NEW MINERAL NAMES*

MICHAEL FLEISCHER, G. Y. CHAO AND J. A. MANDARINO

Arsenocrandallite*


Microprobe analysis gave As2O5 22.9, P2O5 10.7, Al2O3 28.7, Fe2O3 1.2, CaO 6.9, SrO 6.0, BaO 4.3, CuO 1.8, ZnO 0.3, Bi2O3 2.4, SiO2 3.2, H2O (loss on ignition) 11.7, sum 100.1% corresponding to (Ca0.61Sr0.29Ba0.14Bi0.031CaU0.11Fe0.07 Zn0.02)1.99 (As0.99 P0.75 Si0.26)2.00 H6.44 O13.63, or (Ca, Sr)Al[(As, P)O4]2(OH)6. Spectrographic analysis showed small amounts of Na, K, and Cl. A second sample is nearly free of Ba and P. The mineral is partly dissolved by cold 1:1 HCl or HNO3, dissolved slowly by hot 1:1 HCl.

The strongest X-ray lines (21 given) are 5.84(101,111), 3.55(9)(1120,1014), 2.99(104)(0221,1123,0115), 1.919 (5)(1225,0227,0009), 1.769(6)(2240,2028). Calculated cell constants are: hexagonal setting a = 7.08, c = 17.27 Å, Z = 3; rhombohedral setting a = 7.06 Å, α = 60.18°, Z = 1, the second sample had a = 7.06, c = 17.22 Å, or a = 7.04 Å, α = 60.19°.

The mineral forms reniform crusts and spherulitic aggregates up to 0.1 mm. Color blue to bluish-green, luster vitreous. No cleavage, fracture conchoidal, H ~ 5½, D meas. 3.25±0.1, calc. 3.30. Isotropic to weakly birefringent, n (average) = 1.625±0.01, but rarely down to 1.600 and up to 1.650. Under the microscope may show triangular sectors.

The mineral was found on old dumps in the Neubulach mining district, Black Forest, Germany, associated with brochantite, chalcopyllite, paraunite, arseniosiderite, mansfieldite, and corroded tennantite.

The name is for the composition and relation to crandallite.

M.F.

Burtite*


The mineral occurs as octahedra (up to 2 mm across) with an earthy, yellow surface caused by alteration to varlamoffite. Burtite is colorless, has a vitreous luster, is very brittle with H about 3. It is non-fluorescent in ultraviolet light and has a good cubic cleavage. D meas. 3.28(1), calc. 3.22. Optically, burtite appears to be isotropic with n = 1.633 but thick grains are very weakly birefringent and show uniaxial positive interference figures.

Although single-crystal X-ray diffraction study showed no departure from cubic symmetry, the burtite unit cell is considered to be rhombohedral with space group R3, a = 8.128 Å, α = 90°, Z = 4 (a = 11.49, c = 14.08 Å in hexagonal setting). The strongest lines in the X-ray powder diffraction pattern are (in Å, for CoKα, indexing is based on the pseudo-cubic cell): 4.06(vs)(200), 1.814(s)(420), 1.657(s)(422), 0.9850(s)(820,644) and 0.9576(s)(822,660).

Electron microprobe analysis (with H2O calculated to provide the stoichiometric quantity of OH) gave SnO2 56.3, CaO 20.6, MgO 0.3, H2O 20.2, total 97.4 wt.%. These data give an empirical formula of (Ca0.98Mg0.02)3.0102Sn0.999(OH)6 or, ideally, CaSn(OH)6.

Burtite occurs in a garnetite in a tin skarn at 33°31'26" Long., 5°49'50" Lat. on the west bank of the Beht River in central Morocco. Associated minerals are: wickmanite, stokesite, datolite, pectolite, a member of the apophyllite group, varlamoffite, andradite, wollastonite, malayaite, clinoxyroxene and loellingite.

The name is for Prof. Donald M. Burt, Arizona State University.

M.F.

Caswell silverite*


Electron microprobe analysis gave S 46.3, Cr 37.4, Ti 0.18, Mn 0.08, Na 15.7, total 99.7%, corresponding to NaCr2S4. X-ray study shows it to be trigonal, space group R3m, a = 3.55, c = 19.5 Å, (hexagonal setting). The strongest X-ray lines are 6.49(7)(003), 2.60(10)(014), 2.07(8)(017), 1.910(8)(108), 1.779(8)(110), 1.465(6)(204), 1.134(6)(0.1.16).

The mineral occurs in anhedral grains up to 1 mm in size, associated with daubreelite, titanian trolleyite, alabandite, perryite, and another Na-Cr sulfide. Yellowish-gray to light gray, luster metallic. Pleochroic, O pale yellow, E gray in air; O pale greenish yellow, E dark gray in oil.

The name is for Caswell Silver, U. S. Geologist. M.F.

Chromium*


Analysis gave Cr 98.01, Fe 0.001, Cu 0.366, Zn 1.40, sum 99.78%, corresponding to Cr 98.59, Zn 1.12, Cu 0.28 atomic %. Cu and Zn are probably in substitution for Cr. The material is homogeneous, showing no evidence of exsolution, under reflecting and electron microscopes.
The mineral is white with a yellow tint under reflected light. It is isotropic without internal reflection. Reflectance data are 480 nm, 65.3; 546 nm, 67.9; 589 nm, 68.8; 656 nm, 70.0%.

