NEW MINERAL NAMES*

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Alumotantite*, Natrotantite*


Both minerals occur in albited areas of granite pegmatites, Kola Peninsula, USSR. Alumotantite forms rims around crystals of simpsonite and also rims natrotantite. The latter occurs intergrown with microlite and rims simpsonite.

Microprobe analysis of alumotantite gave $\text{Ta}_2\text{O}_5$ 81.13, $\text{Nb}_2\text{O}_5$ 0.80, $\text{Al}_2\text{O}_3$ 18.47, sum 100.40%, corresponding to Al$^{0.98}\text{Ta}_{0.02}\text{O}_5$, or $\text{AlTaO}_4$. X-ray study showed it to be orthorhombic, $a = 4.90 \pm 0.01$, $b = 11.58 \pm 0.02$, $c = 5.66 \pm 0.01 \AA$. The strongest lines (59 given) are 5.66(5)(001), 3.64(7b)(101), 3.13(10)(121), 2.89(8)(040), 2.439(5)(200), 1.649(5)(070).

Alumotantite is colorless, transparent, luster adamantine. No cleavage. Birefringent and anisotropic. Reflectances: 486 nm, 15.6 and 14.7; 589 nm, 15.4 and 14.6; 656 nm, 15.9 and 15.1%. Microhardness at different loads: 20 g, 1840–2230; 40 g, 1950–2090; 100 g 1650–1690 kg/sq.mm. Strongly luminescent bright blue in cathode rays, not luminescent in ultra-violet.

Microprobe analysis of natrotantite gave $\text{Ta}_2\text{O}_5$ 91.26, $\text{Nb}_2\text{O}_5$ 2.71, $\text{Na}_3\text{O}$ 4.69, $\text{CaO}$ 0.08, $\text{PbO}$ 0.87, sum 99.61%, corresponding to (Na$^{0.02}\text{Ca}_{0.01}\text{Pb}_{0.01})\text{Ta}_3\text{O}_8\text{Nb}_{0.04}\text{O}_5$, or $\text{NaTa}_3\text{O}_8$.

The X-ray pattern is indexed on monoclinic cell with $a = 10.819 \pm 0.02$, $b = 6.239 \pm 0.02$, $c = 12.781 \pm 0.02 \AA$, space group $C2/c$. The strongest lines (60 given) are 3.06(7)(004), 3.02(10b)(021), 2.779(9b)(022), 1.556(8)(606), 1.548(8)(041). The pattern matches closely that given by J.C.P.D.S. for synthetic $\text{NaTa}_3\text{O}_8$ (Reisman, J. Phys. Chem., v. 66, no. 1, 1962). Further study of the composition of the synthetic compound is needed.

Natrotantite is colorless, transparent, with a slight yellowish tint. Luster adamantine. Cleavage absent, fracture uneven. Strongly luminescent yellow-green in cathode rays, but not luminescent in UV. Strongly anisotropic and birefringent. Reflectances: 486 nm, 15.0, 13.6; 589 nm, 12.4, 11.8; 656 nm, 12.0, 12.0%. Microhardness: 20 g load, 1250; 40 g load 1270 kg/sq.mm.

The names are for the composition. Type material is at the Mineralogical Museum, Geological Institute, Kola Branch, Acad. Sci. USSR, Apatite. M.F.

Bartelkeite*


Electron microprobe analysis gave GeO$_2$ 53.7, PbO 34.0, FeO 12.1, sum 99.8%, corresponding to Pb$_{0.97}$Fe$_{0.13}$Ge$^3\text{O}_8$. The infra-red spectrum showed the absence of water, and microchemical tests showed the iron to be ferrous. Dissolved by hot HCl.

X-ray data showed the mineral to be monoclinic, space group $P2_1/m$, $a = 5.431$, $b = 13.689$, $c = 5.892 \AA$, $\beta = 111.79^\circ$, $Z = 2$. D calc. = 4.97. The strongest X-ray lines (40 given) are 4.74(6)(110), 4.42(8)(111), 2.91(041,041), 2.87(8)(121), 2.75(7)(141,002), 2.20(7)(222,230).

The mineral occurs in cavities in primary ore containing germanite, renierite, tennantite, and galena. One crystal is tabular on {101}, the other accicular on {101}. Other forms observed are {111} and {100}. Max. size 1.0 x 0.3 x 0.2 mm. Colorless to very pale greenish, cleavage {101} distinct. H about 4. Optically biaxial, negative, 2V $\sim 35^\circ$, $n_a = 1.885, \beta = 1.910, \gamma = 1.913$. $Z = b, c, r < v$.

The name is for Wolfgang Bartelke, mineral collector and specialist in Tsumeb minerals. Type material is at the University of Stuttgart and the Smithsonian Institution, Washington. M.F.

