NEW MINERAL NAMES*

John L. Jambor

CANMET, 555 Booth Street, Ottawa K1A 0G1, Canada

Edward S. Grew

Department of Geological Sciences, University of Maine, Orono, Maine 04469, U.S.A.

Jacek Puziewicz

Institut für Kristallographie und Petrographie, Universität Hannover, D-3000, Hanover 1, Federal Republic of Germany

David A. Vanko

Department of Geology, Georgia State University, Atlanta, Georgia 30303, U.S.A.

Argentotennantite*

E.M. Spiridonov, N.F. Sokolova, A.K. Gapeev, D.M. Dashevskaya, T.L. Evstigneeva, T.N. Chvileva, V.G. Demidov, E.P. Balashov, V.I. Shul'ga (1986) A new mineral—Argentotennantite. Doklady Akad. Nauk SSSR, 290, 206–210 (in Russian).

Analysis of the mineral by electron microprobe gave Ag 33.54, Cu 15.60, Zn 5.44, Fe 1.13, Pb 0.18, Cd 0.10, As 8.80, Sb 12.59, S 22.66, sum 100.04 wt%, corresponding to $(Ag_{5.67}Cu_{4.48})(Zn_{1.52}Fe_{0.37}Pb_{0.01}Cd_{0.01})(As_{2.14}Sb_{1.89})S_{12.90}$, ideally $(Ag,Cu)_{10}(Zn,Fe)_2(As,Sb)_4S_{13}$.

X-ray study shows the mineral to have a pattern very similar to those of tetrahedrite and tennantite (which have space group $I\bar{4}3m$), unit cell $a = 10.584(3)$ Å. The strongest lines (21 given) are 3.06(100)(222), 2.65(30)(400), 2.073(20)(510), 1.869(80)(440), 1.595(40) (622), 1.230(20)(750), 1.214(20)(662), and 1.080(20)(844).

The mineral occurs as small grains up to 0.1 mm in the polymetallic Kvartsitoviye Gorki deposit of northern Kazakhstan, associated with quartz, ankerite, siderite, pyrite, galena, tennantite, tetrahedrite, freibergite, stibnite, and mercurian gold. It is often in zoned grains, occurring between tennantite cores and argentotetrahedrite (see Discussion) rims. The mineral is grayblack with black resinous luster and red-brown to black streak. Fracture is conchoidal. Microhardness is about 305 kg/mm² (range 285–320), H = 3.4, D_{calc} = 5.05 g/cm³. Light gray to greenish gray in reflected light and isotropic with no internal reflections. Reflectance in air (nm, %): 400, 30.9; 420, 30.9; 440, 30.8; 460, 30.7; 480, 30.5; 500, 30.4; 520, 30.4; 540, 30.4; 560, 30.4; 580, 30.3; 600, 29.9; 620, 29.4; 640, 28.8; 660, 28.4; 680, 28.2; 700, 27.8.

The name is for the chemical composition and by analogy to tennantite. Type material is at the Fersman Mineralogical Museum, Akademii Nauk SSSR, Moscow.

Discussion. The mineral is a member of the tetrahedrite group, which has general formula $A_{12}B_4X_{13}$. The authors present chemical data for associated minerals freibergite (an accepted species) and argentotetrahedrite (a possible new mineral). All the minerals are close in composition and seem to be distinguished in the following way: argentotennantite has a formula with Ag > Cu > Zn > Fe in the A site and As > Sb in the B site; argentotetrahedrite has Ag > Cu > Zn > Fe and Sb > As; and the associated freibergite has Cu > Ag > Zn > Fe and Sb > As. **D.A.V.**

Benleonardite*

C.J. Stanley, A.J. Criddle, J.E. Chisholm (1986) Benleonardite, a new mineral from the Bambolla mine, Moctezuma, Sonora, Mexico. Mineral. Mag., 50, 681–686.

The average of fourteen electron-microprobe analyses gave Ag 64.5, Cu 0.1, Sb 7.3, As 1.4, Te 18.7, S 8.0, sum 100.0 wt%, corresponding to $Ag_{7.80}Cu_{0.02}Sb_{0.78}As_{0.24}Te_{1.90}S_{3.25}$, ideally $Ag_8(Sb,As)Te_2S_3$. The mineral forms monomineralic crusts, <1 mm across, in which individual grains are up to 40 μm wide; also lathlike, 5–20 μm by 50–60 μm. In reflected light, very pale blue, nonpleochroic, strong anisotropism in air from dark brown, dark blue, blue-gray, dark brown, light brown (darker, but unchanged in hue in immersion oil). Simple twinning is common. Mean VHN_{25} = 117 (10 indentations; range 105–125). Reflectance measurements of three grains in air and in oil are given in 10-nm steps; representative R_o and $R_{e'}$ values (WTIC standard) in air for one grain, in 40-nm steps from 400 to 680 nm are 35.35, 37.0; 35.6, 36.4; 35.2, 35.2; 34.4, 33.6; 33.3, 31.9; 32.3, 30.5; 31.6, 29.6; 31.0, 28.8; color values for the grain, relative to illuminant C at 6774 K, are x 0.3014, 0.2952; y 0.3104, 0.3038, Y (%) 33.4, 32.1, λ_d 482, 480, P_e (%) 3.8, 6.8. The X-ray powder-diffraction pattern, indexed by trial and error, gave a tetragonal cell with $a = 6.603(5)$, c $= 12.726(6)$ Å; D_{calc} = 7.76 g/cm³ for the average composition and Z = 2. Strongest lines of the powder pattern (114.6-mm camera, Fe radiation) are 12.7(70)(001), 3.188(30)(021,004), 2.936(100)(022), 2.863(25)(014), 2.608(35)(023), 2.328(20)(220), 2.158(35)(124), 2.120(20)(006).

Benleonardite occurs as black powdery crusts, 1 to 2 mm thick, in irregular fractures in silicified volcanic rocks on the dumps of the dormant Bambolla mine, Moctezuma, Sonora, Mexico. Associated minerals are native silver, acanthite, hessite, an unnamed Ag_4TeS mineral, pyrite, and sphalerite. The new name is for Dr. Benjamin Franklin Leonard of the U.S. Geological Survey, Denver, Colorado. Type material is at the British Museum (Natural History) and is catalogued as BM 1985, 354. **J.L.J.**

Ginzburgite

A.V. Voloshin, Ya.A. Pakhomovskii, D.L. Rogachev, F.N. Tyusheva, N.M. Shishkin (1986) Ginzburgite—A new calcium-beryllium silicate from desilicated pegmatites. Mineralog. Zhurnal, 8, 85–90 (in Russian).

Analysis by electron microprobe (BeO by wet chemistry, H_2O by TGA) gave SiO_2 43.77, Al_2O_3 20.00, BeO 4.60, CaO 20.77, Na_2O 0.34, K_2O 0.16, H_2O 9.80, sum 99.44 wt%, corresponding

---

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

to $(Ca_{3.63}Na_{0.11}K_{0.03})Be_{1.81}Al_{3.85}Si_{7.15}O_{23.29}(OH)_{4.60} \cdot 3.08H_2O$, or ideally $Ca_4Be_2Al_4Si_7O_{24}(OH)_4 \cdot 3H_2O$. The DTA curve shows endothermic maxima at 100 and 400 °C, and the TGA curve shows two intervals of weight loss at 80–160 °C and 200–600 °C, corresponding to 5.6 and 4.2 wt% H_2O, respectively. The infrared spectrum suggests molecular water and OH are present.

