NEW MINERAL NAMES*

PETE J. DUNN, LOUIS J. CABRI, JAMES A. FERRAILOLO, JOEL D. GRICE, JOHN L. JAMBOR, WOLFGANG MUELLER, JAMES E. SHIGLEY, JACEK PUZIEWICZ, AND DAVID A. VANKO

Bismutostibiconite*


Quantitative analysis (electron beam instrument with standardless EDS) of the mineral gave Fe₂O₃ 6.9, Bi₂O₃ 49.2, Sb₂O₃ 43.9, sum 100.0%, corresponding to Fe₃ₓBi₇₋ₓSb₁₋ₓO₇, a Bi and Fe containing member of the stibiconite group.

X-ray camera studies show the mineral to be cubic, Fd₃m, a = 10.38Å, Z = 8, D calc. 7.38. The strongest X-ray lines (12 given) are 3.01(10[222]), 2.60(7)[400], 1.833(7)[440], 1.565(7)[622].

The mineral is always anhedral and forms yellow to yellowish-brown, rarely greenish, earthy crusts on quartz, barite and variegated sandstone. Sometimes it is in association with corrodite and tetrahedrite-tenantite. It has no cleavage and a probable hardness of 4-5. Optically isotropic with nₑ 2.09 ± 0.01.

It is a secondary mineral that occurs as encrustations on samples from the Clara mine and from the mine dumps at Neubulach in the Black Forest. In the district of Neubulach it is intergrown with bayerite, atelestite and preisingerite. The mineral is an alteration product of Bi-containing tetrahedrite-tenantite.

The name is derived from its being a Bi member of the stibiconite group. W. M.

Cabriite*


Analyses by six analysts using three different electron microprobes gave Pd 55.5, 51.0, 51.4, 49.5, 53.5, 52.1; Pt - , 1.0, 3.3, 7.1, 3.7, 2.6; Sn 27.5, 30.0, 28.0, 29.2, 29.5, 30.0; Cu 16.0, 16.0, 12.7, 15.2, 15.3, 16.2, Ag - , 2.0, 0.5, - , - ; Sb 2.2, 1.0, 1.4, - , - , - ; totals 101.2, 101.0, 97.3, 101.0, 102.0, 100.9%; corresponding to a general formula of (Pd, Pt)₃Sn,Sb,Cu or, ideally, Pd₂SnCu.

X-ray study (Gadolfini camera, Fe radiation) shows that the mineral may be indexed as orthorhombic, space group Pnma, a ~ b ~ 7.88 (5), c = 3.94(2)Å, Z = 4, D calc. 11.1 (4th analysis), for ideal composition D calc. 10.7. The strongest X-ray lines (18 given) are 2.29(10)[221], 2.17(9)[230,301], 1.840(3)[330,112], 1.434(3)[151], 1.230(8)[161,450,502,342,123], 1.217(4)[152], 1.182(3)[223,261].

Cabriite is characteristically found in massive Cu-Ni sulfide ores of the Oktyabr’ sk deposit (Noril’sk district, USSR), especially those rich in moohoeitke, putoaneite and talnakhite. The mineral is white with a slight greyish (pinkish?) tinge the brightness of the pink color changes depending on the host minerals. Bireflectance in air is detectable, and under crossed nicols, cabriite grains are strongly anisotropic (from greyish brown to golden colors). Cabriite characteristically exhibits a shreddy-aggregate texture, and individual grains are polysynthetically twinned. Reflectance values are given for three grains and for analysis No. 1 (R₂₋,R₁,mm) 43.0, 42.4, 44.0; 43.4, 43.0, 46.0; 44.7, 44.0, 48.0; 46.5, 45.5, 50.0; 48.4, 46.8, 52.0; 50.0, 48.2, 540; 51.7, 50.0, 56.0; 53.2, 51.4, 58.0; 55.2, 53.2, 60.0; 57.2, 55.0, 62.0; 59.4, 57.2, 64.0; 61.9, 59.0, 66.0; 64.5, 62.0, 68.0; 67.0, 64.8, 700; 69.3, 63.7, 720; 71.9, 70.0, 74.0. Micro-indentation hardness with a 5 g load was 272(258–282).

The name is in honor of Canadian mineralogist, Louis J. Cabri. Polished sections with cabriite are preserved in the Mineralogical Museum of the Academy of Sciences of the USSR, in the Mineralogy Laboratory of IGEM, Academy of Sciences of the USSR, both in Moscow and in the National Mineral Collection, Geological Survey of Canada, Ottawa. L. J. C.

