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NEW MINERAL NAMES*

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Benyacarite

F. Demartin, T. Pilati, H.D. Gay, C.M. Gramaccioli (1993) The crystal structure of a mineral related to paulkerrite. Zeits. Kristallogr., 208, 57–71.

Electron microprobe analysis gave Na_2O 0.2, K_2O 1.6, Al_2O_3 0.7, Fe_2O_3 11.0, FeO 2.8, MnO 11.2, MgO 0.3, CaO 0.1, TiO_2 12.3, P_2O_5 28.1, F 1.5, H_2O_{calc} 28.9 (less O ≡ F 1.3, sum 97.4 wt%); from the microprobe analysis and single-crystal X-ray structure study (*R* = 0.034) the formula is $[H_2O)_{0.78}K_{0.16}Na_{0.03}]_2Ti(Mn^{2+}_{0.75}Fe^{2+}_{0.21}Mg_{0.04})_2(Fe^{3+}_{0.68}Ti^{4+}_{0.28}Al_{0.07})_2(PO_4)_4(O_{0.6}F_{0.4})_2 \cdot 14H_2O$. The mineral is orthorhombic, space group *Pbca*, $a = 10.561(5)$, $b = 20.585(8)$, $c = 12.516(2)$ Å, $D_{calc} = 2.37$ g/cm³ for $Z = 4$. Occurs with other phosphates and with F-rich minerals such as fluellite and pachnolite in a granitic pegmatite at Cerro Blanco, near Tanti, Córdoba, Argentina. The mineral is the Mn (and H_2O) analogue of paulkerrite.

Discussion. The authors reported that the status of the mineral and new name "have not been approved yet by the Commission on New Minerals and Mineral Names." Complete data, however, have not yet been submitted to the CNMMN. **J.L.J.**

Borodaevite*

S.N. Nenasheva, A.V. Efimov, A.V. Sivtzov, N.N. Mozgova (1992) Borodaevite $[Ag_5(Fe,Pb)_1Bi_7]_{13}(Sb,Bi)_2S_{17}$: A new mineral. Zapiski Vseross. Mineral. Obshch., 121 (4), 113–120 (in Russian).

Microprobe analyses (average of 3) gave Ag 18.23, Pb 3.22, Fe 0.43, Bi 53.47, Sb 6.42, S 17.92, sum 99.69 wt%, corresponding to $[Ag_{5.10}(Fe_{0.23}Pb_{0.47}Bi_{7.32})_{\Sigma 8.02}]_{\Sigma 13.12}(Sb_{1.59}Bi_{0.41})_{\Sigma 2.00}S_{16.88}$. The mineral forms elongate, platy crystals, some with an angle of ~94° between faces, or irregular grains up to 1.2 × 0.5 mm. Some crystals have decomposition rims of matildite + aramayoite + galena or matildite + gustavite, and some contain inclusions of these minerals. $VHN_{20} = 165$. White in reflected light, very weak bireflectance (only on grain boundaries), distinct brown anisotropy, nonpleochroic, no internal reflections. Reflectance percentages (nm, R_1, R_2): 420, 41.4, 39.9; 460, 42.1, 39.8; 480, 42.3, 39.7; 520, 41.8, 39.1; 546, 41.4, 38.8; 589, 40.8, 37.9; 620, 40.3, 37.7; 650, 39.8, 36.9; 700, 39.3, 36.1. X-ray powder and electron diffraction study showed the mineral to be monoclinic, space group *C2/m* or *Cm*, $a = 13.515(7)$, $b = 4.098(3)$, $c = 26.000(8)$ Å, $\beta = 93.00(4)°$, $Z = 2$, $D_{calc} = 7.90$ g/cm³. The strongest lines of the powder pattern (47 given) are 3.49(80,113, diffuse), 3.37(90,400, diffuse), 3.24(90,008), 2.82(100, 313), and 1.992(80,023). The mineral, which belongs to the pavonite homologous series, occurs in the Alaskitovoe deposit, Yakutia, Siberia, Russia, where it is associated with quartz, molybdenite, triplite, hübnerite, pavonite, benjaminite, gustavite-andorite, ramdohrite, teremkovite (owyheeite), matildite, and aramayoite. The name is for Russian mineralogist Yu. S. Borodaev. Type material is at the Fersman Mineralogical Museum, Moscow, Russia. **J.P.**

Hennomartinite,* kornite*

T. Armbruster, R. Oberhänsli, V. Bermanec, R. Dixon (1993) Hennomartinite and kornite, two new Mn^{3+} rich silicates from the Wessels mine, Kalahari, South Africa. Schweiz. Mineral. Petrogr. Mitt., 73, 349–355.