X-ray study shows the mineral to be tetragonal, possible space groups $I4/mcm$, $I\bar{4}c2$, or $I4cm$, unit cell $a = 18.366(5)$, $c = 9.183(2)$ Å, $Z = 4$. The strongest lines (99 given) are 12.96(100)(110), 9.16(45)(200), 6.12(13)(211), 5.80(14)(310), 3.604(15)(510,312), 3.411(40)(431), 3.198(18)(521), and 3.149(22)(530,332).

The mineral occurs as acicular crystals with complex to square cross-sections of up to 0.02 mm across, arranged in subparallel, radiating, and spherulitic clusters with diameters up to 2 cm. It is associated with bavenite, bityite, behoite, analcime, phillipsite, and albite in hydrothermally altered desilicated pegmatites of the Murzinsk region, Urals, USSR. Ginsburgite is colorless, with white streak, vitreous luster, no fluorescence, no cleavage, brittle fracture. H = 3–4. D_{meas} (liquid immersion) = 2.3(5). $D_{calc} = 2.37$. Optically uniaxial, negative, $\omega = 1.526(1)$, $\epsilon = 1.519(1)$.

The name is for the mineralogist A. I. Ginzburg. Type material is at the Fersman Mineralogical Museum, Moscow, and at the Mining Museum of the Leningrad Mining Institute.

Discussion. Contrary to the statement by the authors, the mineral and name have *not* been approved by the Commission on New Minerals and Mineral Names, IMA. **D.A.V.**

Grumantite*

A.P. Khomyakov, M.F. Korobitsyn, T.A. Kurova, G.E. Cherepivskaya (1987) Grumantite $NaHSi_2O_5 \cdot H_2O$—A new mineral. Zapiski Vses. Mineralog. Obshch., 116, 244–248 (in Russian).

Wet-chemical analysis gave Na_2O 17.20, SiO_2 68.17, H_2O 14.65, sum 100.02 wt%, corresponding to $Na_{0.98}H_{1.02}Si_2O_5 \cdot 0.93H_2O$. The IR spectrum confirms the presence of OH and H_2O in the structure; insoluble in cold water and cold 10% HCl, readily soluble in hot 10% HCl giving a silicic residuum. The DTA curve exhibits marked endothermal effects at 280 °C (dehydration), 700 °C (phase transition), and 760 °C (melting). The effects on TG and DTG curves correspond to dehydration.

Single-crystal X-ray study shows the mineral to be orthorhombic, $a = 16.00(2)$, $b = 18.24(2)$, $c = 7.18(1)$ Å, $Z = 16$. The X-ray powder pattern was indexed with a face-centered cell; the strongest reflections (36 given) are 6.20(150)(111), 6.05(50)(220), 4.46(50)(131), 3.505(100)(102,331), 3.087(50)(032,222), 3.006(100)(440).

Aggregates of the mineral are snow white, with a dull to silky luster; monocrystals are transparent to slightly turbid, with a vitreous luster, white streak, and steplike fracture; perfect {110} and other unspecifiable cleavages; H = 4 to 5, D_{meas} = 2.21, D_{calc} = 2.26/cm³. Optically biaxial positive, $\alpha = 1.494(2)$, $\beta = 1.507(2)$, $\gamma = 1.523(2)$, $2V_{meas} = 85(2)°$, $2V_{calc} = 84.9°$, $X = a$, $Y = c$, $Z = b$, weak dispersion $r > v$. Weak bluish-white fluorescence in ultraviolet light.

Grumantite occurs in ultra-agpaitic pegmatites at Mount Alluiav, Lovozero massif, Kola Peninsula, USSR. The mineral forms fine-grained (~1 mm), compact to porous veins, 2 to 3 mm thick, with discontinuous 3- to 5-mm margins of ussingite; also irregular 2- to 5-mm crystals that replaced makatite. Grumantite veins contain crystals of kazakovite, tisinalite, nordite, and sodalite. Grumantite single crystals coexist with a pegmatitic mineral assemblage comprising nepheline, sodalite, potassium feldspar, arfvedsonite, aegirine, eudialyite, loparite, etc.

The name is the old Russian name for the Spitsbergen archipelago. Type material is at the Fersman Mineralogical Museum AN SSSR (Moscow) and at the Geological Museum of the Kola Branch of AN SSSR (Apatity). **J.P.**

Heneuite*

G. Raade, M.H. Mladeck, V.K. Din (1986) Heneuite, Ca-$Mg_5(CO_3)(PO_4)_3(OH)$, a new mineral from Modum, Norway. Neues Jahrb. Mineral. Mon., 343–350.

Wet-chemical analysis gave Na_2O 0.16, CaO 10.9, MgO 37.9, FeO 0.39, P_2O_5 38.6, As_2O_5 1.05, CO_2 8.23, H_2O^+ 2.54, H_2O^- 0.05, sum 99.82 wt%, reported as $(Ca_{1.023}Na_{0.027})_{\Sigma1.050}(Mg_{4.949}$-$Fe_{0.029})_{\Sigma4.978}(CO_3)_{0.984}[(PO_4)_{2.862}(AsO_4)_{0.048}]_{\Sigma2.910}(OH)_{1.484}$ on the basis of 16 oxygen atoms. The mineral is pale blue-green, vitreous luster, white streak, H = 5, good {001} cleavage, $D_{meas} = 3.016(7)$, $D_{calc} = 3.007$ g/cm³ for the ideal formula $CaMg_5(CO_3)(PO_4)_3(OH)$ with Z = 2. Nonfluorescent in ultraviolet light. Dissolves slowly with effervescence in cold dilute HCl. Optically biaxial negative, $\alpha = 1.586(2)$, $\beta = 1.620(2)$, $\gamma = 1.630(2)$, $2V_{meas} = ~50°$, $2V_{calc} = 56°$. Single-crystal study indicated triclinic symmetry, space group $P\bar{1}$ (demonstrated in a companion paper on the crystal structure), $a = 6.3069(5)$, $b = 10.8386(9)$, $c = 8.6736(6)$ Å, $\alpha = 95.013(7)$, $\beta = 93.412(7)$, $\gamma = 101.039(7)°$ as refined from a Guinier-Hägg powder pattern (Fe$K\alpha_1$ radiation, 111 lines given) that has strongest lines at 3.6738(40)(120,$\bar{1}$02), 3.1548(32)(031,1$\bar{2}$2), 2.8756-(90)(0$\bar{3}$2), 2.8450(40)(0$\bar{1}$3), 2.8363(42)(201), 2.7894(80)($\bar{2}$21), 2.7030(100)(013), 2.6043(37)($\bar{2}$02,0$\bar{4}$1,032), and 2.0597(32)-($\bar{3}$20).

The name is for Dr. Henrich Neumann (1914–1983), professor of mineralogy at the Mineralogical-Geological Museum in Oslo, Norway. The mineral occurs with other phosphates in material from the dumps of the Tingelstadtjern quarry in a Precambrian serpentine-magnesite deposit, Modum area, southern Norway. Type material is in the Mineralogical-Geological Museum, University of Oslo, Norway. **J.L.J.**

Hydroxyl-bastnaesite-(Nd)*

Z. Maksimović, Gy. Pantó (1985) Hydroxyl-bastnaesite–(Nd), a new mineral from Montenegro, Yugoslavia. Mineral. Mag., 49, 717–720.