Cestibtantite*


Five microprobe analyses gave $\text{Ta}_2\text{O}_5$ 70.47–72.51, $\text{Nb}_2\text{O}_5$ 1.33–3.40, $\text{Sb}_2\text{O}_3$ 12.26–14.15, $\text{Bi}_2\text{O}_3$ 0.20–1.07, $\text{Cs}_2\text{O}$ 6.88–8.33, $\text{Na}_2\text{O}$ 0.88–1.60, $\text{CaO}$ 0.04–0.24, $\text{PbO}$ 1.06–3.52, sum 98.62–99.04%. Atomic absorption analysis showed $\text{Li}_2\text{O} \leq 0.05\%$. The infra-red spectrum of the mineral indicates the presence of hydroxyl and the formula is calculated as (Cs$_{0.58}$Na$_{0.42}$Ca$_{0.01}$)($\text{Sb}_{1.97}\text{Bi}_{0.03}\text{Pb}_{0.06}$($\text{Ta}_{3.78}\text{Nb}_{0.22}$)O$_{12}$OH)$_{0.58}$.

The X-ray pattern is indexed as cubic, $a = 10.256 \pm 0.005 \AA$, $G$ max. 6.4–6.6, calc. G for CsSbTa$_4$O$_{12} = 6.67$, for (Cs$_{0.58}$Na$_{0.42}$)SbTa$_4$O$_{12} = 6.35$. The strongest lines (49 given) are 3.17(9)(311), 3.04(10)(222), 2.02(8)(333,511), 1.840(10)(440), 1.587(10)(622), 1.474(8)(551,711), 1.370(9)(553,731), 1.074(8)(844), 1.017(9)(773,951), 1.012(10)(666,102,22).

The mineral is isosstructural with microlite.

Cestibtantite is colorless to gray, lustre adamantine. Fracture uneven, brittle, microhardness (kg/sq.mm) 130–1200 (20g load), 800–1050 (40g load), 670–780 (100g load). Isotropic, $n > 1.8$.

Coefficient of reflectance (%) 13.8, 480 nm, 13.6 at 551 nm, 13.6 at 589 nm, 13.0 at 656 nm. It shows orange-yellow luminescence in UV light, a weak yellowish glow in cathode rays.

The mineral occurs in intensely albited zones of a granite pegmatite, Kola Peninsula, USSR, associated with simpsonite, stibiotantalite, microlite, wodginite, tannite, and pollucite. It forms grains 0.1–3 mm long bordering stibiotantalite and simpsonite and along fractures in them.

*Minerals marked with asterisks were approved before publication by the Commission on New Minerals and Mineral Names of the International Mineralogical Association.
The name is for the composition. Type material is at the Mineralogical Museum, Acad. Sci. USSR, Moscow, and the Geological Institute, Kola Branch, Apatite.

Discussion

The formula can be written, in better accord with the usual formulation of the Pyrochlore Group (62, 403-410 (1977) as (Cs, Na, Sb)(Ta, Nb)2(O, OH)2·2H2O.

Clinophosinaite*

P20S25.35, 25.5; SiO2 20.1, 20.1; RE2O3 0.18, 0.44; CaO 15.65, 16.45; SrO 3.08, 1.91; MnO 0.60, 0.54; Na2O 32.55, 32.7; K2O 0.09, 0.05, sum 97.60, 97.69%. The mineral is decomposed by cold 10% HCl. X-ray study showed the mineral to be monoclinic, space group n/c, a = 7.303, b = 12.201, c = 14.715 Å, f3 = 91°56' (K), a = 7.30, b = 12.21, c = 14.81 Å, f3 = 92° (Y); Z = 8. The strongest lines (28 given) are 2.724 (100) (034, 230), 2.639 (57) (204), 2.550 (50) (204), 2.031 (50) (060), 1.823 (47) (400). The mineral is pale lilac, lustervitreous. Hardness 4, fracture conchoidal, G = 2.88, 2.85. Optically biaxial, positive nα = 1.557, β = 1.561, γ = 1.567, 2V = 80° (K), a = 1.556, β = 1.559, γ = 1.563, 2V = 75° (Y).

The mineral occurs in dumps from Mt. Yukspor, Lovozero massif, and in drill cores from Mt. Koashva, Khibina massif. Both are in alkaline pegmatites, and occur intergrown with zirconsantoite, which appears to be a replacement product of euclase.

The name is for the analogy in composition to phosinaite (60, 488 (1975)); the latter contains 13-14% RE2O3. Type material is at the Fersman Mineralogical Museum, Acad. Sci. USSR, Moscow.

Cobaltkoritnigite*


Microprobe analyses gave As2O5 54.63, 54.14; CoO 20.55, 23.46; NiO 2.05, 2.37; CuO 0.50, 0.41; ZnO 57.13, 9.09; FeO 0.45, 0.48%. H2O not detd., corresponded to (Co0.83Zn0.15 Cu0.02Fe0.08Ni0.01)As1.1 and (Co0.69Zn0.24Cu0.02Fe0.01Ni0.01) As1.02. From a study of the X-ray powder data with those of koritnigite, the formula is (Co, Zn)2As2O5(OH)2·H2O.

