb_4O_3(Cl,SO_4)_2$. Optically biaxial, possibly negative. Perfect {001} cleavage. Single-crystal X-ray study indicated monoclinic symmetry and a pronounced pseudotetragonal subcell; A = 3.945(3), B = 3.933(5), C = 13.119(5) Å, β = 91.11(4)° as refined from the powder pattern (114-mm Gandolfi camera, Cu$K\alpha$ radiation). True cell and space group not known. The strongest lines of the powder pattern are 3.77(80, slightly broad, $\bar{1}01$,011,101), 2.952(100,$\bar{1}03$), 2.897(100,013,103), 2.785(100,110), 1.743(40,$\bar{1}21$,211,121), and 1.701(40,-116,$\bar{1}07$,$\bar{2}04$,017). The pattern has similarities to that of synthetic $Pb_{3.6}O_4Cl_{1.6}$ (PDF 21–473). The type specimen is in the Smithsonian Institution, Washington, DC. **J.L.J.**

Se-bearing minerals

L.E. Gertsen, P.E. Kotelnikov, E.Ya. Eremeeva (1989) New find of selenium minerals in porphyry copper deposits of Kazakhstan. Izvestiya Akad. Nauk Kazak. SSR, Ser. Geol., 1989(3), 45–49 (in Russian).

Mineral A

Microprobe analysis gave Cu 17.71, Fe 15.20, Pb 27.31, Bi 11.84, Ag 0.27, Se 7.51, S 19.83, sum 99.67, corresponding to $(Cu_{0.38}Fe_{0.37}Pb_{0.18}Bi_{0.08}Ag_{0.01})_{\Sigma 1.02}(S_{0.85}Se_{0.13})_{\Sigma 0.98}$. In reflected light, creamy white, weak pleochroism, anisotropic effects in air reddish brown to bluish gray. In immersion oil, brown to bluish gray. Reflectance (nm, R%): 450 31; 500 38; 550 40; 600 41; 650 40; 700 38. H_{20} = 290 kg/mm². The mineral occurs as an aggregate, 6 × 20 μm, of crystals 1–3 mm.

Mineral B

Microprobe analysis gave Cu 7.33, Fe 20.67, Pb 7.15, Bi 21.34, Ag 9.13, Se 7.69, S 8.00, sum 81.30 wt%; the ratios are Fe/Cu/Bi/(Ag + Pb)/(S + Se) = 3/1/1/1/3 with Ag/Pb = 2.48/1 and S/Se = 2.3/1. In reflected light, pleochroic from gray to dark gray in air, dark gray to brownish gray in immersion oil (sections perpendicular to grain elongation). Anisotropic effects in air bluish gray to bright yellow, in immersion oil dark gray to yellowish gray. Relief higher than those of mineral A and Se-bearing bismuthinite. The mineral occurs as elongate grains, 1 × 1 μm in diameter, that form a 2–4 μm rim around mineral A. Both minerals occur in the Kenkuduk deposit, Kazakhstan, USSR. **J.P.**

New Data

Berborite polytypes

G. Giuseppetti, F. Mazzi, C. Tadini, A.O. Larsen, A. Åsheim, G. Raade (1990) Berborite polytypes. Neues Jahrb. Mineral. Abh., 162, 101–116.

Berborite, $Be_2(BO_3)(OH)\cdot H_2O$, from nepheline syenite pegmatites in quarries in larvikite in the Tvedalen district, southern Oslo region, Norway, occurs as the *1T, 2T,* and *2H* polytypes, each of which has a distinct X-ray powder-diffraction pattern. Berborite-*1T* has a = 4.434(1), c = 5.334(2) Å, space group *P*3; berborite-*2T* has a = 4.431(1), c = 10.663(3) Å, space group *P*3*c*1; berborite-*2H* has a = 4.433(2), c = 10.638(5) Å, space group $P6_3$. Structures of the polytypes were refined to R = 0.014, 0.019, and 0.029, respectively. The Be atoms and the O(2) apical O atoms of Be tetrahedra are split into two nonequivalent sites, and H_2O and OH oxygen atoms are ordered on separate O(2) positions. **J.L.J.**

Dewindtite

P. Piret, J. Piret-Meunier, M. Deliens (1990) Chemical composition and crystal structure of dewindtite $Pb_3[H(UO_2)_3O_2(PO_4)_2]_2\cdot 12H_2O$. Eur. J. Mineral., 2, 399–405 (in French, English abstract).

X-ray crystal-structural study (R = 0.063) of cotype dewindtite showed the mineral to be orthorhombic, space group *Bmmb*, a = 16.031(6), b = 17.264(6), c = 13.605(2) Å, D_{calc} = 5.12 g/cm³ with Z = 4 for the ideal formula cited in the title; the formula corresponds to $3PbO\cdot 6UO_3\cdot 2P_2O_5\cdot 13H_2O$, requiring PbO 23.06, UO_3 59.10 P_2O_5 9.78, H_2O 8.06 wt%. **J.L.J.**

Lazurite

A.N. Saposhnikov (1990) Indexing of additional reflections on the X-ray Debye diffraction patterns of lazurite concerning the study of modulation of its structure. Zapiski Vses. Mineralog. Obshch., 119(1), 110–116 (in Russian).