The mineral occurs in artificial heavy sands of massive ores in the contact zone between ultrabasic rocks and siliceous marble in Sichuan, China. The mineral is finely granular (grain size about 20 μm), closely associated with another new mineral CuZn2 (Cu 32.52, Zn 67.47, sum 99.99%, or Cu1.0Zn2.0reo). The mineral CuZn2 forms rims around chromium. Other associated minerals are pyrrhotite, pentlandite, chalcopyrite, pyrite sulfur-senides and platinum group minerals. The name is for the composition. G.Y.C.

**Gruzdevite**


Electron microprobe analyses by E.P.S. on 6 samples gave (range and average) S 20.29-20.91, 20.44; Sb 25.29-27.22, 26.21; As 0.06-0.57, 0.37; Hg 32.23-33.23, 32.73; Fe trace-0.40, 0.29; Cu 19.26-20.77, 19.99, sum 98.93-101.00, 100.03%. The average corresponds to Cu(Hg)SbS3.12 (58, 562 (1973)). Gruzdevite is isotropic withновакштве.

X-ray study shows gruzdevite to be rhombohedral, a = 13.90 Å, c = 9.432 Å, Z = 3, α = 8.609 Å, α = 107.41°. Z = 1, D calc. 5.88.

The strongest X-ray lines (50 given) are 500 nm, 32.7; 660 nm, 31.9%. Microhardness = 2.60(50)(71~), 2.547(40)(711,112), 2.52(40)(222), 1.645(8)(621,523,315), 1.561(5) (651,911,625,317), 1.113(6)(654,914,318,10.1.2).

In reflected light the mineral is perfectly reflective. Anisotropy weak, AR ~ 0.06. Reflectances are given at 8 wavelengths, R = 460 nm, 33.1; 540 nm, 32.8; 580 nm, 32.7; 660 nm, 31.9%. Microhardness 295±5 kg/sq. mm at 30 g load. Cleavage absent.

The mineral occurs in the Chauvai Sb–Hg deposit, southern Kirgizia, intergrown with well-formed tetraedical crystals of actakhite, 0.2–4 mm in size, growing on stibnite and cinnabar in quality veinlets. It is associated with fluorite, calcite, barite, metacinnabar, and wurtzite. The actakhite crystals are zoned, with high Sb at the core, no Sb at the periphery.

The name is for the type locality, Brandy Gill, Cumberland, England, and on the Ingoda deposit, central Transbaikai, also contained a new mineral.

Electron microprobe analyses of 5 samples from the 2 local-0003–004X/82/0708–0855$00.50

**Ingodite**, (Griinlingite discredited)


During the study of numerous samples labelled “grünlingite”, all were found to consist of joseite or bismuthinite. A sample from the type locality, Brandy Gill, Cumberland, England, and one the Ingoda deposit, central Transbaikal, also contained a new mineral.

Electron microprobe analyses of 5 samples from the 2 local-0003–004X/82/0708–0855$00.50

The mineral is for the composition. G.Y.C.

**Kamaishilite**


Microprobe analysis (H2O by wet chemical analysis) gave SiO2 20.03, Al2O3 34.15, FeO 0.21, MgO 0.02, CaO 37.42, CuO 6.1, H2O* 6.1, H2O+ 0.2, sum 98.13%, corresponding to Ca9Fe2Al2Hg2O16 or Cu9Fe2Al2Hg2O16. A dimorph of bicchulite.

X-ray powder data are indexed on a tetragonal cell with a = 8.850, c = 8.770 Å, Z = 4. The strongest X-ray lines (28 given) are 3.607(100)(211,112), 2.799(85)(310,301), 2.777(40)(103), 2.547(40)(222), 2.085(30)(330,411), 1.557(35)(404).

The mineral occurs as grains about 0.1 mm in diameter. Colorless and transparent. No cleavage was observed. Optically nearly isotropic, n = 1.629, close to that of bicchulite. No conoscopic interference figure was observed.

The mineral occurs in vesuvianite skarn, associated with vesuvianite, “hydrogranite”, and small amounts of perovskite, calcite, magnetite, and chalcopyrite. It is apparently an alteration product of vesuvianite.

The name is for the Kamaish mine. M.F.

**Kyzylkumite**


Electron microprobe analysis (by V.V.P.) gave TiO2 61.7, V2O5 36.2, Cr2O3 1.2, FeO2 0.7, sum 99.8%, corresponding to (V1.85Cr0.14Fe0.06)Ti3O9 or V2Ti3O9. Titration with KMnO4 and with Mohr’s salt showed that V4+ and V5+ were absent. The mineral is insoluble in acids. The IR absorption spectrum is given. When heated to 320–390°C, the mineral is transformed into rutile.

Laue and oscillation studies showed the mineral to be monoclinic, a = 33.80±0.05 Å, b = 4.578±0.005 Å, c = 19.99±0.03 Å, β = 93.40±0.05°, Z = 18, D calc. 3.77, meas. 3.75±0.1. The strongest X-ray lines (23 given) are 3.70(80)(511), 2.92(100)(713), 2.60(50)(715), 2.19(48)(018), 1.692(50)(12.2.Å), 1.682(65)(028). The mineral is therefore a dimorph of schreyerite (63, 1182 (1978)).
The mineral is black, luster vitreous to resinous, opaque. Reflectances, \(R_g\) and \(R_p\) are given at 12 wave lengths: 480 nm, 15.7, 14.5; 540 nm, 16.05, 14.7; 580 nm, 16.2, 14.85; 640 nm, 16.5, 15.2%. Birefringence not noticeable visibly, anisotropy distinct, without color tints.

The mineral was found in fine veins cutting siliceous schists in "a deposit of Central Asia", associated with chlorite, pyrite, and rutile. Grains are 0.01–0.2 mm long and have prismatic habit, sometimes with pyramidal terminations and striations along the elongation. The name is for the locality (Kzyyl–Kum) (Uzbekistan). M.F.

