American Mineralogist, Volume 65, pages 205-210, 1980

NEW MINERAL NAMES*

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Admontite*

K. Walenta (1979) Admontite, a new borate mineral from the gypsum deposit Schildmauer near Admont in Styria (Austria). *Tschermaks Mineral. Petrogr. Mitt., 26,* 69–77 (in German).

Admontite is a magnesium borate found in the gypsum deposit of Schildmauer near Admont in Styria (Austria) in association with gypsum, anhydrite, hexahydrite, löweite, quartz, and pyrite. Chemical analysis gave MgO 10.20%, B_2O_3 54.50% (by difference), H_2O 35.30%, corresponding closely to $2MgO \cdot B_2O_3 \cdot 15H_2O$. The mineral occurs in poorly developed colorless crystals of monoclinic symmetry, elongated parallel to c and flattened on {100}. Cell dimensions are: $a = 12.68$, $b = 10.07$, $c = 11.32$ (all ±0.02A), β 109° 68±1′, $Z = 2$, G meas 1.82, calc 1.875. Strongest lines in the powder pattern are: 12.08(9)(100), 5.29(7)($\bar{2}11$), 3.09(6)($\bar{3}13,\bar{4}02,\bar{3}22$), 2.68(9)($\bar{4}13,203,\bar{4}21,312,\bar{3}04,004,123,132$). No cleavage, fracture conchoidal, H probably 2–3; optically biaxial negative, $\alpha = 1.442(2)$, $\gamma = 1.504(2)$, $2V_\alpha \sim 30°$, plane of optic axes normal to (010).

Admontite is slowly decomposed in water; on heating it loses part of its water below 100° C, the rest between 150 and 350° C. **A.P.**

Aluminum

B. V. Oleinikov, A. V. Okrugin, and N. V. Leskova, (1978) Petrological significance of the occurrence of native aluminum in basites. *Dokl. Akad. Nauk SSSR, 243,* 191–194 (in Russian).

Native Al is reported to occur in trap intrusives of the Siberian platform in Middle Paleozoic, Late Paleozoic, and Early Mesozoic tholeiite basalts and rarely in picrite basalts, associated with moissanite and with various alloys. Electron probe analyses from a gabbro dolerite dike of the Tsepochechnyi intrusive gave Al 98, 98; Mg 2.1, 2.5%. X-ray study gave 2.320(10), 2.010(6.7), 1.423(4.5), 1.215(6.7). Analyses of associated phases (semiquant.) gave Al 48, Si 12, Mg 13, Cu none; and Al 70, Mg 5, Cu 27, Si none.

Discussion

This seems extremely improbable from thermodynamic considerations. **M.F.**

Aubertite*

Fabian Cesbron, Daria Ginderow, Marie-Claude Sichere, and Helene Vachey (1978) Aubertite, a new chloride-sulfate of copper and aluminum. *Bull. Mineral. (Soc. fr. Mineral. Cristallogr.), 102,* 348–350 (in French).

Analysis by H. V. (spectrophotometric for Cu, Al, SO_3, Cl; H_2O by Penfield) gave SO_3 28.30, Cl 6.70, Cu 11.80, Al_2O_3 9.16, Na_2O 0.13, K_2O 0.05, CaO 0.18, H_2O 45.40, sum 101.72 ($-O = Cl_2$) 100.21%, corresponding to $Cu_{1.65}Al_2(SO_4)_{3.94}Cl_{2.10} \cdot 28.1\ H_2O$, or $CuAl(SO_4)_2Cl \cdot 14\ H_2O$. The DTA curve shows large endothermic breaks at 92° and 143° and small ones at 308°, 730°, and 1047°, the last corresponding to the reduction of CuO to Cu_2O. The TGA curve shows a loss (of H_2O) of 35.6% to 100° and 9.8% more from 100° to 300°. Loss of SO_3 occurs at about 530° to 650°. Aubertite is soluble in water.

X-ray study shows aubertite to be triclinic, $P1$, $a = 6.288 \pm 0.003$, $b = 13.239 \pm 0.006$, $c = 6.284 \pm 0.003$A, $\alpha = 91°52'$, $\beta = 94°40'$, $\gamma = 82°27'$(all ±10′), $Z = 1$, G calc 1.83, meas 1.815. The strongest lines (70 given) are 6.25(45)(001), 5.59(44)(011), 4.83(40)(120), 4.50(100)($11\bar{1}$), 4.247(69)(101)($1\bar{2}0$), 3.952(58)($1\bar{1}1$), 3.690(42)(121), 3.130(42)(002), 3.113(40)(210). Structural study indicates the formula to be $Al(H_2O)_6Cu(H_2O)_{4+2}(SO_4)_2Cl \cdot 2\ H_2O$.

The mineral occurs as azure-blue crusts of corroded grains. Cleavage {010} perfect. Optically biaxial, neg., *ns* (Na) $\alpha = 1.462$, $\beta = 1.482$, $\gamma = 1.495$, $2V = 71°$, $r > v$ moderate, optic axis nearly perpendicular to (010).

The mineral was collected in 1961 at Quetena, Antofagasta Province, Chile, in the zone of oxidation, associated with copiapite, amarantite, parabutlerite, and hohmannite. The name is for J. Aubert, assistant director, Inst. Natl. Geophysics, France, who collected the mineral. Type material is at the Univ. Pierre and Marie Curie and the Ecole Natl. Superieure des Mines, both in Paris. **M. F.**

Carlhintzeite*

P. J. Dunn, D. R. Peacor and B. D. Sturman (1979) Carlhintzeite, a new calcium aluminum fluoride hydrate from the Hagendorf pegmatites, Bavaria, Germany. *Can. Mineral., 17,* 103–105.

