NEW MINERAL NAMES*

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Argentocuproaurite


Microprobe analyses of two grains from Noril’sk and Talnakh, respectively, gave Au 67.7, 66.5; Cu 9.2, 11.2; Ag 12.8, 19.4; Pd 4.2, 2.2; Rh 4.3, ±; Pb 1.6, ±; Pt 0.9, ±; Sn = 0.5; totals 100.7, 99.8, with idealized formulae of Au$_{30}$Cu$_{2}$Ag$_{8}$Rh$_{4}$Pd$_{4}$ and Au$_{30}$Ag$_{8}$Cu$_{2}$Pd$_{4}$. The X-ray powder pattern (8 lines) was indexed as primitive cubic with $a = 4.073(2)$A. The mineral is light reddish-rose in reflected light, isotropic, with no observed birefringence. Reflectance at 580 mm $= 64.3$ percent. VHN$_{ab}$ = 214(211-216). Negative to standard etch agents, except for KCN and aqua regia.

Discussion

Compositionally, the mineral is argentoo CuAu or cuproan argentoo gold. The mineral can be indexed as face-centered cubic (hence cuproan argentoo gold), except for the weakest reflection in the pattern reported at 1.673A. Confirmation by single-crystal methods of this single weak extra reflection in the powder pattern is necessary to justify characterization as a new mineral species. The name is unnecessary. L.J.C.

Aurocuproite


Microprobe analyses of two grains gave Au 61.6, 64.5; Cu 28.4, 28.0; Ag 0.9, ±; Pd 7.7, 6.9; Pt 2.3, ±; Rh 1.9, ±; Bi 0.6, ±; totals 103.4, 99.4, with idealized formulae of Cu$_{32}$Au$_{4}$Pd$_{4}$ and Cu$_{32}$Au$_{4}$Pd$_{4}$. The X-ray powder pattern (8 lines) was indexed as primitive cubic with $a = 3.862(2)$A. The mineral, found in ores of the Talnakh deposit, is light orange-yellow in reflected light, isotropic, with no observed birefringence. Reflectance at 580 mm $= 63.1$ percent. VHN$_{ab}$ = 199(189-206). Negative to standard etch agents except for KCN and aqua regia.

Discussion

Compositionally the mineral is palladian AuCu or auroan palladian copper. The powder pattern may be indexed as face centered cubic (hence auroan palladian copper) except for the weakest reflection at 1.070A. Confirmation by single-crystal methods of this single extra weak reflection in the powder pattern is necessary to justify characterization as a new mineral species. The name is unnecessary. L.J.C.

* Minerals marked with an asterisk after the name were approved before publication by the Commission on New Minerals and Mineral Names, International Mineralogical Association.
Kankite


Analysis by M. Mrazek gave As₂O₅ 43.92, SO₃ 0.44, Fe₂O₃ 31.84, CuO 0.02, H₂O + 13.91, H₂O - 9.91, insol. 0.36, sum 100.40 percent (given as 100.41), corresponding to Fe₂AsO₄·6.74 H₂O. Spectrographic analysis showed traces of N, B, Cu, Mg, Mn, Ti, and Zn. The DTA curve shows 2 endothermic peaks at 190 and 290° and an exothermic peak at 605°. The loss in weight is 9.0 percent (given as 100.46), corresponding to 2FeAsO₄·6.74 H₂O.

The mineral is insoluble in water, but dissolves readily in 10 percent HCl.

The name is for Dr. Kazunosuke Masutomi, amateur mineralogist and mineral collector. Type material is preserved at Kanazawa Univ. (anal. 1) and at Tohoku University (anal. 2). M.F.

Masutomiite*


Analyses of masutomiite gave SiO₂ 46.85, 47.67, Al₂O₃ 19.81, 22.17, TiO₂ 0.13, 0.09, Fe₂O₃ 0.38, 0.35, Fe₂O₃·3H₂O 1.53, 1.12, MnO 8.12, 4.28, MgO 0.00, 0.02, Li₂O 4.45, 5.78, CaO 0.00, 0.08, Na₂O 0.54, 0.61; K₂O 9.88, 9.78; Rb₂O 1.54, 1.20; F 7.04, 6.84; H₂O + 1.27, 1.95; H₂O - 1.36, 0.45; sum 102.90, 102.38, = (0 = F₂) 2.96, 2.88 = 99.94, 99.50 percent. These correspond to the formula (K,Na,Rb)₂Mn₃[Fe₆⁺,Fe³⁺,Al⁺]₂(Si,Al)O₂F₀.₉₂(F,OH)₇, i.e., the Mn-analogue of zinnwaldite, with Mn⁰⁺⁺.