**Mcnearite**


Analysis by atomic absorption (H_2O by thermogravimetry) gave As_2O_3 60.59, 57.80; CaO 25.27, 26.16; Na_2O 3.40, 3.40, H_2O 11.32, 11.32, sum 100.58, 100.68, giving \(Na_{1.99}Ca_{1.99}H_{3.91}(AsO_4)_4\cdot 3.24H_2O\). Dissolved by acids.

Precession and Weissenberg photographs showed the mineral to be triclinic, \(P1\) or \(P1\). \(a = 13.50, b = 14.10, c = 6.95\) Å., \(\alpha = 90^\circ, \beta = 92^\circ, \gamma = 119^\circ, Z = 2\) D calc. 2.85, meas. 2.60 (difference probably due to fibrous nature). The strongest X-ray lines (37 given) are 12.33(100)(010), 6.94(50)(001), 3.92(60)(300,123); 3.12(60)(122,122).

The mineral occurs as radiating fibers, length up to 1–2 mm. Color white, luster pearly. H. could not be measured. Optically positive. Cleavage perfect, parallel to the elongation. Mcnearite was found in specimens from Sainte-Marie-aux-Mines, Vosges, France, associated with micropharmacolite, pharmacolite, guerinite, and haidingerite. The name is for Miss Elizabeth McNear, mineralogist and crystallographer, University of Geneva. Type material is at the Museum of Natural History, Geneva. M.F.

**Muchuanite**


Electron microprobe and chemical analyses gave Mo 54.20, 52.88; S 36.60, 37.34, Fe 2.20, — Si 0.50, —; \(H_2O^+ \times 5.95, 6.03; H_2O^{-} 1.00, 2.07; \) summs 99.85, 98.32%, corresponding to \((Moo_{0.1}Fe_{0.7})_2S_2\cdot 0.59H_2O\) and \((Moo_{0.95}S_2\cdot 0.58H_2O\), or ideally \(MoO_2\cdot 0.5H_2O\). Electron microprobe analysis shows the presence of 0.26% Re and a homogeneous distribution of Mo. Infra-red analysis shows a distinct absorption band at 3380 cm^{-1} (OH bending) and an indistinct band at 1620 cm^{-1} (OH bending).

The strongest X-ray lines (25 including \(\beta\)-lines given) are 6.098(10)(0007), 2.704(9)(0.0.16), 2.280(8)(1.0.10), 1.579(7)(112), 1.536(6)(0.0.28), 1.362(5)(200), 1.096(11.28), 1.0325(7)(0.0.42), 1.0048(7)(0.1.40.21.10). Most lines are broad and diffuse. The indexing was based on a trigonal cell, \(P3m1, a = 3.16, c = 43.60\) Å, \(Z = 7\), derived from two molybdenite-2H_l layers and one 3R layer stacked according to the sequence A_B_2A_B_2C_A_B_2. The mineral is intermediate between molybdenite and jordisite with \(H_2O\) molecules between MoS_2 layers.

DTA curve shows a weak endothermic reaction at 315°C (dehydration) an exothermic reaction above 580°C (oxidation of S). Infra-red spectrum shows an absorption band at 3380 cm^{-1} (OH stretching) and an indistinct band near 1620 cm^{-1}.

The mineral occurs as black flakes (0.05–0.5 mm) with organic matter, minor chlorite and kaolinite in the matrix of a lenticular Middle Jurassic sandstone bed near Muchuan County, Sichuan, China. The flakes are apparently aggregates of fine-grained particles (1 to several \(\mu\)m). The mineral is grayish white under reflected light, strongly anisotropic. It is uniaxial negative. Reflectance \(R_g = 26.6–29.5, R_p = 12.3–14.2\%\). Color index \(X = 0.3125, Y = 0.3754, \lambda_d = 568.5\) nm, \(P_e = 17.6\%\) Dispersion \(\nu > r\).

The name is for the locality.

**Discussion**

The mineral is most likely an altered molybdenite-2H_l, perhaps mixed with jordisite (amorphous MoS_2). All X-ray lines can be indexed on the molybdenite-2H_l cell except two weak lines at 3.287(1) and 1.442(1) which may be due to impurities in view of its occurrence. The poor crystallinity of the material and the use of a 57.3 mm camera with unfiltered radiation may have contributed to the difficulties in the interpretation of data. The indexing based on the large cell is not as satisfactory as is claimed. A seven-layered structure cannot be reconciled with the space group \(P3m1\). The c-dimension derived from 2c(2H_l) + c(3R) does not allow space for interlayer water molecules. G.Y.C.

**Nahpoite**


The mineral occurs as a fine-grained white material filling fractures in marcite. The fine-grained nature of nahpoite prevented single-crystal studies as well as precise determination of optical properties. Hardness could not be measured, but the mineral appears to be very soft. It is extremely soluble in water and, to a much lesser extent, in concentrated HCl. Nahpoite grains are elongate with a maximum dimension of 4 \(\mu\m\). Optically, they are length fast with nearly parallel extinction and have minimum and maximum refractive indices of about 1.490 and 1.505.