X-ray powder data are nearly identical with those for koritnigite and the same unit cell is derived—triclinic a = 7.95, b = 15.83, c = 6.67 Å, α = 90.9, β = 96.6, γ = 90.0. The strongest lines are 7.94(100)(020, 200), 3.82(50)(210, 210), 3.25(40)(221, 012, 221), 3.23(40)(012), 3.14(70)(211, 230, 211, 230), 3.46(40)(250, 250). The X-ray data agree less well with data for synthetic CoAs2O5(OH)2·H2O.

The name koritnigite is for the composition and the relation to koritnigite. M.F.

Coutinite (= Lanthanite-(Nd))


The name coutinite is given to the mineral of composition (Nd, La, Sm, Pr)(CO3)3·nH2O from Curitiba, Paraná, Brazil, described by Roberts et al. (1980) (abs. in Am. Mineral. 66, 637-638 (1981) as lanthanite-(Nd), a name approved before publication by the IMA Commission on New Mineral Names. The X-ray powder data, agreeing well with the data of Roberts et al., correspond to a different orientation, space group Pnnn, a = 10.01, b = 9.30, c = 17.94 Å.

Discussion

The name lanthanite-(Nd) has priority. M.F.

Duhamelite*


The average of 3 chemical analyses performed on 1318, 322 and 869 µg gave CuO 20.4, PbO 28.4, Bi2O3 15.9, V2O5 23.1, H2O 11.8, total 99.6%, in close agreement with the formula given in the title. Duhamelite occurs with chrysocolla, malachite, and rare fornacite, wulfenite, and bismuthite in quartz veins cutting Precambrian greenstones in an area 5 km southwest of Payson, Arizona, where some gold mining was carried on a hundred years ago. The small, green, crystals of duhamelite, no longer than 0.4 mm or 0.02 mm in width, may be free-standing or compacted into barrel-shaped bundles. The streak is pale yellow-green, the crystals are brittle and the estimated Mohs hardness is 3. Specific gravity determined by Berman balance is 5.80 ± 0.05.

Duhamelite is orthorhombic with a = 7.49, b = 9.66, and c = 5.87 Å. The strongest lines of the powder diffraction pattern are 5.014(4)(011), 3.493(5)(210), 3.159(7)(201), 2.950(10)(130), and 2.642(9)(012). The prism axis, taken as [001], is coincident with c. Indices of refraction are n(p) = 2.08, b = 2.11 for NaD light. Pleochroism is weak, with X = Y < Z. Duhamelite is soluble in cold dilute HCl or HNO3, but not in water. It fuses readily to a syrupy black slag. The name is for J. E. DuHamel, geologist for Phelps Dodge Corporation, the finder of the mineral. A.P.

Fe-tcychite

Material found by A. P. Khomyakov in alkalic rocks of the Kola Peninsula was analyzed by microprobe by S. M. Sandomirskaya, giving SO\textsubscript{4} 14.00, CO\textsubscript{2} 30.89, FeO 15.26, MnO 4.35, MgO 2.77, Na\textsubscript{2}O 32.30, sum 99.75%. Corresponding to Na\textsubscript{2}O (Fe\textsubscript{2}+0.34Mn\textsubscript{0.6}Mg\textsubscript{0.7})[SO\textsubscript{4}2(OH)](CO\textsubscript{3})\textsubscript{3}. Cubic, space group F\textit{3}d, \(a = 13.962\), \(Z = 8\), \(G = 2.78\). No other data are given.

**Giuseppetite**


Electron microprobe analysis gave SiO\textsubscript{2} 33.25, Al\textsubscript{2}O\textsubscript{3} 28.56, FeO\textsubscript{2} 0.03, CaO 4.85, Na\textsubscript{2}O 14.37, K\textsubscript{2}O 8.00, SO\textsubscript{3} 9.92, Cl 0.78, sum 99.76–(O–Cl\textsubscript{2}) 0.18 = 99.58%. The empirical formula expressed in terms of the general cancrinite formula is (Na\textsubscript{1.96} K\textsubscript{1.86} Sr\textsubscript{0.46} Ca\textsubscript{0.54})[SO\textsubscript{4}2(OH)](CO\textsubscript{3})\textsubscript{3}. Infrared analysis confirmed the absence of H\textsubscript{2}O, OH and CO\textsubscript{2} groups. Strong absorption maxima were observed at 995 cm\(^{-1}\) (Si–O–Si) and 1100 cm\(^{-1}\) (Si–O–Si and SO\textsubscript{4}).