X-ray data show the mineral to be monoclinic, space group Cm or C2/m, units corresponding to the 2 analyzed samples respectively a = 5.253, 5.248; b = 9.085, 9.087; c = 10.070, 10.090; β = 100.15°, 100.10°, Z = 1. The strongest X-ray lines (33 given) of the material of the first analysis are 10.10 (7201), 3.64 (43112), 3.35 (65022), 3.32 (100003), 3.09 (5812), 2.589 (46200, 621), 1.982 (46005).

The first sample is pale purplish pink, transparent even in thick flakes, H 2.5, G 2.94. Cleavage (001) perfect. Optically biaxial, negative, 2V = 29-31°, α 1.534, β 1.569, γ 1.570, r > > v very weak, pleochroic with X and Z colorless to pale pink, Y purple, abs. X < Z < Y, elongation positive, Y = b, Z = c. The second sample is purple, translucent in thick flakes, H 2.5-3, G 2.90, optically biaxial neg., α 1.536, β 1.570, γ 1.571, 2V = 28°, r > > v very weak, Y = b, Z < a 2-4°, elong. pos., pleochroic with X and Z colorless to pale purple, abs. X < Z < Y.

The first sample forms the core of a zoned single crystal, the outer part being brown managanous zinnwaldite, from a druse of granite pegmatite at Tanakamiyama, Japan, associated with topaz, black tourmaline, albite, and quartz. The second is a pseudohexagonal crystal, 3 cm across and 1 cm thick from Tawara, Gifu Prefecture, associated with casseriter, topaz, black tourmaline, albite, and quartz.

The name is for the locality. M.F.

Petrovicite*


Microprobe analyses by E. Joseph and R. Giraud, using Cu, HgS, PbS, Bi, and Se as standards, gave Cu 16.0, 15.5, Hg 17.4.
17.9; Pb 16.7, 17.3; Bi 16.6, 17.4; Se 34.4, 32.6; sum 101.1, 100.5 percent, corresponding to Cu: Hg: Pb: Bi: Se = 2.97: 1.02: 0.95: 0.93: 5.13 and 2.91: 1.08: 1.01: 1.01: 4.99.

Weissenberg and rotation photographs showed it to be orthorhombic, space group *Pmn2*1 or *Pnma*, a = 16.176 ± 0.005, b = 14.684 ± 0.005, c = 4.331 ± 0.003 Å, V = 1029 Å³, Z = 4, G calc 7.707. The strongest X-ray lines (27 given) are 3.621 (7), 3.546 (8) (420), 3.186 (8) (131), 3.120 (10) (430), 2.961 (10) (520,401), 2.720 (5) (440), 2.262 (5) (611), 2.109 (5) (161), 2.061 (5) (122, 261).

Petrovite is cream-colored with strong metallic luster in reflected light. Reflectances are given at 15 wave lengths: 480 nm, 45.7 percent; 540, 46.5 (max.); 580, 46.2; 660, 45.7. Weakly anisotropic, with polarization colors dark green to violet. The mineral polishes well. Microhardness 102 kg/sq. mm (~ 3 Mohs). Cleavage poor, parallel to flattening of crystals.

The mineral forms tabular crystals up to a few tenths mm in size in hydrothermal dolomite-calcare veins of the Petrovice deposit, western Moravia, Czechoslovakia. It is almost completely replaced by umangite and eskebornit; 12 other selendites occur in the deposit.

The name is for the deposit. Type material (2 polished sections) are in the Ecole Natl. Superieure des Mines, Paris. M.F.

Rozhkovite = palladian cuproauride


Microprobe analyses of five grains gave a range in composition and (average) for Au 60.8-65.6(61.8); Cu 23.0-28.4(24.9); Pd 7.1-8.6(7.6); Rh 1.9-3.4(2.5); Pt 0.0-2.3(1.9); Ag 0.6-0.9(0.7); and Bi 0.6-0.8(0.6). Another sample (No.2) gave Au 65.6, Pd 7.1, Rh 3.4, Ag 0.6, Bi 0.6, Ni 0.15, Cu 23.0, total 100.45, which the authors calculated to 5 atoms to (Cu2RhNiAg3Bi0.97) Ao (CuAu)0.03 0.005. X-ray powder data (24 lines) were indexed as orthorhombic, Pna21, a = 3.86(l), b = 39.00(l) Å, c = 3.84(l) Å when indexed as for synthetic CuAu(II), and with a = 3.88(l), b = 42.68(l), c = 3.84(l) Å when indexed as for synthetic CuAu(II).