L. Farkas, Z. Maksimović, Gy. Pantó (1985) X-ray powder data and unit cell of natural hydroxyl-bastnaesite–(Nd). Neues Jahrb. Mineral. Mon., 298–304.

Electron-microprobe analysis, combined with thermogravimetric and evolved-gas analyses of a 5.128-mg sample for CO_2 and H_2O, gave Y_2O_3 0.2, La_2O_3 27.1, Ce_2O_3 0.3, Pr_2O_3 8.5, Nd_2O_3 31.5, Sm_2O_3 4.4, Eu_2O_3 1.3, Gd_2O_3 1.4, CaO 0.3, F 3.3, H_2O 2.26, CO_2 20.63, less O = F 1.39, sum 99.80 wt%, corresponding to $(Nd_{0.41}La_{0.36}Pr_{0.11}Sm_{0.06}Gd_{0.02}Eu_{0.02}Ca_{0.01})_{\Sigma0.99}(CO_3)_{1.03}[(OH)_{0.55}$-$F_{0.38}]_{\Sigma0.93}$ ideally $(Nd,La)CO_3(OH,F)$. Color and streak white, dull luster, apparent aggregate hardness 1 to 2, parting {001}, not fluorescent in ultraviolet light, $D_{calc} = 4.89$ g/cm³ for Z = 6. Optically uniaxial positive with $\omega = 1.715(2)$, $\epsilon = 1.81(1)$. Cell dimensions refined from the diffractometer powder pattern gave $a = 7.191(1)$, $c = 9.921(2)$ Å and strongest lines of 4.955(88)(002), 3.596(79)(110), 2.911(100)(112), 2.077(29)(300), 2.042(51)(114), and 1.914(30)(302).

The mineral occurs in irregular aggregates, typically 0.1 to 0.2 mm in diameter, but a few up to 5 mm, in karst-type bauxite near its contact with a limestone footwall, at Niksić, Yugoslavia. Type material is at the Department of Mineralogy and Petrology,

University of Belgrade, Belgrade, Yugoslavia; at the Laboratory for Geochemical Research, Hungarian Academy of Sciences, Budapest, Hungary, and at the Royal Ontario Museum, Toronto, Canada.

Discussion. The spelling of the new name hydroxyl-bastnaesite–(Nd) is exactly as was approved by the IMA. **J.L.J.**

E.K. Podporina, V.V. Burkov (1986) Neodymian bastnaesite— A new mineral from the weathering crust of metamorphic rocks. Doklady Akad. Nauk SSSR, 289, 959–961 (in Russian).

Chemical analysis of the mineral gave La_2O_3 7.44, Ce_2O_3 0.10, Pr_2O_3 3.05, Nd_2O_3 22.26, Sm_2O_3 5.34, Eu_2O_3 1.23, Gd_2O_3 5.93, Tb_2O_3 0.27, Dy_2O_3 1.70, Ho_2O_3 0.32, Er_2O_3 1.03, Tm_2O_3 0.10, Yb_2O_3 0.27, Lu_2O_3 0.02, Y_2O_3 10.87, CaO 4.61, MgO 0.5, CO_2 22.68, H_2O 10.9, F 4.2, O $\equiv F_2$ 1.77, sum 101.04 wt%. The calculated formula is $Nd_{0.28}La_{0.14}Y_{0.21}(Gd,Sm)_{0.19}Ca_{0.18}(CO_3)$-$(OH,F)\cdot nH_2O$, or ideally $(Nd,Y,La,Ca)(CO_3)(OH,F)\cdot H_2O$.

X-ray study shows the mineral to be hexagonal, space group $P62c$, unit cell $a = 7.02(7)$, $c = 9.54(8)$ Å. The strongest lines (9 given) are 4.77(40b)(002), 3.52(80)(110), 2.83(100)(112), 2.02(50b)(300), and 1.99(60b)(301).

The mineral occurs as tabular crystals forming microcrystalline ooids 1–2 mm in diameter, in a 60–m thick weathering zone on gneisses, amphibolites, and shales. It is restricted to the lower ochre-gibbsite-kaolinite zone of the weathering profile, and associated minerals are limonite, gibbsite, kaolinite, epidote, quartz, rutile, churchite-(Y), and an Y-rich variety of rhabdophane. The mineral is white, light yellow, and light pink, with vitreous luster, brittle fracture. Microhardness is approximately 130 kg/mm². Optically uniaxial, positive, $\epsilon = 1.717$, $\omega = 1.630$. $D_{meas} = 3.08$ g/cm³.

Discussion. The authors have recognized that the mineral differs from other bastnaesites by having lower total rare-earth elements, near-absence of Ce, higher water content, and lower density. Their proposed formula, with molecular water, differs from the approved formula: $(Nd,La,Pr)(CO_3)(OH,F)$. **D.A.V.**

Mongshanite

Jianxiong Zhou, Kezi Zhou, Yelong Fang, Guojie Yang (1982) A preliminary study of ilmenites from kimberlites by the electron probe. Bull. Inst. Mineral Deposits, Chinese Acad. Geol. Sciences, 5, 103–114 (in Chinese, English abstract).

Electron-microprobe analysis gave TiO_2 60.91, Cr_2O_3 18.58, Al_2O_3 0.42, MgO 4.56, MnO 0.20, FeO 9.70, K_2O 0.97, CaO 0.42, Nb_2O_5 0.35, ZrO_2 3.80, sum 99.91 wt%, corresponding to $(Mg,Cr,Fe^{2+},Ca,K)_2(Ti,Zr,Cr,Fe^{3+})_5O_{12}$. The mineral occurs as inclusions in ilmenite; physical properties (not given) are similar to those of ilmenite. The strongest lines and intensities of the X-ray pattern are 3.44(40), 2.89(100), 2.26(70), 2.14(70), 1.80(50), 1.60(50), 1.51(30), 1.45(70), and 0.904(70). Hexagonal.

Discussion. Details about the properties and crystallography are not given, nor is a complete X-ray pattern listed. The locality, whether China or elsewhere, is not specified. In addition to mongshanite, similarly incomplete data are given for yimengite, but the latter subsequently was described fully and was abstracted in *Am. Mineral.*, 70, 218 (1985). **J.L.J.**

Olenite*

P.B. Sokolov, M.G. Gorskaya, V.V. Gordienko, M.G. Petrova, Yu.L. Kretser, V.A. Frank-Kamenetskii (1986) Olenite Na_{1-x}-$Al_3Al_6B_3Si_6O_{27}(O,OH)_4$—A new high-alumina mineral of the tourmaline group. Zapiski Vses. Mineralog. Obshch., 115, 119–123 (in Russian).

Analysis of the mineral by electron microprobe (FeO by wet chemistry; Li_2O, B_2O_3, H_2O calculated according to stoichiometry) gave SiO_2 36.86, TiO_2 0.03, Al_2O_3 46.43, Fe_2O_3 0.14, FeO 0.0, MnO 0.49, CaO 0.26, Na_2O 1.60, K_2O 0.03, ZnO 0.03, F 0.06, Li_2O 0.00, B_2O_3 10.90, H_2O 1.36, sum 98.29 wt%, corresponding to $(Na_{0.51}K_{0.01}Ca_{0.05})(Al_{2.91}Mn_{0.07}Fe_{0.02}Ti_{0.01})Al_6B_3Si_6$-$O_{27}(O_{2.53}OH_{1.44}F_{0.03})$, or ideally $Na_{1-x}Al_3Al_6B_3Si_6O_{27}(O,OH)_4$.