Both minerals occur in a coarse-grained sample consisting of about 70% sugilite and 25% serandite-pectolite from the Wessels mine, Kalahari Mn field, Republic of South Africa. The minerals formed as hydrothermal reaction products of primary manganese ore.

Hennomartinite

Chemical and crystallographic data were abstracted as unnamed $SrMn^{3+}_2[Si_2O_7](OH)_2 \cdot H_2O$ in *Am. Mineral.*, 77, p. 1307, 1992. The mineral occurs as yellow-brown poikiloblasts ~1 mm in diameter; vitreous luster, translucent, $H = \sim 4$, nonfluorescent, $D_{calc} = 3.68$ g/cm³ for $Z = 4$. Optically biaxial, sign uncertain, $n = >1.82$, $2V = 63(1)°$, strongly pleochroic from yellowish brown to dark red-brown. The strongest lines of the X-ray powder pattern (Guinier camera, Fe$K\alpha_1$, radiation) are 4.804(86,111), 3.373(66,113), 2.833(100,202), 2.807(82,114), and 2.401(68,222). The new name is for Henno Martin, German geologist, who has published several papers on the

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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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Precambrian geology of Namibia. Type material is in the Museum of Nataural History, Bern, Switzerland.

Kornite

Occurs with hennomartinite as dark red to brownish lilac bundles of fibers, commonly bent and 5–20 μm in diameter, with fiber length <200 μm. Electron and ion microprobe analyses gave K_2O 3.56, Na_2O 7.61, Li_2O 1.96, MgO 10.03, Mn_2O_3 13.17, Fe_2O_3 4.93, SiO_2 56.06, H_2O (by difference 2.68), sum 100 wt%, corresponding to $(K_{0.65}Na_{0.31})_{\Sigma 0.96}(Na_{1.79}Li_{0.21})_{\Sigma 2.00}(Mg_{2.12}Mn^{3+}_{1.43}Fe^{3+}_{0.52}Li_{0.91})_{\Sigma 5.00}Si_8O_{22}(OH)_2$. Transparent, vitreous luster, brittle, elongate [001] and with a cleavage parallel to it, nonfluorescent, D_{calc} = 3.15 g/cm^3 for $Z = 2$. Optically biaxial negative, $\alpha = 1.654(4)$, $\beta_{calc} = 1.675$, $\gamma = 1.696(4)$, $2V$ = 88–92°; $Z = b$, $Y{:}c$ = 60–65° in the obtuse angle β, pleochroic formula X = pink, Y = dark red, Z = orange-red. Various X-ray single-crystal methods gave diffuse diffraction spots from which a pattern was assembled with strong lines at 3.257(240), 3.132(310), 2.812(330), and 2.553 Å (002); of the 13 medium-intensity lines, the first three are 8.890(020), 8.427(110), and 5.077(130). The mineral is an amphibole and, by analogy, $a = 9.94(1)$, $b = 17.80(2)$, $c = 5.302(4)$, $\beta = 105.5(2)°$. The new name is for Hermann Korn (d. 1946), German geologist, who was associated with Henno Martin and was coauthor of several papers with Martin on the geology of Namibia. Type material is deposited with hennomartinite at Bern. **J.L.J.**

Mineevite-(Y)*

A.P. Khomyakov, L.I. Polezhaeva, N.A. Yamnova, D.Yu. Pushcharovsky (1992) Mineevite-(Y), $Na_{25}Ba(Y,Gd,Dy)_2(CO_3)_{11}(HCO_3)_4(SO_4)_2F_2Cl$: A new mineral. Zapiski Vseross. Mineral. Obshch., 121 (6), 138–143 (in Russian).