X-ray study showed the mineral to be hexagonal, preferred space group \(\text{P}6_3/m\), \(a = 12.850(1)\), \(c = 4.252(2)\) Å, \(D = 2.70\), \(Z = 8\). The strongest powder lines (69 given) are 3.712(100)(300), 3.446(80)(217), 3.126(70)(219), 2.141(66)(331), 6.420(62)(110), 2.640(62)(405,0.0.16). The mineral occurs in fragmented, pale violet-blue veinslets a few millimeters thick in an ejected sandstone block at Sacrofano, Latium, Italy. Optically uniaxial, positive, \(\varepsilon = 1.507\), \(\omega = 1.491\). H 6–7. No cleavage.

The name is for Professor Giuseppe Giuseppetti of the University of Pavia. Type material is preserved at the Mineralogical Museum, University of Pavia.

**Lammerite**


Electron microprobe analysis gave CuO 49.9, ZnO 0.8, MgO 0.2, FeO 0.2, AsO\textsubscript{3} 49.8, total 100.9% leading to the ideal formula Cu\textsubscript{3}[AsO\textsubscript{4}2]. The absence of water or hydroxide ions was established by IR spectroscopy.

X-ray study shows the mineral to be monoclinic, diffraction symbol \(P2_1/n\), with \(a = 5.080(2)\), \(b = 11.616(6)\), \(c = 5.391(2)\) Å, \(\beta = 111.71(3)\); \(Z = 2\), \(D = 2.35\), calc. 2.365, \(z = 8\). The strongest powder lines (29 indexed given) are 3.80(6)(021), 3.46(80)(021), 3.12(60)(219), 2.141(66)(330), 2.640(62)(405,0.0.16). The mineral occurs in fragmented, pale violet-blue veinslets a few millimeters thick in an ejected sandnite block at Sacrofano, Latium, Italy. Optically uniaxial, positive, \(\varepsilon = 1.507\), \(\omega = 1.491\). H 6–7. No cleavage.

The name is for mineralogist E. K. Lazarenko, academician of the Acad. Sci. Ukraine SSR. Type material is at the Mineralogical Museum, Acad. Sci. USSR.

**Lazarenkoite**


A preliminary report on “unnamed calcium-iron arsenite” is in 52, 300 (1967). The mineral was found, associated with anabergite, as fibrous orange crystal incrustations formed by oxidation of skutterudite-loellingite ores of a deposit in W. Siberia.

Analyses showed (average of 2 complete, 2 partial) As\textsubscript{3}O\textsubscript{5} 61.5, FeO\textsubscript{2} 16.7, FeO 5.6, MgO 0.7, CaO 5.1, H\textsubscript{2}O\textsubscript{e} 12.2, sum 101.8%. Corresponding to (Cu\textsubscript{0.44}Fe\textsubscript{0.56}Mg\textsubscript{0.09})[Fe\textsubscript{2}O\textsubscript{3}2(OH)2] 3.32H\textsubscript{2}O, or (Ca\textsubscript{Fe}\textsuperscript{2+} Fe\textsuperscript{3+}3As\textsubscript{3}O\textsubscript{2}3H\textsubscript{2}O. Infra-red study showed the absence of arsenate (AsO\textsubscript{4})\textsuperscript{3–} and arsenite (AsO\textsubscript{2})\textsuperscript{3–}. The DTA curve shows an endothermic effect at 160° (loss of water) and exothermic effects at 460°, 510°, and 610°. All the water is lost at 140°C; further heating decomposes the mineral at 350°, when it gives off white fumes with the characteristic odor of As\textsubscript{2}O\textsubscript{3}. The IR spectrum has bands corresponding to molecular water, but no bands corresponding to arsenate or arsenite ions. Insoluble in H\textsubscript{2}O, dissolved by cold dilute HCl. Single crystal study was unsuccessful. The X-ray pattern (21 lines) was indexed on an orthorhombic cell with \(a = 21.80\), \(b = 12.64\), \(c = 8.40\) Å, \(Z = 10\), G calc. 3.59, meas. 3.45 ± 0.05. The strongest lines are 11.20(9)(110, 200), 8.40(10)(001), 6.55(8)(111, 201), 6.55(8)(011, 200). Color bright orange, luster resinous to silky, H = 1. Optically biaxial, negative, \(n_s = 1.820\), \(\beta = 1.920\), \(\gamma = 1.955\) (all ±0.003), 2V about 30°, elongation positive, pleochroism strong, with \(X\) pale yellow, \(Y\) pale brown, \(Z\) rose-brown.

The name is for mineralogist E. K. Lazarenko, academician of the Acad. Sci. Ukraine SSR. Type material is at the Mineralogical Museum, Acad. Sci. USSR.

**Mbobomkulite**, Hydrombobomkulite*, Nickelalumite


The minerals occur in the Mbobo Mkuwu cave (the big hole), Nelspruit district, eastern Transvaal, as sky-blue, friable nodules in a matrix of powdery allophane. Nickelalumite, associated with chalcoalumite also occurs as thin, pale-blue coatings on gypsum crystals that form a crust on the ceiling.