X-ray study shows the mineral to be hexagonal, unit cell $a = 15.803(3)$, $c = 7.086(1)$ Å. The strongest lines (42 given) are 4.18(40)(121), 3.95(70)(220), 3.43(80)(102), 3.394(70)(311), and 2.551(100)(501).

The mineral occurs as the outer zone of acicular tourmaline crystals that are up to 3 mm long, associated with quartz and albite, in pegmatitic veins that crosscut Precambrian metadiabase. The tourmaline cores are elbaite, and Al enrichment toward the edge of zoned crystals demonstrates a solid solution between elbaite and olenite. The mineral is pale pink with vitreous luster. Microhardness varies according to the formula $VHN_{100} = 1044 - 3.681x$, where x is mole percent olenite. Optically uniaxial, negative, $\omega = 1.654(2)$, $\epsilon = 1.635(2)$. Weak pleochroism with O = bright pink and E = pink-yellow. $D_{meas} = 3.010(2)$, $D_{calc} = 3.12$ g/cm³.

The name is for the occurrence. Type material is at the Mineralogical Museum of the Leningrad Mining Institute and at the Fersman Mineralogical Museum, Akademii Nauk SSSR, Moscow. **D.A.V.**

Volfsonite

V.A. Kovalenker, I.Ya. Nekrasov, V.S. Malov (1986) Mineralogy and paragenesis of copper and iron sulfostannates in gold-silver deposits. Geologiya Rudnykh Mestorozdenij, 1986 (2), 67–84 (in Russian).

Chemical analysis (average of 8) gave Cu 40.34, Fe 9.60, Sn 19.26, Sb 0.94, As 0.32, S 26.91, sum 100.07 wt%, corresponding to $Cu_{10}^+Cu^{2+}Fe^{2+}Fe_2^{3+}Sn_3S_{16}$. Space group $P\bar{4}2_1m$ or $P42_12$, $a = 10.78$, $c = 5.39$ Å. Brown in reflected light. Weak bireflectance, no pleochroism. Anisotropic, with brown effects. Reflectance curves are illustrated for the approximate range 430–730 nm; at 580 nm, R'_g 18.4, r'_p 17.0%. Microhardness 220 kg/mm². The mineral occurs in volcanic gold-silver deposits in Soviet Central Asia.

Discussion. Data were submitted in 1985 to the Commission on New Minerals and Mineral Names, IMA, and the mineral was *not* approved. The authors could have presented a more detailed description of their mineral as an unnamed species and could have incorporated their specific arguments as to why the IMA ruling was deemed to be inappropriate. By publishing a disapproved name, the authors and editors have done a disservice to all mineralogists. **J.P.**

Xinganite

Lulu Ximen, Peng Zhizlong (1985) Crystal structure of xinganite. Acta Mineral. Sinica, 5, 289–293 (in Chinese with English abstract).

Xinganite from Heilongjiang, China, occurs mainly as milky-white to light yellow to light green grains, 0.1 to 0.2 mm, a few showing a stout prismatic form. Chemical analysis (XRF and wet-chemical, but results not given) led to the formula $(Y_{0.33}Ce_{0.19}$-$Nd_{0.10}La_{0.05}Fe_{0.05}^{3+}Dy_{0.05}Gd_{0.04}Sm_{0.04}Na_{0.03}Fe_{0.03}^{2+}Pr_{0.02}Er_{0.02}Tb_{0.01}$-

$Ho_{0.01} bYb_{0.01})_{\Sigma 1.06} (Be_{0.97} Al_{0.03})_{1.00} (Si_{0.98} Al_{0.05})_{\Sigma 1.03} O_{4.00} [(OH)_{0.77}$ $O_{0.23}]_{1.00}$, ideally $(Y,Ce)BeSiO_4(OH)$. In transmitted light, colorless, biaxial positive, $2V = 80°$, $\alpha = 1.765$, $\beta = 1.753$, $\gamma = 1.744$, strong dispersion $r < v$, $Y = b$, $c \wedge Z = 13°$, $a \wedge Z = 14°$. Single-crystal four-circle diffractometer study gave $a = 4.7681(26)$, b $= 7.6757(69)$, c $= 9.9301(64)$, $\beta = 90.17°$, space group $P2_1/c$; $D_{meas} = 4.57$, $D_{calc} = 4.72$ g/cm³ for Z $= 4$. The structure, refined to $R = 8.6\%$, is of the datolite type.

Discussion. The name has not had IMA approval. The mineral is gadolinite-(Y). **J.L.J.**

Yttroceberysite

Xiaoshi Ding, Ge Bai, Zhongxian Yuan, Luren Sun (1981) Yttroceberysite, a new Ce-Be–rich sililcate. Geol. Review China, 27, 459–465 (in Chinese, English abstract).

Wet-chemical analysis gave SiO_2 25.20, Fe_2O_3 1.63, FeO 0.89, Al_2O_3 1.70, TiO_2 0.10, CaO 0.96, MgO 0.09, BeO 10.41, PbO 0.38, $(K,Na)_2O$ 1.17, ΣCe_2O_3 28.47, ΣY_2O_3 26.11, H_2O 2.94, sum 100.05 wt% (after rounding of the results, nearly all of which are given to three decimals, including those constituting ΣCe_2O_3 and ΣY_2O_3). The analysis corresponds to $[(Ce_{0.84}Nd_{0.39}La_{0.21}-Gd_{0.18}La_{0.21})_{\Sigma 1.85} (Y_{1.347} Dy_{0.19} Tb_{0.06} Er_{0.06} Ho_{0.02} La_{0.02})_{\Sigma 1.69} Ca_{0.16}-(K,Na)_{0.28} Mg_{0.02} Fe^{2+}_{0.12} Fe^{3+}_{0.19} Pb_{0.01} Ti_{0.01}]_{\Sigma 4.33} (Be_{4.02}Al_{0.32})_{\Sigma 4.34} Si_{4.05}-O_{20.74}H_{3.20}$, ideally $(Ce,Y)_2Be_2Si_2O_8(OH)_2$. The mineral occurs as disseminated irregular grains, some as prisms 0.1 to 0.2 mm long; milky-white, to light yellow, to light green in color, with a vitreous luster. H $= 415$–467 kg/mm² (Mohs' 5–5.5), $D_{meas} = 4.57$, $D_{calc} = 4.53$ g/cm³ with Z $= 2$. Colorless in thin section, optically biaxial positive with $\alpha = 1.748$, $\beta = 1.765$, $\gamma = 1.783$, $2V = 80°$, $Z \wedge c = 6°$, $r < v$. Indexing of the X-ray powder pattern (57.3-mm camera, Cu radiation) gave $a = 4.74$, $b = 7.50$, $c = 9.88$ Å, $\beta \simeq 90°$. The powder pattern (27 lines listed) is similar to that of gadolinite and was indexed by analogy with the gadolinite cell. The mineral occurs in a Be- and REE-bearing granophyre in the Greater Khingan area, Manchuria. Type material is in the Museum of the Geology Bureau, Chinese Academy of Geological Sciences, Beijing, China.

Discussion. The ideal formula as written by the authors corresponds to gadolinite-(Ce), but Y predominates and the mineral is actually gadolinite-(Y). In neither case is the mineral new. **J.L.J.**

Unnamed γ-Fe

N.S. Rudashevskii, A.G. Mochalov (1984) New associations of native elements in ultrabasites. Geologiya i Geofizika, 25, 38–44 (in Russian, English translation available).