In lazurite from deposits in the southwestern Baikal region, USSR, three structural modifications of lazurite were found: (1) triclinic, a = 9.091, b = 12.857, c = 25.719 Å, $\alpha = \beta = \gamma = 90°$, space group *P*1 or $P\bar{1}$, optically biaxial positive, strongly pleochroic from blue to pale blue or colorless, α = 1.503, β = 1.510, γ = 1.514; (2) monoclinic, a = 36.36, $b = c$ = 51.40 Å, $\alpha = \beta = \gamma = 90°$, space group $P2_1/b$, optically negative, no pleochroism, $\gamma \approx \beta$ = 1.512–1.514, α = 1.511–1.513; (3) cubic, a = 9.072 Å, space group *P*43*n*, optically isotropic, n = 1.498–1.512.

Discussion. The triclinic and monoclinic modifications are new polymorphs of lazurite. **J.P.**

Högbomite-*24R*

K. Schmetzer, A. Berger (1990) Lamellar iron-free högbomite-*24R* from Tanzania. Neues Jahrb. Mineral. Mon., 401–412.

Lamellae of högbomite, 0.01 to 0.1 μm thick and oriented parallel to the {111} faces of the spinel host, occur in gem-quality octahedral spinel crystals free of host rock and thought to have been derived from the Morogoro area of Tanzania. Energy-dispersion analyses, calculated for $(MgO + Al_2O_3 + TiO_2)$ = 100 wt%, revealed compositions of two types, one with MgO 18.19, Al_2O_3 67.03, TiO_2 14.78 wt% and the other with MgO 23.31, Al_2O_3 69.56, TiO_2 7.13 wt%. Selected-area electron-diffraction patterns revealed no differences, with both compositional types giving unit cells of a = 5.7, c = 12 × 4.65 = 55.8 Å. The lamellae correspond to högbomite-*24R*, the first natural occurrence of this polytype. **J.L.J.**

Hotsonite

O.K. Ivanov, L.L. Shiryaeva, L.A. Khoroshilova, V.G. Petrisheva (1990) Hotsonite—Confirmation of discovery and new data (Blyavinskij mine, the Urals). Zapiski Vses. Mineralog. Obshch., 119(1), 121–126 (in Russian).

One of three similar wet-chemical analyses done at different laboratories gave SiO_2 0.16, TiO_2 0.01, Al_2O_3 39.60, Fe_2O_3 0.18, MgO 0.41, CaO 0.89, P_2O_5 9.06, SO_3 13.73, H_2O^+ 31.29, H_2O^- 4.28, insoluble residuum 0.33, sum 99.94 wt%, corresponding to $Al_5(PO_4)_{0.82}(SO_4)_{1.07}(OH)_{10.40}\cdot 7.4H_2O$, ideally $Al_5(PO_4)(SO_4)(OH)_{10}\cdot 8H_2O$ rather than previously proposed $Al_{11}(PO_4)_2(SO_4)_3(OH)_{21}\cdot 16H_2O$. **J.P.**

Perlialite

G. Artioli, Å. Kvick (1990) Synchrotron X-ray Rietveld study of perlialite, the natural counterpart of synthetic zeolite-L. Eur. J. Mineral., 2, 749–759.

Structural analysis of perlialite by synchrotron X-ray powder methods gave hexagonal symmetry, space group *P*6/*mmm*, a = 18.5432(4), c = 7.5310(3) Å, composition $K_8Tl_4Al_{12}Si_{24}O_{72}\cdot 20H_2O$. The formula is new, but Tl is considered to have entered the larger cavities of the zeolite framework as a consequence of the use of thallium malonate during mineral separation. **J.L.J.**

Phosphuranylite

P. Piret, J. Piret-Meunier (1991) Compositon chimique et structure crystalline de la phosphuranylite $Ca(UO_2)[(UO_2)_3(OH)_2(PO_4)_2]_2\cdot 12H_2O$. Eur. J. Mineral., 3, 69–77 (in French, English abstract).

X-ray structural study ($R = 0.089$) of phosphuranylite gave orthorhombic symmetry, space group *Bmmb*, $a = 15.835(7)$, $b = 17.324(6)$, $c = 13.724(4)$ Å, $D_{calc} = 4.58$ g/cm³ with $Z = 4$. The gross composition is $CaO \cdot 7UO_3 \cdot 2P_2O_5 \cdot 14H_2O$, with U/P = 7/4. The formula is new. **J.L.J.**

Vinogradovite

J.G. Rønsbo, O.V. Petersen, E.S. Leonardsen (1990) Vinogradovite from the Ilimaussaq alkaline complex, South Greenland, a beryllium bearing mineral. Neues Jahrb. Mineral Mon., 481–492.

Semi-quantitative laser-probe analysis indicated the presence of about 1 wt% Be in vinogradovite, and microprobe analysis led to the proposed formula $Na_8Ti_8O_8(Si_2O_6)_4[(Si_3Al)O_{10}]_2 \cdot [(H_2O),(Na,K)_2]$. Mineral X of Karup-Møller [*Am. Mineral.*, 73, p. 445, 1988] is vinogradovite. **J.L.J.**