NEW MINERAL NAMES*

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Antimonselite*
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The mean and range of fourteen electron microprobe analyses are Sb 47.32 (43.78-51.14), Hg 2.35 (0.94-4.78), Cu 0.61 (0.10-2.43), As 0.19 (0.0-0.42), Se 48.91 (48.60-49.72), S 0.13 (0.0-0.71), sum 99.54 (98.07-101.76) wt%, corresponding to (Sb < Hg < Cu < As < Se < S). Ideally Sb<Se<. Occurs as black anhedral grains and as radiating acicular crystals, typically <20 μm and to a maximum of 21 x 23 μm. Metallic luster, black streak, VHNro: 120, D*: 5.88 g/cm3 for Z = 4. White in reflected light, distinct bireflectance, distinct pleochroism from white to grayish white, distinct anisotropism. Reflectance percentages (SiC standard) are given in 10-nm steps from 420 to 700 nm for Rι and Rν; values at 470, 546, 589, and 650 nm are, respectively, 42.62, 40.55, 41.95, 39.02; 42.23, 39.42; 44.39, 41.56. The X-ray powder pattern, similar to those of stibnite and synthetic Sb-Se, has strongest lines of 3.70(70,130), 3.17(50,211), 2.870(100,221), 2.625(60,240), and 1.746 Å (35,601); by analogy the new mineral is orthorhombic, space group Pbnm, a: 11.593(3), b: 11.747(3), c: 3.3984(1).

Germanocolusite*

Electron microprobe analyses of specimens from Urup, Tsumeb, and Chelopech gave, respectively: Cu 49.69, 49.22, 48.04, Ag 0.13, 0.09, Fe 0.47, 1.56, 1.54, Zn 0.91, 0.15, 1.28, V 3.32, 3.19, 3.17, Ge 8.62, 6.55, 9.13, Ga 0.35, 0.17, As 5.09, 5.90, 3.38, Sb 0.08, 0.12, 0.40, Sn 0.14, 0.06, 1.33, Mo 0.67, 1.18, 0, W 0.03, 0.06, 0, Bi 0.15, 0, 0, S 32.10, 31.97, 31.05, Se, 0, 0, 1.80, sum 101.40, 100.31, 100.66 wt%. Normalized to 66 atoms these analyses correspond, respectively, to (Cu25.5,Fe0.3,Zn0.2,V2.5,V3,Ge3,As3.8,Mo0.2)26.2S32, (Cu24.9,Fe0.1,Sn0.1)V2.0(Ge2.5,Ga0.4,As2.3,Mo0.1)26.0S32, and (Cu24.5,Fe0.3,Zn0.3,V2.0,Ge1.1,As1.3,Sn0.4)26.2(S3,Se0.4)32.3, ideally Cu25(As,Ge)S32. The mineral forms single grains or equant to elongate segregations <1-100 μm across. No cleavage, unaffected by standard chemical reagents, VHNro: 330 (range 280-370, Urup), D*: 4.55 g/cm3 for Z = 1 (Urup). In reflected light, isotropic, no internal reflection; color is yellow, grayish yellow, greenish yellow, olive yellow, cream yellow, less commonly yellowish cream with a rose to brownish rose tint. Reflectance values (Si standard in air) are given in 20-nm intervals (or less) from 400 to 700 nm; representative values for Urup and Tsumeb are (470 nm) 23.8, 25.4, (546) 27.3, 29.5, (589) 27.9, 30.9, (650) 27.9, 31.5. Powder X-ray data (FeKα, 114-mm camera), indexed by analogy with colusite (which has isometric symmetry, space group P43m), gave a = 10.568(3) Å. Strongest lines (30 given) are 3.05(100,222), 2.64(40,400), 1.870(50,440), 1.595(30,622), 1.320(30,800), 1.212(30,662), 1.079(30,844), and 1.017(30,666,10,22).

