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NEW MINERAL NAMES*

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Berdesinskiite*

H.-J. Bernhardt, K. Schmetzer, and O. Medenbach (1981) Berdesinskiite, V_2TiO_5, a new mineral. Zeitschr. Deutschen. Gemmol. Geo. 30, 143–145 (in German).

A preliminary account. The average microprobe analysis gave V_2O_3 64.3, Cr_2O_3 1.4, Al_2O_3 0.8, TiO_2 34.1, MnO 0.01, sum 100.6%, corresponding to $V_2^{+3}Ti^{+4}O_5$. X-ray study showed it to be monoclinic, space group not given $a = 10.11$, $b = 5.084$, $c = 7.03$Å., $\beta = 111.46°$. Powder data are not given. Color black, luster metallic. Under the microscope yellow-brown to red-brown, birefringence weak, reflectance 20.2–21.1% at 589 nm. Weakly anisotropic. The mineral occurs at the kornerupine mine near Lasamba Hill, Kenya, in weathered gneiss, with schreyerite (63, 1182, (1978)), tourmaline and kornerupine. The name is for Prof. Waldemar Berdesinski, Univ. Heidelberg. **M.F.**

Cechite*

Z. Mrazek and Z. Taborsky (1981) Čechite, $Pb(Fe^{+2},Mn^{+2})(VO_4)(OH)_{1.10}$, a new mineral of the descloizite–pyrobelonite group. Neues Jahrb. Mineral., Monatsh., 520–528 (in English).

Analysis gave V_2O_5 19.98, As_2O_5 0.25, Sb_2O_5 0.14, PbO 47.14, FeO 13.23, MnO 3.99, ZnO 0.11, CaO 0.25, Fe_2O_3 1.45, H_2O 2.41, insol. 10.90 (8.88% hematite, 2.02% quartz), sum 99.85%. This leads to the formula $(Pb_{0.93}Ca_{0.02})(Fe^{+2}_{0.81}Mn_{0.25}Zn_{0.01})(V_{0.96}As_{0.01})O_{3.90}(OH)_{1.10}$, the ferrous iron analogue of pyrobelonite (Mn), descloizite (Zn), and mottramite (Cu). Traces of Sn, Bi, Cu, Mg, and Al were found spectrographically. The mineral dissolves readily in HCl (1:1) or HNO_3 (1:1). The infra-red spectrum is very similar to those of descloizite and mottramite, giving absorption bands characteristic of the VO_4^{-3} group and $(OH)^{-1}$ group.

X-ray study shows the mineral to be orthorhombic, space group *Pnam* or *Pna*2_1, $a = 7.607$, $b = 9.441$, $c = 6.096$Å., $a{:}b{:}c = 0.8057{:}1{:}0.6457$, D calc. 5.94, meas. 5.88. The strongest X-ray lines (37 given) are 5.119(77)(011), 4.249(51)(111), 3.228(100)(201), 2.908(77)(130), 2.663(53)(221), 2.625(81)(131).

The mineral was found in old mine dumps of a polymetallic ore deposit at Vrancice, near Pribran, Bohemia, Czechoslovakia, mainly as granular masses up to 3 cm associated with calcite, hedyphane, and hematite, Rare crystals up to 3 mm long show forms {110} and {010}. Color black, luster submetallic to resinous, streak black. Brittle, fracture uneven to conchoidal. H 4½–5. Magnetic. Opaque, in reflected blue light it is gray-white with a yellowish tint, in yellow light brown-yellow to beige. Birefringence very weak to imperceptible. Anisotropy perceptible to strong with color shift from light gray to dark gray with brownish tint. Reflectances are given at 15 wavelengths (max. and min.): 460 nm, 18.5, 16.0; 540, 17.6, 14.8; 580, 17.7, 14.4; 660, 18.9, 15.1%.

The name is for Prof. Frantisek Čech, head of the Department of Mineralogy at Charles University, Prague, where type material is deposited. **M.F.**

Chameanite,* Geffroyite,* Giraudite*

Z. Johan, P. Picot, and F. Ruhlmann (1982) Paragenetic evolution of the Uranium Mineralization Rich in Selenides at Chaméane (Puy-de-Dôme) France: Chaméanite, Geffroyite and Giraudite, Three New Selenides of Cu, Fe, Ag and As. Tschermaks Min. Petrog. Mitt., 29, 151–167 (in French).

Three new selenides occur in a complex quartzitic vein cutting granite at the Chaméane deposit 5 km north of Vernet-la-Varenne. Three stages of mineralization, separated by tectonic movements causing brecciation, are recognized. In the first stage pitchblende was deposited with copious barite gangue; in the second quartz with loellingite, arsenopyrite, pyrite, chalcopyrite, tetrahedrite, tennantite and clausthalite, with partial replacements of barite by quartz, pitchblende by chalcopyrite, and chalcopyrite by clausthalite. In the third stage the selenides bukovite, athabascaite, umangite, eucairite, eskebornite, more clausthalite, and the three new selenides occur with an ankerite gangue, followed by a second generation of chalcopyrite.

Geffroyite occurs in very fine-grained intergrowth (0.2–0.7 mm) with eskebornite, clausthalite and the other new selenides. Eight microprobe analyses, Cu 27.46–29.51, Fe 19.01–19.41, Ag 5.16–7.05, Se 34.42–38.54, S 8.23–10.06, Σ 98.60–99.80, lead to the formula $(Cu,Fe,Ag)_9(Se,S)_8$ Geffroyite is cubic, *Fm3m*, $a = 10.889$Å, $Z = 4$, D (calc.) 5.39, with a pentlandite-like structure. The strongest lines of the X-ray powder pattern are: 3.282(9)(311), 3.145(9)(222), 2.094(6)(511,333), 1.925(10)(440). 1.660(5)(533), 1.112(6)(844). The Vickers hardness is 70 kg/mm^2; by reflected light the color is brown with a cream tint.

Chaméanite occurs in myrmekite-like intergrowths with giraudite, but mostly associated with eskebornite and geffroyite. Eleven microprobe analyses, Cu 33.93–36.38, Fe 2.58–6.25, As 10.81–11.98, Sb 0.22–0.56, Se 45.39–47.50, S 1.42–2.07, Σ 98.43–100.02 lead to the idealized formula $(Cu,Fe)_4As(Se,S)_4$ with the Cu/Fe ratio varying from 6 to 13. Chaméanite is cubic with a body-centered lattice, space group undetermined, $a = 11.039$Å, $Z = 8$, D (calc.) 6.17. The strongest lines of the powder pattern are: 3.187(10)(222), 1.951(9)(440), 1.665(8)(622), 1.381(4)(800), 1.266(6)(622), 1.127(7)(844), and 1.062(5)(10.2.2,666). The Vickers microhardness is 265 kg/mm^2. Chaméanite is grey in reflected light; some grains show irregular zoning due to Cu/Fe variation. The name is for the type locality, Chaméane (Puy-de-Dôme), France.

In the association at Chaméane giraudite is the best developed of the newly recognized phases, sometimes occurring alone and attaining dimensions of 400 μm. Three microprobe analyses: Cu

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

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30.06–32.78, Zn 3.19–3.64, Ag 1.73–3.89, Hg 0.30–0.85, Fe 0.03–0.19, As 7.61–9.56, Sb 7.50–10.66, Se 40.62–41.09, S 2.73–4.12, Σ 99.83–100.17 lead to the formula $(Cu,Zn,Ag)_{12}(As,Sb)_4(Se,S)_{13}$. Giraudite is cubic, $I\bar{4}3m$, a = 10.578Å, Z = 2, D (calc.) 5.75. Giraudite is a member of the tetrahedrite group; it is the arsenian analogue of hakite, and is light grey in reflected light.

The names geffroyite and giraudite are for Jacques Geffroy, metallurgist at the Commissariat à l'Energie atomique, and Roger Giraud, in charge of the microprobe laboratory of the BRGM–CNRS, respectively. **A.P.**

Furutobeite*

Asahiko Srigaki, Arashi Kitakaze, and Yoshitsugu Odashima (1981) Furutobeite, a new copper–silver–lead sulfide mineral. Bull. Mineral. 104, 737–741 (in English).

Microprobe analyses of 7 grains gave (range and av.): Cu 40.2–40.6, 40.4; Ag 15.5–15.8, 15.7; Pb 26.5–26.8, 26.6; S 16.6–16.9, 16.8, sum 99.0–99.7, 99.5%, corresponding (av.) to $Cu_{4.88}Ag_{1.12}Pb_{0.99}S_{4.02}$, or $(Cu,Ag)_6PbS_4$. When heated, the mineral decomposes at 100±2° C into galena plus a solid solution of CuAgS and Cu_2S, which when cooled forms stromeyerite and chalcocite. The mineral is etched iridescent by 20% $FeCl_3$ solution and is blackened instantly by 20% KCN solution, negative to KOH, HCl 1:1, HNO_3 1:1 and $HgCl_2$ solution.