The mineral was found in the sulfide ores of the Talnakh deposit, consisting mainly of talnakhite, chalcopyrite, and cubanite. It is variably anisotropic from grain to grain and in differently oriented sections of a single grain.

The color under crossed nics varies from bright to very weak, changes from yellowish to dark gray, and sometimes has reddish-brown tints. The mineral tarnishes brown a few days after polishing. Reflectance measurements with a pyrite standard for sample No. 2 gave: 460nm 46.0, 49.6; 480nm 46.9, 50.5; 500nm 49.0, 52.8; 540nm 53.0, 57.1; 580nm 59.0, 63.5; 620nm 64.0, 68.5; 660nm 67.4, 71.6; 700nm 72.4, 76.4; and 750nm 76.2, 80.5. Values are also given up to 1100nm. Microindention hardness gave VHN³ = 204.6(195.4-213.8), VHNº = 188.9(173.6-204.6), VHN° = 192.8(195.8-200.6), VHN = 183.4(180.5-186.3) for No. 35; and VHN° = 163.3(159.7-165.8), VHN = 178.7(161.0-199.2) for No. 27. The mineral is negative to standard etching reagents, except for KCN and sometimes with aqua regia (after 1 min).

Samples of the mineral are preserved in the Mineralogical Museum, Academy of Sciences, Moscow, U.S.S.R.

Discussion

The authors refer to the work of Johansson and Linde (1936, Ann. Physik., 25, 1-48) for comparison with a presumed CuAu synthetic phase. Hansen and Anderko (1958, Constitution of Binary Alloys, p. 199), however, state that Johansson and Linde were unable to find any clear indication of CuAu as a distinct phase by X-ray investigations. Hansen and Anderko further state that recent investigations by several other authors, using either X-rays, resistivity, emf, or combinations, found no support for the existence of CuAu as a separate phase. In view of the lack of single-crystal data for this mineral, its indexing must be considered tentative, but if any likeness to synthetic phases is to be made, it must rather be to CuAu(II). It can be also demonstrated that the one complete analysis given may be recalculated on the basis of 2 atoms to give (Cu,Rh,Ni,Bi,Au)0.97 (Au,Pd)0.03 or, simply CuAu.


The mineral described as palladian cuproauride by Razin et al. (1971) is now referred to as rozhkovite with a footnote that the name rozhkovite was considered and recommended by the Commission on New Minerals and Mineral Names, I.M.A., in May 1970.

Discussion

The uncertainties regarding the ideal composition of palladian cuproauride and the indexing of its powder pattern apply equally to rozhkovite. The unexplained appearance of this second name four years later has created an unfortunate and confusing precedent. Though the text and Table 2 show the mineral to be orthorhombic, tetragonal cell parameters are given in Table 3. Both names are unnecessary pending reexamination and better data for characterization as a unique mineral species. L.J.C.

Senegalite*


Microprobe analysis by E. Joseph gave P₂O₅ 31.83, Al₂O₃ 46.23, Fe₂O₃ 0.28, H₂O 21.00, sum 99.34 percent, (H₂O by thermal analysis), corresponding closely to the formula above. The DTA curve shows small endothermic breaks at 250° and 370° and a very large one at 440°. The final product of dehydration gave the X-ray pattern of Al₂O₃ (tridymite type). The infrared spectrum shows the presence of hydroxyl and H₂O.

X-ray study (Weissenberg and rotation) showed the mineral to be orthorhombic, Pna₂₁, a 9.678, b 7.597, c 7.668 (all ± 0.002 Å), Z = 4, G(calc) 2.551, (meas) 2.552 ± 0.007. Goniometric data are in close agreement. Forms present a (100), c (001), b (010), m (110), l (210), h (011), e (302), p (111). The strongest x-ray lines (42 given)

Crystals are colorless to pale yellow, luster vitreous. H 5.5. Cleavage (100) imperfect, observed only under the microscope. Not fluorescent. Optically biaxial, positive, α (Na) 1.562, β 1.566, γ 1.587 (all ± 0.002), 2V 53 ± 4° (meas), 48° (calc), dispersion r > v, weak., Z = a, Y = c.