Ferronickelplatinum*


Analyses of six grains in one polished section by electron microprobe gave Pt 75.7–77.6, Fe 10.4–11.0, Ni 10.2–11.7, Ir 0.27–0.69, Cu 0.33–0.36, totals 98.41–100.76 corresponding to (Pd₁₋₀₅,Fe₀₁₋₀₂)₂(Cu₀₂₀₆,Fe₂₀₆,Co₀₂₀₆) or, ideally, Pd₂SnCu. Analyses of another 4 grains gave variable but low contents of Ru, Rh, Pd and Co and also suggest a continuous series with tulameenite because of variable Cu/Ni contents.

X-ray powder data (Fe radiation) shows that the pattern is similar to tetraferroplatinum and tulameenite so that it is indexed as tetragonal, a = 3.87(4), c = 3.63(5)Å, Z = 1. The strongest X-ray lines (14 given) are 2.192(10)[111], 1.935(5)[020], 1.699(3)[021], 1.324(4)[022], 1.157(3)[013].

The mineral was found in the heavy fraction of Quaternary alluvial deposits associated with ultramafics from the ophiolite belt of the Koryak-Kamchatska folded region, northeastern USSR. It occurs in intergrowths of platinum-group minerals which occur as unrounded or slightly rounded (nodule-like) grains ranging in size from 0.2–4.5 mm. Ferronickelplatinum occurs as a minor constituent, together with isoferroplatinum

* Minerals marked with asterisks were approved before publication by the Commission on New Minerals and Mineral Names of the International Mineralogical Association.
and tetraferroplatinum in intergrowths which may consist up to 90–95% of ruthenium dioxide and a solid solution of (Pt, Ru, Ir, Os) of up to 30–70%. The Pt–Fe–Cu–Ni minerals also contain inclusions of laurite, irarsite, cooperite, sperrylite, honingworthite and unnamed RhAs and RhNiAs. Chromite and olivine are also intergrown. Monomineralic areas of the new mineral do not exceed 0.15 mm. It is intensely etched only by hot aqua regia.

The mineral is ductile, polishes well and fragments are silver-white with a metallic luster. In polished section the mineral has a rosy-cream color, imperceptible bireflectance and is weakly anisotropic. Reflectance values (for the grain whose analysis is reported above) are (R'/nm) 56.5, 420; 56.4, 440; 56.8, 460; 56.9, 500; 57.0, 520; 57.4, 580; 57.7, 550; 58.2, 600; 58.7, 620; 59.0, 640. The strongest X-ray lines are: 4.64 (000), 3.24 (1011), 3.20 (1002), 3.03 (900), 2.98 (1100), 2.95 (1010), 2.91 (1011), 2.88 (1012), 2.86 (1013), 2.83 (1014), 2.79 (1015), 2.76 (1016), 2.73 (1017), 2.70 (1018), 2.67 (1019), 2.64 (1020), 2.61 (1021), 2.58 (1022), 2.55 (1023), 2.52 (1024), 2.49 (1025), 2.46 (1026), 2.43 (1027), 2.40 (1028), 2.37 (1029), 2.34 (1030), 2.31 (1031), 2.28 (1032), 2.25 (1033), 2.22 (1034), 2.20 (1035), 2.17 (1036), 2.14 (1037), 2.11 (1038), 2.08 (1039), 2.05 (1040), 2.02 (1041), 1.99 (1042), 1.96 (1043), 1.93 (1044), 1.90 (1045), 1.87 (1046), 1.84 (1047), 1.81 (1048), 1.78 (1049), 1.75 (1050), 1.72 (1051), 1.69 (1052), 1.66 (1053), 1.63 (1054), 1.60 (1055), 1.57 (1056), 1.54 (1057), 1.51 (1058), 1.48 (1059), 1.45 (1060). The strongest line (74 given) (Z = 2) are: 4.64 (000), 3.24 (1011), 3.20 (1002), 3.03 (900), 2.98 (1100), 2.95 (1010), 2.91 (1011), 2.88 (1012), 2.86 (1013), 2.83 (1014), 2.79 (1015), 2.76 (1016), 2.73 (1017), 2.70 (1018), 2.67 (1019), 2.64 (1020), 2.61 (1021), 2.58 (1022), 2.55 (1023), 2.52 (1024), 2.49 (1025), 2.46 (1026), 2.43 (1027), 2.40 (1028), 2.37 (1029), 2.34 (1030), 2.31 (1031), 2.28 (1032), 2.25 (1033), 2.22 (1034), 2.19 (1035), 2.16 (1036), 2.13 (1037), 2.10 (1038), 2.07 (1039), 2.04 (1040), 2.01 (1041), 1.98 (1042), 1.95 (1043), 1.92 (1044), 1.89 (1045), 1.86 (1046), 1.83 (1047), 1.80 (1048), 1.77 (1049), 1.74 (1050), 1.71 (1051), 1.68 (1052), 1.65 (1053), 1.62 (1054), 1.59 (1055), 1.56 (1056), 1.53 (1057), 1.50 (1058), 1.47 (1059), 1.44 (1060).