Single crystal study showed it to be monoclinic, space group Cm, $C2$, or $C2/m$, a = 20.025, b = 3.963, c = 9.705Å., β = 101.57°. Z = 4, D. calc. 6.74. The strongest X-ray lines (19 given) are 3.43(5)(310), 2.95(9)($112,\bar{4}03$), 2.61(5)(312), 2.55(7)($\bar{5}12,\bar{6}03$), 2.50(10)($\bar{1}13$).

In reflected light gray with a creamy yellowish tint. Weakly birefringent; moderately anisotropic with color effects from light yellow to dark brown. Reflectances: 480 nm, 32.0–34.6; 546, 32.8–34.9; 589, 33.2–35.2; 657, 33.6–34.6%. Hardness (25 g load) 100–108 kg/sq.mm.

The mineral occurs in bornite-rich ore, Furutobe mine, Akita Prefecture, Japan, as grains 10–300 μm, associated with bornite, stromeyerite, galena, sphalerite, tennantite, sometimes digenite and electrum. It is replaced by stromeyerite.

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

Johillerite*

P. Keller, H. Hess, and P. J. Dunn (1982) Johillerite, $Na(Mg,Zn)_3Cu(AsO_4)_3$, a new mineral from Tsumeb, Namibia. Tschermaks Min. Petrog. Mitt. 29, 169–175 (in German).

Johillerite has been recognized only in a single specimen consisting of altered tennantite with chalcocite. In cavities in this specimen the succession of secondary minerals conichalcite–cuprian adamite–johillerite is found. The exact source is not known but the paragenesis suggests that the specimen may be from pillar 9 on level 31. Microprobe analysis gave Na_2O 5.4, MgO 18.3, ZnO 5.4, CuO 15.8, As_2O_5 55.8, total 100.7% leading to the formula in the title. Johillerite is monoclinic, $C2/c$, with cell dimensions a = 11.870(3), b = 12.755(3), c = 6.770(2)Å, β = 113.42(2)°, Z = 4, D (meas.) 4.15, (calc.) 4.21. The strongest lines of the X-ray powder pattern are: 4.06(5)($22\bar{1}$), 3.50(4)(310), 3.25(8)($11\bar{2}$), 2.75(10)(330,240), 2.64(5)($311,13\bar{2},40\bar{2}$) and 1.952(4)($13\bar{3},35\bar{2}$). There is a close relation between johillerite and o'danielite, $Na(Zn,Mg)_3H_2(AsO_4)_3$. Johillerite is violet and transparent. In radial aggregates thin (010) platelets elongated parallel to c are recognizable; average dimensions are 1.0 × 0.3 × 0.1 mm. Cleavage: {010} perfect, {100} and {001} good; H(Mohs) 3. The name is in honor of the late Professor Johannes-Erich Hiller of Stuttgart. **A.P.**

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Plumbotellurite*

E. M. Spiridonov and O. I. Tananaeva (1982) Plumbotellurite, α-$PbTeO_3$, a new mineral. Doklady Akad. Nauk SSSR, 262, 1231–1235 (in Russian).

Electron microprobe analyses of 3 samples (E.M.S., analyst), with standards synthetic $PbTeO_3$, TeO_2, Sb, Se, and analyzed hessite, chalcopyrite, and tellurobismuthite, gave Pb 54.0–54.5, Bi 0.44–0.57, Sb 0.05–0.21, Ag none–0.30, Te 33.4–33.8, Se none–0.10, S none–0.04, O 12.0–12.5, sum 100.7–101.2%. The average corresponded to the formula $(Pb_{1.006}Bi_{0.010}Sb_{0.004}Ag_{0.005})(Te_{1.012}Se_{0.004}S_{0.015})O_{2.955}$, or $PbTeO_3$. The DTA pattern shows inflections at 540–560° (transformation to β–$PbTeO_3$) and at 780° (oxidation to $PbTeO_4$).

The X-ray pattern coincides with that of synthetic α–$PbTeO_3$. The mineral is orthorhombic, a = 8.423, b = 13.739, c = 9.199Å., Z = 12, D. calc. 7.16, meas. 7.2. The strongest X-ray lines (67 given) are: 3.21(32)(041), 3.17(100)(140), 3.099(35)(202,230), 2.980(29)(141,013), 2.857(25)(103). Weak spacings (not given) were observed, which corresponded to those of synthetic $PbTeO_4{\cdot}9PbTeO_3$. Plumbotellurite is a dimorph of triclinic fairbankite (65, 809 (1980)).

The mineral is gray, yellow-gray, to brown, streak yellowish-gray. In reflected light, gray to brownish-gray, distinctly anisotropic. Biaxial, positive 2V about 50°, α = 2.19, β = 2.23, γ = 2.35. Microhardness 30–42, av. 38 kg/sq.mm. Cleavage not observed.

The mineral occurs as replacement rims and pseudomorphs after altaite in the Zhana–Tyube deposit, northern Kazakhstan. The name is for the composition. Type material is in the Fersman Museum, Acad. Sci. USSR, Moscow. **M.F.**

Plumbotsumite*

P. Keller and P. J. Dunn (1982) Plumbotsumite, $Pb_5(OH)_{10}Si_4O_8$, a new lead silicate from Tsumeb, Namibia. Chem. der Erde, 41, 1–6 (in German).

Electron microprobe analysis gave PbO 76.7, SiO_2 16.5, H_2O (loss of weight) 6.2, sum 99.4%, close to the theory. The mineral dissolves with difficulty in hot HNO_3. The water is lost at 495° C.

Weissenberg and precession photographs show it to be orthorhombic, pseudohexagonal, space group $C222_1$, a = 15.875, b = 9.261, c = 29.364Å, Z = 10, D. calc. 5.56, meas. (pycnometer) 5.6. The strongest X-ray lines (35 given) are 14.70(7)(002), 7.99(6)(110), 3.65(10b)(008,025,315), 3.12(8b)(027,317), 2.47(7)(0.2.10,3.1.10), 1.633(6)(828,916,0.0.18), 1.476(6)(844).

Colorless, transparent. Cleavage {001} perfect. H ~ 2. Optically biaxial, neg., 2V = 32°, $r < v$, ns α = 1.922, β = 1.933, γ = 1.938, $X = c$, $Z = a$.

The mineral occurs in irregular to skeletal grains up to 1 × 1 × 0.5 mm. in size. Crystals are thick tabular on (001), commonly twinned. It occurs on alamosite and is incrusted by melanotekite. The exact locality in the Tsumeb mine is not known.

The name is for the composition and the locality. Type material is at the Univ. of Stuttgart, Germany, and the Smithsonian Institution, Washington. **M.F.**

Revdite*

A. P. Khomyakov, G. E. Cherepivskaya, T. A. Kurova, and V. P. Vlasyuk (1980) Revdite, a new mineral. Zapiski Vses. Mineralog. Obsh., 109, 566–579.

Analysis of the mineral gave SiO_2 45.21, Na_2O 22.25, K_2O 0.08, H_2O 32.50, sum 100.4%, corresponding to $Na_{1.91}Si_2O_{5.91}{\cdot}4.79H_2O$, or $Na_2Si_2O_5{\cdot}5H_2O$. The mineral dissolves slowly in water at room temperature, giving an alkaline reaction to phenolphthalein, dissolves quickly in cold dilute acids. The DTA curve shows endothermic breaks at 160° and 860° C (dehydration and fusion) and an exothermic effect at 520° (Structural rearrangement?). The infra-red spectrum shows molecular H_2O.

X-ray study shows the mineral to be triclinic, space group $P1$ or $P\bar{1}$, unit cell $a = 27.470$, $b = 10.006$, $c = 6.995$Å., $\alpha = 90.00°$, $\beta = 97.29°$; $\gamma = 100.49°$, $Z = 8$. The strongest lines (51 given) are 13.37(76)(200); 4.46(100)(600); 3.79(42)($\bar{4}21,121,22\bar{1}$); 3.34(71)(800); 2.879(38)($\bar{6}12,51\bar{2},312$); 2.501(48)($\bar{2}40$).

The mineral occurs as irregular rounded deposits up to 1–2 cm in diameter in ussingite veinlets cutting nepheline syenites in deep workings on Mt. Karnasurt, Lovozero massif, Kola Peninsula. It is colorless, transparent, luster vitreous to pearly. Cleavages very perfect {100}, perfect {010}. H about 2 D 1.94 (hydrostatic suspension), 1.93 calculated from X-ray data. Optically biaxial, negative, *ns* $\alpha = 1.469$, $\beta = 1.482$, $\gamma = 1.490$ (all ±0.002), $2V = 75°$ meas. 75.6° calc. The plane YZ is nearly parallel to (100), $Y \wedge c = 0–10°$ in different sections.