Microprobe analyses (average of 3, CO_2 and F by wet methods) gave Na_2O 36.87, BaO 7.33, Y_2O_3 5.90, La_2O_3 0.19, Ce_2O_3 0.58, Nd_2O_3 0.50, Sm_2O_3 0.95, Gd_2O_3 2.33, Tb_2O_3 0.35, Dy_2O_3 1.80, Ho_2O_3 0.15, Er_2O_3 0.51, Yb_2O_3 0.06, SO_3 7.63, Cl 1.70, F 1.80, CO_2 30.83, H_2O (by difference) 1.66, $O \equiv (F,Cl)_2$ 1.14, sum 100 wt%, corresponding to $Na_{25.30}Ba_{1.02}TR_{1.98}C_{14.90}S_{2.03}H_{3.92}O_{52.95}F_{2.01}Cl_{1.02}$, in which $TR = Y_{1.11}Gd_{0.27}Dy_{0.20}Sm_{0.11}Ce_{0.07}Nd_{0.06}Er_{0.06}Tb_{0.04}La_{0.03}Ho_{0.02}Yb_{0.01}$, ideally $Na_{25}Ba(Y,Gd,Dy)_2(CO_3)_{11}(HCO_3)_4(SO_4)_2F_2Cl$. Occurs as pale green to yellowish green irregular grains 0.5–1.0 cm in diameter, almost colorless in thin pieces. Transparent, vitreous luster on fractures, pearly on cleavage. Perfect {0001} cleavage, steplike fracture, brittle, $H = 4$, $D_{meas} = 2.85(2)$, $D_{calc} = 2.84$ g/cm^3 for $Z = 2$, weak yellowish green fluorescence in ultraviolet light. Stable in water, but readily decomposed in dilute acids (including citric) with effervescence. Optically uniaxial negative, $\epsilon = 1.510(2)$, $\omega = 1.536(2)$ (white light). The infrared pattern has absorption bands (s = strong) at 3400–3500, 1790, 1740, 1600, 1540s, 1520s, 1438, 1383s, 1154s, 1128, 1077, 1060, 920, 897s, 882, 870s, 830, 766s, 728, 708, 690, 650s, 635, and 460 cm^{-1}. The DTA curve has endotherms at 410, 500, and 690 °C (decarbonation and dehydroxylation). TGA gave weight losses of 2.5% from 20–220 °C (dissociation of nahcolite and other impurities), 8.1% from 220–480 °C, 1.9% from 480–620 °C, and 1.9% from 620–1000 °C. Single-crystal X-ray study ($R = 0.041$) indicated hexagonal symmetry, space group $P6_3/m$, $a = 8.811(7)$, $c = 37.03(3)$ Å. The strongest lines of the powder pattern (62 lines given) are 2.829(100,1.1.10), 2.659(51,0.1.13,0.2.10, diffuse), 2.531(71,030,031, diffuse), 2.270(90,1.2.10), and 1.660(46,237).

The mineral occurs among interstices of potassium feldspar crystals in pegmatites of the Alluaiv Mountain, Lovozero massif, Kola Peninsula, Russia, in association with nahcolite, trona, thermonatrite, sidorenkite, neighborite, aegirine, albite, sphalerite, manganotychite, and unnamed $Na_3Ca(Mn,Ca)(CO_3)_3F$. The name is for Russian mineralogist D. A. Mineev (1935–1992). Type material is in the Fersman Mineralogical Museum, Moscow, Russia. **J.P.**

Paranatisite*

A.P. Khomyakov, L.I. Polezhaeva, E.V. Sokolova (1992) Paranatisite Na_2TiSiO_5: A new mineral. Zapiski Vseross. Mineral. Obshch., 121 (6), 133–136 (in Russian).

Microprobe analyses (average of 3) gave Na_2O 28.04, CaO 0.05, MnO 0.39, FeO 2.61, SiO_2 29.69, TiO_2 35.70, Nb_2O_5 0.14, F 1.0, H_2O (by coulometry) 1.6, $O \equiv F_2$ 0.4, sum 98.82 wt%, corresponding to $(Na_{1.831}Ca_{0.002}Mn_{0.011})_{\Sigma 1.844}(Ti_{0.904}Nb_{0.002}Fe^{2+}_{0.074})_{\Sigma 0.980}Si[O_{4.583}(OH)_{0.359}F_{0.106}]$, ideally Na_2TiSiO_5. The mineral occurs in ijolitic-urtitic pegmatites as interstitial 0.5–1 mm grains and aggregates up to 3–5 mm in diameter. Yellow, orange-yellow, or orange-brown color, vitreous to adamantine luster, translucent, thin pieces transparent. Fracture conchoidal, no cleavage, nonfluorescent, $H = 5$, $D_{meas} = 3.12(5)$, $D_{calc} = 3.07$ g/cm^3 for $Z = 4$. The infrared pattern has distinct absorptions at 432, 632, 862, 903, and 1003, and a weak one at 3400–3500 cm^{-1}. Optically biaxial positive, $\alpha = 1.740(2)$, $\beta = 1.741(2)$, $\gamma = 1.765(2)$, $2V_{meas} = 20(1)$, $2V_{calc} = 23°$, weakly pleochroic with Z = yellow, X, Y = brown; $X = b$, $Y = a$, $Z = c$. Single-crystal X-ray structure study ($R = 0.064$) showed the mineral to be orthorhombic, space group $Pmma$, $a = 9.827(3)$, $b = 9.167(2)$, $c = 4.799(2)$ Å. The strongest lines of the powder pattern are 2.748(100,221), 1.720(30,250), 1.680(30,440), 1.475(33,342), and 1.443(35,630).

