Akhhtenskite*


The mineral, whose synthetic counterpart is $\epsilon$-MnO$_2$, occurs as light gray to black mixtures with cryptomelane and nsutite in a specimen of psilomelane from the Akhtenskoye limonite deposit, South Urals. X-ray photoelectron spectroscopy and energy-dispersive analysis showed only Mn$^{4+}$ and O to be present; no OH or molecular water was detected. The mineral occurs as platy (001) aggregates; hexagonal, with $a$:2.85, $c$: 4.48 Å, space group $P6_3/mmc$ as indicated by electron-diffraction patterns. Cleavage (001). Approved by the CNMMN in 1983; subsequently identified as flaky polycrystalline aggregates in ferromanganese encrustations on oceanic basalt from a Permo-Carboniferous guyot at Mt. Zarod in Sikhote Alin, associated with vernadite and buserite; electron-diffraction patterns show rings at 2.45, 2.15, 1.65, and 1.42 Å, corresponding to $hkl$ 100, 101, 102, and 110, respectively, from which $a$: 2.83, $c$: 4.47. Energy-dispersive peaks indicate that end-member and Fe-bearing varieties are present, the latter with Fe/Mn:0.1-0.3. The new name is derived from the initial locality (Akhtenskoye limonite deposit). The original specimen was from the Leningrad Mining Institute, presumably the repository of type material. The mineral is the structural analogue of feroxyhite, $\delta$-Fe$_3$O(OH), and the general formula is $(Mn_{1-x},Fe_x)O_2(OH)_x$. J.L.J.

Auroantimonate


Electron-microprobe analyses (using a JXA-50A probe for Au and Sb, and a JXA-5 probe for O) of one aggregate gave Au 49.7, 50.1, 49.3, Sb 39.2, 39.1, 39.2, O 10.7, 11.2, 11.2, sum 99.6, 100.4, 99.7 wt%; a second aggregate gave Au 52.4, 52.6, Sb 36.7, 36.3, O 11.6, 11.4, sum 100.7, 100.3 wt%; the averages correspond to $Au_{1.02}Sb_{1.26}O_{2.76}$ and $Au_{1.02}Sb_{1.26}O_{2.76}$, respectively, close to a theoretical composition $AuSbO_x$. $H$: 223.8 and 186.8 kg/mm$^2$. No crystallographic parameters could be deduced from the X-ray powder pattern, in which the following lines were present: 4.18(100), 3.92(30), 3.72(30), 3.12(10), 2.08(10), 2.03(30), 1.719(10), 1.676(10), 2.72(10), 2.59(10), 2.35(90), 2.23(10), 1.588(10), 1.553(10), 1.434(50), and 1.223(30). The 2.35-Å line corresponds to that of native gold. Aggregates observed in immersion oil showed thin, elongate, wormlike grains in which no anisotropy or internal reflection could be detected. Reflectance percentages obtained with a WTIC standard ($R_p$ and $R_p$, respectively) are 420 14.5, 15.8; 440 14.5, 15.4; 460 14.0, 15.0; 480 13.7, 14.7; 500 13.4, 14.5; 520 14.5, 15.5; 540 16.2, 16.8; 560 17.9, 17.8; 580 19.6, 19.6; 600 20.4, 19.6; 620 21.2, 20.2; 640 21.7, 20.4; 660 22.2, 20.5; 680 22.5, 20.5; 700 22.6, 20.5.

Auroantimonate occurs as fillings of microscopic cells with Au walls in a porous and friable variety of Au-Ag ore known as mustard gold, from Eastern Yakutia, USSR. Other minerals in these fillings include stibnite, valentinite, and aurostibite. The studied material was obtained from unoxidized Au-Sb ore taken from 150 m below the surface. One aggregate (first analysis above) is associated with stibnite and is 0.008 x 0.03 mm in cross section. The aggregate is olive gray and brown-gray in reflected light. The second aggregate consists of similar material in an olive-colored margin, 0.003-0.02 mm thick, around a gold grain that lies between stibnite and quartz. Auroantimonate is interpreted to be a hypogene mineral formed by reaction of Au in contact with Sb$_2$S$_3$, or by breakdown of aurostibite to gold and $AuSbO_x$ under oxidizing conditions (0.2-0.4 eV) at 150-200 °C and through the action of hydrothermal solutions.