The name is for the village Revda, Murmansk district, near the occurrence. Samples are preserved in the Mineralogical Museum, Acad. Sci. USSR, Moscow, and in the Geol. Museum, Kola Branch Acad. Sci. USSR, Apatite. **M.F.**

Sveite*

J.E.J. Martini, (1980) Sveite, a new mineral from Autana Cave, Territorio Federal Amazonas, Venezuela Trans. Geol. Soc. S. Africa, 83, 239–241.

Analysis of material dried over silica gel gave N_2O_5 18.26, Cl 8.50, SO_3 2.65, P_2O_5 0.17, $C < 0.30$, Al_2O_3 37.12, K_2O 5.18, $(NH_4)_2O < 0.02$, H_2O 29.25, insol. (quartz) 0.10, sum 101.23 − ($O{=}Cl_2$) 1.92 = 99.31%, corresponding to $K_{1.07}Al_{7.07}(NO_3)_{3.28}(SO_4)_{0.32}Cl_{2.32}(PO_4)_{0.02}(OH)_{15.96} \cdot 7.77H_2O$ or $KAl_7(NO_3)_4Cl_2(OH)_{16} \cdot 8H_2O$.

DTA study showed a strong broad endothermic peak at 240°C (loss of wt. 49%) and weak ones at 400°C (loss of wt. 6%), 1000°C (loss of wt. 3%), and 1150°C (loss of wt. 1%). Dissolved by HCl and HNO_3. In water swells to ten times its volume and leaves a gelatinous residue (aluminum hydroxide?) which is isotropic.

The strongest X-ray lines (54 given) are 10.20(100)(003), 5.995(35)(022), 3.692(40)(018), and 2.443(55)(309,$40\bar{6}$), indexed on a monoclinic cell with $a = 10.89$, $b = 13.04$, $c = 30.71$Å, $\beta = 92°10'$, Z = 6, D calc. 2.185, measured by sink-float 2.0.

Color white. Very soft. The mineral forms aggregates of contorted flakes with one perfect cleavage, probably {001}. Optically biaxial, positive, *ns* $\alpha = 1.503$, $\gamma = 1.535$, 2V small.

The Autana Cave is in a precipitous cliff face (height 850 m) in quartzite; the mineral forms white crusts and efflorescences on the walls. These have been formed by solutions trickling down from a bedding plane close to the ceiling. The name is for the Scoiedad Venezolana de Espeleologia, whose members collected the mineral. Type material is at the Univ. Central Venezuela and the Soc. Venezolana Espeleologia, both in Caracas. **M.F.**

Taprobanite (= Taaffeite)

Robert Moor, W. F. Oberholzer, and Eduard Gübelin (1981) Taprobanite, a new mineral of the taaffeite-group. Schweiz. Mineralog. Petrog. Mitt., 61, 13–21.

Electron microprobe analysis gave Al_2O_3 73.63, Cr_2O_3 0.12, MgO 21.64, FeO (total Fe) 1.24, MnO 0.12, BeO (by difference) 3.33%; corresponding to $Be_{1.94}(Mg_{5.92}Fe_{0.19})(Al_{15.94}Cr_{0.02})O_{32}$, or $BeMg_3Al_8O_{16}$.

X-ray study shows the mineral to be hexagonal, space group $P6_3mc$, $a = 5.684$, $c = 18.332$Å., Z = 2, D calc. 3.588, meas. 3.605. The strongest lines are 4.58(50)(004), 2.595(60)(106), 2.415(100)(114), 2.043(60)(205), 1.469(50)(2.0.10), 1.421(50)(220).

The mineral is bright red, H = 8, fracture conchoidal. Optically uniaxial, neg., $\omega = 1.721$, $\epsilon = 1.717$, pleochroic, carmine red on O, yellow-rose on E.

The data were obtained on a single hexagonal-prismatic crystal from Sri Lanka, that was cut as a gemstone of 204 mg.

Discussion

After the mineral and name had been approved by the IMA commission, it was noted that the X-ray pattern, D, and optical properties were identical with those of taaffeite, described in 1951, (37, 360, (1952)). The name taprobanite (for the old Greek name for Sri Lanka) is therefore unnecessary. The Commission has voted 15–1 to use the name taaffeite. **M.F.**

Tolovkite*

L.V. Razin, N.S. Rudashevskii, and G.A. Sidorenko (1981) Tolovkite, IrSbS, a new sulfoantimonide of iridium from northeastern USSR. Zapiski Vses. Mineralog. Obsch., 110, 474–480 (in Russian).

Analysis by electron probe gave Ir 56.60, 55.00; Pt 0.25, 0.69; Os 0.12, 0.49; Ni 0.06, 0.06; Sb 35.00, 34.70; S 9.22, 9.20; sums 100.25, 100.14. This gives an average formula of $(Ir_{0.993}Pt_{0.009}Os_{0.006})_{\Sigma 1.014}Sb_{0.993}S_{0.993}$ or an ideal formula of IrSbS.

X-ray powder study suggests similar structure to ullmannite and the pattern is indexed as cubic with $a = 6.027(3)$Å, based on the (600), (531) and (440) reflections. The strongest X-ray lines (24 given) are 3.49(6)(111), 2.99(9)(200), 2.69(6)(210), 2.47(6)(211), 2.126(8)(220), 1.813(10)(311), 1.349(6)(420), 1.233(7)(422), 1.146(9)(511,333), 1.118(6)(520,432), 1.065(9)(440), 1.019(6)(531), 1.005(8)(600,442). With Z = 4, D calc. 10.50.

Tolovkite occurs as intergrowths included in Os–Ir alloys which come from Quaternary placer deposits associated with the Ust'–Bel'skii (Alpine-type) hyperbasite-gabbro massif in the basin of the Tolovka river in northeastern U.S.S.R. The inclusions are anhedral (18 × 18 μm) and also form aggregates with a skeletal isometric crystalline outline (up to 50 × 72 μm). The grains are corroded on the surface. Under the binocular, particles of tolovkite have a steel-gray color, metallic luster, concoidal fracture, and are non-magnetic. The mineral is very hard, with $VHN_{10} = 1522$ (1431–1703). Under reflected light tolovkite is gray, distinctly paler than laurite but has a very pale-brown

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tint. Bireflection is absent and it is isotropic. Reflectance measurements (R%, nm) gave 36.7(442), 39.0(468), 39.9(484), 42.0(525), 42.5(554), 42.9(586), 43.5(621), 43.8(666), and 44.0(699).

The name is for the locality. Type material (polished section) at the Mining Museum, Leningrad Mining Institute.

Discussion: The 1.182 line of the X-ray pattern should be the (510). The wavelengths chosen for reflectance are unusual. **L.J.C.**

Vanmeersscheite*, Meta-vanmeersscheite*

Paul Piret and Michel Deliens (1982) Vanmeersscheite, U$(UO_2)_3(PO_4)_2(OH)_6{\cdot}4H_2O$, and meta-vanmeersscheite, U$(UO_2)_3(PO_4)_2(OH)_6{\cdot}2H_2O$, new minerals. Bull. Mineral., 105, 125–128 (in French).

Microprobe analyses of vanmeersscheite (VM) by J. Wantier (5 analyses) gave P_2O_5 10.1–10.6, av. 10.4; UO_3 79.4–81.6, av. 80.76, H_2O (by difference) 7.9–10.5, av. 8.84%, corresponding to $3.96UO_3{\cdot}1.03P_2O_5{\cdot}6.87H_2O$. Analyses of metavanmeersscheite (MVM) (5) gave P_2O_5 9.6–11.0, av. 10.20, UO_3 81.8–84.5, av. 83.24, H_2O (by difference) 5.2–7.2, av. 6.56, corresponding to $4.01UO_3{\cdot}0.99P_2O_5{\cdot}5.02H_2O$.

X-ray study of VM showed it to be orthorhombic, space group $P2_1mn$, a = 17.06, b = 16.76, c = 7.023Å., Z = 4, D calc. 4.67. For MVM, orthorhombic, space group Fdd, a = 34.18, b = 33.88, c = 14.074Å., Z = 32; D calc. 4.49. The strongest lines for VM (27 given) are 8.39(100)(020), 5.96(80)(220), 4.18(70)(040), 3.069(70)(501), 2.887(70)(521). For MVM, the strongest lines (25 given) are 8.49(100)(040), 6.01(90)(440), 5.38(50)(260), 4.23(50)(080), 3.516(50)(004), 3.073(70)(10.0.2), 2.886(60)(10.4.2).

Both minerals occur as plates elongated on [001], forms noted (010),(100),(101),$(\bar{1}01)$. Cleavage {010} good, {100} less so. Weakly pleochroic, yellow to pale yellow. For VM, optically biaxial, neg., $2V$ −56°, α = 1.704 (calc.), β = 1.715, γ = 1.718 (both ±0.002); for MVM, biaxial, neg., $2V$ −83°, $\alpha \sim 1.67$, $\beta \sim 1.68$, $\gamma \sim 1.69$. Strongly fluorescent in green in short- or longwave UV light.

