NEW MINERAL NAMES*


Ten electron microprobe analyses gave a mean (and range) of Hg 7.46 (7.28-7.51), Cu 5.61 (5.36-5.86), sum 99.67 (99.29-100.20) wt%, corresponding to Hg,Cu,Cu for the mean and Hg,Cu for the range, ideally Hg,Cu. The mineral occurs as a globular, 6.1-g nodule also containing a small amount of native mercury. Metallic luster, silvery streak, silvery color rapidly tarnishing to matte yellow and ultimately to blackish brown. VHNns : 125, but values were clustered near both ends of a range between 45 and 206. Dmns : 13.2(g), Dmoff : 13.15 g/cm³ with Z = 2, nonfluorescent, soluble in HCl. Optically yellowish green, nonpleochroic, biaxial positive, 2V = 91°, 2V calc = 91.3(1)°, α = 1.90(3), β = 1.93(3), γ = 1.96(3), strong dispersion r > v, α = 21.9°, β = 36.2°, γ = b. X-ray single-crystal study indicated monoclinic symmetry, space group C2/m, a = 19.83(2), b = 6.72(9), c = 5.529(6) Å, β = 103.9(1)° as refined from a Guinier pattern (CuKα radiation). Strongest lines of the powder pattern are 4.815(80,400), 4.425(40,310), 4.276(40,201), 4.100(100,401), 3.734(90,311), 3.254(40,510), 2.628(40,402), and 2.481(60,221,312).

The mineral occurs at the Cap Garonne mine near Pradet, Var, France, with metazeunerite, atacamite, paratacamite, malachite, tournellite, and barite on a dendritic quartz gangue. The new name is for mineral collector Jean Claude Delory, who found the specimen, which is preserved in the Mineralogy Department of the Natural History Museum, Geneva, Switzerland. There is a crystallographic relationship to derriksite, which is orthorhombic, Cu(Zn,Fe)₂(UO₂)(SeO₃)₈(OH)₆.

Deloryite* Electron microprobe analysis (ave. of three) gave CuO 33.36, UO₂ 31.78, MoO₃ 29.16, SO₃ 0.27, Al₂O₃ 0.10, H₂O (TGA) 5.84, sum 100.47 wt%, corresponding to Cu₃(Al₂O₃)₄(H₂O)₉(OH)₄, ideally Cu₃(Al₂O₃)(MoO₃)₂(H₂O). Occurs as dark green to black rosettes to 6 mm, in which individual crystals are 3 x 1 x 0.3 mm, tabular (010), elongate [001], showing (010), [010], and with a rounded termination. Transparent to nearly opaque, vitreous to greasy luster, green streak, conchoidal fracture, cleavages perfect (010), (100), good (001), H = 4, Dmns = 4.91(g), Dcalc = 4.84 g/cm³ with Z = 2, nonfluorescent, soluble in HCl. Optically yellowish green, nonpleochroic, biaxial positive, 2V = 90°, 2V calc = 91.3(1)°, α = 1.90(3), β = 1.93(3), γ = 1.96(3), strong dispersion r > v, α = 21.9°, β = 36.2°, γ = b. X-ray single-crystal study indicated monoclinic symmetry, space group C2, a = 19.83(2), b = 6.72(9), c = 5.529(6) Å, β = 103.9(1)° as refined from a Guinier pattern (CuKα radiation). Strongest lines of the powder pattern are 4.815(80,400), 4.425(40,310), 4.276(40,201), 4.100(100,401), 3.734(90,311), 3.254(40,510), 2.628(40,402), and 2.481(60,221,312).

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* 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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translucent, pale yellow streak, uneven fracture, good \( \{001\} \) cleavage, \( H = 3 \), nonfluorescent, \( D_{\text{meas}} = 4.25 \), \( D_{\text{calc}} = 4.25 \text{ g/cm}^3 \) for the empirical formula above, and \( Z = 2 \). Optically biaxial positive, \( \alpha = 1.811(5), \beta = 1.844(5), \gamma = 1.88(1), 2V_{\text{meas}} = 85(5)^\circ, 2V_{\text{calc}} = 89^\circ \); \( Y = b, X \approx a \), strongly pleochroic from \( X = \) olive green, \( Y = \) pale green, to \( Z = \) colorless; distinct inclined dispersion. X-ray single-crystal study indicated monoclinic symmetry, \( a = 8.997(7), b = 6.236(2), c = 7.390(3) \AA, \beta = 115.74(4)^\circ \) as refined from the Debye-Scherrer powder pattern (114.6-mm camera, CuK\( \alpha \) radiation). Strongest lines are 4.95(70,110), 3.398(100,202), 3.175(100,112), 2.938(100,201), 2.823(70,021), 2.702(70,311), and 2.544(100,221); by analogy to lotharmeyerite, space group \( C2, Cm, \text{or} C2/m \).