Cleavage and fracture are perfect on (110) and imperfect on (001). Optically biaxial, positive, 2V = 90°, strong dispersion r << v. It is colorless, transparent. Luster vitreous. Cleavage {110} perfect, {001} imperfect. Optically biaxial, positive, 2V = 90°, strong dispersion r << v. It is colorless, transparent. Luster vitreous. Cleavage {110} perfect, {001} imperfect. Optically biaxial, positive, 2V = 90°, strong dispersion r << v. It is colorless, transparent. Luster vitreous. Cleavage {110} perfect, {001} imperfect. Optically biaxial, positive, 2V = 90°, strong dispersion r << v.

Keivite occurs as elongated platy and prismatic crystals within violet fluorite in amazonitic pegmatites of the Kola Peninsula. Polyhedral twins are common. Two generations of the mineral are present. It is associated with fluortite, bastnaesite and hingganite.

The name is for the place Keiva in the Kola Peninsula. Type material is at the A. E. Fersman Mineralogical Museum, Acad. Sci. USSR (Moscow). J. P.


Analysis by electron microprobe (Li_2O by atomic absorption) gave Ta_2O_5 71.55, Nb_2O_5 24.96, SnO_2 0.57, Li_2O 2.33, sum 99.41%, corresponding to Li_0.25Ta_0.92Nb_0.04O_6. IR spectra show a broad absorption band from 600 to 700 cm^{-1}, containing two weak maxima, and several additional bands. The spectra are complicated, however, by mineral inclusions.

X-ray study shows the mineral to be monoclinic, space group P2_1/c, unit cell a = 7.444, b = 5.044, c = 15.255Å, β = 107.18°, Z = 4, D calc. 7.08, meas. 7.0. The strongest lines (74 given) are: 2.96(100) (212, 014), 1.772(60) (206), 1.722(80) (226), 1.45(80) (223, 226, 221, 10).
The mineral forms equant, poorly formed crystals up to 0.4 mm, in thoreaulitized edge zones of microcline-albite pegmatites of Eastern Kazakhstan. Associated minerals are cassiterite, renkamaite and thoreaulite, and rare fractures through lithiandite contain lepidolite, apatite and albite. Lithiandite is colorless, transparent, but stained creamy pink and brownish pink by cassiterite inclusions. Luster adamantine, fracture conchooidal to uneven, moderately brittle, cleavage absent, H 6-6.5. Microhardness measured with a 40 g load: 1200 kg/mm². Weak yellow-green cathodoluminescence, no ultraviolet luminescence. StrongTe₁⁻ₓS₂⁺ (where x = 0.08 to 0.33, and y = -0.11 to 0.09).

Phosphofibrite


Combined electron microprobe and microchemical analyses gave K₂O 1.9, CuO 2.6, Fe₂O₃ 46.6, Al₂O₃ 1.5, P₂O₅ 34.0, H₂O 13.4 (by difference), sum 100.0%, corresponding to K₁₀₀Cu₁₀₀Fe₁₀₀PO₄₁₂(OH)₁₂·3H₂O, or ideally KCuFe(OPO₄)₁₂(OH)₁₂·3H₂O. The mineral is relatively soluble in cold HCl but is unaffected by warm dilute HNO₃.

X-ray study shows the mineral to be orthorhombic, space group Pbnm or Pnmm, unit cell a = 14.40, b = 18.76, c = 14.04Å, Z = 2. The strongest lines (29 given) are: 3.15(10)(020), 2.29(7)(100), 2.13(60)(203), 2.33(50)(024), 2.99(50)(061,431,151,133), 2.77(50)(252,233,313,501,261,454,220,511,114).

