**NEW MINERAL NAMES**

MICHAEL FLEISCHER, J. A. MANDARINO AND ADOLF PABST

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**Admontite***


Admontite is a magnesium borate found in the gypsum deposit of Schildmauer near Admont in Styria (Austria) in association with gypsum, anhydrite, hexahydrite, löwite, quartz, and pyrite. Chemical analysis gave MgO 10.20%, B₂O₃ 54.50% (by difference), H₂O 35.30%, corresponding closely to 2MgO·B₂O₃·15H₂O. 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(9X100), 5.29(7)(211), 3.96(9)(310,322), 2.68(9)(413,203,412,312,304,004,123,132). No cleavage, fracture conchoidal, H probably 2-3; optically biaxial negative, α = 1.442(2), γ = 1.504(2), 2V a ~ 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.

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**Aluminum**


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, 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.

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**Aubertite***


Analysis by H. V. (spectrophotometric for Cu, Al, SO₃, Cl; H₂O by Penfield) gave SO₃ 28.30, Cl 6.70, Cu 11.80, Al₂O₃ 9.16, Na₂O 0.13, K₂O 0.05, CaO 0.18, H₂O 45.40, sum 100.72 (O = Cl₂) 100.21%, corresponding to Cu₁.₅₆Al₁₂(SO₄)₃Cl₂₋₁₀.28H₂O or CuAl(SO₄)₂Cl·14H₂O. 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 Cu₂O. The TGA curve shows a loss of (H₂O) of 35.6% to 100° and 9.8% more from 100° to 300°. Loss of SO₃ occurs at about 530° to 650°. Aubertite is soluble in water.

X-ray study shows aubertite to be triclinic, P₁, a = 6.288±0.003, b = 13.239±0.006, c = 6.284±0.003A, α = 91°52', β = 94°40', γ = 82°27'(all ±1°), Z = 1, G calc 1.83, meas 1.815. The strongest lines (70 given) are 6.25(45)(001), 5.49(44)(011), 4.83(40)(120), 4.50(100)(111), 4.247(69)(01) (120), 3.952(58)(111), 3.690(42)(121), 3.130(42)(002), 3.113(40)(210). Structural study indicates the formula to be Al₂(H₂O)₆Cu(H₂O)₄(SO₄)₂Cl·2H₂O.

The mineral occurs as azure-blue crusts of corroded grains. Cleavage [010] perfect. Optically biaxial, neg., ns (Na) α = 1.462, β = 1.482, γ = 1.495, 2V = 71°, r > v moderate, optic axis nearly perpendicular to (010).

The mineral was collected in 1961 at Quetcna, Antofagasta Province, Chile, in the zone of oxidation, associated with copiapite, amaranthite, 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.

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**Carlhintzeite***


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°; α = 1.411, β = 1.416, γ = 1.422. Orientation: X ≈ b, c: Z = 10°.

The mineral occurs as tufts and bundles of crystals up to 2mm long. The crystals are elongate parallel to [010] and flattened on {011}. Present are the forms {100} and {001} and the face (110). The crystals are twinned about [010]. Carlhintzeite is triclinic (psuedomonoclinic), space group C1 or C1, α = 9.48, b = 6.98, c = 9.30A, α = 91.14° β = 104.85°, γ = 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, H₂O(TGA) 7.0, sum 99.23 wt%. (Note by J.A.M.: Al and Ca are given as Al₂O₃ and CaO, but these are typographical errors). The analytical data yield the empirical formula (based on 7 fluorine ions): Ca₃Al₁₉O₉₇F₁₉·0.96H₂O or, ideally, Ca₃Al₁₁F₇·H₂O.
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**


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 13.5, 13.4; Bi 65.6, 56.8; Pb 0.1, 0.3; S 18.0, 17.6; sum 99.9, 100.1%, corresponding to Cu₅Ag₇Bi₇P₇O₃₀₋₂S₇O₇. Weissenberg study showed the mineral to be monoclinic, space group C2/m or Cn, a = 13.45, b = 4.02, c = 33.06Å, 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, HgCl₂, KCN, HNO₃, and HF. 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 13.5, 13.4; Bi 65.6, 56.8; Pb 0.1, 0.3; S 18.0, 17.6; sum 99.9, 100.1%, corresponding to Cu₅Ag₇Bi₇P₇O₃₀₋₂S₇O₇. Weissenberg study showed the mineral to be monoclinic, space group C2/m or Cn, a = 13.45, b = 4.02, c = 33.06Å, 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, HgCl₂, KCN, HNO₃, and HF.