The mineral occurs in the zone of oxidation, Kourondicko iron ore deposit, Segnal, associated with turquoisite, angelite, wavellite, and clardalite.

The name is for the country of origin. Note—Bolivarite is the 5H₂O analogue. M.F.

Sugilite*


Recalculations of analysis by N. M. and H. Mitsunaga of a sample estimated to contain 8.1 percent pectolite gave (all CaO allotted to pectolite)SiO₂ 71.38, TiO₂ 0.51, Al₂O₃ 2.97, Fe₂O₃ 12.76, FeO 0.19, Li₂O 3.14, Na₂O 4.37, K₂O 3.76, H₂O + 0.81, H₂O − 0.12, sum 100.06 percent; corresponding to K₂Na₂O₁r₂[Na₂O₂Si₁₂O₃₆(H₂O)₉]. This is formulated, in accord with the X-ray data, as a member of the osmumite group as: (K₂Na₂)[NaₓSi₁₂O₃₆(H₂O)₉].

The mineral occurs (3-87°) as aggregates of subhedral grains in Mesozoic biotite granite, N.E. Iwagi Islet, southwest Japan. Mineral. J. (Japan), 8, 110-121 (in English).

The name is for Professor Ken-ichi Sugi (1901-1948), Japanese petrologist, who first found the mineral. Type material is at Yamaguchi University, National Museum (Tokyo), Sakurai Museum (Tokyo), and Smithsonian Institution, Washington, D.C. M.F.

Unnamed Ag₃Pd₃Te


Two grains of this unknown Ag-Pd telluride occurred in a microvein of sperrylite, kotulskite, and hessite within chalcopyrite-marcasite masses occurs in disseminated sulfide ore. Electron probe analyses of a homogeneous grain showed that Cu > Ni > Fe > Co with a stoichiometry very near (Cu, Ni, Fe, Co)₃S₄.

Discussion

May be a new mineral. X-ray data and quantitative probe data are required. L.J.C.

Unnamed hydrous magnesium carbonate


Analysis of material containing chrysotile gave SiO₂ 5.01, MgO 38.38, CaO 0.12, Fe₂O₃ 0.21, CO₂ 28.93, H₂O + 20.90 H₂O − 6.39, sum 99.94 percent. After subtracting SiO₂ as chrysotile, the analysis gives MgO:CO₂:H₂O = 5.09:4.04:8.81 MgO, corresponding to the formula above (a hydromagnesite + 4H₂O). The mineral is slightly soluble in water. The DTA curve gives endothermic breaks at 40°, 114°, 270°, 410°, and 515° and exothermic breaks at 495°, 637° (chrysotile), and 808° (chrysotile). The DTA pattern above 150° is like that of hydromagnesite. The infrared absorption spectrum is similar to that of hydromagnesite. The X-ray powder pattern of the mineral has strongest lines (44 given) 33.2 (62), 16.36 (33), 10.82 (55), 6.454 (55) (plus nesquehonite), 5.887 (100), 4.206 (38), 2.933 (57). After being heated to 150°, the mineral gives an X-ray pattern close to that of hydromagnesite. The mineral occurs as snow-white to gray olivine, botryoidal, or reniform aggregates. Scanning electron microscope photographs show that it consists of aggregates of flaky crystals.

Under the microscope, very fine-grained, colorless, α 1.515, β 1.521, γ 1.522, 2V = 44.5°, extinction nearly parallel, elongation positive.

Discussion

Not certainly distinct from dyspinte [55, 1457-1465 (1970)]; the latter is however optically biaxial positive. It occurs on the weathered surface of a brucite-bearing serpentine mass. Associated minerals are chrysotile, nesquehonite, brucite, pyroaurite, artinite, and hydromagnesite. M.F.

Unnamed dimorph of lazurite


A sample from the lazurite deposits of Cis-Baikal has α 1.503, β 1.510, γ 1.514, biaxial positive, 2V = 62° (Note—the αs correspond to a negative mineral, M.F.). Color, pale green to dark blue; deeply
colored varieties are strongly pleochroic with absorption $Z > Y > X$. Oscillation and rotation photographs led to a unit cell with $a = 9.08 \pm 0.01$, $b = 12.85 \pm 0.01$, $c = 25.70 \pm 0.02A$, $\alpha = \beta = \gamma = 90^\circ$, $a_\text{cub} = a_\text{cub} x = 2$, $c = a_\text{cub} y x z$. All grains are twinned, some show complex polysynthetic twinning.