The mineral occurs at Yukspor Mountain in the Khibiny massif, Kola Peninsula, Russia, where it is associated with lepidomelane, aegirine, lorenzenite, shcherbakovite, villiaumite, and hisingerite(?). The name relates to natisite, tetragonal Na_2TiSiO_5. Type material is at the Fersman Mineralogical Museum, Moscow, Russia. **J.P.**

Petitjeanite*

W. Krause, K. Belendorff, H.-J. Bernhardt (1993) Petitjeanite, $Bi_3O(OH)(PO_4)_2$, a new mineral, and additional data for the corresponding arsenate and vanadate, preisingerite and schumacherite. Neues Jahrb. Mineral. Mon., 487–503.

The mean of five electron microprobe analyses gave Bi_2O_3 76.04, PbO 3.39, P_2O_5 14.34, As_2O_5 2.99, V_2O_5 0.01, H_2O_{calc} 1.18, sum 97.95 wt%, corresponding to $(Bi_{2.86}Pb_{0.13})_{\Sigma 2.99}O_{0.85}(OH)_{1.15}[(PO_4)_{1.77}(AsO_4)_{0.23}]_{\Sigma 2.00}$, ideally $Bi_3O(OH)(PO_4)_2$. Additional analyses indicate complete solid solution between the AsO_4 analogue preisingerite, and the VO_4 analogue schumacherite. Occurs as spherical aggregates or crusts of intergrown crystals to 0.2 mm, tabular on {100}, slightly elongate [001], with distinct {010}, {001}, {011}, and minor $\{\bar{1}10\}$; typically twinned by rotation on [010]. Color white to pale pink for V-free samples, yellow for V-bearing material, also dark brown. Transparent to translucent, white streak, vitreous to adamantine luster, conchoidal fracture, H = 4.5, nonfluorescent, soluble in dilute HCl, D_{calc} = 6.99 g/cm³ for Z = 2. Optically biaxial positive, α = 2.06(2), γ = 2.13(2), $2V$ = 75(5)°, distinct dispersion $r > v$. Cell dimensions calculated from the X-ray powder patterns (diffractometer, Cu$K\alpha$ radiation) are triclinic, space group $P1$, a = 9.798(3), b = 7.250(3), c = 6.866(2) Å, α = 88.28(2), β = 115.27(2), γ = 110.70(3)°; the strongest lines are 4.437(46,$\bar{2}$01,110), 3.247(87,$\bar{2}$20,$\bar{2}$02), 3.188(100,$\bar{2}$21,$\bar{1}$21), 3.135(95,0$\bar{2}$1,111), 3.026(75,$\bar{1}$12,210,2$\bar{1}$1), 2.953(47,$\bar{3}$10), and 2.165(41,301,$\bar{1}\bar{1}$3).

The mineral occurs with bismutite, mixite, reichenbachite, pyromorphite, and malachite in silicified barite veins at Gadernheim (type locality) and Reichenbach near Bensheim, Odenwald, Hesse, Germany; also at Schneeberg, Saxony, Germany. The new name is for K. Petitjean, mineral collector, who first found the mineral. Type material is in the Institut für Mineralogie, Ruhr-Universität Bochum, Germany. **J.L.J.**

Qilianshanite*

Shiqing Luo, Jian'an Lu, Liben Wang, Jingqing Zhu (1993) Qilianshanite: A new boric carbonate mineral. Acta Mineral. Sinica, 13 (2), 97–101 (in Chinese, English abs.).