The mineral, which is the Fe\( \text{II} \) analogue of lotharmeyerite, occurs with tennantite, scorodite, conichalcite, beudantite, and schneiderhohnite at the Tsumeb mine, Tsumeb, Namibia. Type material is in the National Mineral Collection, Geological Survey of Canada, Ottawa, and in the Museum of Victoria, Melbourne, Australia. J.L.J.

**Hejtmanite**


Electron microprobe analysis gave SiO\(_2\) 33.52, TiO\(_2\) 13.27, Nb,O\(_3\) 1.4, Al,O\(_3\) 0.37, FeO 11.29, MnO 14.12, MgO 0.13, BaO 30.20, Na,O 0.06, K,O 0.30, F 3.3, H,O (calc.) 1.86, F = O 1.39, sum 98.43 wt\%; for 10 (O,OH,F) the formula ratios are Ba\(_{0.33}\)K\(_{0.03}\)Na\(_{0.01}\)(Mn\(_{0.10}\)Fe\(_{0.82}\)-
Mg\(_{0.01}\)Ti\(_{0.97}\)Nb\(_{0.05}\)Al\(_{0.05}\)Si\(_{0.96}\)O\(_{3.05}\)OH\(_{0.15}\)Fe\(_{0.95}\)O\(_{0.05}\), ideally Ba(Mn,Fe)\(_{2}\)TiO\(_3\)(Si\(_{0.96}\)O\(_{3.05}\))(OH\(_{0.15}\)Fe\(_{0.95}\)O\(_{0.05}\)). Occurs as lath-shaped crystals with large \( \{100\} \), elongate [010], vitreous luster, 11:2-3, cleavage {010}, 13.768(5), c: 10.698(4) \AA, \( a' = 12.27(2), a' = 15.9^\circ \), \( Y \times c = 37.9^\circ \) in obtuse angle \( B \). Single-crystal X-ray study indicated monoclinic symmetry, space group \( C2/m, Cm, \text{or} C2/m \). Strongest lines of the powder pattern (diffractometer, CuK\( \alpha \) radiation) are 7.625(78,001), 5.410(43,100), 5.200(52,200), 5.145(45,111), 3.040(100,310), 3.014(63,203), and 2.924(83,021).

The mineral occurs in a secondary assemblage derived by oxidation of mainly chalcopyrite and tetrahedrite at the former Reiner mine, Lubietova, near Banska Bystrica, Slovakia. The new name is for Zdenek Mrázek (1952-1984), codiscoverer of the mineral. Type material is in the National Museum, Prague, Czechoslovakia, and in the Faculty of Science, Charles University, Prague. J.L.J.

**Mrázekite**


Electron microprobe analysis gave CuO 26.14, BiO\(_2\) 51.97, P,O\(_5\) 15.89, As,O\(_3\) 0.11, H,O and OH\(_{\text{calc}}\) 5.90, sum 100 wt\%, corresponding to Bi\(_{0.92}\)Cu\(_{0.08}\)P\(_{0.02}\)As\(_{0.00}\)O\(_{0.06}\), 1.954H,O, ideally Bi\(_2\)Cu\(_2\)(OH)\(_2\)(PO\(_4\))\(_2\)\( \cdot 2\text{H}_2\text{O} \) as determined by crystal-structure analysis (\( R = 0.051 \)). Occurs as bright or cerulean blue needles up to 2 mm long, either isolated or loosely grouped as rosettes in a quartz matrix. Crystals are elongate [010], tabular (201), translucent, vitreous luster, \( H = 2-3 \), cleavage (010), \( D_{\text{meas}} = 4.90(2), D_{\text{calc}} = 5.013 \text{ g/cm}^3 \) with \( Z = 2 \). The infrared spectrum shows absorption bands characteristic of H,O, OH, and PO\(_4\). Optically biaxial negative, refractive indices are between 1.8 and 1.9, \( 2V_{\text{calc}} = 68(2)^\circ \), \( X = b, Y = a, Z \approx c, Z \times c = 16^\circ \). Single-crystal X-ray structural study indicated monoclinic symmetry, space group \( C2/m, Cm, \text{or} C2/m \), \( a = 12.359(6), b = 6.331(4), c = 9.060(4) \AA, \beta = 122.71^\circ \). Strongest lines of the Guinier powder pattern (CuK\( \alpha \) radiation) are 7.625(78,001), 5.410(43,100), 5.200(52,200), 5.145(45,111), 3.040(100,310), 3.014(63,203), and 2.924(83,021).