Phosphofibrite occurs as radial aggregates of fibrous crystals reaching 0.5 mm in length among the secondary minerals at the Clara mine in the central Black Forest, Germany. It is found with beraunite, strengite, and barium-pharmacosiderite on quartz. It has a submetallic luster and is typically twinned in thick parallel lamellae or as interpenetration twins.

Protojoseite


Examination of 24 museum samples from 13 deposits worldwide shows that joseite (joseite A) corresponds well with the theoretical formula Bi₂Te₂S₅ and that mutual substitution of Te for both Bi and S extends the solid-solution field to Biₓ₋₀.ₐₓ₋₀.ₐₕ₋₀.ₐₜ, (where x = 0.08 to 0.33, and y = -0.11 to 0.09). Substitutions of Pb for Bi, and Se for S are minor. Joseite B, theoretically BiₓTe₁₋ₓS₂₋ₕ_, shows a field of solid solution corresponding to Biₓ₋₀.ₐₓ₋₀.ₐₕ₋₀.ₐₜ (where x = -0.04 to 0.11). A third sulfotelluride, protojoseite, was found in two samples from Rezbanya, Roumania, and in two from the Malishevskii Izumrydrye pit, Uralis; eight microprobe analyses gave compositions which indicate that the theoretical formula, BiₓTeS₅, extends to Biₓ₋₀.ₐₓ₋₀.ₐₕ₋₀.ₐₜ (where x = -0.02 to 0.14, and y = -0.05 to 0.17). Substitutions of Pb for Bi, and Se for S are minor. The solid solution fields of joseite A, joseite B, and protojoseite do not overlap; the individuality of the three minerals also is suggested by their coexistence in one sample.

The crystal structure of joseite A was determined by M. A. Peacock in 1941: hexagonal, R₃m, a = 4.25, c = 39.77Å. The structural motif, strongly reflected in systematic variations in the X-ray powder pattern, leads to a dimensionally similar cell, but different space group, for joseite B. The X-ray pattern of protojoseite is reminiscent of that of joseite-B, but many lines are displaced, split, or new. The strongest lines for protojoseite (57.3 mm camera, Fe rad.) are: 3.15(10)(010·10), 2.29(7)(10·10), 1.571(4)(20·20), 1.441(4)(1·2·3·0), 1.379(4)(2·3·1·0), 1.251(4)(3·0·3·0). Utilization of the basic structural motif and indexing of powder patterns from four protojoseite samples gave a hexagonal cell with a = 4.330 to 4.340, c = 57.65 to 58.19Å; assuming Z = 6 and 5 atoms in the formula, D calc. is 8.48 to 8.52 g/cm³. Calculated densities of joseite-A and joseite-B are in this range, but with Z = 3.

Strontio-chevkinite


Analyses by electron microprobe gave (average of 32 analyses) TiO₂ 23.16, SiO₂ 20.45, ZrO₂ 10.3, FeO 6.0, CaO 2.0, SrO 19.6, La₂O₃ 9.18, Ce₂O₃ 9.35, and minor amounts of Nb₂O₅, Al₂O₃, Cr₂O₃, MnO, MgO, BaO, Na₂O, K₂O, PbO, and Y₂O₃ (totaling 0.84%), sum = 100.85%, corresponding to (Sr₂[La₉·₄Ce₃·₄]ₙ₉·₄Fe₆·₄Fe₃·₆)[Ti₆(Zr)₂]₁₅Si₁₅O₁₁₂, the strontium analog of chevkinite.

X-ray study shows the mineral to be monoclinic, space group P2₁/a, with a = 13.56, b = 5.79, c = 11.10Å, β = 100.32°, V = 844.86Å³. The strongest X-ray diffraction lines (34 given) are: 3.01(100·401), 1.97(75·024), 2.19(70·421), 2.51(40·022), 2.73(30·004), 2.85(25·020)Å. Calculated density is 5.44 g/cm³.

The mineral is opaque in 30 μm polished thin sections, gray in reflected light, and strongly anisotropic in shades of gray, with a characteristic flesh-red color. Reflectivity is estimated, by comparison with strontian-loparite, at ≈10% in air and ≈2% in oil. It has a submetallic luster and is typically twinned in thick parallel lamellae or as interpenetration twins. Strontio-chevkinite occurs as rounded grains, up to 1.5 mm in

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The name is for the chemical composition. Samples with more or less perfect cleavage along one pinacoid. H about 4. D is yellow or yellowish green, weakly translucent, luster vitreous, n = 1.755, ½v = 1.790 (both t0.004), 2.90 (hydrostatic suspension), 2.94 (calc.) from X-ray data.
diameter, associated with strotian-lorpatite (tazonite) and lamprophyllite in fenite from Sarambi, Paraguay.