**Curetonite**


Analysis gave P₂O₅ 23.39 (av. of 3 by probe), V₂O₅ 1.27 (av. of 2 by chem. and spec.), BaO 35.09 (av. of 3 by probe), Al₂O₃ 12.81 (av. of 3 by probe, 2 by chem.), TiO₂ 6.84 (chem.), H₂O 2.46 (Penfield), sum 99.86%, corresponding to Ba₆Al₃Ti₂(PO₄)₃(OH)ₓ, 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 P2₁/m or Cn, a = 6.957, b = 12.55, c = 3.22Å, β = 102°20’. G calc 4.31 for Z = 1, meas 4.42±0.05. The strongest X-ray lines (37 given) are 4.290(5)(111), 3.286(8)(210), 3.250(10)(031), 2.991(6)(220), 2.816(6)(221), 2.251(6), 1.686(7).

Crystals up to 3 mm show forms {100}, {010}, {001}, and {210}. Color usually bright yellow-green, in some samples nickel-green. Streak white. H 3.5, brittle. Cleavage {010} good, parting on {010}. Optical properties, positive, nₑ (Na) = 1.676, β = 1.680, γ = 1.693, 2V = 60°. X = b, Z = c = 30°. Mostly colorless in section, but may show splotty 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 of 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**


Koritnigite is a hydrated zinc hydrogen arsenate with the formula Zn[H₂O(HOAsO₃)₂]. Chemical analysis (electron microprobe and TGA) gave: As₂O₅ 51.75, ZnO 35.97, H₂O 12.3%, sum 100.0%. The HOAsO₃ ions were determined by IR spectroscopy. Koritnigite is soluble in cold dilute HCl and HNO₃. The cell dimensions are: a = 7.948(2), b = 15.829(5), c = 6.668(2)A, α = 90.86(2), β = 96.56(2), γ = 90.05(2)°, Z = 8, G meas = 3.54, calc = 3.56. The space group is P 1. Strongest lines in the powder pattern are: 7.90(10)(000), 3.83(7)(210,210), 3.16(9)(211,211,230,230), 2.46(6)(250,250).

Koritnigite is colorless and transparent. There are no euhedral crystals. Cleavage {010} perfect, traces of cleavage parallel to {010} and {100} visible on {010}; H = 2. Koritnigite is optically biaxial, positive, 2V = 70°(2); α = 1.632(2), β = 1.652(3), γ = 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, stranskite, and other minerals not yet identified.

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

**Mandarinoite**


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°, α = 1.715, β = 1.80, γ = 1.87, X = b, c = Z = 22°.

Mandarinoite is monoclinic, space group P2₁/a, c = 16.78, 8 b = 7.86, c = 9.96Å, β = 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 {010} and flattened parallel to {100}. Forms observed are: {100}, {110}, {011}, and {101}. The strongest lines in the X-ray powder diffraction pattern are: 8.25(40)(200), 7.10(100)(110), 3.55(50)(212,220,312), 3.43(40)(302,402), 2.97(70)(213,321,322), and 2.80(40)(222).

Electron microprobe analysis gave: Fe₂O₃ 28.68, SeO₃ 59.53, H₂O 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 H₂O) is Fe₅[Se₄O₉,0.95] 3.65H₂O or, ideally, Fe₅Sedor₃O₇·4H₂O.

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.
Montelegianite


Montelegianite is colorless, white, gray, rarely mauge 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 mes 2.42(2) g/cm³, calculated from the empirical formula 2.391 g/cm³, assuming Z = 4. The mineral is readily etched along cleavage planes by cold 1:1 HCl, HNO₃, and H₂SO₄. Optically biaxial (+), α = 1.510, β = 1.513, γ = 1.517, 2V(meas) 87°, (calc) 82°; X = c, Y = a, Z = b.

Montelegianite 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 Pmmn, P2₁mb, or Pm2₁b. Strongest lines in the X-ray powder diffraction pattern are: 12.00(100)(002), 7.03(100)(200), 6.02(50)(220), 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 needle-like crystals, as elongate tabular crystals in parallel groups, and as irregular micaceous masses. The needle-like crystals are elongate parallel to [001] and flattened on {010}. 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


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 mes 1.929 g/cm³, calc 1.932 g/cm³. Nickelbischofite is biaxial (+), 2V = 87°; α = 1.589, β = 1.617, γ = 1.664; weakly pleochroic with α pale green, β pale green to green, γ green; absorption scheme is given as γ > β > α, but the pleochroic colors indicate γ > β > α 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 = 6.623A, β = 122.37°, Z = 2, a:b:c = 1:1.468:1.0936 (1:1.468 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)(111), 2.924(40)(112), 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, 31.0; H₂O 45.6, 45.7; total 100.59, 100.57 wt.%. H₂O was determined from total weight loss on ignition less Cl. These correspond to the following theoretical contents of NiCl₂ · 6H₂O: Ni 24.70, Cl 29.83, H₂O 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: (Ni₂₅Co₆₆Cu₆₆1₄Mn₆₆₀₆)(AsO₄)₂₅(PO₄)₆Cl₁₀ or, ideally, Ba₂(AsO₄)Cl.] 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.
Phuralumite* and upalite*

Analyses of phuralumite and upalite by electron microprobe (standards used: metatorbernite, corundum, kyanite, and apatite) gave: (H2O by difference) P2O5 10.3, 12.3; Al2O3 7.6, 4.0; UO2 65.9, 80.2; H2O 16.2, 3.5, corresponding to the formulas above. The calculated formula for upalite has additional 0.6 H2O, but the structural data indicate the formula above.