**Mbobomkulite**

Analysis by H. H. Lochmann of pale blue nodules, dried in a silica gel desiccator, gave Al\textsubscript{2}O\textsubscript{3} 39.42, NiO 7.98, CuO 4.28, SO\textsubscript{3} 3.81, Na\textsubscript{2}O 15.23, H\textsubscript{2}O 27.90, SiO\textsubscript{2} 1.91, C 0.26, F 0.07 = 100.86 – (O = F\textsubscript{2}) 0.03 = 100.83% (C, Ni\textsubscript{2}O\textsubscript{3}, and H\textsubscript{2}O by gas chromatography). After deduction of SiO\textsubscript{2}, Al\textsubscript{2}O\textsubscript{3}, and H\textsubscript{2}O as allophane, this gives the formula (Ni\textsubscript{0.77}Cu\textsubscript{0.23})Al\textsubscript{3.8} (NO\textsubscript{3})\textsubscript{1.50}(SO\textsubscript{4})\textsubscript{0.25}(OH)\textsubscript{11.43}F\textsubscript{0.02} · 1.59 H\textsubscript{2}O. When the mineral is
removed from the desiccator, it takes up about 5% of moisture, which would give $3\text{H}_2\text{O}$ in the formula.

The X-ray pattern is very close to that of chalcoalumite and the formula is therefore $(\text{Ni},\text{Cu})\text{Al}(\text{NO}_3)_2\cdot(\text{SO}_4)\text{H}_2\text{O}$. The strongest lines (41 given) are 8.550(100)(002), 7.870(15)(011), 4.549(15)(202), 4.271(40)(004), 3.179(15)(015, 222), 3.054(15)(311), 2.512(15)(133), 2.004(15)(235). Indexed on the chalcoalumite structure, this corresponds to a monoclinic cell with $a = 10.171$, $b = 8.865$, $c = 17.145\AA$, $\beta = 95.37^\circ$, $Z = 4$, $G$ calc. 2.344, measured by sink-float 2.30.

The mineral is powdery, sky-blue. Under the microscope colorless, pseudohexagonal plates about 10 $\mu$m across. Birefringent, $n_a = 1.515$, $\gamma = 1.585$, sign, and $2V$ could not be determined. Cleavage [001] perfect. $X' \perp c = 10^\circ$.

**Hydrombobomkulite**

Freshly collected blue nodules give a different X-ray pattern. On exposure to the atmosphere, this loses water and is transformed into mbobonkulite in a few hours. The loss in a desiccator was 32%, so its formula should be the same as for mbobonkulite, but with 13-14 (perhaps 12-15) $\text{H}_2\text{O}$. The dehydration is irreversible. A DTA curve showed a peak at 60-100°C (loss wt. 32%) and at 160°C (5% loss), a strong endothermic peak at 280°C (loss 24%), and a small endothermic peak at 800°C (loss 3%).

The strongest X-ray lines (42 given) are at 10.45(100)(002), 5.229(50)(004), 3.485(30)(006), 2.489(15)(260, 254, 411). The indexing was on a cell with $a = 10.145$, $b = 17.155$, $c = 20.870\AA$, $\beta = 90.55^\circ$.

**Nickelalumite**

Analysis of a nodule containing allophane and opal gave $\text{Al}_2\text{O}_3$ 39.30, $\text{NiO}$ 6.59, $\text{CuO}$ 2.33, $\text{SO}_3$ 10.28, $\text{N}_2\text{O}_5$ 4.70, $C < 0.30$, $\text{H}_2\text{O}$ 28.53, $\text{SiO}_2$ 8.95, sum 100.70%. Microprobe analysis of a crust on gypsum gave $\text{Al}_2\text{O}_3$ 41.65, $\text{NiO}$ 10.08, $\text{CuO}$ 0.93, $\text{SO}_3$ 13.53, $\text{N}_2\text{O}_5$ not detectable. These indicate a formula $(\text{Ni}_{0.75}\text{Cu}_{0.25})\text{Al}_4(\text{SO}_4)_{0.75}(\text{NO}_3)_{0.25}(\text{OH})_2\cdot3\text{H}_2\text{O}$, the nickel analogue of chalcoalumite. The X-ray pattern (27 lines) has strongest lines 8.543(100)(002), 7.877(20)(011), 4.267(10)(004), 2.907(15)(133), 2.289(15)(126, 305), 1.997(20)(235). This is calculated to a monoclinic cell, $a = 10.175$, $b = 8.860$, $c = 17.174\AA$, $\beta = 95.95^\circ$, $Z = 4$, $G$ calc. 2.28, measured by sink-float 2.24 $ns$ $\alpha = 1.532$, $\gamma = 1.543$, $X' \perp c < 30^\circ$.