The minerals occur in the Kobokobo pegmatite, Kivu, Zaire, associated with studtite. The name is for Maurice Van Meerssche, professor of crystallography, Louvain Univ. Type material is at the Univ. of Louvain and at the Royal Museum of Central Africa, Tervuren, Belgium. **M.F.**

Vismirnovite*, Natanite*

N. K. Marshukova, A. B. Palovskii, G. A. Sidorenko, and N. I. Chistyakova (1981) Vismirnovite, $ZnSn(OH)_6$, and Natanite, $FeSn(OH)_6$, new tin minerals. Zapiski Vses. Mineral. Obsh., 110, 492–500 (in Russian).

These minerals were found in the Trudov and the Mushiston deposits, Central Asia, as oxidation products of stannite, associated with varlamoffite, malachite, azurite, goethite, and other secondary minerals. Natanite also occurs as an oxidation product of hocartite in the Chat-Karagai tin ores.

Microprobe analyses of vismirnovite (6) gave (range and average) Sn 41.0–42.2, 41.8; Fe 0.6–1.4, 0.9; Zn 19.6–21.4, 20.45; Cu 0.1–0.5, 0.3; OH 35.7–36.6, 36.0, sum 99.0–100.1, 99.5%, corresponding (av) to $(Zn_{0.89}Fe_{0.08}Cu_{0.01})Sn_{1.00}(OH)_{6.04}$. Microprobe analyses of natanite (3) gave Sn 42.9–44.8, 43.6; Fe 18.7–20.5, 19.8; OH 36.0–36.6, 36.3, sum 99.6–100.1%, corresponding (av) to $Fe_{0.99}Sn_{1.03}(OH)_{5.98}$. The minerals are dissolved by dilute HCl, insoluble in conc. Na_2CO_3. When heated to 300°, both minerals become amorphous. At 750–800°, natanite yields hematite + cassiterite; vismirnovite Zn–Sn spinel + cassiterite.

The minerals are cubic, $Pn3m$, a = 7.69±0.01Å. for natanite, Z = 4, D calc. 4.035, a = 7.72±0.02 for vismirnovite, Z = 4, D. calc. 4.073. The strongest X-ray lines for natanite (18 given) are 3.729(9)(200), 2.709(7)(220), 2.221(5)(222), 1.710(10)(420), and 1.563(7–8)(422); for vismirnovite the strongest lines (15 given) are 3.840(10)(200), 2.217(7)(222), 1.728(9)(420), 1.570(8)(422), 1.031(6)(642).

Vismirnovite is pale yellow, natanite greenish-brown. Luster vitreous, cleavage not observed. Isotropic, *ns* 1.735 for vismirnovite, 1.755 for natanite. Hardness, natanite 315 kg/sq. mm = 4.7; vismirnovite 173 kg/sq. mm = 3.9.

Vismirnovite is named for Vladimir Ivanovich Smirnov, one of the first investigators of tin deposits of Central Asia, natanite for Professor Natan Il'ich Ginsburg, who aided studies of the zone of oxidation of tin deposits. Type material is at the Fersman Mineralogical Museum, Acad. Sci. USSR.

Discussion

These minerals may be grouped as members of the Schoenfliesite group, along with schoenfliesite, $MgSn(OH)_6$, burtite, $CaSn(OH)_6$ (see above), wickmanite $MnSn(OH)_6$, and the unnamed Cu analogue. This and natanite had previously been described (without names), Am. Mineral., 56, 1488 (1971), 65, 1069–1070 (1980). **M.F.**

Wicksite*

B.D. Sturman, D.R. Peacor and P.J. Dunn (1981) Wicksite, a new mineral from northeastern Yukon Territory, Can. Mineral., 19, 377–380.

Wicksite occurs with wolfeite, satterlyite, marićite, pyrite and quartz in nodules found in the Big Fish River area, Yukon (the type locality for wicksite is at latitude 68°28'30"N and longitude 136°29'W).

The mineral is dark blue, almost black, and has a green streak and submetallic luster. Cleavage {010} is good, H = $4\frac{1}{2}$ to 5. Wicksite is non-fluorescent under ultraviolet light. It occurs as masses and as plates parallel to {010}, striations parallel to [100] are developed on many plates. No forms other than {010} were observed. Single-crystal X-ray diffraction study gave the following data: orthorhombic, space group $Pbca$, a = 12.91(2), b = 12.54(2), c = 11.64(2)Å. Least squares refinement of the Guinier powder data gave: a = 12.896(3), b = 12.511(3), c = 11.634Å, Z = 4 (V = 1877.05 Å^3, JAM). The five strongest lines in the Guinier-deWolff powder pattern are (in Å for Cu$K\alpha$): 3.015(80)(411), 2.910(80)(004), 2.753(100)(042,412), 2.571(40)(422) and 2.118(60)(343,610). D calc. from the unit cell parameters and the ideal composition is 3.58 compared to D meas. 3.54. (If the empirical formula is used, the density is 3.563 g/cm^3, J.A.M.).

Wicksite is optically biaxial (+), 2V = 66(2)° (meas.) and 72° (calc.), α = 1.713(3), β = 1.718(3), γ = 1.728(3). Dispersion of the optic axes is strong, $r < v$. It is strongly pleochroic with absorption $X = Y > Z$; X blue, Y greenish blue, Z pale yellowish brown. The orientation is $Z = c$ and $Y = a$. Some grains show anomalous optical effects with extinction angles up to 5°, but

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single-crystal X-ray study showed that these grains are orthorhombic.

Chemical analysis (FeO by titration with potassium dichromate, H_2O by TGA, others by electron microprobe using analyzed wyllieite as a standard) gave: Al_2O_3 0.51, Fe_2O_3 7.98, Na_2O 3.08, FeO 22.66, MgO 3.77, MnO 4.72, CaO 11.05, P_2O_5 41.64, H_2O 3.70, total 99.11 wt.%. The general formula is given as: $Na_{1.00}\ Ca_{1.96}\ (Fe^{2+}_{3.16}\ Mn_{0.66})_{\Sigma 3.82}\ Mg_{0.94}(Fe^{3+}_{1.00}\ Al_{0.10})_{\Sigma 1.10}\ P_{5.86}\ O_{23.52} \cdot 2.06H_2O$ or, ideally, $NaCa_2(Fe^{2+},Mn)_4\ MgFe^{3+}\ PO_4)_6 \cdot 2H_2O$. (Calculating an empirical formula on the basis of 26 oxygen ions gives: $Na_{1.01}Ca_{2.00}(Fe^{2+}_{3.20}Mn_{0.68})_{\Sigma 3.88}Mg_{0.95}\ (Fe^{3+}_{1.02}Al_{0.10})_{\Sigma 1.12}\ (PO_4)_{5.96}(OH)_{0.15} \cdot 2.01H_2O$, J.A.M.).

The name is for Frederick John Wicks, Curator of Mineralogy at the Royal Ontario Museum, Toronto. Type material is preserved at the Royal Ontario Museum, the Smithsonian Institution and the National Mineral Collection, Geological Survey of Canada, Ottawa. **J.A.M.**

Zhonghuacerite

Zhang Peishan and Tao Kejie (1981) Zhonghuacerite $Ba_2\ Ce(CO_3)_3$—a new mineral. Scientia Geologica Sinica, 195-196 (in Chinese with English abstract).

Chemical analyses of three samples gave BaO 44.26, 45.93, 45.74; CaO 2.33, 2.76, 3.05; SrO 1.79, 1.81, 1.93; MgO 0.85, 0.06, 2.23; Ce_2O_3 10.96, 10.67, 10.11; $(La,Nd..)_2O_3$ 13.89, 12.23, 11.91; Fe_2O_3 2.52, 2.40, 1.50; Al_2O_3 0.06, 0.16, 0.08; ThO_2 0.41, 0.38, 0.29; CO_2 21.10, 20.98, 20.77; F 3.21, 4.00, 3.77; sums (after $-O = F$) 100.03, 99.70, 99.80%. The analyses correspond to $(Ba_{1.67}Ca_{0.24}Sr_{0.08})(La_{0.49}Ce_{0.39}Fe_{0.18}Mg_{0.12}Al_{0.01}Th_{0.01})\ C_{2.78}\ O_{9.76}F_{0.95}$, $(Ba_{1.74}Ca_{0.29}Sr_{0.10})(La_{0.43}Ce_{0.38}Fe_{0.17}Al_{0.02}Mg_{0.01}\ Th_{0.01})C_{2.76}O_{9.79}F_{1.22}$, and $(Ba_{1.73}Ca_{0.32}Sr_{0.11})(La_{0.41}Ce_{0.36}Mg_{0.32}\ Fe_{0.11}Al_{0.01}Th_{0.01})C_{2.73}O_{9.88}F_{1.15}$. The ideal formula is $Ba_2Ce\ (CO_3)_3F$. The mineral dissolves readily in HCl, $HClO_4$, HNO_3 and H_2SO_4.