Weissenberg and rotation photographs show phuralumite to be monoclinic, space group P21/a, a = 13.87, b = 20.79, c = 9.38 A, b = 112°, Z = 4; G calc 3.54, meas 3.5. The strongest X-ray lines (19 given) are: 3.800(9)(010), 5.17(70)(040), 3.47(40)(401,060), 3.40(50)(242), 3.08(80)(202,213,422).

Phuralumite occurs as lemon-yellow prismatic crystals, max. length 0.5 mm. H ~ 3. Optically biaxial, neg., α = 1.559 (calc), β = 1.616, γ = 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 Bbcn or Bba2, 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)(10-02), 2.903(75)(10-22).

Upalite occurs as amber-yellow needles, max. length 0.33 mm. Optically biaxial, α = 1.649, β = 1.666, γ = 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 and phosphure, in vein rich in analcime and sodalite in the flimaussaq alkalic intrusive, south Greenland. The 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, %):

Rohaite*

Electron microprobe analyses made on two samples. The average on 7 grains and 8 grains, resp., were Ti 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 Tl5+8Sb13(Sb4Sb0.07)Pb0.04 Sb2.13 and Tl5+8Sb13(Cu4.97Fe0.06)Pb0.03Sb2.13 or TlCuSb2S. Etch tests with HgCl2, KOH, KCN, and FeCl3 were negative, with HCl(1:1) the mineral turned slightly steel-blue-gray, with HNO3(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 ± 0.001, c = 20.986 ± 0.008 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(9)(114), 1.902(9)(020).

The crystal occurs intergrown with chalcolite, also enclosed in antimorian silver together with loellingite, cuprohistite, and cuprite, also at the contact of cuprohistite and sphalerite, all these in a vein rich in analcime and sodalite in the flimaussaq 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, %):
Součekite*


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% (analyst Z. Kotrba and I. Vavrin). The first analysis corresponds to the formula Pb₁₀Cu₀₉Bi₀₉S₇Se₆. The name is applied to material with S > Se; the analyzed sample is a selenium soudekite.

Single-crystal data could not be obtained. The X-ray pattern is similar to those of bournonite and seligmannite. Space group probably Pn₂₁m, by analogy. The powder pattern was indexed on similar optics, but also contained Ca and probably Fe. Soudekite is the phosphate analogue of meta-vanaluralite in composition, but the latter is triclinic. M. F.

Uytenbogaardtite*


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 (Rₙ, Rₚ, 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 Ag₃AuS₂.

Uytenbogaardtite is tetragonal, space group P4₁2₁2 or P4₁₁₂, a = 9.68, c = 9.81Å (Sumatra). With Z = 8, the calculated density of Sumatran material is 8.45 g/cm³. The strongest lines in the X-ray powder diffraction pattern of the Sumatran material are: 6.94(4)[110], 4.33(3)[210], 2.80(2)[222], 2.71(1)[203], 2.59(1)[321], and 2.11(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 Amsterdam, the University of Amsterdam, and the Smithsonian Institution. J. A. M.

Unnamed Minerals

NEW MINERAL NAMES

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 HNO₃. 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 chalcopyllite 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 HNO₃. 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 α' = 1.735, γ = 1.745.

Unnamed copper arsenate

Microchemical tests showed Cu, Fe, and As, with minor Ca and Sb. Partly dissolved by 1:1 HCl or HNO₃, mostly dissolved by hot HCl. The strongest lines (5 given) are 3.19(9), 2.75(10).

Unnamed orthorhombic FeAsO₄, monoclinic FeAsO₄

Incrustations on quartz gave an X-ray pattern that indicated the material to be a mixture of 2 known synthetic forms of FeAsO₄. Dissolved by cold 1:1 HCl, more slowly by cold 1:1 HNO₃. 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, α = 1.540, γ = 1.548 (both ± 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)₃(H(AsO₄)₂)(OH)₆. Scarcely dissolved by cold 1:1 HCl or HNO₃, 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


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 V₂O₅. No water was present. The mineral is therefore dimorphous with schcherbinita.

Discussion

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

Sturtite


Analysis of reddish-brown to dark brown cryptocrystalline masses in altered effusives from northeast USSR gave SiO₂ 40.50, TiO₂ 0.01, Al₂O₃ 3.80, Fe₂O₃ 4.80, MnO 23.70, CaO 2.20, alkalies none, H₂O 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°C (loss of H₂O) and at 400°C (loss of OH); heating at 1000°C gave bixbyite. The infrared absorption curve (identical to that of a sample from S. Yakutia that contained MnO₂ 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 (Mn₁.₅₇Fe₆.₅₇Alo.₃3Ca₆.₂O)₂Si₄O₁₀( OH)₁₂₁₂H₂O.

Discussion

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