Wet-chemical analysis gave Na_2O 17.92, CaO 0.22, MgO 0.05, B_2O_3 20.02, CO_2 16.99, H_2O 43.11, sum 98.31 wt%, corresponding to $Na_{1.07}Ca_{0.01}H_{8.86}C_{0.71}B_{1.06}O_{8.00}$; the ideal formula $NaHCO_3 \cdot H_3BO_3 \cdot 2H_2O$ requires Na_2O 17.04, B_2O_3 19.14, CO_2 24.20, H_2O 39.63 wt%. The mineral occurs mainly as colorless aggregates to 4 mm in diameter, less commonly as tabular or prismatic crystals to 2 mm. Transparent, white streak, vitreous luster, H = 2, perfect {100} and {010} cleavages, D_{meas} = 1.706, D_{calc} = 1.639 g/cm³ for Z = 4, polysynthetically twinned, soluble in water, soluble with effervescence in dilute HCl. Optically biaxial negative, α_{calc} = 1.351, β = 1.459(2), γ = 1.486(2), $2V$ = 50(1)°, $X = b$, $Z{:}c$ = 9°, moderate dispersion $r < v$. Single-crystal X-ray study showed the mineral to be monoclinic, space group $C2$, a = 16.119(8), b = 6.928(4), c = 6.730(3) Å, β = 100.46(4)°. The strongest lines (13 given) of the powder pattern (Cu$K\alpha$ radiation) are 6.36(25,110), 4.203(6,310), 3.464(100,020), 3.173(59,220), 2.608(5,420), and 1.731(19,040). DTA gave strong endothermic peaks at 100 (double peak), 185, and 960 °C, plus five weaker ones to 960 °C; total loss (H_2O + CO_2) was 59.5 wt% (theoretical, 63.83 wt%). An infrared spectrum is given.

The mineral is associated with quartz, calcite, tincalconite, and nahcolite at the Juhongtu boron deposit on the southwestern border of the Qilian Mountain System, Qinghai Province, China. The new name is for the locality. Type material is in the National Museum of Geology, Beijing, China.

Discussion. The large differences between the measured and calculated densities, and between the theoretical and analytical CO_2 values (although the total weight on heating gave a reasonable result), suggest that something is wrong with the formula or the aforementioned determinations. **J.L.J.**

Rosenbergite*

F. Olmi, C. Sabelli, R. Trosti-Ferroni (1993) Rosenbergite, $AlF[F_{0.5}(H_2O)_{0.5}]_4 \cdot H_2O$, a new mineral from the Cetine mine (Tuscany, Italy): Description and crystal structure. Eur. J. Mineral., 5, 1167–1174.

Electron microprobe analyses of two grains gave Al 19.94, F 41.05, H_2O (by difference) 39.01, sum 100 wt%, corresponding to $Al_{1.02}F_{2.98} \cdot 2.99H_2O$, simplified as $AlF_3 \cdot 3H_2O$, with the structural formula as given in the title. Occurs as radiating tufts of colorless, transparent, slender tetragonal prisms, elongate [001] to 0.25 mm in length; vitreous luster, good {001} cleavage, VHN_{15} = 103 (92–113), D_{meas} = 2.10(1), D_{calc} = 2.111 g/cm³ for Z = 2, nonfluorescent. Optically uniaxial negative, ϵ = 1.403, ω = 1.427. Single-crystal X-ray structure study (R = 0.0276) indicated tetragonal symmetry, space group $P4/n$, a = 7.715(1), c = 3.648(1) Å. The strongest lines from a 114-mm Gandolfi powder pattern (Cu$K\alpha$ radiation) are 5.47(100,110), 2.439(72,130), 2.027(70,131), 1.775(78,012), 1.725(85,240), and 1.306(70,142), in good agreement with the data from the synthetic analogue.

The new name is for P. E. Rosenberg of Washington State University, who discovered and partly described an occurrence in volcanogenic encrustations at Mount Erebus, Antarctica. The mineral from the Cetine mine is associated with gypsum, fluorite, elpasolite, ralstonite, and onoratoite in cavities in a highly silicified limestone. Type material is in the Museum of Natural History of the University of Florence, Italy. **J.L.J.**

Shomiokite-(Y)*

A.P. Khomyakov, N.G. Shumyatskaya, L.T. Polezhaeva (1992) Shomiokite-(Y), $Na_3Y(CO_3)_3 \cdot 3H_2O$: A new mineral. Zapiski Vseross. Mineral. Obshch., 121 (6), 129–132 (in Russian).