Discussion. This is the first report of a natural oxide with Au. The available information does not preclude the possibility that the apparently homogeneous auroantimonate is not an ultrafine (submicroscopic) mixture of gold and antimony oxide rather than a Au-Sb oxide. The new mineral and name were not submitted to the CNMMN. E.S.G.
Cervandonite-(Ce)*


Twelve electron-microprobe analyses of three specimens gave CeO0.94–12.65, NdO3.44–6.61, LaO3.88–6.09, YO0.00–1.05, ThO2.92–2.86, UO2.00–1.77, CaO 0.11–0.40, PbO 0.00–0.25, Fe2O3 13.99–16.82, FeO 4.20–5.05, Ti2O5 10.83–12.52, Al2O3 2.14–4.07, SiO2 0.00–1.24, SiO2 11.97–17.76, As2O3 20.41–26.07, sum 96.41–101.93 wt%. The Fe3+/Fe2+ ratio was established as 3/1 by Mössbauer spectroscopy, and As was assumed to be present as As5+. On the basis of 13 O atoms, the average composition is (Ce0.00 Nd0.22 La0.21 Th0.06 Y0.03 U0.02 Ca0.02 Pb0.00)2+ (Fe3+0.68 Fe2+0.32 Ti0.36 Al0.55 Sn0.02)2+ (Si0.38 As0.38)2+2.64 O13. The mineral occurs as black, brittle, porous, rosettelike aggregates; adamantine luster, poor {001} cleavage, conchoidal fracture, brownish black streak, translucent in thin splinters, D* = 4.9 g/cm3 with Z = 6. Refractive indices are n = 1.99 parallel brown, and n = 2.0 where black. In reflected light the reflectance varies from 8 to 12% between 440 and 660 nm. The X-ray powder pattern (Guinier camera, CuKa radiation) has strongest lines of d = 5.390(80, 130), 3.2530(90, 060, 331), 3.0847(80, 002), 2.962(100, 121), and 2.522 Å (64, 130). Calculated cell dimensions are a = 4.545, b = 7.664, c = 5.685, α = 98.0, β = 110.0, γ = 111.1°. Dcalc = 5.38 g/cm3 with Z = 1 and the average composition of the mineral from Ashburton Downs.

The new mineral occurs at the Anticline copper prospect near Ashburton Downs, Western Australia, as fine-grained coatings and cavities formed in altered material consisting of quartz, clay minerals, iron oxides, and numerous secondary minerals; also occurs at the Kintore open pit, Broken Hill, N.S.W., as yellowish powdery encrustations associated with drussy brown hidalgoite-beudantite. The new name is for Blair Gartrell, who collected the original specimen. Type material, from Ashburton Downs, is in the Museum of Victoria, Melbourne, Australia. J.L.J.