In alluvial sands derived from Pt-bearing serpentinites of the Soviet Far East are $1.3 \times 1 \times 0.5$ mm, tabular, dark gray grains with a metallic luster. Eleven electron-microprobe analyses gave an average and (range) of Fe 67.4(64.1–70.1), Cr 18.6(17.3–20.4), Ni 10.2(9.88–10.7), Mn 2.70(2.63–3.28), Si 0.15(0.13–0.20), sum 99.05(99.76–100.85) wt%, corresponding to $(Fe_{0.65}Cr_{0.21}Ni_{0.10}-Mn_{0.03})$. In reflected light, white and isotropic. A Gandolfi X-ray pattern (57.3 mm) gave a face-centered unit cell of the type γ-Fe, with $a = 3.65(1)$ Å. The mineral contains sparse inclusions of a silicate interpreted to be Mn-dominant garnet (which see).

Discussion. Additional details, such as the X-ray pattern, are not given. The mineral differs from native iron and chromium, both of which are body-centered cubic. **J.L.J.**

Unnamed Cr₂C and CrS

N.S. Rudashevskii, A.G. Mochalov (1984) Geologiya i Geofizika, 25, 35–41 (in Russian, English version available).

In alluvial sands derived from Pt-bearing serpentinite of the Soviet Far East, one grain of native chromium contains isometric, rounded inclusions, up to 7 μm in diameter, for which an electron-microprobe analysis gave Cr 61.5, S 38.0, Fe and Si not detected, sum 99.5 wt%, corresponding to the ideal formula CrS. The mineral is light gray with a brownish tint in reflected light.

Associated with two 1-mm grains of native chromium are rare, elongate inclusions of corundum with thin (1–15 μm), light pink, isotropic fringes that have irregular but sharply defined boundaries. Electron-microprobe analysis of the fringes gave Cr 87.3, Fe 0.1, C 10.7, sum 98.1 wt%. Ideal Cr_2C contains Cr 89.7, C 10.3 wt%.

Discussion. The locality is not specified precisely and data are insufficient to establish these as new minerals. The analysis for the chromium sulfide corresponds to $Cr_{0.999}S_{1.001}$. A synthetic compound with the composition CrS is reported in PDF 11-343, but the phase is monoclinic. Similarly, data for Cr_2C are reported in PDF 14-519, but the phase is hexagonal. **J.L.J.**

Unidentified Pt-group minerals

S. Rosenblum, R.R. Carlson, J.M. Nishi, W.C. Overstreet (1986) Platinum-group elements in magnetic concentrates from the Goodnews Bay district, Alaska. U.S. Geol. Survey Bull. 1660.

Ferromagnetic concentrates from placer deposits in the Goodnews Bay district contain Pt-Fe alloy, sperrylite, hollingworthite, and four unidentified phases. *Mineral A* (Ir,Fe) is elongate, possibly bladed, up to 30 μm in length; the blades appear to be striated, possibly an indication of cleavage. Some blades are terminated sharply, at a high angle to the length, suggesting relatively low symmetry. X-ray dispersive analyses show only Fe and Ir; possibly a noncubic alloy of these metals. *Mineral B* (Ir-Rh-Pt-Fe-As-S) is known only as a single grain, 15×20 μm. X-ray dispersive peaks show heights (direct) of Ir > Rh = Pt > Fe, and major As and S (peak-height ratio 7:9). Weakly anisotropic, whereas irarsite is cubic. *Mineral C* (Rh-Pd-Ni-As-S) is similar to hollingworthite in appearance, but with definite weak anisotropism. The largest area is 40×15 μm. Preliminary electron-microprobe analyses gave the following element proportions: Th 3, 5; Pd 2.4, 5; Ni 1, 1.4; Fe 1, 3.6; As 3.5, 6; S 1, 1. *Mineral D* (Pb-Rh-Fe-Ir-S) occurs as interstitial blebs up to 5 μm long in Ir-Fe alloy. Reflectivity less than that of Pt-Fe alloy; strong but spotty anisotropism in brown tones. A sulfide with mainly Pb and Fe and abundant but lesser Rh and Ir. **J.L.J.**

Unnamed cubic NiSe₂

E.-D. Franz (1986) Natural cubic $NiSe_2$ from Caracoles, Bolivia. Naturwissenschaften, 72, 655–656 (in German).

Cubic $NiSe_2$, known synthetically, occurs with penroseite and clausthalite at Caracoles in the silver-tin mining district of Potosi, Bolivia. The mineral could not be detected optically in reflected light because of its similarity to penroseite, but X-ray powder-diffraction patterns show extra lines identical to those of cubic $NiSe_2$. **J.L.J.**

Unnamed stannite-like minerals

V.A. Kovalenker, I.Ya. Nekrasov, V.S. Malov (1986) Mineralogy and paragenesis of copper and iron sulfostannates in gold-silver deposits. Geologiya Rudnykh Mestorozdenij, 1986(2), 67–84 (in Russian).

In the review of Cu-Fe-Sn-S minerals from the gold-silver volcanic deposits of Soviet Central Asia, the following unnamed minerals are listed:

Mineral I

Chemical analyses (2 given) gave Cu 42.26, Fe 9.23, Zn 0.31, Sn 18.84, Sb 0.56, As 0.24, S 28.57, sum 100.01 wt%, corresponding to $Cu_6^+Fe_{0.5}^{2+}Fe^{3+}Sn_{1.5}S_8$. Space group $P4m2$, $a = 7.60$, $c = 5.76$ Å. Orange-brown in reflected light; visible bireflectance, distinct pleochroism from orange to pink-brown. Distinct anisotropism with blue-brown-red effects. Microhardness (average) 240 kg/mm².

Mineral II

Chemical analysis (average of 8) gave Cu 42.26, Fe 14.01, Sn 7.31, Sb 2.61, As 3.02, S 31.24, sum 100.21 wt%, corresponding to $Cu_{10}^+Cu^{2+}Fe_4^{3+}Sn_3S_{16}$. Space group $P42_1m$ or $P42_12$, $a = 10.78$, $c = 5.29$ Å. Orange-red in reflected light. Weak bireflectance, pleochroic from orange to red-orange, marked anisotropism with yellow-red to dark blue effects. Reflectance curves are illustrated for R'_g and R'_p from 440 to 740 mm; at 580 nm $R'_g = 24.5$, $R'_p = 22.7$. Microhardness (average) 250 kg/mm².

Mineral III

Chemical analysis (average of 11) gave Cu 38.32, Fe 6.34, Zn 0.09, Sn 21.78, Sb 2.54, As 1.49, S 28.45, sum 99.01 wt%, corresponding to $Cu_{10}^+Cu^{2+}Fe_2^{3+}Sn_4S_{16}$. Space group $P42_1m$ or $P42_12$, $a = 10.78$, $c = 5.39$ Å. In reflected light, gray with a lilac tint. Very weak bireflectance, no pleochroism, weak anisotropism. R 19.5% (580 nm). Microhardness (average) 230 kg/mm².

Mineral IV

Chemical analysis (2 given) gave Cu 36.70, Fe 6.33, Sn 27.46, S 29.62, sum 100.11 wt%, corresponding to $Cu_{16}^+Cu_4^{2+}Fe_4^{2+}Sn_8S_{32}$. Space group $P4_12m$ or $P4/mmm$, $a = 10.70$, $c = 10.70$ Å.