The X-ray powder diffraction data are essentially the same as those obtained from synthetic \(Na_2HPO_4\) (JCPDS PDF No. 10-184). The strongest lines in the pattern for CuKα radiation are: 3.97(45)(011.110), 3.84(55)(110), 3.41(25)(020), 2.86(30)(101), 2.803(100)(021,120), and 2.720(70)(201,102) all in Å (a total of 17 indexed lines are listed down to 1.913Å). The data on PDF Card 10-184 are indexed on a B-centered cell and refinement of the unit cell parameters from the powder data of nahpoite based on this indexing gives: \(a = 9.26(1), b = 6.82(1), c = 5.75(1)Å, \lambda = 90.3^\circ, V = 363.13Å^3, Z = 4\). The authors give the following refined cell parameters based on a primitive cell: \(a = 5.47(1), b = 6.84(1), c = 5.45(1)Å, \lambda = 116^\circ 20(5), V = 182.75Å^3, Z = 2\). (However, an error must have occurred in these calculations because the \(b\) and \(c\) parameters of the two cells must remain the same and the volume of the primitive cell should be \(\frac{1}{2}\) that of the...
centered cell; the abstractor calculated $a = 5.463$, $b = 6.82$, $c = 5.75$, $\beta = 122.0^\circ$, $V = 181.58A^3$, $Z = 2$.) The possible space groups for the primitive cell are $P2_1/m$ or $P2_1$.

Chemical analysis (Na by AA spectrometry, P by colorimetry, $H_2O$ calculated to produce neutrality) gave: $Na_2O$ 43.67, $P_2O_7$ 49.54, $H_2O$ 6.32, total 99.53 wt.%. These data compared to $Na_2O$ 43.66, $P_2O_7$ 49.99, $H_2O$ 6.35 wt.% for stoichiometric $Na_2HPO_4$.

The analysis yields an empirical formula, based on four oxygen ions, of $Na_2.013H_1.002P_0.99704.000$ J.A.M.). (The D calc. from the cell parameters and the empirical formula is 2.600. J.A.M.)

In addition to manticite from which it appears to have formed, nahpoite occurs with another sodium phosphate which gave an X-ray powder diffraction pattern corresponding to that of $Na_2HPO_4.7H_2O$ (PDF 12-445). However, subsequent attempts to isolate this material yielded only data for nahpoite. Synthetic nahpoite when exposed to air for several weeks takes on water.

**Nahpoite**


Microprobe analyses gave (8 determinations range and av.): Cu 10.0–10.4, 10.2; Bi 65.8–67.0, 66.5; V 8.0–8.2, 8.1, corresponding to $Cu(OH)_{11.5}$, $Bi_2O_3$ 74.1, $V_2O_3$ 14.5, sum 100.1%, CuBi$_2$O$_6$. The mineral is easily soluble in cold dilute acids. The infra-red spectrum showed no $H_2O$ or O$_2$.

Precession photographs showed nahmoite to be monoclinic, space group $C2/m$, $C_n$, or $C2$, $a = 11.864 \pm 0.008$, $b = 3.695 \pm 0.004$, $c = 7.491 \pm 0.005\AA$, $\beta = 109.9^\circ \pm 0.06$, $Z = 2$, D calc. 6.76, meas. (Berman balance on 11.9 mg) 6.86 \pm 0.03. The strongest X-ray lines (23 given) are 5.58(70)(200), 1.545(520), 3.49(5)(221), 3.52(5)(210), 2.54(10)(410), 2.5(10)(402), 1.95(5)(432), 1.93(5)(432,520).

Colorless, luster vitreous, fracture conchoidal, H about 2, birefringent. The mineral occurs as crystals, mostly 0.2–0.5 but up to 2–3 mm and as deposits of irregular form up to 1 cm in diameter. It occurs on Alluaudite, Lovezovite massif, Kola Peninsula in pegmatitic veins and veinlets in cancrinite syenites and on Karsnast Mt., Lovezovite massif, in veinlets cutting nepheline syenites. Associated minerals include cancrinite, aegirine, vuonemite, epistolite, mountainite, kogarkoit, and thermatite.

The name is for the composition. Type material is preserved in the Department of Geological Sciences, University of Saskatchewan, Saskatoon, Saskatchewan. J.A.M.

**Nullaginite**


Analysis by M.E.K. (K, Na, and Ca by flame photometry by G.N.P.) gave P$_2O_5$ 19.04, SrO 22.19, BaO 8.17, CaO 0.41, Na$_2$O 8.21, K$_2$O 40.52, insol. (= inclusions of acicular aegirine) 1.64, H$_2$O 40.52, sum 100.23%. Thermal analysis on unground material gave 43.5% for the loss in weight; this is taken as the better determination because the mineral partly dehydrates under natural conditions. This gives $(Na(Sr,Ba)PO_4.9H_2O)_{C2/m}$. These data compare to 7.96% for the loss in weight; this is taken as the better determination for the mineral partly dehydrates under natural conditions. The name is for the composition. Type material is preserved in the Department of Geological Sciences, University of Saskatchewan, Saskatoon, Saskatchewan. J.A.M.

**Nullaginite**


Nullaginite occurs as ovoid to irregular nodules up to 2 mm in diameter and as cross-fiber veinlets. It is bright green with a luster varying from dull (nodules) to silky (veinlets). VHN$_{50}$ = 34.4, D meas. 3.528 to 3.606, av. 3.56. Optically, the mineral is biaxial, pale green and weakly pleochroic with a slightly greater absorption normal to c than parallel to it, $\alpha = 1.67$, $\beta = \gamma = 1.78$, extinction $X \perp c$, $a = 6^\circ$, $b \perp c$ or Z.

The mineral is monoclinic, space group $P2_1/m$ or $P2_1$, cell parameters refined from the powdered data are $a = 9.236(3)$, $b = 12.001(6)$, $c = 3.091(2)\AA$, $\beta = 90.48(7)^\circ$, $Z = 4$. The strongest lines in the Guinier powder pattern (in A for CuKa) are: 7.302(30b)(110), 5.038(30)(120), 4.619(40)(200), 3.660(40)(130, 220), 2.579(100)(201), 2.557(90)(201), 1.545(30)(002) and 1.543(30)(600). These data are similar to those given by rosasite and glaukosphaerite.