Gartrellite*


Electron-microprobe and CHN analyses (avg. of thirteen for the mineral from Ashburnton Downs; avg. of two for Broken Hill) gave, respectively, PbO 36.0, 38.62, CuO 15.1, 13.41, ZnO 0.31, Fe2O3 9.3, 7.74, Al2O3 – 2.09, As2O3 33.7, 32.50, SO3 1.3, 0.74, CO2 3.7, n.d. (not determined), H2O 0.5, n.d., sum 99.6, 95.41 wt%. The first electron-microprobe analyses of three specimens gave Pb0.6 Cu0.4 (AsO2)0.64 (SO4)0.16 (CO3)0.25 (H2O)0.18, simplified as Pb(Fe3+, Fe2+) (AsO4)2- (SO4)2- (CO3)H2O, where x is about 0.7. That all Fe is trivalent was confirmed by Mössbauer spectroscopy. The mineral is bright yellow to greenish yellow, soft, friable, chalky luster and texture, yellow streak, soluble in conc. HCl; cryptocrystalline, consisting of platelets ~1 × 10 μm. Pale yellow in transmitted light, transparent, highly birefringent, n = 1.94 to 2.00. Electron-diffraction patterns indicated triclinic symmetry; strongest lines of the X-ray powder pattern (80-mm Guinier camera, CuKa radiation, intensities by diffractometer) are d = 4.612(70, 100), 3.399(70, 021), 3.203(97, 110, 111), 2.962(100, 121), 2.915(70, 111), and 2.522 Å (64, 130). Calculated cell dimensions are a = 5.454, b = 7.664, c = 5.685, α = 98.0, β = 110.0, γ = 111.1°. Dcalc = 5.38 g/cm3 with Z = 1 and the average composition of the mineral from Ashburton Downs.

Rittmannite*


Electron-microprobe analysis gave MgO 1.5, Al2O3 11.3, CaO 3.3, FeO 12.7 (partitioned as FeO 10.4, Fe2O3 2.6), MnO 18.9, P2O5 35.9, H2O (calc.) 19.7, sum 103.6 wt%, corresponding to (Mn4.5Ca0.52)0.10Mn0.10(Fe3+0.32)(Mn2+0.68)0.30(Al0.75Fe0.25)0.22(OH)0.20(PO4)0.8H2O, ideally Mn4+Mn3+Fe3+Al2(OH)4(PO4)2.8H2O. The mineral occurs as pale yellow, transparent, pseudohexagonal crystals averaging 0.3 × 0.3 × 0.04 mm, tabular on 001; white streak, vitreous luster, H = 3.5, indistinct (001) cleavage, Dcalc = 2.81 g/cm3 in heavy liquids, Dcalc = 2.83 g/cm3 for Z = 2. Optically biaxial positive, α = 1.622, β = 1.628, γ = 1.654, 2V = 43(2)°, X = b, Z = c = 7°, nonpleochroic. Single-crystal X-ray study indicated monoclinic symmetry (space group P2/a by analogy with the whiteite group). The X-ray powder pattern (114.6-mm Gandolfi camera, FeKa radiation) has strongest lines of d = 5.66(m, 111), 4.93(m, 211), 4.85(m, 202), 4.69(m, 002), 3.530(m, 402), 3.458(m, 400), 3.274(m, 411), 2.802(s, 222), 2.588(s, 510), 2.344(m, 004), 1.947(m), and 1.884(m); refined cell dimensions are a = 15.01(4), b = 6.893, c = 10.16(3) Å, β = 112.82(25)°.

The mineral occurs in the core of a pegmatite that cuts granite near Mangualde, Viseu district, northern Portugal.
Associated minerals are the adularia variety of orthoclase, frondelite, hureaulite, and kryzhanovskite. The name is for Professor Alfred Rittmann (1893-1980), noted volcanologist. Type material is in the Museo di Storia Naturale of Pisa, and the Museo Civico di Storia Naturale, Milan, Italy. J.L.J.