Carlhintzeite is colorless with a white streak and vitreous luster; D meas 2.86 g/cm³, calc 2.89 g/cm³. It is non-fluorescent. Biaxial (+), 2V meas 77°, calc 78°; $\alpha = 1.411$, $\beta = 1.416$, $\gamma = 1.422$. Orientation: $X \cong b$, $c{:}Z = 10°$.

The mineral occurs as tufts and bundles of crystals up to 2mm long. The crystals are elongate parallel to [101] and flattened on {001}. Present are the forms {100} and {001} and the face (110). The crystals are twinned about [101]. Carlhintzeite is triclinic (pseudomonoclinic), space group $C\bar{1}$ or $C1$, $a = 9.48$, $b = 6.98$, $c = 9.30$A, $\alpha = 91.14°$ $\beta = 104.85°$, $\gamma = 90.0°$, $Z = 4$. The strongest lines in the X-ray powder diffraction pattern are: 4.56(70), 3.69(60), 3.48(100), 2.852(40), and 1.460(40). Because of the pseudosymmetry, the spacings could not be unambiguously indexed.

The average of two closely agreeing electron microprobe analyses is: Al 10.27, Ca 29.86, F 52.1, H_2O(TGA) 7.0, sum 99.23 wt%. (Note by J.A.M.: Al and Ca are given as Al_2O_3 and CaO, but these are typographical errors). The analytical data yield the empirical formula (based on 7 fluorine ions): $Ca_{1.90}Al_{0.97}F_{7.00} \cdot 0.96H_2O$ or, ideally, $Ca_2AlF_7 \cdot H_2O$.

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

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Carlhintzeite occurs with rockbridgeite, pyrite, strengite, and apatite on a specimen from Hagendorf, Bavaria, Germany. The name is in honor of Professor Dr. Carl Hintze, the compiler of the Handbuch der Mineralogie. Type material is preserved at the Royal Ontario Museum, Toronto, and the Smithsonian Institution, Washington. **J.A.M.**

Cupropavonite*

Sven Karup-Møller and Emil Makovicky (1979) On pavonite, cupropavonite, benjaminite, and "oversubstituted" gustavite. *Bull. Mineral. (Soc. fr. Mineral. Cristallogr.), 102,* 351–367.

A sample from the Alaska mine, Colorado, contained crystals of pavonite with an exsolved pavonite-like mineral, associated with interstitial gustavite. Microprobe analyses of the exsolved mineral gave Ag 5.7, 5.9; Cu 6.2, 6.1; Pb 13.5, 13.4; Bi 56.4, 56.8; Sb 0.1, 0.3; S 18.0, 17.6; sum 99.9, 100.1%, corresponding to $Cu_{1.8}AgBi_5Pb_{1.2}S_{10}$.

Weissenberg study showed the mineral to be monoclinic, space group *C2/m* or *Cn*, $a = 13.45$, $b = 4.02$, $c = 33.06$A, similar to data for pavonite, but with *c* doubled. The X-ray pattern given (50 lines) was on a mixture of pavonite and cupropavonite, for which calculated values are given.

Optically the mineral is very similar to pavonite, with reflectance equal or slightly less. Pleochroism is weak in air, weak to distinct in oil. Anisotropy strong, with colors identical for both minerals. Etch tests negative with solutions of KOH, $HgCl_2$, KCN, $FeCl_3$, and HCl (1:1). HNO_3 (1:1) produced a yellow-brown film; conc. HNO_3 etches cupropavonite more strongly than pavonite. **M.F.**

Curetonite*

S. A. Williams (1979) Curetonite, a new phosphate from Nevada. *Mineral. Rec., 10,* 219–221.

Analysis gave P_2O_5 23.39 (av. of 3 by probe), V_2O_5 1.27 (av. of 2 by chem. and spec.), BaO 53.09 (av. of 3 by probe), Al_2O_3 12.81 (av. of 3 by probe, 2 by chem.), TiO_2 6.84 (chem.), H_2O 2.46 (Penfield), sum 99.86%, corresponding to $Ba_4Al_3Ti(PO_4)_4(O,OH)_6$, with O:OH nearly 1:1. Readily fusible to a gray slag. Insoluble in acids.

X-ray study shows the mineral to be monoclinic; space group probably $P2_1/m$, $a = 6.957$, $b = 12.55$, $c = 5.22$A, $\beta = 102°0.2'$. G calc 4.31 for $Z = 1$, meas 4.42±0.05. The strongest X-ray lines (37 given) are 4.290(5)$(1\bar{1}1)$, 3.286(8)(210), 3.230(10)(031), 2.991(6)(220), 2.816(6)$(22\bar{1})$, 2.251(6), 1.686(7).

Crystals up to 3 mm show forms {100}, {010}, {001}, {011}, and $\{\bar{2}01\}$. Color usually bright yellow-green, in some samples nickel-green. Streak white. H 3.5, brittle. Cleavage {011} good, parting on {010}. Optically biaxial, positive, *n*s (Na), $\alpha = 1.676$, $\beta = 1.680$, $\gamma = 1.693$, 2V = 60°, $X = b$, $Z:c = +30°$. Mostly colorless in section, but may show splotchy pleochroism in yellow with absorption $X > Y = Z$. Dispersion weak, $r < v$, strong inclined dispersion. Polysynthetic twinning is common on {100}.

The mineral occurs in a barite mine near Golconda, Nevada. The barite replaces sericitic, phosphatic, and black organic cherts and shales. The massive barite is cut by veins by coarse-grained barite and euhedral adularia crystals and curetonite.

The name is for Forrest Cureton and Michael Cureton, who found the mineral. Type material will be in the Smithsonian Institution and the British Museum (Natural History). **M.F.**

Koritnigite*

P. Keller, H. Hess, P. Süsse, G. Schnorrer, and P. J. Dunn (1979) Koritnigite, Zn $[H_2O|HOAsO_3]$, a new mineral from Tsumeb, South West Africa. *Tschermaks Mineral. Petrogr. Mitt., 26,* 51–58 (in German).