Electron microprobe analyses (average of 3, with CO_2 by wet chemistry, H_2O by coulometry) gave Na_2O 21.93, CaO 0.01, Y_2O_3 21.52, Ce_2O_3 0.09, Gd_2O_3 1.80, Tb_2O_3 0.46, Dy_2O_3 5.03, Ho_2O_3 0.63, Er_2O_3 1.24, CO_2 32.10, H_2O 14.20, sum 99.10 wt%, corresponding to $(Na_{2.93}Ca_{0.01})_{\Sigma 2.94}(Y_{0.79}Dy_{0.11}Gd_{0.04}Er_{0.03}Ho_{0.01}Tb_{0.01})_{\Sigma 0.99}C_{3.18}O_{9.00}\cdot 3.26H_2O$, ideally $Na_3(Y,Dy)(CO_3)_3\cdot 3H_2O$. The mineral forms irregular grains and short prismatic pseudohexagonal crystals up to 1–2 mm in diameter. Their rosettelike aggregates are up to 3 mm. Distinct {010}, {110}, and {011} faces, dull and uneven. Colorless, translucent, in small pieces transparent, luster dull waxy to silky, parts into needles ‖ **c**, perfect {110} cleavage, {001} parting, $H = 2–3$, $D_{meas} = 2.52(5)$, $D_{calc} = 2.59$ g/cm³ for $Z = 4$. Soluble with effervescence in dilute acids. Becomes turbid and dehydrates on heating. The infrared spectrum has absorption bands at 675, 730, 880, 1020, 1065, 1385, 1515, and 1560 cm^{-1}. Optically biaxial positive, $\alpha = 1.528(2)$, $\beta = 1.529(2)$, $\gamma = 1.531(2)$ (white light), $2V_{meas} = 49°$ (red), 45° (yellow), 39° (blue); $a = Z$, $b = X$, $c = Y$. Single-crystal X-ray study indicated orthorhombic symmetry, *P* cell, $a = 10.136(2)$, $b = 17.348(4)$, $c = 5.970(2)$ Å. Strongest lines of the powder pattern (54 lines given) are 6.53(55,120), 5.05(50,200), 4.85(65,210), 2.858(70, 250), 2.229(50,270), and 2.076(100,062).

The mineral occurs among the interstices of potassium feldspar crystals in pegmatites of the Alluaiv Mountain, Lovozero massif, Kola Peninsula, Russia. Associated minerals are albite, cancrinite, kogarkoite, villiaumite, neighborite, and sidorenkite. The name is derived from the Shomiok River, which is close to the place of occurrence. Type material is at the Fersman Mineralogical Museum, Moscow, Russia. **J.P.**

Uranopolycrase*

C. Aurisicchio, P. Orlandi, M. Pasero, N. Perchiazzi (1993) Uranopolycrase, the uranium-dominant analogue of polycrase-(Y), a new mineral from Elba Island, Italy, and its crystal structure. Eur. J. Mineral., 5, 1161–1165.

Electron microprobe analysis gave UO_2 39.08, TiO_2 27.36, ThO_2 4.14, Nb_2O_5 11.27, Ta_2O_5 5.98, Y_2O_3 7.78, Nd_2O_3 0.37, MnO 0.48, CaO 0.22, sum 96.73 wt%, corresponding to $(U_{0.62}Y_{0.29}Th_{0.07}Mn_{0.03}Ca_{0.02}Nd_{0.01})_{\Sigma 1.04}(Ti_{1.46}Nb_{0.36}Ta_{0.12})_{\Sigma 1.95}O_6$, simplified as $(U,Y)(Ti,Nb)_2O_6$. Occurs as opaque, euhedral, brown-red crystals elongate [001] (to at least 0.15 mm, judging from a SEM photo); crystals are tabular {100}, also showing {010} and {011}. Adamantine luster, brownish streak, good {100} cleavage, $VHN_{20} = 659$. In reflected light, pale gray with bluish tones, dark-brown red [sic] internal reflection; reflection percentages (SiC standard) at 470, 546, 589, and 650 nm are, respectively, 23.6, 21.5, 22.3, and 25.1. The mineral is "almost totally metamict"; grains heated to 900 °C gave Weissenberg patterns showing orthorhombic symmetry, space group *Pbcn*, $a = 14.51(1)$, $b = 5.558(5)$, $c = 5.173(4)$ Å. Strongest lines of a 114-mm Gandolfi pattern ($FeK\alpha$ radiation) are 2.99(100,311), 2.78(25,020), 1.90(50,022), 1.77(35,602), and 1.48(40,911). Single-crystal X-ray structure study ($R = 0.047$) confirmed isostructural relationships with AB_2O_6 compounds.

The new mineral contains domains of uranian polycrase-(Y) and is associated with euxenite-(Y), manganocolumbite, titanowodginite, and uranmicrolite in a pegmatitic vein at Campo village, Elba Island. Type material is in the Museo di Storia Naturale e del Territorio, Università di Pisa, Pisa, Italy. **J.L.J.**

$(Pd,Ni)_{0.44}(Te,Sb)_{0.56}$

Y. Chen, M.E. Fleet, Y. Pan (1993) Platinum-group minerals and gold in arsenic-rich ore at the Thompson mine, Thompson Nickel Belt, Manitoba, Canada. Mineral. Petrology, 49, 127–146.