The mineral occurs in late bornite and tennantite mineralization of the polymetallic deposits Urup (Northern Caucasus, Russia), Maykain (northeastern Kazakhstan), Tsumeb (Namibia), and Chelopech (Bulgaria). At Urup and Maykain, the new mineral is commonly mantled by one or two of the following: renierite, mawsonite, chalcopyrite, and chalcocite. The mineral occurs mostly in bornite, less commonly in tennantite, sphalerite, barite, pyrite, galena, chalcocite, luzonite, stoameyerite, stephanite, and chalcopyrite. Occurs at Tsumeb in tennantite, sphalerite, and chalcopyrite ore with germanite, gallite, chalcocite, enargite, and bornite. Occurs at Chelopech with enargite, bornite, luzonite, germanite, renierite, mawsonite, and hemusite. The new name is for a colusite with Ge > Sn,As(+Sb). A specimen from Urup has been deposited in the Fersman Mineralogical Museum, Moscow, Russia. E.S.G.

Kamphaugite-(Y)*

* Before publication, minerals marked with an asterisk were approved by the Commission on New Minerals and Mineral Names, International Mineralogical Association.

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Electron microprobe and CHN analyses gave CaO 18.4, Y₂O₃ 30.5, Nd₂O₃ 1.4, Sm₂O₃ 0.8, Gd₂O₃ 1.6, Dy₂O₃ 2.1, Er₂O₃ 1.2, Yb₂O₃ 1.1, CO₂ 29.6, H₂O 12.1, sum 98.8 wt%, corresponding to Ca₉₋₂(Y₁₋₄REE₂₋₅)₂₋₅(C₄O₈)ₙ₋₂(OH)₆₋₅·3.2H₂O, simplified as Ca₉₋₂(Y₂)(CO₃)ₙ₋₂(OH)₂·3H₂O. Occurs as crystals of roughly square outline, up to 1 mm across, platy on (001) and typically divergent, roseline, or spherulitic. White to colorless, with some spherules pale yellow to pale brown; white streak, transparent, vitreous luster, nonfluorescent, H = 2–3, uneven fracture, no cleavage, effervesces in dilute acids, D₄° = 2.99 g/cm³ for Z = 4. Anomalously optically biaxial negative, 2V = 15°, α = 1.627(2), β = 1.663(2), γ = 1.674(2). Single-crystal X-ray structure study (R = 0.027) indicated tetragonal symmetry, space group P4/2,2, a = 3.19(5) Å, c = 2.793(3) Å. The study structure indicated that the ideal formula is [8Ca₉₋₂(Y₂)(CO₃)ₙ₋₂(OH)₂·3H₂O. Strongest lines of the X-ray powder pattern (Cu radiation) are 6.140(1), 4.381(8), 3.261(6), 2.831(5), 2.631(4), 2.361(3), 2.281(2), 2.191(2), 1.891(3), 1.803(2), 1.634(1), 1.565(5). The mineral occurs in cavities of a magnetite and hematite cortex at Høydalen amazonite pegmatite, Tørdal, Norway; also known as well-crystallized rosettes in the Tangen granite pegmatite, Kragerø, Norway; and as fine-grained alteration product of kuliokite-(Y) at the Skåne skarn at Hørstekollen, Oslo region, Norway, and as white spheroids on opal from a quartz and barite vein, Transvaal, South Africa. The new name is for Erling Kamphaug (b. 1931), mineral collector, who supplied the original specimens. Type material (Hørdalaksen) is in the Mineralogical-Geological Museum, University of Oslo, Norway. J.L.J.

**Manganoparawollastonite**


Electron microprobe analysis (highest MnO content of the nine analyses reported) gave SiO₂ 49.54, CaO 33.17, MnO 13.26, FeO 3.66, MgO 0.08, Al₂O₃ 0.03, sum 99.74 wt%, corresponding to (Ca₀₋₁₋₂Mn₀₋₂Feₓ₂₋₅)₂₋₅Si₁₋₅O₉₋₅(OH)₆₋₅. The mineral occurs as columnar, radial, and granular grains typically 0.03–0.12 mm; colorless, vitreous luster, H = 2–3, uneven fracture, no cleavage, effervesces in dilute acids, D₄° = 2.99 g/cm³. Optically biaxial negative, α = 1.631–1.635, β = 1.629–1.633, γ = 1.614–1.621. Strongest lines of the X-ray powder pattern (Cu radiation, diffractometer) are 3.447(58,311), 3.331(100,202), 3.261(81,220), 3.223(64,021), 3.040(71,112), and 3.003 Å (89.221); calculated cell dimensions are a = 14.721(3), b = 7.049(3), c = 6.906(3), β = 95.827(30°). The mineral, which is from a Pb- and Zn-bearing skarn deposit in Inner Mongolia, China, is an intermediate member between Ca₅Si₅O₁₄ and Mn₅Si₅O₁₄.