Koritnigite is a hydrated zinc hydrogen arsenate with the formula $Zn[H_2O|HOAsO_3]$. Chemical analysis (electron microprobe and TGA) gave: As_2O_5 51.75, ZnO 35.97, H_2O 12.3%, sum 100.0%. The $HOAsO_3$ ions were determined by IR spectroscopy. Koritnigite is soluble in cold dilute HCl and HNO_3. The cell dimensions are: $a = 7.948(2)$, $b = 15.829(5)$, $c = 6.668(2)$A, $\alpha = 90.86(2)$, $\beta = 96.56(2)$, $\gamma = 90.05(2)°$, $Z = 8$, G meas = 3.54, calc = 3.56. The space group is $P\,\bar{1}$. Strongest lines in the powder pattern are: 7.90(10)(020,100), 3.83(7)$(2\bar{1}0,210)$, 3.16(9)$(2\bar{1}1,211,2\bar{3}0,230)$, 2.46(6)$(2\bar{5}0,250)$.

Koritnigite is colorless and transparent. There are no euhedral crystals. Cleavage {010} perfect, traces of cleavage parallel to [001] and [100] visible on {010}; H = 2. Koritnigite is optically biaxial, positive, $2V = 70(5)°$; $\alpha = 1.632(2)$, $\beta = 1.652(3)$, $\gamma = 1.693(3)$, $X = b$, $Z:c = 22°$. It was found on the 31st level at Tsumeb, SW Africa. It occurs in cavities in tennantite, associated with Cu-adamite, stranskiite, and other minerals not yet identified.

The name is in honor of Professor Sigmund Koritnig of Göttingen. **A.P.**

Mandarinoite*

P. J. Dunn, D. R. Peacor, and B. D. Sturman (1978) Mandarinoite, a new ferric-iron selenite from Bolivia. *Can. Mineral., 16,* 605–609.

The mineral is light green and has a very light green streak and a vitreous to greasy luster. No cleavage was observed; hardness is about 2 1/2. *D* meas 2.93 g/cm³, calc 2.89 g/cm³. No luminescence was observed. Mandarinoite is biaxial (−), 2V 85°, $\alpha = 1.715$, $\beta = 1.80$, $\gamma = 1.87$, $X = b$, $c:Z = 2°$.

Mandarinoite is monoclinic, space group $P2_1/c$, $a = 16.78$, $b = 7.86$, $c = 9.96$A, $\beta = 98.3°$, $Z = 4$. Crystals are less than 0.5mm long and are twinned with (100) as both twin plane and composition plane. The crystals are elongate parallel to [001] and flattened parallel to {100}. Forms observed are: {100}, {110}, {011}, and $\{\bar{1}01\}$. The strongest lines in the X-ray powder diffraction pattern are: 8.25(40)(200), 7.10(100)(110), 3.55(50)$(212,220,31\bar{2})$, 3.43(40)$(302,40\bar{2})$, 2.977(70)$(21\bar{3},321,122)$, and 2.804(20)(222).

Electron microprobe analysis gave: Fe_2O_3 28.68, SeO_2 59.53, H_2O 11.79 (by difference). Microchemical tests gave strong reactions for ferric iron and weak reactions for ferrous iron. The empirical formula based on 9 oxygen atoms (excluding oxygen in H_2O) is $Fe^{3+}_{2.01}Se_{2.99}O_{9.00} \cdot 3.65H_2O$ or, ideally, $Fe^{3+}Se_3O_9 \cdot 4H_2O$.

Mandarinoite occurs on specimens from the oxidized zone of the Pacajake mine, Bolivia, where it is associated with penroseite, siderite, quartz, native selenium, and goethite. The mineral has also been found at the Skouriotissa mine, Cyprus, and at El Plomo mine, near Tegucigalpa, Honduras. At the latter locality, Te is also present and the Se:Te ratio is about 7:3.

The name is for Joseph A. Mandarino of the Royal Ontario Museum, Toronto. Type material is deposited at the Smithsonian Institution, Washington; Pinch Mineralogical Museum, Rochester, New York; Royal Ontario Museum, Toronto; and Harvard Mineralogical Museum, Cambridge. **J.A.M.**

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Monteregianite*

G. Y. Chao (1978) Monteregianite, a new hydrous sodium potassium yttrium silicate mineral from Mont St-Hilaire, Quebec. *Can. Mineral., 16,* 561–565.

Monteregianite is colorless, white, gray, rarely mauve or pale green, has a white streak and vitreous to silky luster. Cleavage is perfect on {010}, very good on {001} and good to fair on {100}. Hardness is about 3½. *D* meas 2.42(2) g/cm^3, calculated from the empirical formula 2.391 g/cm^3, assuming $Z = 4$. The mineral is readily etched along cleavage planes by cold 1:1 HCl, HNO_3, and H_2SO_4. Optically biaxial (+), $\alpha = 1.510$, $\beta = 1.513$, $\gamma = 1.517$, 2V(meas) 87°, (calc) 82°; $X = c$, $Y = a$, $Z = b$.

Monteregianite is orthorhombic, space group *Bmab* or *B2ab* with $a = 14.014(4)$, $b = 23.910(5)$ and $c = 13.096(2)$A. A pronounced pseudocell exists with *a* and *c* halved and space group *Pmmb*, *P2mb*, or *Pm2b*. Strongest lines in the X-ray powder diffraction pattern are: 12.00(100)(020), 7.03(100)(200), 6.02(50)(220,040), 4.42(100)(042), 3.405(50)(062), 3.026(50)(034,440), and 2.873(80)(044).