The composition is stated to be similar to that of cubic lazurite.

**Discussion** — Data insufficient as to composition and symmetry. X-ray powder data are not given. M.F.

### Unnamed lead–bismuth tellurides


Quartz veins in Archean granitic rocks contain pyrrhotite and other sulfides, with small amounts of gold, hessite, altaite, tellurobismuthite, and tetradyamite, and 4 minerals:

- Electron microprobe analyses gave:

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<th>Ag</th>
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<th>Te</th>
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<tr>
<td>Mineral A</td>
<td>1.2</td>
<td>13.0</td>
<td>40.2</td>
<td>44.9</td>
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<td>99.3</td>
</tr>
<tr>
<td>Mineral B</td>
<td>1.3</td>
<td>20.5</td>
<td>33.1</td>
<td>43.0</td>
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<td>52.2</td>
<td>30.9</td>
<td>5.5</td>
<td>99.3</td>
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<tr>
<td>Mineral D</td>
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<td>20.3</td>
<td>46.0</td>
<td>27.3</td>
<td>6.3</td>
<td>99.9</td>
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These correspond respectively to the formulas: $(\text{Ag}_{6.13} \text{Pb}_{0.86} \text{Bi}_{0.18})\text{Te}_{10}$, $(\text{Ag}_{0.15} \text{Pb}_{0.17} \text{Bi}_{0.18})\text{Te}_{10}$, $(\text{Pb}_{0.86} \text{Bi}_{1.14})\text{Te}_{10}$, and $(\text{Te}_{0.86} \text{S}_{0.14})$. Reflectances are given for Minerals A, B, and D.

X-ray powder data for Minerals A and D.

Mineral A is similar in optical properties to tellurobismuthite, but the reflectance is lower (57–65%). It has a pale cream tint. Cleavage [001] perfect, microhardness 65–80, av. 75kg/sq mm. The strongest lines of the pattern (22 given) are 3.21 (10), 235 (5), 212 (3); the data resemble those published for synthetic PbBiTe$_3$. Mineral B was found as a grain 0.1 mm., bordering mineral A. It resembles mineral A in appearance and optics, but has a slightly lower reflectance. Mineral C occurs as veinlets 0.05 mm wide. Reflectance 48.5–53 percent, and it differs in color, with a slight greenish tint. Mineral D is light gray with associated with gold and tellurobismuthite. It has a light gray tint lines of the palten (22 given) are 3.21 (10), 235 (5), 212 (3); the data resemble those published for synthetic PbBiTe$_3$. Reflectances are given for Minerals A, B, and D.

### Unnamed palladium telluride


An unnamed cream-colored, weakly anisotropic mineral of composition PdTe$_4$ occurs as discrete grains intergrown with bismuthian merenskyite.

**Discussion**

Insufficient data on the unnamed mineral and the bismuthian merenskyite. L.J.C.

### Unnamed nickel–bismuth telluride


A mineral that optically resembles melanite in the Hitura deposit, Finland, was analyzed with the electron probe: Ni 20.1, Pd 1.1, Te 61.6, Bi 16.1, Sb 0.5. total 99.4 percent, corresponding to $\Sigma = 5.01$ (Te$_{0.86}$Bi$_{0.14}$Sb$_{0.04}$). A pale apricot-yellow, moderately anisotropic mineral is reported to correspond closely to $\text{Pd}_2(\text{Bi,Sb})\text{Te}_4$. It occurs as anhedral grains, 50–250 microns across, enclosed in chalcopyrite and supergene replacements of chalcopyrite and pyrrhotite.

**Discussion**

Insufficient data to assess whether the stoichiometry is realistic. No X-ray or analytical data are given. L.J.C.

### Unnamed Pd–Bi–Te mineral


A light coffee-brown, extremely anisotropic Pd–Bi–Te mineral whose stoichiometry has not been determined occurs as thin rims replacing micheinite in weakly oxidized ore. L.J.C.

### Unnamed Pd$_4$(Te,Bi,Sb)$_3$


The unnamed Pd$_4$(Te,Bi,Sb)$_3$ mineral contains tiny inclusions of a slightly darker, peach-buff-colored mineral with a composition reported to conform exactly to Pd$_4$(Te,Bi,Sb)$_3$ stoichiometry.