Mineral V

Chemical analysis (2 given) gave Cu 38.18, Fe 10.13, Sn 20.26, Sb 0.73, As 0.18, S 30.79, sum 100.17 wt%, corresponding to $Cu_{16}^+Cu_4^{2+}Fe_4^{2+}Fe_4^{3+}Sn_6S_{32}$. Space group $P4_12m$ or $P4/mmm$, $a = 10.70$, $c = 10.70$ Å.

Mineral VI

Only one chemical analysis is given: Cu 38.12, Fe 0.53, Sn 29.92, Sb 1.41, As 0.87, S 28.43, sum 99.28 wt%.

Mineral VII

Chemical analysis (average of 4) gave Cu 41.80, Fe 10.81, Zn 0.42, Sn 16.32, Sb 1.89, S 29.16, sum 100.40 wt%, corresponding to $Cu_{26}^+Fe_2^{2+}Fe_6^{3+}Sn_6'S_{36}$. Probably orthorhombic. Brown in reflected light; marked bireflectance, visible pleochroism from pale brown to brown. Strong anisotropism without color effects. Microhardness (average) 200 kg/mm². Reflectance curves are illustrated for the range 440 to 740 nm; at 580 nm $R'_g = 23.5$, $R'_p = 21.1$.

Discussion. Mineral I is grouped with mawsonite and chatkalite by the authors, minerals II and III with volfsonite (which see),

and minerals IV and V with vinciennite. More detailed data are needed to establish the relationships of minerals I–VII to the existing stannite-like phases. **J.P.**

Unnamed "Cu-stannoidite"

V.A. Kovalenker, I.Ya. Nekrasov, V.S. Malov (1986) Mineralogy and paragenesis of copper and iron sulfostannates in gold-silver deposits. Geologiya Rudnykh Mestorozdenij, 1986(2), 67–84 (in Russian).

Chemical analysis (1 given) gave Cu 43.58, Fe 8.51, Zn 0.25, Sn 10.71, Sb 4.65, As 2.34, S 29.55, total 99.59 wt%, corresponding to $Cu_{24}^+Cu_3^{2+}Fe_6^{3+}Sn_6S_{36}$. Orthorhombic, possible space group $I222$, $a = 10.76$, $b = 5.40$, $c = 16.09$ Å. The mineral, referred to as "Cu-stannoidite" and "cuprostannoidite" (authors' quotation marks), occurs in volcanic gold-silver deposits in Soviet Central Asia. **J.P.**

Unnamed Ag-Cu-Fe-S minerals

H. Kucha, A. Gluszek (1985) Variation of Cu-Zn-Pb-Ag mineralization in the deposit of the Lubin mine. Ann. Soc. Geolog. Pol., 53, 143–168 (in Polish).

In the ore-bearing sandstone of the Lubin copper mine (southwest Poland), in association with amalgam, stromeyerite, bornite, and galena, five phases were found: (1) $Cu(Fe,Ag)S_2$, isotropic, brassy yellow with faint green tint. $R = 44\%$. (2) $(Fe,Cu)Cu_2(Ag,Cu)_3S_4$, isotropic, brownish yellow with green tint. R ≅ 30%. (3) $FeCu_3Ag_6S_7$, isotropic, gray. R ≅ 25%. (4) $Cu_{5.28}Fe_{0.55}Ag_{1.17}S_4$, isotropic, blue with pink-brown tint. R ≅ 26%. (5) $FeCu_2(Ag,Cu)_2S_5$, isotropic, yellow with green tint. R ≅ 45%.

Discussion. No chemical analyses used for formula calculation and no X-ray data are given. Doubtful description, suggesting that some of the phases listed may be the same phase of varying composition. **J.P.**

Unnamed Ag-Pb-Bi sulfosalts

N.S. Bortnikov, V.A. Kovalenker, Yu.G. Safonov, N.V. Troneva, I.P. Laputina, N.V. Razdolina (1985) Paragenetic associations and conditions of formation of Ag-Cu-Pb-Bi–sulfosalts in the Kanimansur ore field. Izvestiya Akad. Nauk SSSR, Ser. Geol. 1985(9), 65–75 (in Russian).

Several unnamed sulfosalts are associated with quartz-hematite-pyrite-chalcopyrite mineralization in the Kanimansur ore field southeast of Tashkent (Kyramin Range). These minerals have been identified on the basis of electron-microprobe analyses only. Sulfosalt $Pb(Ag,Cu)_4Bi_4S_9$ (?) occurs in one section in a grain not exceeding 15 μm in association with gustavite, berryite, matildite, and chalcopyrite. Microprobe analysis gave Pb 13.63, Ag 22.44, Cu 0.43, Bi 47.50, S 16.37, Se not determined, sum 100.37 wt%, corresponding to $Pb_{1.16}Ag_{3.68}Cu_{0.12}Bi_{4.02}S_{9.02}$. Sulfosalt $Ag_4PbBi_6S_{12}$ (?) is found in one section in grains not exceeding 20 μm in an intergrowth with gustavite and matildite. Analysis gave Pb 8.39, Ag 17.69, Cu 0.51, Bi 55.56, S 16.16, Se 0.13, sum 98.44 wt%. Sulfosalt $Ag_{12}PbBi_{12}S_{25}$ (?) occurs relatively commonly in association with matildite, berryite, aikinite, and galena. Analyses gave Pb 4.71, 7.04; Ag 27.35, 20.87; Cu 0.25, 0.84; Bi 50.91, 52.48; S 16.70, 16.62; Se not detected; sums 99.92, 97.87 wt%.

Discussion. The two analyses for sulfosalt $Ag_{12}PbBi_{12}S_{25}$ (?) are as distinct from one another as they are from the analyses for the other two unnamed sulfosalts. **E.S.G.**

Unnamed $Pb_5Cu_2(Sb,Bi)_{15}S_{28}$

N.S. Bortnikov, A.I. Tsepin (1987) Antimony-bismuth sulfosalts of the Middle Golgotaish deposit (eastern Transbaikal). Izvestiya Akad. Nauk SSSR, Ser. Geol., No. 1, 86–95.

Energy-dispersion microprobe analysis gave Pb 25.11, Cu 3.08, Ag 0.36, Sb 36.17, Bi 13.43, S 21.55, sum 99.70 wt%, corresponding to $Pb_{5.05}Cu_{2.02}(Sb_{12.37}Bi_{2.67})_{\Sigma15.04}S_{23}$, ideally $Pb_5Cu_2(Sb,Bi)_{15}S_{23}$. The mineral occurs as acicular aggregates, 10×50 μm, in carbonate. The composition of the sulfosalt is somewhat similar to that of zinkenite, but Cu and Bi are higher than known previously. The unnamed mineral occurs in quartz-sulfide-tourmaline veins containing arsenopyrite, galena, chalcopyrite, and sulfosalts that occur in thin veinlets and in pockets 2–3 mm in diameter. Boulangerite and bournonite are the most common sulfosalts; others, including tintinaite and bismuthian tintinaite, izoklakeite, jaskolskiite, a possibly Cu-rich zinkenite, and the unnamed mineral have been found in only one or two polished sections. **J.L.J.**

Unnamed $Cu_{11}Fe_4GeAsS_{16}$

V.A. Kovalenker, D. Tsonev, V.V. Breskovskaya, V.S. Malov, N.V. Troneva (1986) New data on the mineralogy of copper-pyrite deposits of the central Sredne Gory, Bulgaria. In Metasomatism, Mineralogy, and problems of genesis of gold and silver deposits in volcanic strata, 91–110, Nauka, Moscow (in Russian).