The mineral occurs as irregular and radiating clusters of needlelike crystals, as elongate tabular crystals in parallel groups, and as irregular micaceous masses. The needle-like crystals are elongate parallel to [100] and are bounded by {010}, {001}, {100}, and occasionally {101}. The tabular crystals are also elongate parallel to [100] and flattened on {010}.

Chemical analysis of one gram of hand-picked colorless material (D.C. Mah, analyst) gave: SiO_2 60.30, Al_2O_3 0.50, Y_2O_3 11.97, CaO 0.65, MgO 0.15, BaO 0.35, MnO n.d., FeO n.d., Na_2O 9.14, K_2O 5.36, H_2O 11.40, total 99.82 wt%. The empirical formula derived from these data is: $(Na_{4.66}K_{1.80})(Y_{1.68}Ca_{0.18}Mg_{0.06}Ba_{0.04})(Si_{15.87}Al_{0.16})O_{38} \cdot 10.02H_2O$. The ideal formula is $(Na,K)_6Y_2Si_{16}O_{38} \cdot 10H_2O$. An electron microprobe analysis of a mauve variety gave: Y_2O_3 10.67, MnO 1.38, K_2O 5.89, and Na_2O 9.37 wt%. The water in monteregianite is considered to be zeolitic.

Monteregianite (formerly known as UK-6) occurs in miarolitic cavities, metamorphosed inclusions and rheomorphic breccias in nepheline syenite at Mont St-Hilaire, Quebec. Associated minerals are calcite, pectolite, microcline, albite, aegirine, arfvedsonite and minor amounts of phlogopite, fluorite, quartz, ekanite, sepiolite, ashcroftine, lorenzenite, narsarsukite, natrolite, harmotome, apophyllite, molybdenite, and pyrite.

The name is for the Monteregian Hills, of which Mont St-Hilaire is one, and the type specimen is preserved at the National Museum of Natural Sciences, Ottawa. Monteregianite belongs to the macdonaldite group of minerals, which includes rhodesite and delhayelite. **J.A.M.**

Morelandite*

P. J. Dunn and R. C. Rouse (1978) Morelandite, a new barium arsenate chloride member of the apatite group. *Can. Mineral., 16,* 601–604.

Morelandite occurs as irregular masses in calcite which, in turn, is intermixed with hausmannite in a specimen from Jakobsberg, Sweden. The mineral is light yellow to almost pure gray, has a white streak, and a greasy to vitreous luster. There is an extremely weak cleavage parallel to {0001} and the hardness is about 4½. *D* meas 5.33 g/cm^3; calculated from the composition and unit-cell parameters 5.30 g/cm^3. Optically uniaxial (+); $\omega = 1.880$, $\epsilon = 1.884$. Morelandite is soluble in cold 1:1 HNO_3 and turns an opaque chalky white after long exposure to cold 1:1 HCl. It does not fluoresce.

The mineral is hexagonal, space group $P6_3$ or, more probably, $P6_3/m$ with $a = 10.169(2)$, $c = 7.315(2)$A; *V* 655.1(3)A^3; $c/a = 0.7193$. The strongest lines in the X-ray powder diffraction pattern are: 5.089(3)(110), 4.175(3)(111), 3.658(5)(002), 3.030(10)(211), 2.969(7)(112), 2.935(6)(300), and 1.965(3)(213).

An electron microprobe analysis gave: CaO 8.85, FeO 0.41, BaO 33.00, MnO 0.39, PbO 24.85, P_2O_5 2.05, As_2O_5 28.11, Cl 3.69, F 0.00, H_2O tr., total 101.35, less O = Cl 0.83, sum 100.52 wt%. The following formula was calculated on the basis of the cell dimensions, density, and normalization to 100%: $(Ba_{2.25}Ca_{1.65}Pb_{1.16}Fe_{0.06}Mn_{0.06})[(AsO_4)_{2.56}(PO_4)_{0.30}]Cl_{1.09}$ or, ideally, $Ba_5(AsO_4)_3Cl$. From the chemical formula and the crystallographic data, it is clear that morelandite is a member of the apatite group. No evidence of a monoclinic superstructure was found.

The name is in honor of the late Grover C. Moreland, supervisor of the sample preparation laboratory at the Smithsonian Institution. Type material is preserved at the Smithsonian Institution and at the British Museum (Natural History); National Science Museum, Tokyo; Royal Ontario Museum, Toronto; and Geological Survey of Canada, Ottawa. **J.A.M.**

Nickelbischofite*

W. W. Crook, III and J. L. Jambor (1979) Nickelbischofite, a new nickel chloride hydrate. *Can. Mineral., 17,* 107–109.

The mineral is emerald green, has a very pale green to white streak, a vitreous luster, is translucent and non-fluorescent. Hardness of about 1½; brittle with subconchoidal to conchoidal fracture and perfect {001} cleavage. The mineral is deliquescent and readily soluble in water. *D* meas 1.929 g/cm^3, calc 1.932 g/cm^3. Nickelbischofite is biaxial (+), $2V = 87°$, $\alpha = 1.589$, $\beta = 1.617$, $\gamma = 1.644$; weakly pleochroic with α pale green, β pale green to green, γ green; absorption scheme is given as $\alpha > \beta > \gamma$, but the pleochroic colors indicate $\gamma > \beta > \alpha$ or $Z > Y > X$; orientation, $Y = b$, $X{:}C = +8°$.