Electron microprobe analysis gave: Ni 49.4, Mg 0.56, Cr 0.23, Fe 0.15, Cu 0.07, Si 1.88, OH(calc.) 3.44, CO$_2$(calc.) 22.70, total 89.43 wt.%. The Si and some of the Ni was attributed to admixed peccorite. Infrared absorption analyses indicated the presence of OH, CO$_2$, and H$_2$O. On the basis of the chemical data and the crystallographic analysis of the related minerals, nullaginite is considered to be, ideally, $Na(Sr,Ba)PO_4.9H_2O$ with some admixed water (13.34 wt.%), D (including admixed H$_2$O) 3.66.

Nullaginite occurs with millerite, polydymite, peccorite, ga-
spéite, otwayite, parkerite, shandite and breithauptite in serpen-
tinized peridotite in the Nullagine district of Western Australia.
The name is for the district.

Discussion

Even if the analysis is expressed in oxide form, the actual total
determined is only 68.43 wt.%. J.A.M.

Nybøite

Crystal-chemistry by X-ray structure refinement and electron
microprobe analysis of a series of soda-calcic to alkalii-
 amphiboles from the Nybø eclogite pod, Norway. Bull. Miner-
al, 104, 400–412 (in English).

The name nybøite is proposed for the amphibole of ideal
composition NaNa$_2$Mg$_3$Al$_3$(Si$_7$Al$_3$)O$_{22}$(OH)$_2$. Analyses of the
crystal nearest to this composition by electron microprobe gave
SiO$_2$ 53.84, 52.63; TiO$_2$ 0.16, 0.15; Al$_2$O$_3$ 12.92, 13.87; MgO 14.21,
13.12; FeO 5.03, 5.75; MnO 0.02, 0.08; NiO 0.11, 0.11; CaO 2.33,
2.75; Na$_2$O 9.26, 8.55; K$_2$O 0.14, 0.11; Cl 0.01, 0.02, sum 98.03,
97.14%. This corresponds to (Na$_{0.76}$K$_{0.22}$)(Na$_{0.76}$Ca$_{0.28}$)
(Mg$_{0.72}$Fe$_{0.22}$Ti$_{0.28}$Al$_{1.43}$) (Si$_{7.24}$Al$_{0.76}$)O$_{22}$(OH)$_2$.

The unit cell has a

Discussion

It is to be regretted that publication of the new name was not
delayed until the IMA Commission could consider the name.
M.F.

Ogdensburgite*

P. J. Dunn (1981) Ogdensburgite, a new calcium-zinc-ferric iron
arsenate from Sterling Hill, New Jersey. Mineralog. Record,
12, 369–370.

Microprobe analyses gave As$_2$O$_3$ 39.2, 37.3; Fe$_2$O$_3$ 1.0, 1.0;
Al$_2$O$_3$ 1.0, 1.0; CaO 10.5, 11.1; ZnO 3.1, 3.1; MnO 2.1, 2.2;
MgO 0.5, 0.5, SiO$_2$ 0.5, 0.5, H$_2$O (12.4) (by difference), sum 100.0%.
The average of these gives (Ca$_{2.8}$Mn$_{0.07}$Zn$_{0.08}$Mg$_{0.18}$)(Fe$_{2.7}$Al$_{0.29}$)
(As$_{4.86}$Si$_{10.02}$) O$_{19.92}$ (OH)$_{11.00}$ · 4.64H$_2$O, or Ca$_4$Fe$_{2.7}$ (AsO$_4$)$_{13}$
(OH)$_{11}$ · 5H$_2$O. The mineral gave a strong microchemical test for
Fe$^{3+}$ and a very weak one for Fe$^{2+}$.

X-ray powder data are given. The strongest lines (41 given) are
14.8(100), 7.47(20), 5.70(20), 5.32(20), 4.52(30), 3.284(20),
2.793(25), 2.734(25), 2.656(30).

The mineral occurs with pararsymplesite, kottigite, and other
iron arsenates in the Sterling Hill mine, Ogdensburg, N.J. Type
material is at the Smithsonian Institution, cotyypie material in the
Spex-Gerstmann collection, Franklin, N. J. The name is for the
locality. M.F.

Pääkkonenite

Yu. S. Borodaev, N. N. Mozgova, N. A. Ozerova, N. S.
Bortnikov, P. Oivanen, and V. Iletuinen (1981), Pääkkonenite,
Sb$_2$As$_2$, a new mineral from the Seinäjoki ore region in
Russian).

Five microprobe analyses gave (range and average) Sb 65.3–
69.5, 66.9; As 17.0–18.9, 18.6; S 15.1–16.2, 15.5, sum 99.1–102.7,
101.0, the average corresponding to Sb$_{24}$As$_{24}$S$_{7}$. The phase
had previously been reported in the system Cu–Sb–As–S (Econ.
Geol. 72, 1977).

X-ray data are indexed on a monoclinic cell with

\[ a = 5.372 \pm 0.007, \quad b = 3.975 \pm 0.007, \quad c = 11.41 \pm 0.01, \quad \beta = 89.71 \pm 0.15, \quad Z = 2, \quad D \text{ calc.} \ 5.21. \]

The strongest X-ray lines (17 given) are 3.90(4)(102), 3.13(4)(103), 2.87(10)(004), 2.68(3)(200).