The name is from the chemical and crystallographic relation to chevikinite. Type material is deposited at the Smithsonian Institution, Washington, D. C., and the British Museum (Natural History), London. J. A. F.

**Tantite**


Analysis by electron microprobe gave Ta$_2$O$_5$ 98.28, Nb$_2$O$_5$ 1.36, TiO$_2$ 0.08, sum 99.72%, corresponding to (Ta$_{1.92}$Nb$_{0.045}$)Ta$_{0.004}$O$_2$. Backscattered electron images and maps of characteristic X-rays indicate a high degree of homogeneity for the major elements.

X-ray study shows the mineral to be triclinic, unit cell $a = 3.80(2)$, $b = 3.79(2)$, $c = 35.74(4)\,\AA$, $\alpha = 90.92^\circ$, $\beta = 90.18^\circ$, $\gamma = 90^\circ$, $Z = 6$, D calc. 8.45. The strongest lines (33 given) are 3.01(100b)(017), 2.429(50)(T6), 1.844(90b)(024,T0.17), 1.573(80)(02.13), 1.004(50)(T5.19.25.11).

The mineral forms veinlets 0.5 mm long and 0.02 mm wide, and 0.04 to 0.05 mm lenticular segregations, as well as interstitial material in microlite crystal aggregates, in granitic pegmatites of the Kola Peninsula. Associated minerals are stibiotantalite, holtite, and a Ca$^{4+}$Al$_2$O$_7$ phase. Tantite is colorless, transparent, adamantine luster, cleavage absent. Microhardness measured with a 20 g load is 1300 MPa. Weak blue cathodoluminescence, no ultraviolet luminescence. In reflected light, greyish-white and yellow-brown to colorless, vitreous luster, transparent and translucent. Cleavage perfect [001]. Microhardness determinations under a load of 40 g vary, according to orientation, from 400 to 750 kg/mm$^2$. Reflectance varies from 9.0 to 12.0%, according to crystal orientation and wavelength. Optically uniaxial, negative, $n_\rho = 1.854$, $\epsilon = 1.757$ (both $\pm 0.002$). No cathodoluminescence or ultraviolet luminescence.

The name is for the Tusion River, near the occurrence. Samples containing tusionite are in the Mineralogical Museum, Acad. Sci. USSR, Moscow. D. A. V.

**Tusionite**


Analysis by electron microprobe gave MnO 20.46, FeO 3.57, CaO 0.39, SnO$_2$ 52.45, B$_2$O$_3$ 23.51, H$_2$O not detected, sum 100.39, corresponding to (Mn$_{0.84}$Fe$_{0.15}$Cu$_{0.02}$Sn$_{0.02}$B$_{1.07}$O$_6$). The DTA curve shows endothermic peaks up to 1050$^\circ$C, as well as minor shifts owing to displacement of BO$_3$ groups as a result of the Fe content of natural tusionite.

X-ray studies by powder diffractometry and single crystal techniques show the mineral to be trigonal, space group P$\overline{3}$, $a = 4.787(2)$, $c = 15.30(0.02)\,\AA$, $Z = 3$, D calc. 4.85, meas. 4.73. The strongest lines (21 given) are 3.65(90)(012), 2.818(100)(014), 2.393(60)(110), 1.999(60)(022), 1.744(80)(116). Isosstructural with dolomite.

The mineral occurs as lamellar intergrowths up to 1.5 cm with tetrawickmanite, and as small tabular crystals in miarolitic cavities associated with tourmaline, danburite, hambgerite, quartz, orthoclase and albite, in the axis of granitic pegmatites. The pegmatites cut Precambrian garnet–biotite gneiss in the Tusion River valley of the Pamir mountains. The mineral is yellow-brown to colorless, vitreous luster, transparent and translucent. Cleavage perfect [001]. Microhardness determinations under a load of 40 g vary, according to orientation, from 400 to 750 kg/mm$^2$. Reflectance varies from 9.0 to 12.0%, according to crystal orientation and wavelength. Optically uniaxial, negative, $n_\rho = 1.854$, $\epsilon = 1.757$ (both $\pm 0.002$). No cathodoluminescence or ultraviolet luminescence.