Nickelbischofite occurs as powdery coatings and as aggregates of poorly formed crystals. The crystals are up to 15mm long and are monoclinic, space group $C2/m$, $a = 10.318$, $b = 7.077$, $c = 6.623$A, $\beta = 122.37°$, $Z = 2$, $a{:}b{:}c = 1.468{:}1{:}0.936$ (1.468 is a typographical error for 1.458, J.A.M.). The strongest lines in the X-ray powder diffraction pattern are: 5.59(100)(001), 5.49(40)(110), 4.82(30)($\bar{1}$11), 2.924(40)($\bar{1}$12), 2.747(30)(220), and 2.180(30)(400). Forms present on the crystals are {100}, {110}, and {011}.

Electron microprobe analyses gave: Ni 24.2, 23.0; Cu 0.15, 0.21; Fe 0.04, 0.06; Co 0.5, 1.4; Cr 0.1, 0.1; Cl 30.0, 30.1; H_2O 45.6, 45.7; total 100.59, 100.57 wt%. H_2O was determined from total weight loss on ignition less Cl. These correspond to the following theoretical contents of $NiCl_2 \cdot 6H_2O$: Ni 24.70, Cl 29.83, H_2O 45.47, total 100.00 wt%. [An empirical formula is not given, but from the average of the two analyses I calculated the following formula based on 2 Cl ions: $(Ni_{0.95}Co_{0.04}Cu_{0.01})Cl_{2.00} \cdot 5.98H_2O$, J.A.M.]. Nickelbischofite is, ideally, $NiCl_2 \cdot 6H_2O$, the Ni analog of albrittonite ($CoCl_2 \cdot 6H_2O$).

Nickelbischofite occurs at three localities: in sublimates at Mt. Shirane, Gumma Prefecture, Japan; on drill core from the Dumont ultramafic body near Amos, Quebec, Canada; and at the Oxford serpentine quarry, Llano County, Texas. The data given in the description are for the Texas material which occurs with eryth-

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rite, annabergite, zaratite, albrittonite, cobaltite, linnaeite, siegenite and nickeline in "serpentine."

The name "... indicates that the new mineral is compositionally the nickel analogue of bischofite, $MgCl_2 \cdot 6H_2O$, but the two are not isostructural." Type material from Texas is deposited in the Smithsonian Institution, Washington, and the Quebec material is in the National Mineral Collection, Ottawa.

Discussion

In my opinion, the name of this mineral is totally misleading. If a name had to be given in order to relate it to another mineral why pick a mineral to which it is only chemically related? It would have made much more sense to link this mineral with albrittonite since they will be side by side in most mineralogical classifications. **J.A.M.**

Phuralumite* and upalite*

Michel Deliens and Paul Piret (1979) Uranyl aluminum phosphates from Kobokobo. II. Phuralumite, $Al_2(UO_2)_3(PO_4)_2(OH)_6 \cdot 10H_2O$ and upalite, $Al(UO_2)_3(PO_4)_2(OH)_3$, new minerals. *Bull. Mineral. (Soc. fr. Mineral. Cristallogr.), 102,* 333–337 (in French).

Analyses of phuralumite and upalite by electron microprobe (standards used: metatorbernite, corundum, kyanite, and apatite) gave: (H_2O by difference) P_2O_5 10.3, 12.3; Al_2O_3 7.6, 4.0; UO_3 65.9, 80.2; H_2O 16.2, 3.5, corresponding to the formulas above. The calculated formula for upalite has additional 0.6 H_2O, but the structural data indicate the formula above.

Weissenberg and rotation photographs show phuralumite to be monoclinic, space group $P2_1/a$, $a = 13.87$, $b = 20.79$, $c = 9.38$A, $\beta = 112°$, $Z = 4$; G calc 3.54, meas 3.5. The strongest X-ray lines (19 given) are 10.4(100)(020), 5.17(70)(040), 3.47(40)($40\bar{1}$,060), 3.40(50)($24\bar{2}$), 3.08(80)(202,$21\bar{3}$,$42\bar{2}$).

Phuralumite occurs as lemon-yellow prismatic crystals, max. length 0.5 mm. H ~ 3. Optically biaxial, neg., $\alpha = 1.559$ (calc), $\beta = 1.616$, $\gamma = 1.624$, $X = b$, Y near elongation, $2V = 40°$. Pleochroic from colorless to very pale yellow on Y and Z. Does not fluoresce in UV.

Weissenberg photographs show upalite to be orthorhombic, space group *Bbcm* or *Bba*2, $a = 34.68$, $b = 16.81$, $c = 13.72$A, $Z = 16$; G calc 3.58, meas 3.5. The strongest X-ray lines (24 given) are 8.4(100)(020), 6.03(50)(420), 4.24(60)(612), 4.18(80)(040), 3.43(80)(004), 3.17(70)(024), 3.084(70)($10 \cdot 0 \cdot 2$), 2.903(75)($10 \cdot 2 \cdot 2$).

Upalite occurs as amber-yellow needles, max. length 0.33 mm. Optically biaxial, neg., $\alpha = 1.649$, $\beta = 1.666$, $\gamma = 1.676$, 2V (calc) 74°, $X = b$, $Y = a$; strongly pleochroic, X colorless, Y and Z canary yellow. Does not fluoresce in UV light.

These minerals occur in the beryl–columbite pegmatite at Kobokobo, Kivu, Zaire, associated with meta-autunite, phosphuranylite, threadgoldite, and four other new aluminum uranyl phosphates. The names are for the composition. Type material is at the Royal Museum of Central Africa, Tervuren, Belgium. **M.F.**

Prosperite*

R. I. Gait, B. D. Sturman, and P. J. Dunn (1979) Prosperite, $HCaZn_2(AsO_4)_2(OH)$, a new mineral from Tsumeb, South West Africa (Namibia). *Can. Mineral., 17,* 87–92.