**Velikite**


Electron-microprobe analyses (average of six) give Cu 23.16(49), Ag 0.19(7), Hg 29.49(68), Cd 0.16(9), Zn 2.49(25), Fe 0.01(1), Mn 0.02(1), Pb 0.10(5), Sn 17.60(47), Ge 1.31(22), As 0.27(19), Sb 0.11(9), Te 0.05(3), S 24.78(69), Se 0.10(4). Bi, Mo, W not detected, sum 99.84 wt%, corresponding to (Cu$_{0.95}$Ag$_{0.05}$)$_{1.00}$Sn$_{0.05}$Cd$_{0.10}$Zn$_{0.10}$Ge$_{0.10}$As$_{0.10}$Sb$_{0.10}$Sn$_{0.10}$Se$_{0.10}$Hg$_{1.12}$, that is, close to a Hg end-member Cu$_2$HgSnS$_8$ of the stannite group. The mineral forms small grains and crystals with a tetragonal-scalenohedral habit, up to 1 mm across. Color dark gray, luster metallic, streak gray, H : 2.57-3.05 (avg. 2.70) kg/m$^2$, no cleavage, no internal reflection, $D_{max} = 5.59$ (hydrostatic suspension), $D_{calc} = 5.27$ g/cm$^3$, Z = 1. In reflected light, gray or light gray with greenish-brownish and brownish green tints; bireflectance hardly noticeable, weak pleochroism in brownish and greenish tones sometimes observed; clearly anisotropic with color effects in pale blue and greenish blue tones. Reflectances (R$_{-}$, R$_{+}$) from 420 to 700 nm at intervals of 20 nm are 420 24.6, 440 25.2, 460 25.7, 480 26.3, 500 26.6, 520 26.6, 540 26.4, 560 26.2, 580 25.8, 600 25.4, 620 25.2, 640 24.9, 660 24.7, 680 24.5, 700 24.4. X-ray study shows the mineral to be tetragonal, space group I$4_2$m (by analogy with stannite). X-ray powder data yield $a = 5.554(3)$, $c = 10.911(8)$ Å; strongest lines (34 given) are 3.17(100,112), 1.958(25,220), 1.941(80,204), 1.671 (40,312), 1.646(35,303), 1.264(25,316), and 1.132-20,424).

The mineral occurs with stibnite, metacinnabar, arktashite, livingstonite, quartz, and fluorite in the Sb-Hg Khaydarkan deposit, Kirghiziai, USSR. It is named in the nomenclature system used here are whiteite-(MnFeMg), and jahnsite-(CaMnMg). Discussion. The crystal structure of the mineral was reported by L.N. Kaplunnik, Ye.A. Pobedimskaya, and N.V. Belov in 1977, Kristallographiya, 22(1), 175-177 (summarized in Am. Mineral. 62, p. 1260, 1977) at which time the relation to stannite was proposed. No analyses or physical properties were reported in the original description and naming of the mineral. In the present paper the formula and space group are new; the measured and calculated (from X-ray data) densities diverge markedly from one another and from $D_{calc} = 5.48$ g/cm$^3$ reported in the 1977 paper. The mineral and name were published without prior submission to the CNMMN. E.S.G.

**Whiteite-(CaMnMg)**


Electron-microprobe analysis ($H_2O$ by TGEGA) for three specimens gave $Al_2O_3$ 12.9, 13.4, 13.6, MgO 9.4, 10.1, 11.7, CaO 5.4, 4.6, 6.3, MnO 12.0, 12.6, 8.8, FeO 1.6, 0.9, 0.1, Fe$_2O_3$ 38.2, 37.5, 37.7, $H_2O$ 20.8, 20.9, 21.8 (last two by difference), sum 100.5, 100.0, 100.0 wt%; the first analysis corresponds to (Ca$_{0.76}$Mn$_{0.24}$)$_{1.00}$Mn$_{1.00}$Fe$_{0.07}$Sn$_{0.03}$S$_{0.05}$Al$_{0.05}$P$_{0.17}$O$_{4.10}$OH)$_{0.46}$, ideally CaMn$_{0.80}$Al$_{0.20}$P$_{0.17}$O$_{4.10}$OH, 8$H_2O$. Occurs as individual, dull, bipyramidal crystals up to 1.5 x 0.5 x 0.5 mm, and as anhedral, etched, millimetric blebs; yellow, greenish yellow, pink, or pale lavender in color, white streak, transparent, nonfluorescent. $H = 3.5$, brittle, poor (001) cleavage, $D_{calc} = 2.63(2)$ by heavy-liquid suspension, $D_{calc} = 2.64$ g/cm$^3$ with $Z = 2$. Optically biaxial positive, $\alpha = 1.580(1)$, $\beta = 1.584(1)$, $\gamma = 1.591(1)$ (Na light), $2V_{max} = 81(5)\degree$, $2V_{calc} = 74; Y = b, Z \Delta c = 15\degree$, pleochroism $X =$ mauve, $Y =$ light mauve, $Z =$ colorless. Single-crystal X-ray study indicated monoclinic symmetry, space group $P2_1/a$ or $Pb$, $a = 14.842(9), b = 6.976(1), c = 10.109(4)$ Å, $\beta = 112.59(5)$ as refined from the powder pattern (114.6-mm Debye-Scherrer camera, CuK$\alpha$ radiation). Strongest lines of the pattern are 9.31(100,001), 4.85(50,211), 210,202), 3.51(50,312,020), 3.256(40,021), 2.953(50,403), 2.867- (40,401), 2.790(80,022), 2.547- (40,510,421), and 1.845(40). $H_2O$ corresponding to 5$H_2O$, 3$H_2O$, and 1$H_2O$ is lost in three steps to approximately 500°C.