The mineral is trigonal, $a = 5.07$, $c = 9.82$Å, Z = 1. The principal X-ray lines are: 3.92(8), 3.419(4), 3.216(10), 2.512(6), 2.123(3), 2.103(10), 1.979(10), 1.638(3), 1.572(3).

The mineral occurs as aggregates of small grains in a metamorphosed dolomite in Bayan Obo, northern China, associated with cebaite, ferro-dolomite, phlogopite, riebeckite, magnetite, and quartz. It is yellow, transparent with vitreous to resinous luster. VHN (aggregates) = 289-309 kg/sq. cm, H = 4.6. D meas. (pycnometer) 4.20–4.40, calc. 4.66. Optically the mineral is uniaxial negative, $\omega = 1.745$, $\varepsilon = 1.565$.

The name is for the locality and composition, meaning a cerium mineral for China.

Discussion

Important discrepancies exist in the empirical chemical formulas given in the Chinese original and its English abstract. The number of oxygen atoms is too high in all formulas. The formulas in this abstract are those given in the Chinese original. The English abstract also reported pronounced endothermic peaks at 645° and 800°C on the DTA curve. No reference is given to the name "cebaite" used in the English abstract. The Chinese name for "cebaite" refers to the mineral $Ba_3Ce_2(CO_3)_5F_2$ reported by Wang *et al.* (Geochimica, 1, 31–38, 1973) which was translated to "barium parisite" in the English translation journal (Plenum) Geochimica (1, 30–37, Sept. 1974). "Barium parisite", however, was earlier used by Flink for cordylite (Medd. Grønland 24, 42–49, 1901). The principal X-ray lines of zhonghuacerite are very close to those of huanghoite (Am. Mineral., 48, 1179, 1963). **G.Y.C.**

Unnamed CaZn $(CO_3)_2$

C. L. Garavelli, Filippo Vurro, and Giancarlo Fioravanti (1981) A new mineral, $CaZn(CO_3)_2$, from Tsumeb, Namibia. Rend. Soc. Ital. Mineral. Petrol., 37, 415–417 (in Italian).

The mineral occurs in two varieties; (A) rhombohedral microcrystals, 0.5 mm, with curved faces, milk-white, pearly luster; (B) smaller, distorted rhombohedral crystals. The average of 4 microchemical analyses by atomic absorption of type A gave $CaCO_3$ 43.97, $ZnCO_3$ 51.56, $MgCO_3$ 2.52, $FeCO_3$ 1.78, $MnCO_3$ 0.16, total 99.99%, giving $Ca_{0.98}\ (Zn_{0.92}Mg_{0.07}Fe_{0.03}Mn_{0.003})\ (CO_3)_2$. It had $a = 4.8183 \pm 0.0004$, $c = 16.0295 \pm 0.001$Å., D calc. 3.445, meas. 3.45±0.02, *ns* (Na) $\omega = 1.750$, $\epsilon = 1.550$ (each ±0.002).

For type B, microanalysis gave $CaCO_3$ 50.65, $SrCO_3$ 0.01, $ZnCO_3$ 40.67, $MgCO_3$ 5.24, $FeCO_3$ 3.67, $MnCO_3$ 0.46, total 100.70%, corresponding to $Ca_{1.07}(Zn_{0.70}Mg_{0.13}Fe_{0.07}Mn_{0.01})\ (CO_3)_2$. It had $a = 4.8355 \pm 0.0004$, $c = 16.1433 \pm 0.0012$Å, D 3.306 calc., meas. 3.32±0.02, $\omega = 1.734$, $\epsilon = 1.542$, each ±0.003. No X-ray powder data are given.

The mineral occurs perched on dioptase. **M.F.**

Unnamed $Cu(Re_3Mo)S_8$

Mary Ekström and Ulf Hålenius (1982) A new rhenium-rich sulfide from two Swedish localities. Neues Jahrb. Mineral., Monatsh. 6–10 (in English).

Electron microprobe analyses of 3 grains gave: S 26.25, 27.59, 26.78; Re 54.11, 53.48, 52.87; Mo 11.38, 9.36, 10.01; Cu 5.75, 8.64, 7.82; Co 0.08, 0.70, 2.40; Ni 0.12, 0.35, 1.19; Fe 1.56, 2.09, 1.53; sum 99.25, 102.21, 101.86%. After subtracting pyrrhotite from the first, and chalcopyrite and siegenite from the second and third analyses, these give the formulas $Cu_{0.95}\ (Re_{2.94}Mo_{1.20})S_{8.00}$, $Cu_{1.03}(Re_{3.01}Mo_{1.02})S_{8.00}$, and $Cu_{1.09}\ (Re_{2.94}Mo_{1.20})S_{8.00}$. The mineral occurs in sulfide-rich Precambrian ultramafic rocks from Njuggträsklinden and from U-mineralized Caledonian quartzites from Sölvbacktjärn, both in Sweden. The mineral appears to differ from dzhezkazganite. **M.F.**

Unnamed $Cu(Re_3Mo)S_8$, $(Ni, Pd)_5(Te, Bi)_8$

Mary Ekström and Ulf Hålenius (1982) A new rhenium-rich sulfide from two Swedish localities. Neues Jahrb. Mineral., Monatsh., 6–10.

Microprobe analyses of three grains (first from Njuggträsklinden, others from Sölvbacktjärn) gave S 26.25, 27.59, 26.78; Re 54.11, 53.48, 52.87; Mo 11.38, 9.36, 9.27; Cu 5.75, 8.64, 7.82; Co 0.08, 0.70, 2.40; Ni 0.12, 0.35, 1.19; Fe 1.56, 2.09, 1.53, sum 99.25, 102.21, 101.86%. After deducting pyrrhotite from the first, chalcopyrite and siegenite from the second and third analyses, these correspond to $Cu_{0.95}(Re_{2.94}Mo_{1.20})S_{8.00}$, $Cu_{1.03}\ (Re_{3.01}Mo_{1.02})S_{8.00}$, and $Cu_{1.09}(Re_{3.25}Mo_{1.10})S_{8.00}$.

The mineral was found in Ni-rich ores from Nyuggträsklinden as one small grain (20 × 30 μm), intergrown with a new telluride,

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$(Ni,Pd)_5(Te,Bi)_8$, as a composite inclusion in pyrrhotite. Five small grains (largest 5 × 5 μm) were found in U-mineralized quartzites from Sölvbacktjärn, at the contact between siegenite and chalcopyrite.

The mineral may be related to synthetic $Cu(Mo_2Re_2)S_8$. It appears to be different from the only previously described rhenium mineral, dzhezkazganite ($CuReS_4$?)(48,209(1963)). **M.F.**

Unnamed Ni–S–Sn–Te–Sb mineral

D. R. Hudson and G. A. Travis (1981) A native nickel-heazlewoodite-ferroan trevorite assemblage from Mount Clifford, Western Australia. Econ. Geol., 76, 1686–1697.

The average of 3 electron microprobe analyses of inclusions in heazlewoodite gave S 17.0, Te 6.6, Sb 4.0, As none, Sn 8.3, Ni 60.2, Cu 2.9, Fe 0.9, Co 0.1, sum 100.0%, corresponding to $(Ni_{3.76}Cu_{0.18}Fe_{0.05}Co_{0.01})S_{1.02}(Sn_{0.52}Te_{0.41}Sb_{0.25})$, or approximately $Ni_4S(Sn,Te,Sb)$. This occurs in serpentinized peridotites. **M.F.**

Unnamed Rh(Te,Bi)$_2$

L. J. Cabri, A. J. Criddle, J. H. G. Laflamme, G. S. Bearne, and D. C. Harris (1981) Mineralogical study of complex Pt–Fe nuggets from Ethiopia. Bull. Minéral., 104, 508–525.

Analysis by electron probe gave Rh 22,6, Pt 3.5, Ir 1.2, Te 37.5, Bi 31.3, Sb 2.4, sum 98.5. Formula is $(Rh_{0.93}Pt_{0.08}Ir_{0.02})_{\Sigma 1.03}(Te_{1.25}Bi_{0.64}Sb_{0.08})_{\Sigma 1.97}$ or more simply $Rh(Te,Bi)_2$.