**Discussion**

No X-ray or analytical data are given. L.J.C.

### Unnamed Pd(Te,Bi,Sn)


Three grains found as small inclusions in samples from the old Vermilion and the Creighton mine, Sudbury, Ontario. The mineral is pinkish cream in reflected light (air). No reflection pleochroism, but weakly anisotropic. Reflectance $R'_{\text{g}}$ and $R'_{\text{p}} = 53.1, 52.7$ (470 nm) is pinkish cream in reflected light (air). No reflection pleochroism, Vermilion and the Creighton mine, Sudbury, Ontario. The mineral is pinkish cream in reflected light (air). No reflection pleochroism, but weakly anisotropic. Reflectance $R'_{\text{g}}$ and $R'_{\text{p}} = 53.1, 52.7$ (470 nm) is pinkish cream in reflected light (air). No reflection pleochroism, but weakly anisotropic. Reflectance $R'_{\text{g}}$ and $R'_{\text{p}} = 53.1, 52.7$ (470 nm).


Discussion

These four analyses plot within the PdSb (sudburyite, hexagonal)—PdTe (kotulskite, hexagonal)—PdBi (polarisite, orthorhombic) composition triangle. Synthesis experiments reported by Cabri and Laffamme indicate a wide solid-solution field (hexagonal NiAs-type) and a restricted field of orthorhombic symmetry. Any proposed nomenclature for minerals with compositions in the hexagonal solid-solution field, other than at the PdSb and PdTe corners, will have to take account of the phase relations in the PdSb—PdBi—PdTe system. L.J.C.

**New Data**

**Brongniardite, ramdohrite**


New microprobe analyses are given of “brongniardite,” ramdohrite, andorite, and fizeylite, mostly on samples from various museum collections. Analysis of material from the Ust-Teremkov deposit. Transbaikul, gave Pb 25.2, Ag 26.8, Sb 31.8, S 18.0, sum 101.8 percent, corresponding to Ag$_{27.5}$Pb$_{10.9}$Sb$_{10.1}$, near to the formula of the discredited mineral brongniardite, which is therefore considered to be reestablished.

Material labelled ramdohrite from the type locality, Potosi, Bolivia, was found to be a mixture of two phases, one with the composition of andorite, the other containing Ag 9.6, Pb 35.7, Sb 36.1, S 19.4, sum 100.8 percent, corresponding to Ag$_{27.5}$Pb$_{10.9}$Sb$_{10.1}$, or Ag$_{27.5}$Pb$_{10.9}$Sb$_{10.1}$. It is suggested that the name ramdohrite be transferred to this compound.

Discussion

In the absence of X-ray data, the proposals are not acceptable, especially for the “brongniardite,” for which material from the type locality was not examined. M.F.

**Ceruleite**


Ceruleite (coeruleite) was described by Dufet (1900) (*Dana’s System, 7th Ed.*, vol. 2, p. 927). The present study was made on samples from southern Bolivia (exact locality unknown); their identity with type material (British Museum of Natural History) was proved by X-ray study.

Chemical analysis of 7 samples (range and average) CuO 10.74–12.31, 11.79; Al$_2$O$_3$ 26.12–27.52, 26.85; Fe$_2$O$_3$ 0.11 in 1, not determined in others; As$_2$O$_3$ 36.61–40.63, 38.01; P$_2$O$_5$ traces; H$_2$O 22.18–23.75, 23.24; sum 99.51–100.35 percent, the average corresponding to the ratio CuO:Al$_2$O$_3$:As$_2$O$_3$:H$_2$O = 1.79:3.18:2:15.6. The formula proposed is Cu$_{10}$Al$_{15}$OH$_{17}$(AsO$_4$)$_7$.11H$_2$O. X-ray patterns of heated ceruleite show no change up to 230°, at 250° (14.7% loss in weight) a new phase is formed, as also shown by the infrared spectrum. At 290° the material turns green and becomes amorphous. The DTA curve shows a sharp endothermic effect at 365°. The mineral is insoluble in water, but soluble in HCl, HNO$_3$, or KOH.

X-ray powder data are given; the strongest lines (40 given) are 7.296(75)(020), 5.926 (70)(111), 5.650 (100)(111), 4.877 (50)(211), 4.760 (70)(211), 3.545 (60)(321), 3.233 (50)(411), 2.984 (50)(312), 2.650 (60)(402). These are indexed on a triclinic unit cell, a 14.359.