**Discussion.** The mineral should not have been given a new name and should have been described as manganan wollastonite-2M. J.L.J.

**Mozartite**


The mean of sixteen electron microprobe analyses gave MgO 0.05, CaO 27.08, Al₂O₃ 0.49, MnO, 38.72, SiO₂ 29.25, sum 95.59 wt%, corresponding to Ca₉₋₂(Mn₁₋₄Al₀₋₄)(OH)₆₋₅Si₀₋₅O₉₋₅(OH)₆₋₅. The H₂O was inferred from single-crystal X-ray structure analysis (R = 0.027). Occurs as aggregates of anhedral grains, 0.1–0.5 mm; also as subhedral, stocky prismatic crystals elongate [100]. Transparent, vitreous luster, deep red color, red streak, no cleavage, conchoidal fracture, hardness not determinable, nonfluorescent, D₄° = 3.64(4), D₉° = 3.68 g/cm³ for Z = 4. Optically biaxial positive, α = 1.840(5), β = 1.855(5), γ = 1.920(5), 2V = 50(2)°, 2V calc = 52.8°, strongly pleochroic with X = yellow-brown, Y = yellow. Z = orange-red. Orthorhombic symmetry, space group P2₁2₁2₁, a = 5.838(1), b = 7.224(1), c = 8.690(1) Å. Strongest lines of the X-ray powder pattern (Guinier camera, CuKα radiation, calculated intensities) are 5.588(86,011), 3.613(37,020), 3.070(73,120), 2.584(100,211), 2.509(36,122), 2.441(35,113), and 1.565(51,233). The mineral, which is the Mn analogue of vaugnattite Ca₅Al(OH)SiO₃, is associated with peoctellite, calcite, quartz, and hausmannite that fill large veins that crosscut massive braunite interbedded with metacherts at the Cerchiara mine near Faggiona, La Spezia, eastern Liguria, Italy. The new name is for Wolfgang Amadeus Mozart (1756–1791); the initial discovery was made in 1991, the 200th anniversary of Mozart’s death. Type material is in the Sezione di Mineralogia, Dipartimento di Scienze della Terra, Università di Genova, Genoa, Italy. J.L.J.

**Ni-chalcophanite**

the natural analogue of the cyclic hydrocarbon phenanthrene, 98.92 Mo/0, corresponding to C10H10, ideally C10H10, western Tadzhikistan. CHN analysis gave C 93.41, H 5.51, near Ravat, about 100 km north of Dushanbe, northwestern Tadzhikistan. Lithiophorite, hollandite, and cerianite. These minerals form fine layers in cavities that resulted from shrinkage.


The mineral occurs as a sublimation product from the natural combustion of a Middle Jurassic brown coal seam near Ravat, about 100 km north of Dushanbe, northwestern Tadzhikistan. CHN analysis gave C 93.41, H 5.51, sum 98.92 wt%, corresponding to C10H10, ideally C10H10, the natural analogue of the cyclic hydrocarbon phenanthrene. Occurs as thin platelike individuals of irregular shape, mostly a few hundred micrometers in size; aggregates form crusts generally <1 mm thick. Colorless to white to pale gray, translucent to waxy luster, waxylike tenacity; perfect (001) cleavage, D = 1.11(2), D = 1.207(1) g/cm3 for Z = 2, waxylike yellow fluorescence in ultraviolet light; TGA showed melting at 94.3 °C. The IR spectrum is in good agreement with that of synthetic phenanthrene. Optically biaxial with 2V = 90°, nω = 1.75, nε = 1.95 (λ = 5145 Å). Single-crystal X-ray study indicated monoclinic symmetry, space group P21/a, a = 8.392(3), b = 6.181(3), c = 9.558(3), β = 98.48(12)° as refined from a diffractometer powder pattern (CuKa radiation), in good agreement with data for synthetic phenanthrene; strongest lines of the pattern are 4.343(0.001), 4.941(11.110), 4.724(11.002), 4.028(13.20), and 3.371(10.21).