The name is for the Tusion River, near the occurrence. Samples containing tusionite are in the Mineralogical Museum, Acad. Sci. USSR, Moscow. D. A. V.

**Vyuntspakhite**


Microprobe analyses gave (crystals of first generation and crystals of second generation—in one specimen, crystals of second generation from voids, crystals of second generation from veinlets, respectively): Y$_2$O$_3$ 17.76, 21.18, 23.13, 34.66; Yb$_2$O$_3$ 22.80, 17.70, 15.65, 15.35, 7.03; Er$_2$O$_3$ 6.86, 6.31, 6.58, 3.22; Dy$_2$O$_3$ 2.67, 3.93, 3.84, 1.65; Lu$_2$O$_3$ 3.40, 2.10, 2.49, 0.89; Tm$_2$O$_3$ 2.05, 1.92, 1.61, 1.70; Gd$_2$O$_3$ 0.28, 0.61, 0.32, 0.24; Ho$_2$O$_3$ 0.22, 0.23, 0.67, 0.32; Tb$_2$O$_3$ 0.37, 0.31, 0.27, 0.00; Al$_2$O$_3$ 13.64, 13.69, 12.85, 14.39; SiO$_2$ 26.15, 27.84, 29.14, 31.64; H$_2$O (by difference) 3.90, 4.23, 3.75, 5.26, sum 100.00 in all. IR spectrum shows the presence of SiO$_4$, AlO$_4$ and AlO$_5$ polyhedra in the structure. The ideal formula of the mineral is Y$_2$Al$_2$Si$_6$O$_{18}$(OH)$_3$.

Single crystal X-ray study shows the mineral to be monoclinic, space group $P2_1/c$, $a = 5.830(2)$, $b = 14.763(4)$, $c = 6.261(2)\,\AA$, $\beta = 123.05(2)^\circ$, $Z = 1$, D calc. 4.04, meas. 4.02. The strongest X-ray lines (85 given) are: 7.40(6)(020), 4.98(6)(111), 4.92(6)(110), 3.47(6)(031), 2.604(8)(200.212).

The mineral is colorless, transparent. Luster adamantine. No cleavage. Brittle. H 6-7. Optical axial, positive. 2V meas. 68°, calc. 66°, optical axes plane (010), $\alpha = 1.680$, $\beta = 1.692$, $\gamma = 1.720$, $Z = 6$, $a = 68^\circ$, $X / c = 40^\circ$. No fluorescence in UV light. Varieties rich in Y have faint yellow-green luminescence in cathode rays.

Vyuntspakhite forms 0.5–0.7 mm long and 0.05–0.2 mm thick slender prismatic crystals in small cavities within violet fine-grained fluorite in amazonite pegmatites of the Kola Peninsula. It is associated with fluorite, xenotime, and bastnaesite. Two generations of the mineral were found.

The name is for the mountain Vyuntspakh in the Kola Peninsula. Type material is at the A. E. Fersman Mineralogical Museum Acad. Sci. USSR (Moscow). J. P.

**Walentaite**

New mineral names


Chemical analysis of the mineral gave Al2O3 13.84, Fe3O5 7.19, FeO 0.29, MgO 1.69, CaO 2.92, Na2O 0.39, K2O 2.41, H2O 6.93, SO3 49.51, insol. res. 15.1, total 100.22%. After deduction of contaminating gypsum, quartz and kieserite, this yields (Al1.52,Fe0.29)2(Fe2+0.04)(SO4)3 • 1.2H2O, or ideally Al2(OH)(SO4)2 • H2O.

The DT curve exhibits a small endothermic peak at 100°C (evolution of hygroscopic H2O), and a significant reaction at 840°C (evolution of SO3). The infrared spectra has bands at 3450, 1650, 1125, and 600 cm⁻¹. No X-ray data given.

It occurs as a white, light, porous, pumiceous mineral covering joint walls in coal-bearing rocks at points of seepage of hot gases from spontaneously-ignited spoil heaps of coal mines in the L'vov-Volyn' basin, U.S.S.R., associated with millosevichite, (Al1.52,Fe0.29)(SO4)3 • 1.2H2O, or ideally Al2(OH)(SO4)2 • H2O.

The mineral is insoluble in H2O, dissolves in dilute HCl. When stored in the laboratory, the monohydrate is transformed into two higher hydrates containing 10 and 13.5 H2O. Chemical analyses and physical properties are given for these two phases.

Discussion

A white hexagonal mineral, Al2(SO4)3, was reported from burning anthracite mines and dumps in Pennsylvania [Amer. Mineral. 66, 1279(1981)]. J.A.F.