**Unnamed rhodium sulfide**


Small (<20 μm) inclusions occur in platinum-group element alloy grains, especially in isoperibol platinum. Electron probe analyses gave: Rh 65.7, 54.9, 71.7, 13.3, 2.5, 10.0, 11.2, 19.3; Ru 85.4, 5.4, 3.8, 27.0, 5.6, 3.2; Ir <0.1, <0.1, <0.1, <0.1, <0.1, <0.1; Os <0.1, <0.1, <0.1, <0.1, <0.1, <0.1; Ni 4.7, 0.5, 0.2, 0.2, 0.4, 0.1; Fe <0.1, 1.8, <0.1, 1.1, 3.1, 1.8; S 19.3, 18.7, 18.5, 27.5, 19.5, 22.0; As <0.1, <0.1, <0.1, <0.1, <0.1, <0.1; totals 101.8, 97.3, 96.7, 97.5, 93.0, 98.9 percent. These correspond to approximately (Rh,Pt,Ru,Os,Ir,Pt,Ni,Fe)$_3$(S,As) or Rh$_3$S.

Discussion

This is apparently a new mineral. Poor totals and hence uncertain stoichiometry are probably due to small size. X-ray data are required to confirm whether this is equivalent to synthetic Rh$_3$S$_3$ which is cubic, $a = 9.9103(23)$ Å, probably Pm3m [S. Geller (1962) *Acta Crystallogr.*, 15, 713–721 and 1198–1201]. Rh$_3$S is not known in the Rh–S system. L.J.C.

**Unnamed ruthenium sulfarsenide**


Electron probe analyses of hollingworthite from Witwatersrand gold mines revealed two grains with Ru $>$ Rh. Analyses are: Pt 10.3, 2.8; Ir 7.5, 0.4; Rh 15.1, 20.3; Ru 20.4, 27.4; As 38.1, 29.6; Cu <0.1, <0.1; Ni <0.1, 6.4; Fe 0.8, 1.7; S 7.8, 13.7; totals 100.0, 102.3 corresponding to (PGE + Cu, Ni, Fe)$_3$(Sb$_{0.28}$As$_{0.72}$)$_3$ and (PGE + Cu,Ni,Fe)$_3$(Sb$_{0.25}$As$_{0.59}$)$_3$S$_{0.29}$. Grains are too small for X-ray diffraction but are considered to represent varieties of a mineral with ideal RuAsS composition for the end member.

Discussion

This is probably a new sulfarsenide of the platinum group with RuAsS as end member. X-ray data are required. L.J.C.
± 0.003, b 14.687 ± 0.003, c 7.440 ± 0.001 a 9606 ± 0.03, β 93.19 ± 0.040, γ 91.63 ± 0.04⁰, v' = 1556.9A³, Z = 2, G calc 2.734, meas 2.70 ± 0.02.

The mineral consists of deep blue concretions up to 10 cm in diameter, seen under the electron microscope to consist of rod-like crystals up to 5 microns long and 2 microns thick. H 5-6, mean n 1.60. Associated minerals include quartz, barite, goethite, and mansfieldite. M.F.

Chudobaite

R. Dorner and K. Weber (1976) The crystal structure of chudobaite, (Mg, Zn)₄H₂AsO₇, 10 H₂O Naturwissenschaften, 63, 243.

Chudobaite is triclinic, space group P T, a 7.797, b 11.440, c 6.616A, α 115.31⁰, β 95.7⁰, γ 93.8⁰, Z = 1. G meas 2.94, calc 2.90. Analysis (not given) by Ch. Zaminer by electron microprobe gave the formula above.

Discussion

Highly unsatisfactory. Nothing is said of the original analysis with Na₂O 5.0, K₂O 2.0, CaO 1.0 percent, and why Na and K are not in the formula. M.F.

Julgoldite


Material from two localities in Scotland, hitherto labelled aeginitimite and goethite, is now identified as julgoldite. A microprobe analysis is reported for material from Auchinstryar previously considered to be goethite. The calculated density for this is 3.56 g/cm³, whereas the determined density for the other julgoldite from a Ratho quarry near Edinburgh is 3.58. 15 additional lines are now recorded in the powder pattern of julgoldite in the interval 9.71 to 1.269 A, all strong lines being in excellent agreement with those previously recorded [Am. Mineral., 56, 2157 (1971)]. A.P.