The new name alludes to the type locality, where the weathering of finely dispersed pyrite and the bacterial decay of coal have caused lignite seams to ignite spontaneously, reaching temperatures >800 °C. In the outermost, coolest thermal zone (60–25 °C), ravatite forms as a sublimation product with liquid bitumen and, rarely, native selenium. The type specimen is in the collection of the Freiberg Mining Academy, Freiberg, Germany.

J.L.J.

Ravatite*


Averages of six electron microprobe analyses of the mineral from Vysokovol’tnoye and of two analyses of the mineral from Bethumy gave, respectively, Ag 60.7, 59.95, Cu –, 0.04, Pb –, 1.84, Sb 7.7, 7.28, As –, 0.05, Bi –, 0.06, Te 24.4, 25.25, S 5.2, 6.08, Se 1.9, –, sum 99.9, 100.53 wt%.

Reflected percentages (WTIC standard) are given from 420 to 700 nm for the Vysokovol’tnoye mineral, e.g., Rmax and Rmin (470 nm) 38.0, 34.2, (546) 36.6, 32.2, (589) 35.7, 31.8, (650) 340, 30.2, and from 420 to 740 nm for the Bethumy mineral, e.g., Rmax (470 nm) 36.8, (546) 36.4, (589) 35.5, (650) 34.7. The mineral forms anhedral grains mostly a few tens of micrometers across, rarely up to 0.1 mm across; some grains from Bethumy have nearly rhombic cross sections. In reflected light, gray with a weak greenish blue hue, no internal reflection, birefringence weak, anisotropic in brown and gray tones. VHNro = 125. Dcalc = 7.38 g/cm³ for Z = 4 (Bethumy). Electron diffraction study of single grains and powder X-ray diffraction data suggest monoclinic symmetry, space group P21/m or Pm.

The powder X-ray data (FeKa, 57.3-mm camera)
Jambor and Grew: New Mineral Names

The mineral was found in the gold-silver deposit of Vysokovol'tnoye in the western part of the south Tian Shan fold belt, Uzbekistan. Subsequently, it was also reported from Bethumy, Rajasthan, India. At Vysokovol'tnoye, the mineral is a minor constituent in a late gold + hessite association as intergrowths with hessite and mercurian gold or with tellurian canfieldite; it also occurs as interstitial grains or microveinlets in quartz and tetrahedrite + miargyrite aggregates. At Bethumy, the mineral is associated with galena, sphalerite, pyrrhotite, and falkmanite. The name is from the initials for the Russian name for the Central Scientific-Research Institute of Geological Prospecting in Moscow. The type specimen is in the Fersman Mineralogical Museum, Moscow, Russia. E.S.G.

PtCu₄, (Pd,Cu)₃SnTe,S₂


PtCu₄

Electron microprobe analysis gave Pt 36.84, Ag 0.22, Cu 62.86, sum 99.92 wt%, corresponding to (Pt₀.₉₆Ag₀.₀₁)₀.₉₇Cu₀.₀₃. The mineral forms an overgrowth around rickardite in peridotite of the ultramafic zone of the Lukkulaivaara massif, Russia.

(Pd,Cu)₃SnTe,S₂

Electron microprobe analyses gave Pd 42.45, 42.10, 45.47, 42.04, Pt 1.96, 3.10, 2.80, 2.36, Ag 0.10, 1.06, 6.91, Cu 18.14, 16.73, 12.79, 11.68, Fe 1.82, 2.44, 2.81, 3.29, Sn 9.64, 9.48, 9.14, Te 20.54, 20.42, 20.41, 19.99, S 5.17, 5.17, 5.11, 4.93, sum 99.82, 99.44, 100.19, 100.34 wt%, corresponding to (Pd₀.₄₉Cu₀.₃₅Fe₀.₄₀Pt₀.₁₂)₀.₀₀Sn₀.₀₀Te₁.₀₀S₁.₀₀. The mineral is characterized by the presence of Pt and Cu, forming an overgrowth around rickardite in peridotite of the ultramafic zone of the Lukkulaivaara massif, Russia.