Eight electron-microprobe analyses gave Cu 43.89–44.06, Fe 13.08–14.05, Zn 0.25–1.19, Ge 4.53–5.45, As 3.79–4.89, S 32.24–32.44, sum 99.68–100.20 wt%; the range in formula composition is $Cu_{10.95–11.01}(Fe_{3.71–3.98}Zn_{0.06–0.29})_{\Sigma3.97–4.05}Ge_{0.98–1.02}As_{0.80–1.05}S_{15.97–16.02}$, ideally $Cu_{11}Fe_4GeAsS_{16}$. The mineral occurs as grains, up to 0.1 mm, that are variable from rounded to some showing crystal faces. In reflected light, yellow-orange and lighter than renierite, weakly anisotropic, nonpleochroic, bireflectance not observed. The mineral occurs as rare grains disseminated in bornite and sphalerite, less commonly in tennantite, in the higher levels of the Radka deposit. Renierite and germanite are concentrated in the deeper levels.

Discussion. The composition indicates that the mineral is new, but supporting X-ray data are needed. **J.L.J.**

Beegerite(?)

N.S. Bortnikov, I. Laputina, Yu.G. Safonov (1987) A new group of minerals in the system Ag-Pb-Bi-S from the Kanimansur ore field (Karamazar). Doklady Akad. Nauk SSSR, 292, 1235–1238 (in Russian).

In the Kanimansur volcanogenic ores, thin veins and disseminations of Ag-Pb-Bi-S minerals occur as aggregates, veinlets, and crystals in chalcopyrite and quartz. The Bi-bearing minerals are optically similar to matildite, but are distinguishable by energy-dispersion microprobe analyses. The analyses are considered to convert satisfactorily into the following ideal formulas: (1) $Ag_4PbBi_4S_9$, similar to schirmerite; (2) $AgPbBiS_3$, similar to matildite; (3) $Ag_2Pb_3Bi_2S_7$; and (4) $Ag_3Pb_7Bi_3S_{13}$, the last two similar to beegerite.

Discussion. The microprobe compositions unaccompanied by additional data do not help to clarify the formulas of these minerals, as is evident from the results reported for "beegerite." **J.L.J.**

Unnamed tetragonal U_3O_7

E. George, M. Pagel, Y. Dusausoy, J.M. Gautier (1986) Formation conditions of a tetragonal uranium oxide: α-U_3O_7 in the Brousse-Broquies Basin (Aveyron, France). Uranium, 3, 69–89.

V. Voultsidis, E. von Pechmann, D. Clasen (1982) Petrography, mineralogy and genesis of the U-Ni deposits, Key Lake, Sask., Canada. In Ore genesis—The state of the art, p. 475–489. Springer-Verlag, Berlin.

E. von Pechmann (1985) Mineralogy of the Key Lake orebodies, Saskatchewan, Canada: Evidence for their formation by hypogene hydrothermal processes. In Geology of uranium deposits, Can. Inst. Mining Metall., Special Vol. 32, 27–37.

The average (range unstated) of 12 electron-microprobe analyses of material from the Roube deposit, France, gave UO_3 28.75, UO_2 56.78, CaO 4.1, FeO 1.28, SiO_2 1.87, P_2O_5 0.33, sum 93.11 wt%; Th, Pb, and Zr not detected. Laser-microprobe mass analysis indicated that H_2O or OH is present in significant amounts; the U^{4+}/U_{total} obtained by pulsed polarography is $\sim$0.38 to 0.60. The mineral is similar to pitchblende in reflected light; in transmitted light the grains are polygonal, also elongage [001] and up to 200 μm long. Principal forms are $\{110\}$ and $\{100\}$, terminated by a dipyramid, possibly $\{111\}$. The diffractometer X-ray powder pattern has the following d values (in Å) and indices (peak heights illustrated, but intensities not listed): 3.10(111), 2.72(200), 2.70(002), 1.92(220), 1.91(202), 1.64(311), 1.62(113); all except the first line are split peaks, i.e., 2.72–2.70, 1.92–1.91, 1.64–1.62. The split peaks are interpreted to represent a mixture of a tetragonal phase and an uraninite-type cubic phase. The uranium oxide is the principal ore mineral in the Roube deposit. The natural occurrence of α-U_3O_7 has been reported on several occasions and was reported also to be a principal ore mineral (referred to by Voultsidis et al., in quotation marks, as "tetrauraninite") in the uranium deposit at Key Lake, Saskatchewan, Canada. A detailed description of the mineralogy of the Key Lake orebody is given by von Pechmann (1985), who noted in an addendum that the α-U_3O_7 phase is probably a mixture of uraninite and pitchblende. **J.L.J.**

Unnamed Fe-Mg oxide

L.A. Tompkins, S.E. Haggerty (1985) Groundmass oxide minerals in the Koidu kimberlite dikes, Sierra Leone, West Africa. Contrib. Mineral. Petrol., 91, 245–263.

Nineteen electron-microprobe analyses gave ranges of TiO_2 11.14–18.13, Al_2O_3 1.60–2.49, FeO (all Fe as FeO) 59.48–68.76, MgO 9.32–11.32, Cr_2O_3 1.14–13.12 wt%, with about 1% MnO and lesser amounts of Zr and Ni. The results give a simplified formula of the type $(Fe^{2+},Mg,Ti,Cr)_6O_7$, inferred to be a wüstite-type compound. The mineral (referred to as mineral H) is isotropic, up to 0.05 mm in grain size, and occurs as mantles on spinels in a diamond-bearing kimberlite dike associated with kimberlite pipes in eastern Siena Leone, West Africa. **J.L.J.**

Unnamed Mg phosphates

G. Raade, M.H. Mladeck, V.K. Din (1986) Heneuite, Ca-$Mg_5(CO_3)(PO_4)_3(OH)$, a new mineral from Modum, Norway. Neues Jahrb. Mineral. Mon., 343–350.

Associated with heneuite (which see) is a reddish aureole, up to 1 cm wide, containing apatite, althausite, and an unidentified

mineral for which microprobe analysis gave CaO 2.29, MgO 53.24, SiO$_2$ 0.25, P$_2$O$_5$ 31.24, sum 87.02 wt%. The results closely approximate Mg$_3$(PO$_4$)(OH)$_3$, which requires MgO 55.23, P$_2$O$_5$ 32.42, H$_2$O 12.34 wt%. The mineral is fibrous, averaging 10 μm in thickness.

Also associated with some heneuite is an intensely blue mineral in grains up to 0.5 mm long. The mineral is uniaxial negative with low birefringence and strong dichroism from bright blue (ϵ) to colorless (ω). The mean of six electron-microprobe analyses gave MgO 44.3, FeO 1.0, P$_2$O$_5$ 35.7, SiO$_2$ 0.9, sum 81.9 wt%. A minor amount of As also was detected. **J.L.J.**

Unnamed Fe saponite

Heping Sun, Congxian Li, C.D. Curtis (1985) Authigenic Fe-substituted saponite in the delta area of the Nanliujiang River, Guangxi. Oil and Gas Geology [China], 6, 138–140 (in Chinese, English abstract).

J.M. Ferry (1985) Hydrothermal alteration of Tertiary igneous rocks from the Isle of Skye, northwest Scotland II. Granites. Contrib. Mineral. Petrol., 91, 283–304.