Unnamed freudenbergite-related mineral


Microprobe analysis of the mineral gave TiO2 80.10, 80.75;
The mineral forms a very “distinctive gray” optically anisotropic mantle (50–150 μm) thick on cores of rutile. No other mineral data are provided.

It is concluded that this is the ferrous iron analog of freudenbergite [Na₂(Ti,Fe)OsO₆]; however, the lack of X-ray data prevents the confirmation of this identification.

The mineral is intimately associated with rutile, perovskite, titanite, and ilmenite in lower crustal garnet-clinopyroxene-plagioclase xenoliths entrained in a kimberlite from Liberia. The kimberlite field lies along the 11° W parallel, 7–8° N latitude in the southern portion of the West Africa bulge. These bodies are Cretaceous (=129 m.y.), are diamond-bearing, and are present in both pipes and dikes. W.M.

**Unnamed hydrous Fe-Mg-aluminosilicate**


Electron microprobe analysis (median of 4 analyses) of an alteration product of cordierite from the Champirar Dome, Malawi, yielded SiO₂ 40.0, Al₂O₃ 36.0, FeO 5.4, MnO 0.06, MgO 5.6, CaO 0.8, Na₂O 0.3, K₂O 0.3, TiO₂ 0.01, H₂O 11.5 (by difference), total 99.96%. A similar analysis is given for a substance that is found after biotite, or more probably, after replacement of the biotite with cordierite and the subsequent alteration. The substance in both instances is pale yellow in thin section, n = 1.565, G = 2.51 ± 0.02. X-ray diffraction pattern (no lines given) showed lines characteristic of a dioctahedral kaolinite-group mineral.

The cordierite is associated with quartz, orthoclase microperthite, sodic plagioclase, almandine, biotite, sillimanite, magnetite, hercynite, corundum, ilmenite and hematite. J.A.F.

**Unnamed palladium bismuthotelluride(s)**


Numerous small (<50 μm) anhedral inclusions of an unnamed palladium bismuthotelluride occur in bornite and chalcopyrite from the Konttijärvi intrusion. The grains have high reflectance, a creamy white color, and strong anisotropy with yellow and greenish-violet colors in air. The mineral is also distinctly softer than chalcopyrite. Probe analyses of three grains gave: Pd 37.60, 33.11, 33.65; Pt 0.50, 0.77, 0.77; Au 0.20, 0.20, 0.20; Ag 0.48, 0.48, 0.48; Cu 0.39, 0.39, 0.39; Ni 0.60, 0.60, 0.60; Fe₂⁻, Fe³⁺, 0.30, 0.30, 0.30; Te 43.10, 43.10, 43.10; Bi 19.10, 19.10, 19.10; Sb 0.30, 0.30, 0.30; S 0.30; 0.30, 0.30; 0.30; 0.30; sums 102.83, 99.45, 99.45. These have been calculated to empirical formulae of [(Σcations)₉(Σanions)₉][(Σcations)₉(Σanions)₉], and Σ(Σcations)₉(Σanions)₉ suggesting an "unknown solid solution Pd₅Bi₃PdTₐ₈ in the system Pd–Bi–Te".

**Discussion**

Phases with the suggested stoichiometry have not been reported in phase equilibrium studies of the Pd–Bi–Te system. L.J.C.

**Unnamed Pb-Sb-As sulfosalts**


Microprobe analyses of two sulfosalts found in the Kalliolasalo antimony deposit, Seinajoki district, Finland, named Mineral Y and Mineral Z, gave the following: Mineral Y: Pb 10.0, Sb 59.7, As 15.4, S 14.9, total 99.9%, yielding Pb₂Sb₂As₂S₈, and Mineral Z: Pb 17.7, Sb 56.9, As 11.9, S 15.0, total 101.4%, yielding Pb₂Sb₂As₃S₉. Mineral Y occurs as irregular shaped grains up to 0.1 mm in contact with Pääkkönenite. Mineral Z occurs with zinkinite as grains about 0.1 mm in size. No other data given. J.A.F.