The mineral was found in a Pt–Fe alloy nugget from the Joubdo stream, Birbir River, Ethiopia where it occurs as irregular or lenticular inclusions, up to 10 × 20 μm in size. It is pale grey (in air and in oil) and isotropic. It is but one of several platinum-group mineral inclusions in Pt–Fe alloy and also occurs attached to cubanite. Reflectance measurements (*R*%,^{im}R%,nm) gave 49.3, 34.5(400), 49.7, 34.5(420), 50.2, 35.0(440), 50.5, 35.2(460), 50.8, 35.9(480), 51.0, 36.6(500), 51.3, 36.9(520), 51.5, 37.1(540), 51.7, 37.2(560), 51.9, 37.2(580), 52.0, 37.5(600), 52.1, 37.5(620), 52.3, 37.6(640), 52.3, 37.6(660), 52.4, 37.4(680), 52.5, 37.5(700). Color values (air, oil) are: 0.313, 0.315(*x*), 0.319, 0.323(*y*), 51.6, 37.1(*Y*), 576, 574 (λ*d*), 1.6, 3.1(*Pe*).

Discussion

The mineral may be related to synthetic α-$RhTe_2$(a = 6.441Å, pyrite type) or to a compositional variant of synthetic RhBiTe (a = 6.504Å, pyrite type). **L.J.C.**

Unnamed Rh$_2$S$_3$

Chen Kechiao, Shi Nicheng and Peng Zhizhong (1981) A new platinum group mineral—a preliminary study of the mineral Rh_2S_3. Kexue Tongbao, 26, 728 (in Chinese).

Electron microprobe analysis (pyrite and metallic Rh as standards) gave S 31.05, Rh 68.80, sum 99.85%, corresponding to Rh_2S_3.

Single-crystal X-ray study showed the mineral to be orthorhombic, *Pnca*, a = 6.167, b = 8.493, c = 5.987Å, Z = 4. The strongest X-ray powder diffraction lines are 3.01(100), 2.161(70), 1.761(60), 1.729(80), 1.269(60).

The mineral is bright gray with a pink tint. VHN_{20g} = 575 kg/mm^2. D calc. for Rh_2S_3 6.452. Strongly anisotropic. Reflectance data (R_1, R_2 in %) are 44.84, 46.21 (405 nm); 45.74, 47.20 (436 nm); 49.74, 46.62 (480 nm); 49.86, 46.98 (526 nm); 51.42, 47.36 (546 nm); 51.23, 47.19 (578 nm); 51.25, 47.52 (589 nm); 50.03, 47.07 (622 nm); 49.17, 46.44 (644 nm); 48.80, 46.77 (656 nm); 49.37, 46.55 (664 nm); 48.86, 45.09 (700 nm). Color index (SE) R'_{vis1} 50.6002, X 0.3384, Y 0.3422, λ_d 572, P_e 0.0436; R'_{vis2} 47.1592, X 0.3341, Y 0.3342, λ_d 587, P_e 0.0064.

The mineral occurs in a placer deposit associated with a dunite type platinum ore body in ultrabasic rocks at Gaositai, Hebei, China. The grain size is 85 × 67 × 50 μm. The type specimen is deposited at the Geological Museum, Ministry of Geology (Bejing). See abstract of Cabri *et al.*, below. **G.Y.C.**

Unnamed Rh$_2$S$_3$

L. J. Cabri, A. J. Criddle, J. H. G. Laflamme, G. S. Bearne, and D. C. Harris (1981) Mineralogical study of complex Pt–Fe nuggets from Ethiopia. Bull. Minéral, 104, 508–525.

Analysis by electron probe gave Rh 55.3, Ir 16.1, Pt 1.2, Ru 0.17, S 29.2, sum 101.97 corresponding to $Rh_{1.74}Ir_{0.27}Pt_{0.02}Ru_{0.01}S_{2.96}$ or more simply $(Rh,Ir)_2S_3$.

A single grain (16 × 22 μm in size) was found in a Pt–Fe alloy nugget from the Joubdo stream, Birbir River, Ethiopia. The mineral is grey and without apparent bireflection but it is moderately anisotropic, with bluish grey rotation tints. Reflectance measurements (R_1%, $^{im}R_1$%, R_2%, $^{im}R_2$%, nm) gave 46.7, 32, 46.1, 32.3(400); 46.9, 32.2, 46.7, 32.6(420); 47.1, 32.4, 47.2, 32.8(440); 47.4, 32.6, 47.7, 33.0(460); 47.7, 32.8, 48.3, 33.3(480); 47.9, 33.0, 48.5, 33.6(500); 48.1, 33.3, 48.9, 33.8(520); 48.3, 33.4, 49.1, 34.1(540); 48.4, 33.5, 49.4, 34.3(560); 48.5, 33.5, 49.5, 34.4(580); 48.7, 33.6, 49.6, 34.5(600); 48.8, 33.7, 49.7, 34.6(620); 49.0, 33.8, 49.8, 34.6(640); 49.2, 33.9, 50.0, 34.6(660); 49.5, 34.1, 50.1, 34.7(680); 49.8, 34.3, 50.3, 34.8(700). Color values (R_1 air, oil, R_2 air, oil) are: 0.313, 0.313, 0.314, 0.314(*x*); 0.319, 0.320, 0.321, 0.321(*y*); 48.4, 33.4, 49.2, 34.2(*Y*); 577, 574, 575, 576(λ*d*); 1.4, 1.7, 2.1, 2.2(*Pe*).

Discussion

Probably equivalent to synthetic Rh_2S_3 (orthorhombic a = 8.462, b = 5.985, c = 6.138Å) and to unnamed $(Rh_{1.13}I_{0.93})S_3$ from Gusevogorskiy pluton, Urals, (Begizov *et al.*, 1975, Doklady Akad. Nauk SSSR, 225, 134–137) and from ultramafic rocks at Gaoitai, Hebei, China by Chen *et al.*, see above. **L.J.C.**

Unnamed Ir mineral

L. J. Cabri, A. J. Criddle, J. H. G. Laflamme, G. S. Bearne, and D. C. Harris (1981) Mineralogical study of complex Pt–Fe nuggets from Ethiopia. Bull. Minéral., 104, 508–525.

Analyses of two grains by electron probe gave Ir 33.2, 43.8; Fe 12.2, 4.0; Rh 8.8, 5.1; Ru 5.7, 6.3; Pt 8.3, 8.3; Os 2.4, 1.9; Sb 2.7, 0.58; Ni 0.30, 0.25; sums 73.60, 70.23. Pd, Co, Cu, and As were also sought for but not found.

The mineral is found as an alteration product completely or partly replacing euhedral osmium (>80 at % Os) inclusions in Pt–Fe alloy nuggets from the Joubdo stream, Birbir River, Ethiopia. The mineral is dark grey, internally reflecting and isotropic. Reflectance measurements (*R*%, ^{im}R%, nm) gave 18.2, 7.5(400); 18.2, 7.4(420); 18.1, 7.2(440); 18.1, 7.1(460); 18.0, 7.0(480); 17.9,

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6.9(500); 17.9, 6.8(520); 17.8, 6.8(540); 17.8, 6.7(560); 17.8, 6.7(580); 17.7, 6.7(600); 17.7, 6.7(620); 17.7, 6.7(640); 17.7, 6.6(660); 17.7, 6.6(680); 17.7, 6.6(700). Color values (air, oil) are: 0.309, 0.305(*x*); 0.315, 0.310(*y*); 17.8, 6.8(*Y*); 478, 474(λ*d*); 0.8, 2.8(*Pe*).

Discussion

Probably a new mineral species requiring complete analysis and X-ray data. **L.J.C.**

Unnamed Pt(Rh,Ir)CuS$_4$

L. J. Cabri, A. J. Criddle, J. H. G. Laflamme, G. S. Bearne, and D. C. Harris (1981) Mineralogical study of complex Pt–Fe nuggets from Ethiopia. Bull. Minéral., 104, 508–525.

Analyses of three grains by electron probe gave Pt 39.5, 39.2, 39.8; Rh 17.3, 17.3, 18.4; Ir 6.3, 6.5, 5.2; Cu 12.0, 12.2, 12.4; S 24.6, 24.7, 24.9; sums 99.7, 99.9, 100.7, corresponding to a general formula Pt(Rh,Ir)CuS$_4$.

Four grains of the unnamed mineral was found as subhedral inclusions (from 15 × 15 to 15 × 20 μm) with rounded "hexagonal" outlines in a Pt–Fe alloy nugget from the Joubdo stream, Birbir River, Ethiopia. The mineral is isotropic and pale grey in air, darker grey in oil. Reflectance data are given for all 3 analysed grains and measurements for the first analysed grain ($R\%$,$^{im}R\%$,nm) are 40.2, 26.7(400); 41.1, 27.0(420); 41.6, 27.2(440); 41.8, 27.3(460); 41.9, 27.4(480); 42.0, 27.4(500); 42.0, 27.3(520); 42.0, 27.2(540); 42.0, 27.1(560); 42.0, 27.0(580); 42.1, 26.9(600); 42.1, 26.9(620); 42.1, 26.8(640); 42.1, 26.7(660); 42.1, 26.6(680); 42.1, 26.5(700). Color values (air, oil) are: 0.311, 0.309(*x*), 0.317, 0.316(*y*), 42.0, 27.1(*Y*), 572, 488(λ*d*), 0.5, 0.6(*Pe*).