The mineral occurs on massive beryl in the Tip Top pegmatite in the Black Hills near Custer, South Dakota, associated with several other secondary phosphates. Type specimens are in the National Museum of Natural Sciences, Ottawa, Canada, and in the Smithsonian Institution, Washington, D.C. The general formula for the whiteite group is $XM(1)M(2)M(3)(PO_4)_2(OH)$, 8$H_2O$, where $M(3)$ is dominantly Al for the whiteite series and Fe$^{3+}$ for the jahnite series; other members previously described in the nomenclature system used here are whiteite-(CaFeMg), whiteite-(MnFeMg), and jahnite-(CaMnMg). Rittmannite (which see) was described contemporaneously, and, as is noted by the present authors, "the whiteite group now has a mixture of both trivial and suffixed names in contrast to most other mineral groups . . . in which suffixes appear only for rare-earth elements." J.L.J.

**Zemkorite**


Electron-microprobe analyses of two grains, supplemented by a wet-chemical analysis for CO₂, gave Na₂O 25.61, 25.83, Al₂O₃ 0.05, 0.05, K₂O 6.60, 6.21, CaO 28.29, 28.50, MgO, SiO₂, TiO₂, MnO, FeO, BaO, and SrO not detected, CO₂ 39.20, sum 99.75, 99.79 wt%, the average corresponding to (Na₉₀, K₉₀)Ca, o(CO₃)₉₉, ideally (Na,K),Ca(CO₃)r. Readily soluble in warm water. Grains detected, COr₃9.20, sum 99.75, 99.79 wto/0, the average as determined by a wet-chemical analysis for COr gave NarO 0.20, 0.19, N₉₀.70, 0.71, 0.72, that is, the inclusions contain roughly equal amounts of Au and Pb. These inclusions appear homogeneous and gray against a white background (gold) and constitute 10% of the gold grain. At magnifications above 500 the inclusions appear homogeneous, with a reticulated mesh texture too fine to be resolved by the electron beam. A 57.3-mm Gandolfi X-ray powder pattern contains 15 lines, of which 5 can be matched with those for gold (for which intensities range from 10 to 100). The remaining lines are 2.82(15), 2.6(10), 2.24(10), 1.88(5 broad), 1.608(5), 1.482(5), 1.391(10), 1.369(10), 1.255(10), and 1.207(5). These gave a = 7.36, c = 5.59 Å, close to those for the intermetallic compound AuPb₂.

Discussion. The d values and intensities given for synthetic AuPb₂, although cited as being from the ASTM, do not correspond well with the data on cards 8419 and 25-366, or even with a combination of these. There are significant differences in diffraction-line intensities, and several lines of at least moderate intensity are missing from the X-ray pattern of the natural Au-Pb phase; nonetheless, the results for the natural and synthetic phases show a general correspondence. A similar mineral from an alluvial gold deposit in the USSR was abstracted in Am. Mineral., 73, p. 197 , 1988. E.S.G.