The mineral occurs as a secondary mineral in vugs in partly altered sulfide ore at Tsumeb, South West Africa (Namibia). Associated minerals are chalcocite, mercurian silver, cuprite, conichalcite, adamite, austinite, koritnigite, and other new species. Prosperite is white to colorless with a white streak and a brilliant vitreous to silky lustre. The hardness is 4½ and there is no cleavage. The mineral is non-fluorescent. D meas 4.31 g/cm^3, calc 4.40 g/cm^3. Optically, the mineral is biaxial (+), $\alpha = 1.746$, $\beta = 1.748$, $\gamma = 1.768$, 2V (meas) 34°, (calc) 36°. Dispersion $r \gg v$. Orientation is $Y = b$, $Z{:}C = 27°$.

Prosperite occurs as radiating sprays of prismatic crystals up to 10mm long and 1mm in diameter. Sheaf-like subparallel aggregates are also present. The crystals are elongate parallel to [001] and display the following forms: {100}, {$\bar{1}01$}, {110}, {$\bar{1}11$}, {421}, {540}, {210}, {310}, {301}, {$\bar{1}12$} and {311}. The crystals are monoclinic, space group $C2/c$ or Cc, $a = 19.252$, $b = 7.737$, $c = 9.765$A, $\beta = 104°32'$, $V = 1408.1$A^3, $Z = 8$. The strongest lines in the X-ray powder diffraction pattern are: 3.78(7)(112,$\bar{3}12$), 3.36(6)(510), 3.11(8)(600), 2.992(9)($\bar{1}13$), 2.723(10)(222,$\bar{4}22$,421), and 2.614(6)($\bar{5}13$).

Electron microprobe analysis (with H_2O by TGA) gave: CaO 13.02, ZnO 33.22, CuO 1.35, As_2O_5 47.92, H_2O 4.0, total 99.51 wt%. This yields the following empirical formula based on 9 oxygen ions: $H_{1.04}Ca_{1.09}(Zn_{1.91}Cu_{0.08})As_{1.95}O_{7.96}(OH)_{1.04}$ or, ideally, $HCaZn_2(AsO_4)_2(OH)$. H_2O was assigned as shown on the basis of infrared analyses. A 4% weight loss occurs between 641° and 665°C. DTA showed endothermic peaks at 655° (corresponding to the weight loss) and at 927° and 965°C (corresponding to fusion of the sample).

The name is in honor of Mr. Prosper J. Williams, a well-known mineral dealer from Toronto. Type material is preserved at the Royal Ontario Museum, Toronto; Smithsonian Institution, Washington, D. C.; and British Museum (Natural History), London. **J.A.M.**

Rohaite*

Sven Karup-Møller (1978) Primary and secondary ore minerals associated with cuprostibite. *Bull. Grønlands Geol. Undersøgelse, 126,* 23–45.

Electron microprobe analyses were made on two samples. The averages on 7 grains and 8 grains, resp., were Tl 26.6, 27.7; Sb 41.0, 43.5; Cu 18.6, 17.8; Pb 2.0, 1.6; Fe 0.3, 0.3; S 9.3, 9.6, sum 97.8, 100.5%. These correspond to $Tl_{0.97}Sb_{1.13}(Cu_{4.79}Fe_{0.07})Pb_{0.04}S_{2.15}$ and $Tl_{0.97}Sb_{1.05}(Cu_{4.89}Fe_{0.06})Pb_{0.04}S_{2.14}$, or $TlCu_5SbS_2$. Etch tests with $HgCl_2$, KOH, KCN, and $FeCl_3$ were negative, with HCl(1:1) the mineral turned slightly steel-bluish gray, with HNO_3(1:1) the polished surface is destroyed and the mineral turns black.

Weissenberg and precession studies showed the mineral to be tetragonal, $a = 3.801 \pm .001$, $c = 20.986 \pm .008$A, $Z = 2$, G calc 7.78. The strongest X-ray lines (16 given) are: 3.800(9)(010), 3.078(10)(014), 2.393(10)(114), 1.902(9)(020).

The mineral occurs intergrown with chalcocite, also enclosed in antimonian silver together with loellingite, cuprostibite, and cuprite, also at the contact of cuprostibite and sphalerite, all these in a vein rich in analcime and sodalite in the Ilimaussaq alkalic intrusive, south Greenland. Its grain size is 0.05 to 0.5 mm. In reflected light it is yellowish cream to dull bluish-gray, reflectance pleochroism strong in air and oil. Strongly anisotropic, yellowish-cream to black. Optically positive. Reflectances (Rg and Rp, %):

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481 mm, 32.0, 24.5; 546, 32.4, 22.3; 590, 32.0, 21.8; 650, 31.8, 20.8. Microhardness (25g load) 88 to 103, av. 94.

The mineral alters readily to a mixture of digenite and senarmontite.

The name is for John Rose-Hansen, University of Copenhagen, where type material is preserved. **M.F.**

Součekite*

F. Cech and I. Vavrin (1979) Součekite, $CuPbBi(S,Se)_3$, a new mineral of the bournonite group. *Neues Jahrb. Mineral. Monatsh.*, 289–295.

Analyses by electron microprobe (standards analyzed galena and covellite and pure Bi, Cu, Pb, Se, and Te) gave Pb 33.86, 32.68; Cu 9.76, 9.93; Bi 31.71, 32.41; S 8.83, 9.25; Se 14.55, 14.55; Te 0.79, 0.51; sum 99.50, 99.33% (analysts Z. Kotrba and I. Vavrin). The first analysis corresponds to the formula $Pb_{1.05}Cu_{0.99}Bi_{0.98}(S_{1.77}Se_{1.19}Te_{0.04})$. The name is applied to material with S > Se; the analyzed sample is a selenian součekite.