Mbobonkulite is the nickel nitrate analogue and nickelaluminate the nickel sulfate analogue of chalcoalumite. Type material is at the museum of the Geological Survey of South Africa, Pretoria. M.F.

**Preisingerite**


The mineral occurs with rooseveltite in the deposits of San Francisco de los Andes and Cerro Negro de la Aguadita, Calingasta Dept., San Juan Province, as white to gray rounded tablets up to 0.2 mm in size. Analysis gave the formula $\text{Bi}_3(\text{AsO}_4)_2\cdot\text{OH}$, with a small amount of $\text{P}$ replacing $\text{As}$. Triclinic $P1$, $a = 9.433$, $b = 7.404$, $c = 6.937\AA$, $\alpha = 92.18^\circ$, $\beta = 106.67^\circ$, $\gamma = 110.62^\circ$, $Z = 2$, $G$ calc. 7.24. Optically biaxial, $2V \sim 90^\circ$, $ns$ $\alpha = 2.130$, $\beta = 2.16^\circ$, $\gamma = 2.195$. M.F.

**Unnamed Ag-Au-As-S-Se Minerals**


Electron microprobe analyses are given of 3 minerals:

(1) Four analyses gave (range and average): Au 2.8-15.6, 9.7; Ag 56.6-76.0, 65.0; Se 10.3-14.8, 12.0; Fe 0.1-0.3, 0.2; Cd 0.2-0.3, 0.3; Cu 0-0.1; As 0.1-0.7, 0.1; Ni 5.2-9.0, 8.4%. The average gives $\text{Ag}_1\text{Au}_{0.3}\text{As}_{1.2}\text{S}_{6.1}\text{Se}_{1.5}\text{S}_{3.5}$. The mineral occurs intergrown with electrum and rarely with auriferite.

(2) Two analyses gave Au 6.1, 3.4; Ag 66.5, 71.2; Cd 0.2, 0.3, As 8.1, 5.7; S 13.1, 12.6; Se 5.3, 5.3; the average gives $\text{Ag}_0.95\text{Au}_{0.1}\text{As}_{1.8}\text{S}_{7.7}\text{Se}_{0.3}$. Beaded or tabular grains.

(3) Analysis gave Au 14.7, Ag 59.8, Fe 0.2, Cd 0.2, Cu 0.5, As 5.0, S 12.6, Se 5.3, sum 99.0%, corresponding to $\text{Ag}_0.89\text{Au}_{1.1}\text{As}_{1.3}\text{S}_{7.8}\text{Se}_{0.6}$. Pinkish-red, porous material. M.F.

**Unnamed Alloys (o-brass, b-brass, Mg-Si, Al-CuMg)**


This paper summarizes work of these authors; they have previously published descriptions of native Al (65,205(1980)) and native Cd. The present paper adds those listed above, with X-ray data and microprobe analyses of these phases, all separated from diabases.

**Discussion**

Several of the materials mentioned, especially native Al, are thermodynamically unstable phases in material high in iron oxides. In addition, some of the associations (chromian pyrope in diabase, essentially pure native Zn and Cd in the same rock, and others) are extremely unlikely. It is not surprising, therefore, that V. S. Sobolev, (Zapiski Vses. Mineral. Obsh. 108, 691-695 (1979) pointed out the likelihood that these results are due to contamination of the samples. The authors reject this on the grounds that the samples were collected from sparsely inhabited localities and that great care was taken in the laboratory.

In my opinion the results cannot be accepted unless the authors (1) publish their procedures in detail (grinding, sieving, and separations), (2) publish reports on samples in section in the rocks.

*Note*—Translations of the two papers cited will be furnished on request. M.F.

**Unnamed K$_2$ZrSi$_3$O$_9$ · $\text{H}_2\text{O}$**


The mineral was found in the Khibina alkaline massif, Kola Peninsula, intergrown with another potassium zirconium silicate. Colorless to yellowish crystals, flattened on (010), cleavages (100) and (010) perfect. H 5, $G$ 2.99. Optically biaxial, negative, $2V \sim 80^\circ$, $ns$ $\alpha = 1.596$, $\beta = 1.610$, $\gamma = 1.619$, $X = c$, $Y = b$. The
NEW MINERAL NAMES

mineral is readily decomposed by acids. When heated to 900°C, it is transformed into wadeite.

The mineral is orthorhombic, space group \( P2_12_12_1 \), \( a = 10.208, b = 13.241, c = 7.174 \AA \). The strongest X-ray lines (not indexed) are 8.12(15), 6.66(100), 4.06(15), 3.31(15), 3.02(20), 2.15(15).

Discussion

It is to be regretted that the crystallographic description is published before the mineral is fully described and named. M.F.