OsS₃, Pd₄Hg₅, PdCuHg

Kai Yong, P.K. Seccombe (1993)


(Os, Ir, Ru)S₃

Forms a 20-µm composite inclusion with irarsite in unaltered chromite. Electron microprobe analysis gave Os 59.30, Ir 14.48, Ru 2.65, Pt 1.96, Fe 0.74, Cr 1.79, S 20.43, sum 99.35 wt%, corresponding to (Os₀.₉₆Ir₀.₀₆₅Ru₀.₀₈₅)₀.₀₁₀(PO₄)₀.₃₃₅(S₀.₉₅)₀.₆₆₅ close to OsS₃. Also present is a phase of uncertain homogeneity and composition (Ru, Os, Ir)₅S₃.

(Pd, Cu, Fe)Hg₃ and (Pd, Rh)CuHg

Analysis of possible (Pd, Cu, Fe)Hg₃ and possible (Pd, Rh, Ru, Fe, Bi)CuHg gave, respectively, Hg 46.43, 50.00, Pt 33.68, 19.19, Ru 0.8, 6.86, Rh 3.35, Fe 1.03, 1.79, Cu 0.65, 15.50, Cr 0.92, 3.45, Bi 0.72, 6.13, sum 83.43, 100.27 wt%.

Bi,Pb,Pd)Te

F.L.C. D’Orey (1990)

Plumbian-nickelian merenskyite and the phase (Bi, Pb, Pd)Te with traces of platinum, from Mondunguara, Mozambique. Garcia de Orta, Ser. Geol., Lisboa, 13(1-2), 35-41 (in Portuguese, English abs.).

Electron microprobe analysis gave Bi 40.8, Pb 18.1, Pd 2.3, Pt 0.3, Te 38.5, sum 100 wt%, corresponding to (Bi, Pd, Pb)Te. The mineral occurs in contact with mersenkyite and has a cubic structure; reflection percentages are 41.2, 45.3, 46.2, and 47.8 at 470, 546, and 650 nm, respectively.

Discussion. No X-ray data were given, but cubic BiTe is known as a synthetic phase (JCPDS-PDF 15-820). Possibly the cubic polymorph of tsumoite, BiTe.

Unnamed tetrahedrite-group mineral


Electron microprobe analyses of six grains in six samples gave the following ranges (in parentheses, the analysis for one sample): Ag 50.10-54.21 (52.07), Cu 0.11 (-), Fe 2.34-3.97 (2.54), Zn 1.04-2.38 (2.37), Hg 0.77-1.71 (1.37), Sn 20.10-21.41 (21.41), As 0.29-0.36 (0.29), S 17.42-19.40 (19.08), sum 97.68-98.80 (99.13) wt% for 29 atoms. The single analysis corresponds to Ag₀.₁₁₄Fe₀.₉₉₅Zn₀.₇₆Hg₀.₀₁₁Sn₀.₃₈₉S₀.₈₀₁. The mineral forms aggregates 0.002-0.3 mm across. In reflected light, gray with a bluish hue. Very rare, dark cherry red internal reflections. Isotropic. Unaffected by light. The X-ray pattern corresponds to standard tetrahedrite patterns. The
most intense lines, which have indices of 222, 400, 510, and 622, yield \(a = 10.92\,\text{Å}\) for the sample with the formula cited above (line positions and intensities not given).

The mineral was found in the Khachakchan silver-ore occurrence in the Verkhoyan-Kolyma fold belt, Yakutia, Russia. Aggregates of the mineral fill cavities and fractures in siderite in association with argentian pyrite and tetrahedrite. The mineral also occurs in silver amalgam.

**Discussion.** The authors propose that the mineral represents a distinct series with tetrahedrite in which the \(a\) parameter increases with Ag content, in contrast to tetrahedrite-freibergite, in which the \(a\) parameter decreases with Ag (for Ag > 4 apfu). E.S.G.