Color dark gray, streak gray with a slight brownish tint, luster
metallic. Readily scratched by a Cu needle, brittle, one cleavage.
Fine polysynthetic twinning present. H 66–87, av. 77 kg/sq.mm.
In reflected light pale gray, strongly anisotropic, birefringence
weak. Reflectances: 460 nm, 39.8–51.7; 540, 37.2–47.8; 580,
36.7–46.3; 640, 36.4–45.3. Internal reflections bright red.

The mineral occurs in irregular grains up to 0.4 mm in size in the
Kalliosalo deposit, associated with arsenopyrite and loelling-
ite. The name is for the late Viekkio Pääkkönen, who studied ore
deposits of the region. Type material is at the Fersman Mineral-
ogical Museum, Acad. Sci. USSR, Moscow. M.F.

Palarstanide*

Palarstanide, Pd$_4$(Sn,As)$_3$, a new mineral. Zapiski Vses. Min-

Analyses by electron probe gave Pd 64.5, 66.5, 65.0, 64.4; Pt
5.3, 4.7, 4.9, 4.0; Au 1.9, 1.9, \, \, \, \, \, \, \, --, Cu, 0.5, \, \, \, \, \, \, \, --,
Sn 14.9, 14.0, 12.6, 11.3; As 7.2, 6.9, 7.5, 7.3; Pb 2.9, 2.2, 5.5, 7.9;
Sb 1.9, 4.2, 1.0.0; Bi 0.7, \, \, \, \, \, \, \, 1.6, 1.5; sums 99.3, 100.9, 98.1, 97.2. A general
formula approximates (Pd,Pt,Au,Cu)$_{16}$(Sn,As,Pb,Sb,Bi)$_{12}$ or more
simply Pd$_4$(Sn,As)$_3$.

X-ray powder study gives a pattern indexed as hexagonal $a =
6.784(5), c = 14.80(1)$. The strongest X-ray lines (31 and 21
given) are 2.50(4)(114), 2.22(10)(115,210), and 1.98(6)(107).

Palarstanide only occurs as intergrowths in massive cubanite-
talnakhite and cubanite-chalcopyrite ores of the Talnakh deposit,
U.S.S.R. It is most often intergrown with minerals such as
rubensburgite-Atl, Pt-Fe alloy, polarite, sperrylite, majakite,
"mertieite", and Au–Ag–Cu alloys with an intergrowth size
range from 0.05 to 1.5 mm. The palarstanide grains usually
exhibit elongated forms with rectangular, rarely sinuous out-
lines. Under the binocular, the mineral is steel-gray with a
metallic luster and it is nonmagnetic. Palarstanide has medium
hardness, with VHN$_{50}$ = 470(30), and it is brittle. Under
reflected light palarstanide is grayish-white with a slight rose tint.
Bireflection in air is barely perceptible but is distinct in oil
immersion. The mineral is slightly anisotropic, dark gray to
brownish-gray, and it is optically uniaxial positive. Reflectance
$\alpha = 47.0(30), \gamma = 52.1, 52.4(490), 52.1, 53.5(520), 53.3, 54.7(550), 55.1, 56.4$
(580); 56.7, 57.2(610); 58.5, 59.3(640); 58.7, 60.0(670); and 60.0,
61.0(700). Palarstanide is negative to conc. and dil. HCl and
Discussion

The characterization of this mineral is ambiguous. One analysis has As > Sn, but no data were provided whether that grain has the same structure as those for which Sn > As. In solid solutions of this kind it is essential to clearly demarcate the compositional range and ideal end-member, and, if not possible from natural samples, a certain amount of synthesis is required. The X-ray powder pattern has very few strong lines. L.J.C.

Panasqueiraite*  

Panasqueiraite is a fine grained pink mineral which occurs in aggregates several centimeters in diameter. Individual anhedral grains are about 1 mm in size. It has a poor (010) cleavage, vitreous luster, white streak, H 5. It is non-fluorescent under ultraviolet light, but emits a blue cathodoluminescence in an electron beam at 12 kV. The mineral is biaxial (+), α = 1.590(2), β = 1.596(2), γ = 1.616(2), nonpleochroic; orientation Z = b, X ∩ c = +22°. D meas. 3.27(1); calc. 3.22. (Using the cell parameters and empirical formula, D calc. is 3.213, J.A.M.).

Single-crystal X-ray study showed that panasqueiraite is monoclinal, Cc or C2/c, a = 6.535(3), b = 8.753(4), c = 6.919(4) Å, β = 112.33(4)°, Z = 4 (V = 366.09 Å³, J.A.M.). The strongest lines in the diffractometer pattern (in Å for CuKα radiation) are: 3.20(67)(200), 3.02(86)(200), 2.78(31)(202), 2.62(100)(130), 2.584(45)(131,022), 1.722(33)(242,222) and 1.658(3)(330) (a total of 35 indexed spacings down to 1.346 are given). The powder data are essentially identical to those given by isokite and on this basis and the similar chemical compositions, the minerals are considered isostructural.

An electron microprobe analysis gave: CaO 31.0, MnO 0.0, FeO 0.4, MgO 22.9, P2O5 3.2, F 3.1, OH (calculated assuming P:(OH + F) = 1:1) 6.7, total 103.7, less O = F + OH 4.4, sum 99.3 wt.%. No Cl or As was detected. The empirical formula derived from these data is the abstracter is (Ca0.99, Fe0.01)(Mg0.91, Fe0.01, Mg0.01)Fe0.01O4(OH)0.7(F0.29). Ideally, the formula is CaMgPO4(OH,F) with OH > F. It is the hydroxy analogue of isokite, CaMgPO4F.