Unnamed \( \text{Na}_5\text{Zr}_2\text{Si}_6\text{O}_{18}\text{Cl} \cdot 2\text{H}_2\text{O} \)


The mineral occurs in the Khibina alkaline massif, Kola Peninsula, intergrown with epidote and fluorite. The mineral is monoclinic, space group \( C2/m, Cm, \) or \( C2, \) most probably \( C2/m, a = 10.785 \pm 0.003, b = 14.492 \pm 0.003, c = 6.627 \pm 0.002 \AA, \beta = 113.12 \pm 0.02°, Z = 2, \) G calc. 2.88, meas. 2.9. Strongest lines not stated. Hardness 5. Optically biaxial, positive, 2V = 33°, \( n_a = 1.597, \) \( n_b = 1.599, \) \( n_c = 1.632, X = b, Z \leq c = 50°. \) Cleavages \{110\} perfect, \{100\} and \{121\} less so.

This may be identical to an unnamed mineral from St. Hilaire, Quebec, described by Chao and Baker, Mineralog. Record. 10, p. 99 (1979). M.F.

Unnamed palladium bismuth chloride


Average of 3 separate microprobe analyses (using metals and synthetic chloroparate) gave \( \text{Pd} 24.5, \text{Pt} 2.07, \text{Fe} 0.78, \text{Ni} 0.27, \text{Bi} 64.1, \text{Cl} 6.43, \) sum 98.15 and a formula of \( (\text{Pd}_{0.8}\text{Fe}_{0.2})_2\text{Fe}^{3+}_{0.24}\text{Ni}_{0.04}\text{Bi}_{0.06}\text{Cl}_{0.86} \) for an empirical formula of \( \text{Pd}_2\text{Bi}_3\text{Cl}_7 \). The mineral occurs as very small rounded to anhedral inclusions, not larger than 30 × 50 \( \mu \)m in cross-section, in a matrix of insizwaite-gervite and paolovite. This occurrence is in the massive pyrrhotite ores of the Otkyabr Cu—Ni deposit also containing chalcopyrite, pentlandite, and magnetite. Minor and rare minerals are hisingerite (CI-bearing), sphalerite, pyrite, marcasite, argentopentlandite, cubanite, mackinawite, galena, native silver electrum, and other platinum-group minerals. The unnamed mineral is strongly bireflectant, from dark gray to nearly white with a rose tint. It has an extremely fine fibrous structure and appears gray with a shagreen surface in sections perpendicular to the fibers. It has a relatively low reflectance which increases uniformly towards the red end of the spectrum. The mineral is strongly anisotropic, with color effects, from near extinction to yellowish, which are at maximum in oil immersion. The mineral qualitatively resembles a fine-grained aggregate of vallerite. One distinct, fracture-free micro-indentation gave VHN\(_{30} = 114 \).

Discussion

A probable new mineral species requiring X-ray data for confirmation. The discovery is important as it is the first of a chloride-bearing platinum-group mineral. Also this is the first confirmation of insizwaite in the Noril'sk-Talnakh area. L.J.C.

Four Unnamed Minerals

Henryk Kucha (1979) (publ. 1980) \( \text{Fe}^{3+}\text{Th}\{\text{PO}_4\}_2 \), monoclinic; \( \text{Fe}^{3+}\text{Th}\{\text{PO}_4\}_2 \cdot \text{H}_2\text{O} \), hexagonal; \( \text{Fe}^{3+}\text{Th}_{1-x}\{\text{RE}\} \), orthorhombic; and \( \text{Fe}^{3+}\text{Th}_{1-x}\{\text{H}_2\text{O}\} \), monoclinic;—four new minerals from Poland. Mineral. Polonica, 10, no. 1, 1–29 (in English).

Three samples from pegmatites and hydrothermal veins in the Luzycze granitic rocks, Lower Silesia, were studied by electron microprobe analyses, DTA, TGA, X-ray, and infra-red analyses. The samples are considered to be mixtures of 4 new phases labelled U-1 to U-4; no explanation is given as to how the compositions of the phases were deduced from the analyses, which show great variations. U-1 is red-brown to red-orange. X-ray powder data indicate it was related to monazite, monoclinic, \( P2_1/m, \) with \( a = 6.68, b = 6.97, c = 6.41 \AA, \beta = 103.88°, Z = 4 \) \( (\text{Th},\text{Fe}^{3+});\text{Ca},\text{Fe}^{3+},\{\text{RE}),(\text{PO}_4),(\text{SiO}_4),(\text{OH}). \)

U-2 is white to yellow with green or orange tinge. Probably hexagonal, \( a = 7.04, c = 3.63 \AA, \) related to rhabdophane and brockite, perhaps \( Z = 3 (\text{Th},\text{Fe},\text{Ca},\text{RE})\{\text{PO}_4),(\text{SiO}_4),(\text{CO}_3)\cdot 0.5\text{H}_2\text{O}. \)