### Unnamed layer silicate


Electron microprobe analyses of six grains (cores) averaged SiO₂ 44.18, TiO₂ 0.43, Al₂O₃ 5.19, Fe₂O₃ 6.69, MgO 28.20, CaO 1.77, K₂O 0.23, Na₂O 0.39, F 0.50 (based on partial analyses), sum 87.58 wt%; H₂O is inferred to be 12.42 by difference, which leads to the formula \(\text{(K}_0\text{ or Na}_0\text{ or Ca}_0\text{ or Mg}_0\text{)}_{0.01}\text{Mg}_{0.99}\text{(Si}_{16}\text{ or Ti}_{0.1}\text{ or Al}_{0.9}\text{ or Fe}_{0.1})_{0.1}\text{OH}_{0.1}\text{F}_{0.1}\text{O}_{0.1}\text{H}_2\text{O}\) [sic]. The grains are zoned, gradually increasing in K and decreasing in Ca and H₂O toward the margins, approaching the composition of intergrown phlogopite. The infrared spectrum has features in common but is not identical with that for mixed-layer silicates. The mineral forms light yellow flakes of hexagonal outline, 0.5–2.0 mm across; when viewed parallel to (001), the color is more intense and has a reddish brown tint. Cleavage fragments are dominantly opaque, locally opalescent; a few are transparent. Luster of cleavage surfaces pearly. Hardness like that of mica, or a little less. Highly perfect (001) cleavage. density = 2.43 g/cm³ in heavy liquids. Insoluble in HCl. Does not exfoliate upon heating; basal spacings are unaffected by treatment with ethylene glycol or glycerin. Colorless in thin section, uniaxial or biaxial negative with \(V < 5°\), \(\alpha = 1.543(3)\). Single-crystal studies (oscillation method) gave \(a = 5.31, b = 9.29\,\text{Å}\), not determinable because of layer disorder. Strongest lines in the pattern of one of five grains studied by X-ray (16 lines given) are 14.4(100), 1.48(50), 2.64(50), 2.459(40), and 1.549(80). The mineral, in intimate intergrowths with phlogopite, occurs on the walls of fissures with asbestiform richterite in upper Proterozoic dolomite in the Sirenevyy Kamen (Lilac Stone) charoite deposit, southwestern Aldan Shield, Russia. The mineral apparently formed under hydrothermal conditions, possibly from Si-rich fluids circulating through fissures.

**Discussion.** The mineral is inferred to be a heterogeneous 2:1 layer silicate, with layers varying from 12–14 Å in thickness. Although the mineral behaves like vermiculite after heating, it differs in not exfoliating and in having a higher Si/Al ratio and less H₂O. A formula calculated from the above-cited average analysis for 22 anionic charges, \(\text{OH} + \text{F} = 2\), and H₂O by difference corrected for \(O = F\) (i.e., 12.63 wt% H₂O) is \((\text{K}_{0.02}\text{Na}_{0.06}\text{Ca}_{0.14}\text{Mg}_{0.08}\text{Si}_{0.08}\text{Al}_{0.02}\text{Fe}_{0.05})_{0.1}\text{OH}_{0.1}\text{F}_{0.1}\text{O}_{0.1}\text{H}_2\text{O}\). Although the formulae for the unnamed layer silicate and for intergrown phlogopite are more reasonable, with the assumption that the Fe is \text{Fe}^{3+}, no justification is given for making this assumption. E.S.G.

### New Data

#### Nealite


Single-crystal X-ray structure study \((R = 0.063)\) of nealite from Laurium, Greece, gave triclinic symmetry, space group \(\text{P}1, a = 6.53(1), b = 10.23(2), c = 5.588(5)\,\text{Å}\), \(\alpha = 96.4(1), \beta = 89.5(2), \gamma = 97.8(2)^\circ\). The new formula as given above indicates that the mineral is an arsenite chloride rather than an arsenate chloride. J.L.J.

#### Scawtite


Single-crystal X-ray structure study \((R = 0.0219)\) of scawtite, \(\text{Ca}_2\text{Si}_2\text{O}_7\text{(CO}_3\text{)}_2\text{H}_2\text{O}\), confirmed the monoclinic cell, newly resolved the space group as \(\text{Cm}\), and determined that \(\text{CO}_3\) is ordered in the structure. J.L.J.