The average (and range) of five electron-microprobe analyses gave SiO$_2$ 45.6 (43.8–50.1), TiO$_2$ 0.1 (0.0–0.2), Al$_2$O$_3$ 8.7 (7.4–10.4), total Fe as FeO 21.3 (20.7–22.7), MnO 0.2 (0.2–0.2), MgO 15.1 (14.6–15.9), CaO 1.3 (1.2–1.6), K$_2$O 1.3 (1.0–1.7), Na$_2$O 0.3 (0.2–0.3), sum 93.9 (91.2–96.2) wt%. The average formula is reported as (Ca,Na,K)$_{0.54}$(Mg$_{3.3}$Fe$^{2+}_{2.6}$Al$_{0.2}$)(Si$_{6.7}$Al$_{1.3}$)O$_{20}$(OH)$_4$. The diffractometer traces (Cu radiation) show strong diffraction lines at 15.3, 3.345, and 1.53–1.54 Å. The mineral occurs in the Nanliujiang River delta, Beibu Gulf (near Belkai, Gulf of Tonking, or Beibu Wan, southwestern China).

In the study of igenous rocks from the Isle of Skye, olivine-bearing samples contain a brown clay mineral for which two representative electron-microprobe analyses gave SiO$_2$ 44.06, 42.38, TiO$_2$ 0.15, 0.13, Al$_2$O$_3$ 1.50, 0.94, total Fe as FeO 39.56, 39.55, MgO 0.23, 0.41, MnO 1.16, 1.79, CaO 0.26, 1.09, Na$_2$O 0.02, 0.00, K$_2$O 0.06, 0.05, sum 87.00, 86.34 wt%. The results approximate (Ca,K,Na)$_{0.03}$(Fe,Mn,Mg,Ti)$_{3.01}$(Si,Al)$_{4.01}$ and (Ca,K)$_{0.11}$(Fe,Mn,Mg,Ti)$_{3.15}$(Si,Al)$_{3.89}$ on the basis of 11 anhydrous oxygen atoms. The mineral is associated with montmorillonite and other clay phases.

Discussion. The mineral from China is Mg-dominant but has a significant amount of Fe substitution. In contrast, the mineral from the Isle of Skye has Fe predominating to the extent that Mn and Mg are only minor constituents. The cation contents of the X site are low, however, and no other data are given to characterize the mineral. **J.L.J.**

Unnamed Mn-Cr silicate

N.S. Rudashevskii, A.G. Mochalov (1984) New associations of native elements in ultrabasites. Geologiya i Geofizika, 25, 38–44 (in Russian, English version available).

In the alluvial sands from Pt-bearing serpentinite of the Soviet Far East are Cr-Ni–bearing grains of γ-Fe that contain rounded to spherical, 1–30 μm inclusions of a silicate. Grains larger than 10 μm are zoned markedly, but smaller grains are more homogeneous; the average of fifteen electron-microprobe analyses gave SiO$_2$ 29.5, MnO 38.8, Mn$_2$O$_3$ 11.3 (Mn 37.9, partitioned as MnO and Mn$_2$O$_3$), Cr$_2$O$_3$ 11.3, TiO$_2$ 6.39, Fe$_2$O$_3$ 1.23, Al$_2$O$_3$ 1.56, sum 100.08 wt%. All analyses, calculated to a garnet-type formula A$^{2+}_3$B$^{3+}_2$(SiO$_4$)$_3$, have Mn^{2+} dominant in A, and either Mn^{3+} or Cr^{3+} dominant in B. The Cr-dominant phase is considered to be new garnet with the ideal formula Mn$_3$Cr$_2$(SiO$_4$)$_3$, whereas the Mn^{3+}-dominant phase is a Ti–Cr variety of Mn$_3$Mn$_2$(SiO$_4$)$_3$.

Discussion. The Mn$_3$Mn$_2$(SiO$_4$)$_3$ phase is referred to as blythite, a name that has been used in the past for garnet of this assumed composition. The analyses suggest the presence of two new garnet members, but much more supporting data would be necessary before these could be accepted as new minerals. **J.L.J.**

Unnamed Na-Ti silicate

S. Karup-Møller (1986) Murmanite from the Ilimaussaq alkaline complex, South Greenland. Neues Jahrb. Mineral. Abh., 155, 67–88.

Alteration of murmanite has resulted in a heterogeneous intergrowth of ramsayite and an unidentified mineral. Electron-microprobe analyses of two samples of the latter gave Na$_2$O 15.54, 14.18; K$_2$O 1.21, 0.98; TiO$_2$ 28.87, 29.19; Nb$_2$O$_5$ 3.52, 3.51; Fe$_2$O$_3$ 1.43, 1.76; Al$_2$O$_3$ 7.33, 7.52; SiO$_2$ 38.57, 38.89; sum 96.47, 96.03 wt%. Heating of a 240-mg sample, contaminated with some ramsayite, gave a weight loss of 3% to 600 °C. The formula, calculated for Si = 4.00, is (Na$_{2.98}$K$_{0.14}$)$_{\Sigma 3.12}$(Ti$_{2.25}$Nb$_{0.16}$-Fe$_{0.12}$Al$_{0.79}$)$_{\Sigma 3.32}$Si$_{4.00}$O$_{15.65}$·1.04H$_2$O, ideally (Na,K)$_3$ (Ti,Nb,Fe,Al)$_3$-Si$_4$O$_{16}$·H$_2$O. D_{meas} = 3.00, D_{calc} = 2.77 for the empirical formula, and Z = 3. Colorless in thin section, optically biaxial negative with α = 1.68, γ = 1.72, 2V = 70°. Single-crystal study indicated a C-centered monoclinic lattice with cell dimensions, refined from a Guinier powder pattern, of a = 5.2282(37), b = 8.7200(46), c = 24.375(18) Å, β = 99.50(18)°. Strongest lines of the powder pattern (Cu radiation, 50 lines listed) are 12.193(100)(002), 4.485(60)(11$\bar{1}$), 3.295(100)(12$\bar{2}$), 3.223(80)(017), 3.066(90)(12$\bar{4}$), 2.336(90)(1.0.$\bar{1}$0), and 1.476(60)(0.4.$\bar{1}$2). **J.L.J.**

Unnamed Na-Ti silicate

E.V. Sokolova, N.A. Iamnova, Yu.K. Egorov-Tismenko, A.P. Khomyakov (1985) Crystal structure of a new mineral Na$_8$Ti$_{3.5}$O$_2$(OH)$_2$ [SiO$_4$]$_4$—A polymorphous modification of natisite. Doklady Akad. Nauk SSSR, 284, 1136–1142 (in Russian).

An incomplete microprobe analysis gave SiO$_2$ 28.39, TiO$_2$ 36.02, Nb$_2$O$_5$ 0.07, FeO 3.23, MnO 0.39, Na$_2$O 26.72, sum 94.82 wt%, approximating Na$_2$(TiO)SiO$_4$; a footnote indicates that 1–1.5 wt% F was found later. The mineral is orthorhombic, space group Pmma, a = 9.827(3), b = 9.167(2), c = 4.799(2), D_{meas} = 3.12, D_{calc} = 3.04 g/cm^3 for Z = 1. The structure, refined to R = 6.4%, is similar to that of natisite, which is tetragonal Na$_2$(TiO)SiO$_4$. The unnamed mineral occurs in alkalic pegmatites in the Kibina massif, Kola Peninsula, USSR, associated with natisite. **J.L.J.**