Unnamed nickel compound


Ranges (and averages) of electron-microprobe analyses of inclusions rich in Ni are Au 22.9–88.04 (54.10), Ag 0.11–3.68 (1.15), Ni 2.70–45.6 (18.27), Cu 0–0.60 (0.21), Pb to 0.74, Zn to 1.41, Ti 0.17–5.05 (0.76), Cr to 7.60, S to 0.67 wt%. These inclusions are <3 μm across and are difficult to see because their reflectance is similar to that of their gold host. At magnifications up to 5000 on a JXA-50A microanalyzer, it can be shown that Au is absent in these inclusions; as no other constituent with Z > 10 was detected, these inclusions are native nickel or carbide, boride or nitride of Ni. The inclusions, together with those of AuPb₂ (which see), are present in gold grains separated from the Mir kimberlite pipe, Yakutiya, USSR. E.S.G.

Unnamed Au-Pb intermetallic


Ranges (and averages) of electron-microprobe analyses of inclusions in native gold are Au 41.2–48.90 (45.05), and 44.2–58.98 (54.31); Ni trace to 0.21 (0.10), and trace to 0.55 (0.26); Pb 51.3–56.93 (54.12), and 38.53–55.42 (44.47); Zn not detected (n.d.), and traces; Ti n.d. – 0.19; Ag n.d.; Cu traces; sums, 99.27 and 99.04 wt%, that is, the inclusions contain roughly equal amounts of Au and Pb. These inclusions appear homogeneous and gray against a white background (gold) and constitute 10% of the gold grain. At magnifications above 500 the inclusions appear heterogeneous, with a reticulated mesh texture too fine to be resolved by the electron beam. A 57.3-mm Gandolfi X-ray powder pattern contains 15 lines, of which 5 can be matched with those for gold (for which intensities range from 10 to 100). The remaining lines are 2.82(15), 2.6(10), 2.24(10), 1.88(5 broad), 1.608(5), 1.482(5), 1.391(10), 1.369(10), 1.255(10), and 1.207(5). These gave a = 7.36, c = 5.59 Å, close to those for the intermetallic compound AuPb₂.

Discussion. The d values and intensities given for synthetic AuPb₂, although cited as being from the ASTM, do not correspond well with the data on cards 8419 and 25-366, or even with a combination of these. There are significant differences in diffraction-line intensities, and several lines of at least moderate intensity are missing from the X-ray pattern of the natural Au-Pb phase; nonetheless, the results for the natural and synthetic phases show a general correspondence. A similar mineral from an alluvial gold deposit in the USSR was abstracted in Am. Mineral., 73, p. 197 , 1988. E.S.G.
Discussion. The average Bi and S values for the Fe-poor BiSb$_2$S$_4$ are 79.69 $\pm$ 0.30 (1 $\sigma$) and 20.30 $\pm$ 0.20 wt%, respectively, compared to 80.28% Bi and 19.43% S for an Fe-poor bismuthinite analyzed under the same conditions in this study. The difference between the two analyses, especially in the Bi contents, seems to be less than the precision of microprobe analyses in general. The reported optical distinction from bismuthinite could be due to different orientation of twin(?) lamellae of bismuthinite in bismuthinit. E.S.G.