Single-crystal data could not be obtained. The X-ray pattern is similar to those of bournonite and seligmannite. Space group probably $Pn2_1m$, by analogy. The powder pattern was indexed on an orthorhombic cell with $a = 8.153$, $b = 8.498$, $c = 8.080$A, $Z = 4$, G calc 7.60. The strongest lines (33 given) are 4.249(6)(020), 4.040(8)(002), 2.757(10)(122), 2.717(10)(212,300), 2.019(6)(004,232).

The mineral occurs in hydrothermal quartz–carbonate veins at Oldrichov, western Bohemia, associated with poubaite, galena–clausthalite, and selenian–sulfurian rucklidgeite. Součekite occurs as anhedral grains up to 0.01 mm across. Color lead gray, luster metallic, commonly very finely polysynthetically twinned. No cleavage observed. Vickers microhardness (25mg load) 166–188, av. 179 kg/mm^2. In reflected light in air, color creamy with brownish tint; in oil, creamy brown to light gray with bluish tint. Reflectances are given at 15 wavelengths, 420 to 700 nm; R_{max} and R_{min} are: 460 nm, 47.5, 44.1; 540 nm, 47.2, 43.7; 580 nm, 47.3, 43.5; 660 nm, 47.7, 43.6%. Between crossed nicols, anisotropism is medium strong from light brown to dark blue-gray.

The name is for Frantisek Souček, a former member of the Department of Mineralogy, Charles University, Prague, and a mineral collector. Type material is at the Department of Mineralogy, Charles University. **M. F.**

Threadgoldite*

Michel Deliens and Paul Piret (1979). Uranyl aluminum phosphates of Kobokobo. IV. Threadgoldite, $Al(UO_2)_2(PO_4)_2(OH)\cdot 8H_2O$, a new mineral. *Bull. Mineral. (Soc. fr. Mineral. Cristallogr.), 102,* 338–341 (in French).

Analysis by electron microprobe by J. Wautier gave P_2O_5 13.7, Al_2O_3 5.4, UO_3 63.5, H_2O (by difference) 17.4%, corresponding to $0.98Al_2O_3\cdot 2.04UO_3\cdot 1.78P_2O_5$. A DTA curve on 4.32 mg gave a loss of 17% from 20° to 700° C.

Weissenberg photographs showed the mineral to be monoclinic, space group Cc or $C2/c$, $a = 20.25$, $b = 9.85$, $c = 19.75$A, $\beta = 111.4°$, $Z = 8$; G calc 3.32, meas 3.4. The strongest X-ray lines (24 given) are 9.43(100)(200), 5.35 (50)($31\bar{2}$), 4.10(50)(312), 3.474(80)($22\bar{4}$), 3.366(60)(024), 2.197(60)($22\bar{8}$,$42\bar{8}$).

The mineral occurs with phuralumite and upalite (see above) as greenish-yellow micaceous tabular crystals, elongated on b, max length 1 mm. Forms present are {100}, {001}, {010}, and {012}; these are also cleavage planes. Optically biaxial neg. 2V = 70°, $\alpha = 1.573$ (calc), $\beta = 1.583$, $\gamma = 1.583$, elongation neg., $Y = b$, $Z : c = 4°$. Under the microscope, very pale yellow to colorless. Fluoresces green in long-wave UV, pale green in short-wave UV.

The name is for Ian M. Threadgold, University of Sydney, Australia, who described in 1960 an unnamed mineral from northern Australia that gave the same powder pattern as threadgoldite and similar optics, but also contained Ca and probably Fe. Threadgoldite is the phosphate analogue of meta-vanuralite in composition, but the latter is triclinic. **M. F.**

Uytenbogaardtite*

M. D. Barton, C. Kieft, E. A. J. Burke, and I. S. Oen (1978) Uytenbogaardtite, a new silver–gold sulfide. *Can. Mineral., 16,* 651–659.

Uytenbogaardtite occurs as blebs up to 100 μm across and as rims intimately associated with acanthite, electrum and quartz, at three different localities: Comstock lode, Storey County, Nevada; Smeinogorski (Schlangenberg), Altai, USSR; and Tambang Sawah, Benkoelen district, Sumatra, Indonesia. Detailed information on the occurrences and paragenesis is given. No information is given on the mineral's general appearance, but in polished section it shows weak to distinct reflection pleochroism and the color in air varies from gray-white to gray-white with a brownish tint. In oil immersion the pleochroism is more distinct from brownish-gray to brownish-pink. Anisotropy in air and in oil is strong, but without distinct colors. Reflectance values for Sumatran material are (R_{max}, R_{min}, λ): 34.6%, 33.2%, 470nm; 34.6%, 30.3%, 546nm; 35.2%, 31.1%, 589nm; 33.3%, 30.5%, 650nm. Light etching is extremely strong; the Nevada material develops a completely different surface after several tens of seconds under moderate illumination. Uytenbogaardtite from the other two localities seems to be more stable. The VHN hardness is about 20 for a load of 15g. The mineral is very brittle, considerably more so than is acanthite.

Nine electron microprobe analyses (three from each locality) were carried out. They are all very similar except that the Nevada material has 2.2 to 3.6 wt% Cu and traces of selenium and tellurium. An analysis of the Sumatran material gave Ag 56.7, Au 32.6, S 11.0, total 100.3 wt%. All of the analyses are close to the ideal composition of Ag_3AuS_2.

Uytenbogaardtite is tetragonal, space group $P4_122$ or $P4_1$, $a = 9.68$, $c = 9.81$A (Sumatra). With $Z = 8$, the calculated density of Sumatran material is 8.45 g/cm^3. The strongest lines in the X-ray powder diffraction pattern of the Sumatran material are: 6.94(4)(110), 4.33(3)(210), 2.802(3)(222), 2.712(10)(203), 2.591(9)(321), and 2.112(4)(421).