Orthorhombic lavenite


The name “orthorhombic lavenite” was first introduced by Portnov et al. (1966). At the time, this reviewer (Nickel, 1966) regarded the data as not being sufficiently conclusive to warrant the introduction of a new mineral name, and this opinion was subsequently supported by a vote of the I. A. Commission on New Minerals and Mineral Names, which rejected the proposal. Nickel’s chief objection then was that the evidence for orthorhombic symmetry of the mineral, as opposed to the monoclinic symmetry of lavenite, was not established beyond doubt. The mineral was reported to be polysynthetically twinned, and such a twinned crystal, if monoclinic, could give an apparently orthorhombic “single-crystal” X-ray diffraction pattern, as had been reported for niocalite (Nickel et al., 1958), a mineral belonging to the same group as lavenite.

In their new submission, Portnov and Sidorenko provide little new data. Using the chemical analysis reported by Portnov et al. (1966), they propose the generalized formula (Na₂Ca₄Zr₂(Si₂O₇)(F,OH)₄) for their mineral, as contrasted with the lavenite formula, (Na₂Ca₄Mn)₂Zr₂(AsO₇)(O,F,OH)₄. However, their proposed formula is not electrostatically balanced, and their detailed empirical formula departs even further from electrostatic neutrality.

The x-ray powder diffraction data have been re-done, giving a pattern with the following strongest lines: 2.960 (10, 402), 2.881 (7, 710), 1.791 (7, 832), 1.680 (7, 224, 060), 2.242 (6, 622), and 1.820 (6, 840), which are substantially different from those reported in the earlier publication. The pattern has been indexed on an orthorhombic unit cell with a = 20.97, b = 10.10, and c = 7.21 A. An IR spectrum shows an absence of the splitting of the main bands exhibited by lavenite and titanio-lavenite.

Discussion

For some inexplicable reason, Portnov and Simonov do not give the space group of their orthorhombic cell. Also, they do not indicate how they overcame the problem (if, indeed, they did) of the polysynthetic twinning. They stress that the d values calculated from their orthorhombic cell give better agreement with the measured values than do the d values calculated from the monoclinic lavenite cell. However, equally good agreement is obtained if one employs a monoclinic unit-cell transformed directly from their orthorhombic parameters according to a = ½[101], b = [010], c = [001], giving a = 11.09, b = 10.10, c = 7.21 A, β = 108.97⁰. The IR spectrum, itself, is not conclusive in distinguishing between an orthorhombic and monoclinic unit cell, since the absorption peaks are a function of site symmetry rather than unit-cell symmetry. In conclusion, this reviewer feels that the evidence favoring the existence of an orthorhombic polymorph of lavenite has not been appreciably strengthened by this latest report. E.H.N.

References


Woodwardite


Samples labelled woodwardite from Cornwall and Carnarvonshire both appear to be hydrated sulfates of Cu and Al but with differing Cu:Al ratios, X-ray powder patterns, and behavior on heating. Since the type locality is in Cornwall, only the Cornish material can be regarded as true woodwardite. Unfortunately X-ray powder data for the Carnarvonshire mineral have found their way into the JCPDS file under the number 17-132 as representing woodwardite. These data should be replaced by newly reported powder diffraction data for woodwardite from Cornwall (no. BM 40035); 9.1 vs, 4.43 w (very broad, diffuse), 2.58 m, 1.50 m. A.P.

Glockerite

Many samples were studied of dripstones from Zlata Hory (formerly Zuckmantel), Czechoslovakia, the type locality (Dana's System, 7th Ed., vol. 2, p. 587-588). Five complete analyses are given; they show Fe₂O₃ 61.2–66.7, SO₃ 8.15–11.45, H₂O—8.43–12.79, H₂O⁺ 12.42–16.96 percent. DTA curves show a small endothermic peak at 260–280° (loss of H₂O), a sharp exothermic maximum at 550° (recrystallization), and a large endothermic peak at 700° (loss of SO₃). Some samples are isotropic with n(Na) 1.730–1.736; some are partly anisotropic. G 2.47–2.51. Infrared data are given. X-ray study showed no measurable lines. After being heated at 250°, samples gave lines at 6.3, 3.28, 2.467A., indicating lepidocrocite. Samples heated at 350° gave the pattern of maghemite, those heated above 500° the pattern of hematite.

Glockerite is therefore, a cryptocrystalline variety of lepidocrocite with SO₃ and H₂O. M.F.