Panasqueiraite occurs with thadeite fluorapatite, wolfeite, topaz, muscovite, sphalerite, quartz, chalcopyrite, pyrrhotite, siderite, arsenopyrite, chlorite, vivianite and althausite in vein selvages at Panasqueira, Portugal.

The name is for the locality; type material is preserved at the Department of Geological Sciences, University of Michigan and at the Smithsonian Institution.

Discussion

While there is no doubt in the abstracter’s mind that OH is present, it is unfortunate that H2O was not determined. J.A.M.

Pehrmanite*  

Pehrmanite occurs as subhedral hexagonal tabular crystals (up to 250 µm across and 40 µm thick) and as oriented overgrowths on nigerite. It is light green, has a vitreous luster, is very brittle with VHN 100 = 1700 (Mohs H = 8–8½). D calc. 4.07. Reflectance values are: 8.34% at 470 nm, 8.11(546 nm), 8.01(589 nm), 7.86(650 nm); the mean refractive index calculated from these data is 1.79. The mineral is uniaxial (−) and weakly to distinctly dichroic with O pale greenish and E pale greyish-brown. The birefringence is distinctly higher than that of nigerite.

The X-ray powder diffraction pattern is very similar to that of taaffeite-9R and by analogy to that mineral, pehrmanite is rhombohedral, R 3m, a = 5.70, c = 44.16 Å Z = 9 (a = 14.11, α = 23.32°). The strongest lines in the X-ray powder diffraction pattern are: J.A.M.

Electron microprobe analysis with confirmation of Be by ion probe (BeO given by difference) gave: Al2O3 64.40, FeO 23.30, MnO 0.30, MgO 1.875, ZnO 0.225, BeO 4.9, total 100.00. Based on 8 oxygen ions, these data give an empirical formula of (Be0.62Zn0.38Mg0.15)2(Fe2+0.07Mn0.01)2Al3H(AsO4)2(OH)6 or, ideally, BeFe2+ZnAl3H(AsO4)2(OH)6. Thus, pehrmanite is the ferrous iron analog of taaffeite and a new member of the hübnerite group.

The mineral occurs with quartz, plagioclase (An25–An75), sillimanite, muscovite, spessartine-almandine, chlorite, biotite, epidote, allanite and calcite in the wall zone of the Rosendal pegmatite, Kemiö Island, southwestern Finland.

The name is for Gunnar Pehrman, Professor Emeritus at the University “Åbo Akademi”, Turku, Finland. Type material is at the Free University, Amsterdam, The Netherlands. J.A.M.

Philipsbornite*  

Electron microprobe analysis gave As2O5 28.6, Cr2O3 6.3, SO3 1.3, Al2O3 22.3, Fe2O3 0.6, PbO 32.0, ZnO 1.1, CuO 0.9, MnO 0.3, H2O 9.4, sum 102.8%, corresponding to (Pb0.99 Mn0.01) (Al2.76 Zn0.09 Cu0.07 Fe2+0.03) (As1.57 Cr0.40 S0.10)H2O6(AsO4)2, or PbAl12H2AsO4Si2OH16 or PbAl6(AsO4)2( OH)5H2O. The method of determination of H2O is not stated.

The strongest X-ray lines (30 given) are 5.82(9)(1011), 3.56(8)(1120), 3.02(10)(0221,1123), 2.26(5)(1017), 1.93(5)(3033). These are indexed on a trigonal cell, a = 7.01 Å, α = 60.94°, Z = 1; in hexagonal setting a = 7.11, c = 17.05 Å, Z = 3. Space group R3m or R3m. D calc. 3.33, meas. > 4.1.

The mineral occurs as massive to earthy crusts, composed of fine-grained aggregates, associated with crocoite at the Dundas district, Tasmania. No cleavage, fracture conchoidal. H probably about 4½. Color grayish-green. Optically isotropic, n = 1.790 ± 0.003.

The name is for Hellmut von Philipsborn, emeritus professor of mineralogy, University of Bonn. M.F.
Poyarkovite*


Microprobe analysis by Y.G.L. gave (av. of 10) Hg 91.30, Cl 5.30, O 2.36, sum 98.36%, corresponding closely to Hg$_2$ClO$_4$ or HgO·2HgCl. The mineral is instantly blackened by KOH, decomposed by HNO$_3$, does not react with HCl. When heated in a closed tube, turns brown, red, then yellow (formation of montroseite) and finally sublimes completely as Hg + calomel.

X-ray study showed it to be monoclinic, space group $C2/m$, $C2$, $C2/l$, or $Cc$, $a = 18.82$, $b = 9.02$, $c = 16.79$ Å, $\beta = 112.24'$, $Z = 24$, D. calc. 9.88, D meas. 9.50 (for porous grains) to 9.80 (dense grains). The strongest X-ray lines (48 given) are 3.09(5)(313,514,1 160), $24.5; 546, 28.2, 22.2; 590, 24.3, 20.5; 620, 22.1, 18.5%.

The mineral occurs in the Khaikardakan deposit, in irregular grains and aggregates, usually in contact with euglenite and calomel. Also present in the deposit are terlinguaitc, orange-yellow, calcite, and cinnabar. The mineral is blue to blue-green and transparent, with a vitreous lustre. It is soft, shows no cleavage and is non-fluorescent in ultraviolet light. D meas. 3.93(2), calc. from ideal formula and cell parameters 3.94 (3.946 if the empirical formula is used). Spertiniite is optically anisotropic with parallel extinction and positive elongation. Pleochroism is strong with $X$ colorless and $Z$ dark blue a $\alpha > 1.800$.