The name is for Professor Willem Uytenbogaardt, noted ore microscopist and professor of geology at the Technical University at Delft, The Netherlands. Type material is preserved at the Free University in Amsterdam, the University of Amsterdam, and the Smithsonian Institution. **J. A. M.**

Unnamed Minerals

Kurt Walenta (1979). The secondary minerals of the ore veins of Neubulach, northern Black Forest. *Aufschluss, 30,* 213–252 (in German).

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Unnamed bismuth oxide

Microchemical and probe analyses of green spherulites showed them to have Bi as main component, with minor Cu, Fe, Ca, As, and Sb. Easily soluble in cold 1:1 HCl or HNO_3. The strongest X-ray lines (20 given) are 5.73(7), 3.44(5), 3.16(10), 2.02(5), 1.902(6). Birefringence high, *ns* 2.1–2.2. Elongation negative. Anomalous blue interference colors. Associated with malachite, bismutite, and mixite.

Unnamed Cu-Ca arsenate

The mineral occurs as white to pale green fibrous radiating crystals, associated with chalcophyllite and barium pharmacosiderite. Probe analysis showed it to be a copper arsenate, with Ca present, and minor Fe, Zn, and Sb. Dissolved by cold 1:1 HNO_3. The strongest X-ray lines (9 given) are 4.26(10), 3.04(8)(very diffuse) 2.97(8)(very diffuse), 2.45(9)(diffuse), 1.608(5)(very diffuse). *ns* $\alpha' = 1.735$, $\gamma' = 1.745$.

Unnamed copper arsenate

Microchemical tests showed Cu, Fe, and As, with minor Ca and Sb. Partly dissolved by 1:1 HCl or HNO_3, mostly dissolved by hot HCl. The strongest lines (5 given) are 3.19(9), 2.75(10).

Unnamed orthorhombic $FeAsO_4$, monoclinic $FeAsO_4$

Incrustations on quartz gave an X-ray pattern that indicated the material to be a mixture of 2 known synthetic forms of $FeAsO_4$. Dissolved by cold 1:1 HCl, more slowly by cold 1:1 HNO_3. The strongest X-ray lines of the orthorhombic form (11 given) are 3.70(8)(021), 3.56(10)(111), 2.65(5)(022), 2.54(7)(130), 1.495(6)(152). Probe analyses show Fe, As, and some Cu.

The strongest lines of the monoclinic phase (20 given) are 4.04(10), 3.36(7)(diffuse), 3.05(8), 2.72(5)(diffuse). Contains Fe, As, and a little Cu and Al.

Unnamed aluminum arsenate

Occurs with malachite, azurite, barium pharmacosiderite, and an unnamed aluminum arsenate of the crandallite group (see below). White, fibrous, radiating aggregates, luster silky. Contains Al and As, also traces of Ba, Ca, Cu, and Si. Soluble in 1:1 HCl. Optically biaxial, neg., $\alpha = 1.540$, $\gamma = 1.548$ (both $\pm$ 0.002), $2V = 66°$, $r>v$, extinction parallel, Z = elong. The strongest X-ray lines (42 given) are 8.97(7), 7.78(10), 6.55(7), 5.92(7), 3.75(7), 3.49(8), 2.73(6)(diffuse).

Unnamed aluminum arsenate of crandallite group

Blue-green to green crusts and spherulitic aggregates on silicified sandstone contain Al, Fe, As, Ba, Ca, and Cu; formula possibly $(Ba,Ca,Cu)(Al,Fe)_3H(AsO_4)_2(OH)_6$. Scarcely dissolved by cold 1:1 HCl or HNO_3, slowly and incompletely dissolved in hot 1:1 HCl. The strongest X-ray lines (26 given) are 3.54(8), 2.99(10), 1.913(7), 1.764(6). **M. F.**

NEW DATA

Häggite

E. G. Ryabeva, L. S. Dubakina, A. A. Gorshkov, Z. Z. Nekrasova, L. I. Taichkova, and T. A. Khruleva (1978). Häggite—new data. *Dokl. Akad. Naud SSSR, 243,* 1295–1297 (in Russian).

Häggite was found in Eocene clays of Turkmenia and in alluvial sandstones of Karatau. Optical data are given at 14 wavelengths. X-ray data agree with those of the original description (*Am. Mineral., 45,* 1144–1166, 1961).

Electron probe analysis gave V 55.8%, corresponding to the composition V_2O_5. No water was present. The mineral is therefore dimorphous with shcherbinaite.

Discussion

Data are inadequate to establish the composition. **M. F.**

Sturtite

A. M. Portnov, B. G. Vaintrub, L. S. Solntseva, and L. S. Dubakina (1978) Sturtite, a hydrous silicate of manganese with the structure of trioctahedral mica. *Dokl. Akad. Nauk SSSR, 243,* 1292–1294 (in Russian).

Analysis of reddish-brown to dark brown cryptocrystalline masses in altered effusives from northeast USSR gave SiO_2 40.50, TiO_2 0.01, Al_2O_3 3.80, Fe_2O_3 4.80, MnO 23.70, CaO 2.20, alkalies none, H_2O 25.10, sum 100.11%. Amorphous by X-ray and electron diffraction study. Isotropic, $n = 1.490$. The DTA curve shows endothermic breaks at 120° (loss of H_2O) and at 400°C (loss of OH); heating at 1000° gave bixbyite. The infrared absorption curve (identical to that of a sample from S. Yakutia that contained MnO_2 17.16, MnO 1.76, MgO 17.39) shows molecular water, hydroxyl, and is similar to those of trioctahedral hydrous micas. The formula is therefore given as $(Mn_{1.97}Fe_{0.36}Al_{0.43}Ca_{0.24})Si_4O_{10}(OH)_{2.79}\cdot H_2O$.

Discussion

Type material from Broken Hill, Australia, was not examined. **M. F.**

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