Unnamed MnSb$_2$S$_4$


Berthierite (FeSb$_2$S$_4$), most commonly associated with aurostibite and antimony, has been identified in cores from eleven drillholes in the Hemlo deposit. Electron-microprobe analyses of the berthierite indicate up to 4.7 wt% substitution of Mn for Fe; analyses of three samples from one hole gave Mn 13.4, 12.5, 12.4, Fe 0.0, 0.0, 0.0, Sb 52.1, 55.0, 53.7, As 2.4, 1.8, 2.2, S 30.1, 29.9, 30.0, sum 98.0, 99.2, 98.3 wt%, corresponding to Mn$_{0.7}$Sb$_{1.3}$As$_{0.4}$S$_{2.7}$. This is compositionally the Mn analogue of berthierite, but a weak X-ray powder pattern (not given) indicated that the Hemlo mineral is not structurally related to berthierite. J.L.J.

Routhierite, Sb analogue


Routhierite was defined originally as having a formula of the type MHgAs$_3$S$_8$, in which M is (Tl,Cu,Ag) with Tl dominant. Ten electron-microprobe analyses of core samples from five drillholes gave results consistent with a formula CuTlHg$_{0.2}$As$_{3.8}$S$_{8}$. The mineral occurs as anhedral grains, up to 300 $\mu$m across, associated with pyrite, stibnite, realgar, cinnabar, parapierrotite, molybdenite, sphalerite, and tetrahedrite-tennantite. Single-crystal X-ray study of the routhierite indicated tetragonal symmetry, $a = 9.968(5)$, $c = 11.348(8)$ $\AA$, similar to those reported previously for the mineral. In addition to the ten analyses showing As > Sb, four have Sb > As; the two analyses with the highest Sb contents gave Cu 5.6, 5.8, Zn 0.3, Tl 19.6, 19.3, Hg 36.8, 36.9, As 5.4, 2.8, Sb 12.9, 17.8, S 18.9, 18.7, sum 99.5, 101.3 wt%, corresponding to Cu$_{0.7}$Zn$_{0.3}$Hg$_{0.9}$Tl$_{0.2}$As$_{3.8}$S$_{8}$. Also reported to occur, but without accompanying data, are unnamed AgSbTe$_2$ and Pb$_2$Tl$_2$(SbAs)$_3$S$_8$; the latter is present as a 100-$\mu$m grain in contact with pyrite in a routhierite-bearing sample. J.L.J.
**Unnamed Mg oxalate**


X-ray diffractometer data obtained from plants collected in the Lake Huleh basin, Jordan Rift Valley, are in good agreement with data for synthetic magnesium oxalate dihydrate (L. Walter-Levy et al., Bull. Soc. Chim., 756–761, 1971). There is a minor contribution to X-ray intensities by associated tridymite, cristobalite, whewellite dihydrate (L. Walter-Levy et al., Bull. Soc. Chim., 756–761, 1971). There is a minor contribution to X-ray reflections that would indicate doubling of the & parameter are absent. In the resulting structure, there are 5 positions for P with occupancies ranging from 0.3 to 1.7, in contrast to fully ordered betalomonosovite, in which there are four fully occupied P positions.

**Discussion.** Other relevant data are not given. Differs from lomonosovite in cell dimensions, space group, and composition. Betalomonosovite is not an approved mineral name. E.S.G.

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**Ba analogue of bannisterite**


The most Ba-rich analysis of three, obtained by energy-dispersive methods, gave SiO$_2$ 44.36, Al$_2$O$_3$ 5.05, FeO 8.96, MnO 28.04, MgO 2.40, BaO 2.71, K$_2$O 0.40, sum 92.35 wt%, corresponding to (Ba$_{0.65}$Ca$_{0.29}$)$_{0.95-}$K$_{0.32}$Mg$_{10.8}$Fe$_{0.05}$Mn$_{0.04}$Si$_{2.76}$Al$_{3.3}$O$_{21}.8$ on an anhydrous basis for O : 84 and all Fe as FeO. Formula Ba is dominant in all three analyses, but K ranges from K$_{0.97}$ to K$_{0.32}$. The mineral occurs as radial aggregates, up to 0.4 mm across, that form dark brown veinlets in massive caryopilite-rhodochrosite Mn ore at the Kamo mine, Toba City, Mie Prefecture, Japan. The lack of H$_2$O or structural determinations makes it uncertain whether K is partly substituted by H$_2$O; although Ba > Ca is present in all analyses (thus indicating a new Ba analogue of bannisterite), additional differentiation may be present, based on K > H$_2$O and H$_2$O > K. Until this distinction and definition can be made, the mineral is referred to simply as barian bannisterite. J.L.J.