**Unnamed phosphate of U(IV)**


Microprobe analyses gave: dark-green variety (average of 5) UO₂ 76.91, CaO 0.62, P₂O₅ 17.13, H₂O (by difference) 5.34, sum 100.00, green variety (average of 2) UO₂ 68.69, CaO 0.53, P₂O₅ 17.0, H₂O (by difference) 13.78, sum 100.00. This yields the chemical formulas ([U₁₋₄Ca₀₋₄(OH)₁₋₄]₂₂P₂O₄(OH)₁₋₄)₁₋₄.₂₋₄H₂O. X-ray and electronographic study show the mineral to be orthorhombic, a = 6.96 ± 0.01, b = 9.10 ± 0.01, c = 12.38 ± 0.01 Å, space group Cmcm, Cmc2₁, or C2cm. The strongest X-ray lines (17 given) are: 6.19(10)(002), 4.56(6)(020), 4.13(6)(112), 2.69(7)(211), D meas. 4.6–5.2.

The mineral occurs as green or dark-green platy crystals or spherulitic aggregations on quartz crystals. It is associated with pyrite. The mineral is weakly pleochroic in green colors, γ = 1.731–1.729, β = 1.729–1.726, α = 1.700, Z elongation, cleavage {010}. J.P.

**Unnamed RhAs**


Analysis by electron microprobe gave Rh 55.2, Ru 1.72, Pt 0.41, Ni 0.26, As 41.5, sum 99.09. The mineral is associated with ferronickelplatinum found in alluvial deposits derived from ultramafics in the northeastern USSR. L.J.C.

**Unnamed RhNiAs**


Analyses by electron microprobe gave Rh 43.5, Ni 24.2, Pt 0.50, Ir 0.56, As 30.6, sum 99.36. The mineral is associated with ferronickelplatinum in alluvial deposits derived from ultramafics in the northeastern USSR. L.J.C.

NEW DATA

Derriksite

Crystal structure analysis of derriksite from the Musonoi deposit, Shaba province, Zaire, indicated the true chemical formula is that given above. The originally reported water in the formula was actually absorbed and not structurally bonded. The studied crystal is orthorhombic, $Pn2_1m$, with $a = 5.570(2), b = 19.088(8), c = 5.965(2)\text{Å}$, $Z = 2$. The final $R$ value is 0.031.

J.D.G.

Jarlile

Refinement of the crystal structure of jarlile from Ivigtut, Greenland, has shown it to be monoclinic, space group $C2/m$, unit cell $a = 15.942(4), b = 10.821(5), c = 7.421(2)\text{Å}$, $\beta = 101.86(2)^\circ$, $V = 1222.5\text{Å}^3$. Previous chemical formulae of jarlile are incorrect, since Mg and OH are essential constituents. The general formula is $\text{Na}_2(Sr,\text{Na})_m\text{Al}_2(\text{Mg,}\Box)_n\text{F}_n(\text{OH,}\text{H}_2\text{O})_4$, with some additional replacement of Sr by Ca, Ba, and K. The jarlile structure consists of corrugated (100) sheets of corner-linked Al, Mg, and Na octahedra, intersecting (001) sheets of 9- and 10-coordinated (Sr,Na) polyhedra. This densely packed structure is not closely related to that of any of the previously described aluminofluorides. J.E.S.

Schuilingite

Analysis by microprobe and TGA ($\text{H}_2\text{O}$ and $\text{CO}_2$) of a new occurrence of schuilingite gave $\text{PbO} 37.22$, $\text{CuO} 11.45$, $\text{Nd}_2\text{O}_3$ 17.45, $\text{Gd}_2\text{O}_3$ 3.18, $\text{Dy}_2\text{O}_3$ 3.51, $\text{CO}_2$ 22.60, $\text{H}_2\text{O}$ 5.10, sum 100.51. The formula agrees well with material from Menda and Kasompi but there are fewer rare earth elements.

X-ray study on the sample gave orthorhombic space group $Pmcn$, $a = 7.43, b = 18.89$ and $c = 6.40$. There were additional lines in the X-ray powder data when compared with JCPDS 25-133.

The mineral occurs as transparent prisms. Optically biaxial negative, $n_\alpha = 1.770, n_\beta = 1.795, 2V = 75, X = a Y = c$. J.D.G.

Upalite*

New single crystal X-ray data show the mineral is monoclinic, space group $P2_1/a$, unit cell $a = 13.704(4), b = 16.82(1), c = 9.332(2)\text{Å}, \beta = 111.5(1)^\circ$, $Z = 4$. Crystals always have fine lamellar twinning by reflection on $[001]$ giving pseudo-orthorhombic symmetry. New density measurement gives 3.9(1), calculated 3.94. The formula given above is based on a crystal structure with refinement to $R = 0.049$. J.D.G.