Of the nine electron microprobe analyses listed, those with the highest and lowest Pd values have Pd 30.5, 22.7, Fe 0.5, 0.3, Ni 5.8, 11.4, As 0.3, 0.4, Sb 30.2, 31.2, Bi 1.0, 1.5, Te 31.0, 31.2, sum 99.3, 99.6 wt%, corresponding to $(Pd_{31.2}Ni_{11.0}Fe_{0.9})_{\Sigma 44.0}(Sb_{27.5}Te_{27.2}Bi_{0.5}As_{0.4})_{\Sigma 55.9}$ and $(Pd_{22.8}Ni_{20.8}Fe_{0.5})_{\Sigma 44.1}(Sb_{27.5}Te_{27.0}Bi_{0.8}As_{0.6})_{\Sigma 55.9}$, with the average reported as $(Pd,Ni)_{0.44}(Te,Sb)_{0.56}$. Grains are anhedral to six-sided euhedral, and size is up to 30 × 80 μm. Yellowish and slightly anisotropic, with Ni-rich grains strongly anisotropic. Associated mainly as inclusions in gersdorffite, less commonly in nickeline.

Discussion. As all except one of the analyses have Sb > Te, the formula should be written as (Pd,Ni)(Sb,Te). The predominance is slight, however, and all analyses also have Sb:Te close to 1:1. Associated sudburyite (PdSb) and testibiopalladite [Pd(Sb,Bi)Te] gave analyses close to their stoichiometric compositions, suggesting that the composition of the unnamed phase is distinct. Data for an isotropic phase of composition Pd(Sb,Te,Bi) are reported in *Am. Mineral.*, 76, 1437–1438, 1991. **J.L.J.**

$(Cu,Fe)(Re,Mo)_4S_8$

A.Yu. Barkov, A.I. Lednev (1993) A rhenium-molybdenum-copper sulfide from the Lakkulaisvaara layered intrusion, northern Karelia, Russia. Eur. J. Mineral., 5, 1227–1233.

Three electron microprobe analyses gave an average of Re 55.81, Mo 10.17, Cu 5.73, Fe 1.18, S 26.17, sum 98.85 wt%, corresponding to $(Cu_{0.88}Fe_{0.12})_{\Sigma 1.09}(Re_{2.94}Mo_{1.04})_{\Sigma 3.98}S_{8.00}$. The twelve grains observed are up to 15 × 25 μm and have mainly hexagonal, square, and triangular outlines. In reflected light, gray with a violet tint, isotropic; reflectance percentages at the four standard wavelengths (470, 546, 589, 650 nm) are, respectively, 35.8, 37.0, 37.2, and 37.8. The mineral occurs in pegmatoidal pyroxenite. As in a previous report for an occurrence in the Stillwater Complex (*Am. Mineral.*, 77, 1117–1118, 1992), X-ray data were not obtainable. **J.L.J.**

New Data

Cordylite-(Ce)

Jinchuan Shen, Jinxiao Mi (1992) A discussion of the composition and structure of cordylite-(Ce). Yanshi Kuangwuxue Zashi (Acta Petrologica et Mineralogica), 11 (1), 69–74 (in Chinese, English abs.).

——— (1992) New advances in structural studies of barium rare-earth fluor-carbonate minerals. Jour. China Univ. Geosci., 3 (1), 17–24.

The mean and range of five electron microprobe analyses gave CaO 3.09 (2.60–3.32), BaO 22.54 (21.62–23.27), La_2O_3 15.59 (14.34–16.96), Ce_2O_3 22.20 (21.28–23.28), Pr_2O_3 1.40 (1.30–1.56), Nd_2O_3 5.21 (4.72–6.17), Na_2O and F (single determinations, ion chromatography) 1.16 and 2.52, respectively, CO_2 (elemental analyzer) 26.64, less O $\equiv$ F 1.06, sum 99.35 wt%, corresponding to $(Ca_{0.398}Na_{0.255})_{\Sigma 0.653}Ba_{0.997}(Ce_{0.922}La_{0.652}Na_{0.212}Pr_{0.057})_{\Sigma 1.843}C_{4.130}O_{12.095}F_{0.905}$, simplified as $(Ca_{0.5}\square_{0.5})BaCe_2(CO_3)_4F$. Occurs as colorless to yellowish green, transparent, irregular grains and tablets to 2 mm; white streak, vitreous to oily luster, nonfluorescent, $H = 4.5$, brittle, perfect {0001} cleavage, irregular fracture, $D_{meas} = 4.44(6)$, $D_{calc} = 4.35$ g/cm³ for $Z = 2$. Optically uniaxial negative, $\omega = 1.7750(2)$, $\epsilon = 1.5984(2)$ at 589 nm. DTA gave an endothermic peak at 553 °C (evolution of CO_2) and a weaker endothermic peak at 1047 °C. Single-crystal X-ray structure study ($R = 0.05$) gave hexagonal symmetry, space group *P*62*c*, $a = 5.093(6)$, $c = 23.017(6)$ Å. Strongest lines of the powder pattern (diffractometer, Cu$K\alpha$ radiation) are 4.341(70,101), 4.127(60,102), 3.846(100,006), 3.511(90,104), and 3.192(90,105). The mineral occurs at the Bayan Obo deposit, Inner Mongolia, where it is interlayered with cebaite-(Ce) and is associated with magnetite, fluorite, sphalerite, ilmenite, and pyrite.