Discussion

Synthesis desirable to determine whether ideal formula is PtRhCuS$_4$ as suggested by the relatively constant compositions. May be isostructural with malanite (newly proposed as Cu (Pt,Ir)$_2$S$_4$, a = 9.997Å by Peng *et al.* (1978)—see Am. Mineral., 1980, 65, 408). **L.J.C.**

Unnamed RhSbS

L. J. Cabri, A. J. Criddle, J. H. G. Laflamme, G. S. Bearne, and D. C. Harris (1981) Mineralogical study of complex Pt–Fe nuggets from Ethiopia. Bull. Minéral., 104, 508–525.

Analyses of two grains by electron probe gave Rh 25.6, 36.2; Ir 17.8, 3.0; Pt 3.1, 3.3; Os 0.57, nd; Sb 42.3, 44.3; S 10.8, 12.0; As 0.46, 0.22; sums 100.63, 99.02. A general formula is (Rh,Ir,Pt,Os) (Sb,As)S or more simply RhSbS.

The mineral was found to occur as inclusions in two Pt–Fe alloy nuggets from the Joubdo stream, Birbir River, Ethiopia. Those inclusions vary in size from about 1 μm up to 25 × 55 μm and were frequently found attached to, and associated with erlichmanite, bornite, and chalcopyrite. The mineral is pale brownish grey and isotropic. Reflectance measurements ($R\%$,$^{im}R\%$,nm) gave 46.7, 32.2(400); 47.0, 32.4(420); 47.5, 32.7(440); 48.0, 33.3(460); 48.6, 34.0(480); 49.1, 34.5(500); 49.4, 34.7(520); 49.7, 35.0(540); 50.2, 35.5(560); 50.9, 36.3(580); 51.9, 37.0(600); 52.1, 37.3(620); 52.0, 37.0(640); 51.6, 36.4(660); 50.9, 35.7(680); 50.0, 35.1(700). Color values (air, oil) are: 0.317, 0.319(*x*), 0.322, 0.324(*y*), 50.3, 35.6(*Y*), 580, 579(λ*d*), 3.2, 4.5(*Pe*).

Discussion

Likely equivalent to synthetic RhSbS(a = 6.027Å), and to unnamed RhSbS from Tulameen, B. C. (Raicevic and Cabri, 1976, CIM Bull. 69, No. 770, 111–119). **L.J.C.**

Unnamed Rhodian "pentlandite"

L. J. Cabri, A. J. Criddle, J. H. G. Laflamme, G. S. Bearne, and D. C. Harris (1981) Mineralogical study of complex Pt–Fe nuggets from Ethiopia. Bull. Minéral., 104, 508–525.

Analyses of three grains by electron probe gave Fe 23.0, 31.3, 32.5; Ni 27.7, 21.7, 21.2; Rh 13.2, 14.1, 13.3; Co 4.0, 2.6, 2.6; Pt 1.9, nd, nd; Ir 0.17, nd, nd; S 30.5, 31.5, 31.9; sums 100.47, 101.2, 101.5, corresponding to $(Fe_{3.43}Ni_{3.93}Rh_{1.07}Co_{0.56}Pt_{0.08}Ir_{0.01})_{\Sigma 9.08}S_{7.92}$, $(Fe_{4.55}Ni_{3.01}Rh_{1.11}Co_{0.36})_{\Sigma 9.03}S_{7.97}$, and $(Fe_{4.68}Ni_{2.91}Rh_{1.04}Co_{0.35})_{\Sigma 8.98}S_{8.02}$. Cu, Ru, and Pd were also sought for but not found.

The mineral was found as inclusions in two Pt–Fe alloy nuggets from the Joubdo stream, Birbir River, Ethiopia where it occurs as micron-sized blebs up to a 10 × 15 μm rounded inclusion or as larger lenticular inclusions (up to 25 × 110 μm) with angular and scalloped margins. In the latter case it is found closely associated with unnamed RhS and erlichmanite. It is light brown in color and isotropic. Reflectance measurements ($R\%$,$^{im}R\%$,nm) gave 39.7, 30.2(400); 41.5, 30.9(420); 42.6, 31.4(440); 43.5, 31.8(460); 44.3, 32.1(480); 45.1, 32.5(500); 45.9, 33.0(520); 46.6, 33.7(540); 47.4, 34.5(560); 48.2, 35.3(580); 48.9, 35.9(600); 49.5, 36.4(620); 50.1, 36.9(640); 50.5, 37.3(660); 50.9, 37.7(680); 51.3, 38.0(700). Color values (air, oil) are: 0.321, 0.322(*x*); 0.326, 0.325(*y*); 47.3, 34.4(*Y*); 579, 579(λ*d*); 5.7, 5.7(*Pe*).

Discussion

X-ray data required to confirm pentlandite structure and crystal structure determination to establish whether Rh atom has structural significance requiring species status as for argentopentlandite (Rudashevskiy *et al.*, 1979, Internat. Geol. Rev., 21, 695–698). **L.J.C.**

Unidentified Rh–Fe–Ni sulfides

L. J. Cabri, A. J. Criddle, J. H. G. Laflamme, G. S. Bearne, and D. C. Harris (1981) Mineralogical study of complex Pt–Fe nuggets from Ethiopia. Bull. Minéral., 104, 508–525.

Analyses of five grains by electron probe gave Rh 29.9, 30.1, 25.1, 24.8, 24.5; Ir 5.1, 5.3, 11.0, 12.0, 11.9; Pt 1.5, 1.5, 0.35, nd, 0.10; Fe 13.1, 13.5, 14.5, 18.8, 18.8; Ni 11.5, 10.9, 12.3, 8.9, 9.2; Cu 5.6, 5.5, 6.3, 6.0, 5.7; Co 1.15, 1.1, 0.57, 0.46, 0.49; S 31.1, 30.9, 29.4, 29.3, 29.4; sums 98.95, 98.8, 99.52, 100.26, 100.09. These analyses correspond to $Me_{0.95}S_{1.06}$, $Me_{0.94}S_{1.06}$, $Me_{0.97}S_{1.02}$, $Me_{0.99}S_{1.01}$, $Me_{0.98}S_{1.01}$ or more simply MeS.

The mineral(s) occur as inclusions (as large as 35 × 80 μm in size) in Pt–Fe alloy nuggets from the Joubdo stream, Birbir River, Ethiopia. The grains are subhedral to rounded with mixed rounded and angular outlines. They appear grey in air, darker in oil, and are not noticeably bireflectant. They are weakly to moderately anisotropic, with grey rotation tints. Reflectance spectra for the first two analyzed grains are very similar; measurements for the first analyzed grain ($R_1\%$, $^{im}R_1\%$,$R_2\%$,$^{im}R_2\%$,nm) are 38.6, 26.2, 39.1, 25.9(400); 39.2, 26.1, 39.5, 26.2(420); 39.5, 26.1, 39.8, 26.4(440); 39.8, 26.1, 40.1,

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26.5(460); 39.9, 26.0, 40.4, 26.6(480); 40.0, 26.0, 40.6, 26.6(500); 40.0, 25.9, 40.6, 26.5(520); 39.9, 25.8, 40.6, 26.5(540); 39.8, 25.8, 40.7, 26.5(560); 39.9, 25.8, 40.7, 26.5(580); 40.0, 25.9, 40.8, 26.5(600); 40.1, 26.0, 40.9, 26.5(620); 40.2, 26.0, 41.0, 26.6(640); 40.3, 26.1, 41.0, 26.6(660); 40.5, 26.1, 41.1, 26.7(680); 40.7, 26.2, 41.1, 26.8(700). Color values (R_1 air, oil, R_2 air, oil) are: 0.311, 0.310, 0.312, 0.310(x); 0.317, 0.316, 0.319, 0.317(y); 39.9, 25.7, 40.7, 26.5(Y); 571, 457, 573, 562(λd); 0.4, 0.3, 1.0, 0.2(Pe).

Discussion

These grains have apparent mutual replacement between Rh, Ni, and Fe but may be divided into three groups, two of which have apparent constant compositions; Rh > Fe > Ni, Rh ≃ Fe > Ni, and Fe > Rh > Ni. X-ray data are essential. The first two grains analysed may be equivalent to unnamed ~ RhS from Hokkaido, Japan (Urashima *et al.*, 1972, Sci. Repts. Kagoshima Univ., 21, 119–135) and from the Witwatersrand, South Africa (Feather, 1976—see Am. Mineral., 1977, 62, 598) but RhS is not known in the Rh–S system and the nearest synthetic compound is $Rh_{17}S_{15}$, which is cubic. These sulfides may also be rhodian varieties of pyrrhotite. **L.J.C.**

Unidentified Fe–Ni–Ir–Rh sulfide

L. J. Cabri, A. J. Criddle, J. H. G. Laflamme, G. S. Bearne, and D. C. Harris (1981) Mineralogical study of complex Pt–Fe nuggets from Ethiopia. Bull. Minéral., 104, 508–525.