U-3 is reddish-brown, orthorhombic, \( a = 6.77, b = 12.06, c = 6.41 \AA, \) probably \( P2_2_2, \) related to ningyoite, \( Z = 3 (\text{Fe}^{2+};\text{Th}_{1-x}\{\text{RE},\text{Fe}^{3+}\}),(\text{PO}_4),(\text{SiO}_4),(\text{CO}_3)\cdot 0.5\text{H}_2\text{O}. \)

U-4 gives an X-ray pattern close to that of synthetic \( \text{Fe}^{2+}\text{Th}_2\{\text{PO}_4\}_2 \) of Moore and Arah. Am. Mineral. 60, 454–459 (1975). It is monoclinic, \( a = 9.32, b = 10.04, c = 7.96 \AA, \beta = 117.18°, Z = 4. \) The strongest lines are 3.34(8)(012), 2.68(9)(321) (coincides with goethite line), 2.44(6)(320) (coincides with monazite group).

Discussion

Requires further study. M.F.

NEW DATA

Asbolan


A hybrid structure has been derived for asbolans from several localities in the USSR, including a sample from weathered crust of the Lipov deposit, Middle Urals. Platelets with irregular surfaces ranging in diameter from sub-micron to several microns wide are coated with films of goethite. X-ray energy dispersive microanalyses of these platelets, corrected for FeOOH impurities, yielded the empirical formula \( (\text{Ni}_{0.28}\text{Co}_{0.12}\text{Ca}_{0.05})\text{Mn}\{\text{OH}_2\} \cdot 0.64\text{H}_2\text{O} \). X-ray diffraction patterns showed lines at 9.6(001), 4.82(8)(002), 2.445(8)(100), 1.7(8)(014), and
1.419(ww)(110), giving hexagonal cell parameters \( a = 2.823, c = 9.6\AA \). Electron diffraction patterns, however, indicated two hexagonal sublattices: I with \( a_o = 2.823, c_o = 9.34\AA \); and II with \( a = 3.04, c = 9.34\AA \). Collapse of (001) reflections to 9.34 (001), 4.677 (002), and 3.11\AA (003) is attributed to dehydration in the vacuum of the electron microscope. Asbolan is deduced to have a hybrid layer structure analogous to vallerite and related lithiophorite, and is formulated as \([\text{Mn}^{4+}O_2,\text{OH}]_x\) \([\text{R}^{2+}(\text{OH})_2,\text{OH}]_y \cdot \text{nH}_2\text{O}\), where \(\text{R}^{2+}\) denotes \(\text{Co}^{2+}, \text{Ni}^{2+}, \text{Ca}^{2+}\), and \(x\) and \(y\) are both < 1. Defects leading to the islet character of sublattice II result from different dimensions of the divalent cations in this layer relative to the \(\text{Mn}^{4+}\) ions in sublattice I. The structural model proposed for asbolan shows water molecules bound to \(\text{Ca}^{2+}\) ions adjacent to islets of \(\text{Co}^{2+}\) and \(\text{Ni}^{2+}\) ions octahedrally coordinated to \(\text{OH}^-\) ions. Loss of this molecular water in the temperature range 150–300°C results in X-ray amorphous products, while interlayer water between sublattice I and II lost under vacuum causes contraction of (001) planes in electron diffraction patterns. Thermogravimetric and infrared spectral measurements support the \(\text{H}_2\text{O}\) and \(\text{OH}^-\) species proposed in the structural model. R.G.B.

Surinamite


Ion probe analysis showed several per cent Be in surinamite and wet chemical analysis of a surinamite-kyanite mixture gave \(\text{BeO} 0.6\%\), which, assuming all Be to be in the surinamite, gave \(\text{BeO} 4–5\%\). The formula of surinamite is probably \((\text{Mg}_{5.25}\text{Fe}_{0.75})_2(\text{Al}_{1.75}\text{Fe}_{0.25})_2\text{BeSi}_3\text{O}_16\).

Hydrothermal syntheses in the system \(\text{MgO-}\text{Al}_2\text{O}_3-\text{SiO}_2-\text{H}_2\text{O}\) failed to produce surinamite; with addition of \(\text{BeO}\), however, surinamite was synthesized at 800°C, 20 kbar. M.F.

Tunisite


Neutron-activation analysis of a 4.7 mg sample of tunisite from the type locality (Am. Min. 54, 1–13, 1969) leads to a slight revision of the formula which is now given as \(\text{NaCa}_2\text{Al}_4(\text{CO}_3)_2\text{(OH)}_6\text{Cl}\), the presence of chlorine not having been recognized originally. Determination of the structure and its refinement using better material from France (Schweiz. Min. & Pet. Mitt., 59, 223–238, 1979), analysis of which had also shown the presence of chlorine, confirmed the space group, \(P\overline{4}/nmm\), and cell content, \(Z = 2\), initially reported. Cell dimensions found for the tunisite from France, \(a = 11.193(1), c = 6.5637(7)\AA\), are very close to those reported for the type material. A.P.