Discussion. The authors note that there are inconsistencies in the assumed formula and structure previously given for cordylite-(Ce), and they suggest that cordylite-(Ce) and baiyuneboite-(Ce) may be the same mineral (see *Am. Mineral.*, 75, p. 240, 1990). The authors suggest that cordylite be used as a group name and that baiyuneboite-(Ce) be defined as the Na member, i.e., $NaBaCe_2(CO_3)_4F$; the mineral defined here would be the Ca member, i.e., $(Ca_{0.5}\square_{0.5})BaCe_2(CO_3)_4F$. Substitution of Ca is not ordered, but (Ca,Na) occupies a position distinct from that of Ba. The proposal has not been submitted to the nomenclature committee of the CNMMN. J. A. Mandarino, Chairman of the CNMMN, also has pointed out (personal communication) that the analytical data correspond to $(Ca_{0.376}Na_{0.256})_{\Sigma 0.632}Ba_{1.004}(Ce_{0.924}La_{0.654}Nd_{0.212}Pr_{0.058})_{\Sigma 1.848}C_{4.134}O_{12.094}F_{0.906}$. **J.L.J.**

Ferrihydrite

A. Manceau, V.A. Drits (1993) Local structure of ferrihydrite and feroxyhite by EXAFS spectroscopy. Clay Minerals, 28, 165–184.

V.A. Drits, B.A. Sakharov, A.L. Salyn, A. Manceau (1993) Structural model for ferrihydrite. Clay Minerals, 28, 185–207.

X-ray absorption spectroscopy and calculated X-ray diffraction curves for ferrihydrite indicate that it consists of three components: (1) Structural anionic ABA and ACA fragments in which Fe cations occupy only octahedral sites; the cell is hexagonal, space group $P\bar{3}1C$, $a = 2.96$, $c = 9.40$ Å. These fragments alternate in a regular pattern to form a three-dimensional structure. (2) Fragments that alternate completely at random, but within which the Fe atoms have an ordered distribution in a hexagonal supercell with $a = 5.126$ Å. (3) Ultradispersed hematite in which coherent scattering domains are of the order of 10–20 Å. The hematite accounts for the asymmetry of the X-ray diffraction peak at about 2.7 Å. **J.L.J.**

Lazurite

A.N. Sapozhnikov, V.G. Ivanov, V.I. Levickij, L.F. Piskunova (1993) Structural-mineralogical peculiarities of lazurite from the southwestern Pamir. Zapiski Vseross. Mineral. Obshch., 122 (1), 108–115 (in Russian).

Single-crystal X-ray study of lazurite from the Ladzhvardarinskoe deposit, Pamir Mountains, Russia, gave orthorhombic symmetry, space group *Pnaa*, $a = a_{cub}$, $b = a_{cub}\sqrt{2}$, $c = 3a_{cub}\sqrt{2}$, where a_{cub} refers to the cubic polymorph (9.072 Å).

Discussion. The orthorhombic modification is a new polymorph of lazurite. See also *Am. Mineral.*, 76, p. 1734, 1991. **J.P.**

Parisite-(Ce)-4*H*

Zhuming Yang, Jianhong Zhang, Zhaolu Pang (1992) Electron diffraction study of parisite. Scientia Geol. Sinica, 1993 (1), 20–25 (in Chinese, English abs.).

Quantitative electron microprobe analysis (data given) and electron diffraction study of parisite-(Ce) from Bayan Obo, Inner Mongolia, showed the presence of three different lattices, each with a hexagonal subcell of $a = 4.11$, $c = 4.70$ Å. The superlattice reflections showed that, in addition to the previously known 3*R* and 6*R* polytypes, a 4*H* polytype with $a = 7.12$, $c = 56.4$ Å is present. **J.L.J.**