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**Unnamed Na-P layered titanosilicate**


A chemical analysis (wt% not given) and an X-ray structural analysis gave the structural formula $[Na_{1.22}(TiO_2)^2Fe_2^{2+} O_6)](Ti_2O_3)[Na_{2.28}(TiO_2)SiO_2](Na_{3.87}Ca_{0.2})$. X-ray study showed the mineral to be triclinic, space group $P1\bar{1}$, $a = 5.351(3), b = 7.311(3), c = 14.488(2) \AA, \alpha = 101.74(3), \beta = 95.24(3), \gamma = 90.28(1)^\circ, D_{mean} = 2.9 g/cm^3$. The mineral is from the Lovozero massive, Kola Peninsula, USSR. Betalomonozonite differs from lomonosovite, $Na_{5}Ti_{5}Si_{6}O_{24}NaPO_4$ in that about half of the Na atoms in the interlayer positions are replaced by protons ($H^+$) and in that the P positions are not located around a center of symmetry. X-ray reflections that would indicate doubling of the $b$ parameter are absent. In the resulting structure, there are 5 positions for P with occupancies ranging from 0.3 to 1.7, in contrast to fully ordered betalomonozonite, in which there are four fully occupied P positions.

**Discussion.** The changes in the definition are substantial enough to warrant submission to the CNMMN for approval. J.L.J.

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**Holtedahlite**


The crystal structure of natural holtedahlite was refined to $R = 0.031$ and gave $a = 11.203(3), c = 4.977(1) \AA$, space group $P31m$. The formula is $Mg_{3.8}(PO_4)OH,CO_3$-
NEW MINERAL NAMES

Holtite

Crystal-structure study of holtite gave orthorhombic symmetry, $a = 4.6914(5)$, $b = 11.896(2)$, $c = 20.383(4)$ Å, space group $Pnma$. The structure is closely related to that of dumortierite, but with extensive substitution of Si by Sb in holtite. J.L.J.

Sapphirine polytypes

Transmission electron microscopy of various natural and synthetic sapphirines has shown that, in addition to the previously described 1$A$ and 2$M$ polytypes, 2$A$, 4$M$, and 5$A$ structures are present. The 5$A$ polytype has been found in sapphirine from Naxos, Greece, and the 3$A$ and 4$M$ polytypes are present in sapphirine from Finero, Italy. J.L.J.

Stibivanite-2O

The 2$O$ polytype of stibivanite (Sb$_2$VO$_6$) occurs as emerald-green acicular and fibrous crystals in a vein of dolomite at the Buca della Vena iron mine, Apuan Alps, Italy. Cell dimensions refined from the X-ray crystal-structure study are $a = 17.916(3)$, $b = 4.790(1)$, $c = 5.509(1)$ Å, space group $Pmcn$. Optically biaxial positive, pseudo-uniaxial, $n > 1.87$, $X = a$, $Y = b$, $Z = c$. The X-ray powder pattern has strongest lines of 9.00(m,200), 4.62(m,110), 3.097(s,311), 2.986(ms,600), 1.871(m,620), and 1.747-(mw,911). Stibivanite as described originally is the monoclinic polytype and is designated as stibivanite-2$M$. J.L.J.

Yafsoanite

Crystal-structure analysis of yafsoanite gave cubic symmetry, $a = 12.632(2)$ Å, space group $Ia3d$, $R = 0.075$, $R_w = 0.028$. The formula is Ca$_x$Te$_y$Zn$_z$O$_8$, with $Z = 8$. The formula, space group, and cell contents are new. J.L.J.