Analysis of one grain by electron probe gave Fe 11.3, Ni 11.7, Ir 30.9, Rh 9.4, Pt 5.3, Cu 4.7, Co 0.76, S 21.7, sum 95.76 corresponding to $(Fe_{0.28}Ni_{0.27}Ir_{0.22}Rh_{0.13}Cu_{0.10}Pt_{0.04}Co_{0.02})_{\Sigma 1.06}S_{0.94}$. The small size (5 × 7 μm) of the analyzed grain is considered to contribute to the low total.

The mineral was found in a Pt–Fe alloy nugget from the Joubdo stream, Birbir River, Ethiopia. It is dark brownish grey and slightly anisotropic. **L.J.C.**

NEW DATA

Liujinyinite, Uytenbogaardtite

Wei Mingxiu (1981) Some new data on the crystal structure of liujinyinite. Scientia Geologica Sinica 232–234 (in Chinese with English abstract).

New powder X-ray data of liujinyinite (Am. Mineral., 65, 810, 1980) from Guangdon, China were indexed on the basis of a tetragonal cell with a = 10.01, c = 11.11Å, Z = 8. Extinctions indicate the space group to be $P4/mmc$, $P\bar{4}2c$ or $P4mc$. The strongest lines (25 given) are 7.13(8)(110), 3.57(9)(220), 3.063(7)(311), 2.708(8)(321), 2.585(10)(114), 2.104(5)(314), 1.543(4)(326). New powder X-ray data of $Ag_{2.53}Au_{1.16}S_2$ synthesized in China are similar to those of Uytenbogaardtite (Barton *et al.*, Can. Mineral., 16, 651–657, 1978) and the synthetic Ag_3AuS_2 of Graf (Am. Mineral., 63, 496–500, 1968) but contain additional lines, including 2.527(1)(004). The presence of 004 confirms the space group $P4_122$ or $P4_1$ deduced by Barton *et al.*, (1978) for uytenbogaardtite. Thus, liujinyinite is polymorphous with uytenbogaardtite.

Discussion

Single-crystal data are needed to settle the problem. **G.Y.C.**

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Jeremejevite

E. E. Foord, R. C. Erd and G. R. Hunt (1981) New data for jeremejevite. Can. Mineral., 19, 303–310.

Specimens of jeremejevite from the two known localities (Mt. Soktuj, Transbaikal, U.S.S.R. and Cape Cross, Swakopmund, Namibia) have been restudied. Electron microprobe analyses show that the mineral is high in F rather than OH with an ideal formula of $Al_6B_5O_{15}F_3$. The empirical formula for the Namibian material is $(Al_{6.00}Fe^{3+}_{0.01})_{\Sigma 6.01}B_{4.97}Si_{0.01}O_{15.00}[F_{2.76}(OH)_{0.24}]_{\Sigma 3.00}$ based on 15 oxygen ions. Optical spectra showed the presence of some OH. Crystals from both localities are zoned; the empirical formula given was derived from analytical data for the rim of a crystal. For Namibian material, the rim is biaxial (−), α = 1.637, β = 1.644, γ = 1.645, $2V_\alpha$ = 18°, $r > v$ distinct, $X = c$, $Y = a_2$; $Z = a_1$, X pale blue-violet, Y and Z colorless; the core is uniaxial (−), ω 1.644, ϵ 1.637, O colorless, E pale blue-violet. For the Soviet material, the rim is uniaxial (−), ω 1.647, ϵ 1.637, colorless; the core is biaxial (−), α = 1.637, β = 1.646, γ = 1.647, $2V_\alpha$ = 33°, $r > v$ distinct, $X = c$, $Y < a_2$ = 10°, $Z < a_1$ = 10°, colorless. Single crystal X-ray studies showed no differences between the uniaxial and biaxial sectors. For the core of Namibian material, the cell parameters refined from the powder data and based on space group $P6_3/m$ are a = 8.5591(3), c = 8.1814(6)Å, V = 519.06(4)Å³, Z = 2. D meas. of Namibian material is 3.294(10) (calc. D of core is 3.288, J.A.M.). The Mohs hardness is 7 ½ and no fluorescence is noted for either material under ultraviolet light. **J.A.M.**

Magnesium–Chlorophoenicite and Chlorophoenicite

P. J. Dunn (1981) Magnesium–chlorophoenicite redefined and new data on chlorophoenicite. Can. Mineral., 19, 333–336.

Magnesium–chlorophoenicite was originally defined as $10(Mg,Mn)O.As_2O_5{\cdot}7H_2O$ on the basis of a faulty analysis. Eleven new electron microprobe analyses of chlorophoenicite (10) and magnesium–chlorophoenicite (1) along with X-ray powder diffraction work show that the two minerals are isostructural. They have the ideal formula, $M_3Zn_2(OH)_6[As_{0.5}H_{0.5}(O,OH)_3]_2$ where M is Mn, Mg, Zn, Ca. In chlorophoenicite, Mn is dominant whereas in magnesium–chlorophoenicite, Mg is dominant. New D determinations are: 3.53 (chlorophoenicite) and 3.45 (magnesium–chlorophoenicite). **J.A.M.**

Malanite–dayingite

Yu Zuxiang (1981) A restudy of malanite and cobalt–malanite (dayingite). Geol. Rev., 27, 55–71 (in Chinese with English abstract).

Malanite and dayingite (see Am. Mineral., 61, 185, 1976 and 65, 408, 1980) have been re-studied. Re-analysis of malanite by electron microprobe gives Pt 36.77, Ir 25.23, Co 2.60, Pd 0.45, Cu 9.95, Fe 1.00, Ni 0.33, S 23.47, sum 99.80, corresponding to $(Pt_{1.024}Ir_{0.713}Co_{0.240}Pd_{0.023})_{\Sigma 2.00}(Cu_{0.851}Fe_{0.097}Ni_{0.030})_{\Sigma 0.978}S_{3.979}$. New X-ray powder diffraction data (Gandolfi camera) gave a unit cell of 9.910Å. The strongest X-ray lines (19 and 20 given) are: 5.35(6)(111), 2.95(5)(311), 2.50(10)(400), 1.90(8)(333), 1.75(10)(440), 1.015(7)(844), 0.783(8)(12.4.0).

Re-analysis of dayingite by electron probe gave Pt 45.33, 45.45, 46.41, 44.56; Co 11.79, 12.09, 11.78, 12.47; Cu 12.99, 12.71, 13.10, 14.78; S 29.15, 29.10, 28.35, 26.41; sums 99.26, 99.35, 99.64, 98.22, corresponding to an average of $(Pt_{1.066}Co_{0.934})_{\Sigma 2.00}Cu_{0.965}S_{4.031}$. Structure analysis confirmed the cubic symmetry, $Fd3m$, a = 9.725Å. The strongest X-ray lines (25 given) are: 2.93(6)(311), 2.43(5)(400), 1.86(9)(333), 1.710(10)(440), 1.265(5)(731), 0.993(5)(844). Reflectance measurements (*R%,* nm) gave 38.8(480), 40.2(546), 40.6(589), 41.6(656). The author proposes that dayingite be re-named cobaltian malanite on the grounds that the X-ray data and composition are essentially the same after allowance is made for more Co, resulting in a smaller unit cell.

Both minerals are found at the same locality (as well as carrollite) but occur in different Pt–bearing rocks. They occur in oxidized portions which have high magnetite contents. The minerals are deposited at the Geological Institute, Academy of Geological Sciences of China.

Discussion

The Commission on New Minerals and Mineral Names, I.M.A., disapproved the mineral dayingite (in 1976 after publication) and, in view of Co > Pt reported in the early analyses, the mineral was considered to be possibly platinian carrollite. The present Chinese text refers to dayingite as "cobalt–malanite" and the English abstract refers to the term "cobaltmalanite". There is no doubt that the author means "cobaltian malanite" as he specifically states it to be a *variety* of malanite. The new data give Pt > Co so that the mineral may be correctly referred to as cobaltian malanite as long as there is no structural significance to Pt ≃ Co. **G.Y.C.**

DISCREDITED MINERALS

Grothine = Norbergite

J. S. White (1981) Grothine discredited, equals Norbergite, Mineralogic Record 12, 377–378.

Grothine, described by Zambonini in 1913 as "a silicate of calcium with aluminum and a little iron" (Dana's System, 6th Appendix, p. 34 (1910) has been re-examined on a specimen of type material from the Roebling collection. Analysis by E. Jarosewich gave SiO_2 28, MgO 61, CaO 0.6, FeO 0.6%. Optically biaxial, positive, 2V = 52°, *ns*, $\alpha = 1.554$, $\beta = 1.557$, $\gamma = 1.579$. The X-ray pattern shows it to be norbergite. **M.F.**

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