The X-ray powder pattern is practically identical to that of synthetic Cu(OH)$_2$. On that basis, spertiniite is orthonthrohombic, space group $Cmcm$, $a = 2.951(1), b = 10.592(3), c = 5.257(3)$ Å, $V = 164.3(2)$ Å$^3$, $Z = 4$. The strongest lines in the Gandolfi powder pattern are (in Å for CuKo): 5.29(80)(020), 3.73(90)(021), 2.63(100)(002), 2.50(60)(111), 2.36(50)(041,022), 2.26(60)(130), 1.718(70)(110,132).

Electron microprobe analyses gave: Cu 66.9, Cl 0.1, OH not determined. The theoretical Cu content of Cu(OH)$_2$ is 65.1 wt.%. The ideal formula of spertiniite is Cu(OH)$_2$, (Assuming enough OH to balance charges, the empirical formula is Cu$_{1.06}$(OH)$_2$). Spertiniite occurs with atacamite, chalcocene and copper in a rodinite dike composed of diopside, grossular and vesuvianite. The dike cuts the serpentinized dunite in the Jeffrey mine, Quebec. Can. Mineral., 19, 337–340.

Spertiniite occurs as discrete botryoidal aggregates (~100 μm in diameter) of minute lath-like crystals. Some aggregates consist of blade-like crystals in radial arrangement. The mineral is blue to blue-green and transparent, with a vitreous lustre. It is soft, shows no cleavage and is non-fluorescent in ultraviolet light. D meas. 3.93(2), calc. from ideal formula and cell parameters 3.94 (3.946 if the empirical formula is used). J.A.M.). Spertiniite is optically anisotropic with parallel extinction and positive elongation. Pleochroism is strong with $X$ colorless and $Z$ dark blue a $\alpha > 1.800$.

The X-ray powder pattern is practically identical to that of synthetic Cu(OH)$_2$. On that basis, spertiniite is orthorhombic, space group $Cmcm$, $a = 2.951(1), b = 10.592(3), c = 5.257(3)$ Å, $V = 164.3(2)$ Å$^3$, $Z = 4$. The strongest lines in the Gandolfi powder pattern are (in Å for CuKo): 5.29(80)(020), 3.73(90)(021), 2.63(100)(002), 2.50(60)(111), 2.36(50)(041,022), 2.26(60)(130), 1.718(70)(110,132).

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Shuiskite*

O. K. Ivanov, V. A. Arkhangelogskaya, L. O. Miroshnikova, and T. A. Shilova (1981) Shuiskite, the chromium analogue of pumpellyite. The DTA curve shows exothermic breaks at 19.41 Å, $\beta = 98'$, $Z = 4$, D. 3.24 meas. The strongest X-ray lines (44 given) are 2.90(9)(115,300), 2.73(7)(206), 2.64(5)(311), 2.52(5b)(024), 2.46(5)(117.2,0,10), 1.59(10)(0,0,12), 1.487(8).

The mineral is monoclinic, $A2/m$, $a = 8.897$, $b = 5.843$, $c = 19.41$ Å, $\beta = 98'$, $Z = 4$, D. 3.24 meas. The strongest X-ray lines (44 given) are 2.90(9)(115,300), 2.73(7)(206), 2.64(5)(311), 2.52(5b)(024), 2.46(5)(117.2,0,10), 1.59(10)(0,0,12), 1.487(8).

Shuiskite occurs as a dark brown with a violet tint, luster vitreous, streak light greenish-brown. Optically biaxial, neg., $n_{m} = 1.725-1.733$, $\beta = 1.762-1.772$, $\gamma = 1.769-1.775$, dispersion strong $r > v$, elongation positive, pleochroism strong, violet-blue on X, yellowish-green on Y, dark violet on Z. Elongation positive. Cleavage (001) perfect, H = 6.

Shuiskite occurs in prismatic and radiating-fibrous aggregates on the walls of fractures in chromite, Gorozavod region, Perm province, Urals, commonly associated with uvarovite and rose-colored chlorite, rarely with green chromian titanite.

The name is for V. P. Shuisk, lithologist of the Ural Scientific Center, Sverdlovsk. Type material is at the Mineralogical Museum, Acad. Sci. USSR, Moscow, and at the Ural Geol. Museum. M.F.

Spertiniite*


Spertiniite occurs as discrete botryoidal aggregates (~100 μm in diameter) of minute lath-like crystals. Some aggregates consist of blade-like crystals in radial arrangement. The mineral is blue to blue-green and transparent, with a vitreous lustre. It is soft, shows no cleavage and is non-fluorescent in ultraviolet light. D meas. 3.93(2), calc. from ideal formula and cell parameters 3.94 (3.946 if the empirical formula is used). J.A.M.). Spertiniite is optically anisotropic with parallel extinction and positive elongation. Pleochroism is strong with $X$ colorless and $Z$ dark blue a $\alpha > 1.800$.

The X-ray powder pattern is practically identical to that of synthetic Cu(OH)$_2$. On that basis, spertiniite is orthorhombic, space group $Cmcm$, $a = 2.951(1), b = 10.592(3), c = 5.257(3)$ Å, $V = 164.3(2)$ Å$^3$, $Z = 4$. The strongest lines in the Gandolfi powder pattern are (in Å for CuKo): 5.29(80)(020), 3.73(90)(021), 2.63(100)(002), 2.50(60)(111), 2.36(50)(041,022), 2.26(60)(130), 1.718(70)(110,132).

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The name is for Mr. F. Spertini, Chief Geologist at the Jeffrey mine. Type material is preserved at the National Museum of Natural Sciences, Ottawa. J.A.M.