The mineral occurs in a secondary assemblage derived by oxidation of mainly chalcopyrite and tetrahedrite at the former Reiner mine, Lubietova, near Banska Bystrica, Slovakia. The new name is for Zdenek Mrázek (1952-1984), codiscoverer of the mineral. Type material is in the National Museum, Prague, Czechoslovakia, and in the Faculty of Science, Charles University, Prague. J.L.J.

**Tooeleite**


Electron microprobe analysis gave Fe,O\(_2\) 43.56, As,O\(_3\) 38.61, SO\(_2\) 7.26, H,O (Penfield method) 9.80, sum 99.21 wt\%, corresponding to \( \text{Fe}_{0.75}\text{As}_{0.25}\text{O}_8\), \( \text{S}_{0.05}\text{H}_{0.05}\text{O}_8\), \( \text{OH}_{0.05}\) for \( \text{As} + S < 6 \). The generalized formula is \( \text{Fe}_{x-2}\text{As}_{x/3}\text{S}_{y}\text{O}_z\text{H}_{y-2}\text{O}_z \) with \( x \approx 0.2 \). Color and streak typically cadmium orange, \( H = 3 \), transparent with a greasy luster in crystals, nonfluorescent, \( D_{\text{meas}} = 4.23(8) \), \( D_{\text{calc}} = 4.15 \text{ g/cm}^3 \) with \( Z = 2 \). Crystals are elongate [001] blades to 10 mm, bounded by [010], [304], and \{100\}. J.L.J.
One good cleavage normal to the shortest dimension of the crystals. Optically biaxial, straight extinction, \( \alpha = 1.94, \beta = 2.04, \gamma = 2.05, 2V_{\text{meas}} = 2-5^\circ, \) pleochroism \( Y = \) orange, \( X = Z = \) lemon yellow, weak dispersion \( r > v. \) X-ray single-crystal study indicated orthorhombic symmetry, space group \( \text{Pbcm or Pbc}_2, \), \( a = 6.416(4), b = 19.45(17), c = 8.941(8) \AA. \) Strongest lines of the powder pattern (114-mm camera, CrK\( \alpha \) radiation) are 9.75(100.020), 4.476(40.002), 3.208(90.200,132), 3.047(50.061,220), and 2.680(40.240,113).

The mineral occurs on waste dumps of the U.S. mine at Gold Hill, Tooele County, Utah. The mine formerly produced gold and arsenic from pyrite-arsenopyrite replacement ores in thermally metamorphosed limestone. Oxidation of the quartz-diopside host rock produced massive scorodite containing voids, some lined with jarosite, and both minerals are locally coated with tooeleite crusts up to 10 mm thick. The new name is for the locality. Type material is in the Ecole Nationale Supérieure des Mines, Paris, France. J.L.J.

AgPd


One of two similar microprobe analyses gave Pd 49.70, Ag 49.19, Cu 0.13, sum 99.02 wt%, corresponding to \( \text{Pd}_{0.04} \text{Ag}_{0.96}, \) close to PdAg. The alloy occurs as two angular grains, 5 \( \times \) 15 \( \mu \)m, in a void within an iron oxide nodule consisting mainly of goethite and hematite. The nodule is from near the top of a ferruginous zone, about 30 m thick, in laterite at the Bahia lateritic gold deposit, Serra dos Carajas, Brazil. The angular shape and occurrence in a void suggest growth of the alloy in a lateritic environment. J.L.J.

Pd\(_4\)As\(_2\) and Pd\(_4\)(Sb,As)


Three electron microprobe analyses are given for grains corresponding to unnamed Pd\(_4\)As\(_2\), and three for unnamed Pd\(_4\)(Sb,As).


Pd\(_2\)Ag\(_2\)S\(_2\) and (Rh,Pt)(As,S)\(_2\)


Electron microprobe analysis, normalized to 100 wt% after correction for beam overlap onto surrounding minerals, gave Pd 52.9, Ag 27.0, Cu 2.7, S 17.5, corresponding to Pd\(_{17.2}\)Ag\(_{15.9}\)Cu\(_0.2\)S\(_{20.3}\), possibly Pd\(_2\)Ag\(_2\)S\(_2\). The grain is 0.8 \( \times \) 0.5 \( \mu \)m and occurs in a silicate groundmass.

Analysis of a grain, approximately 1 \( \times \) 1 \( \mu \)m and isolated in epidote, gave Rh 28.5, Pt 15.3, Fe 0.8, As 41.6, S 13.8 wt%, close to (Rh,Pt)(As,S)\(_2\).

Discussion. The composition of the Rh-Pt sulfarsenide corresponds to (Rh\(_{0.68}\)Pt\(_{0.32}\)Fe\(_{0.04}\)O\(_{20.91}\)(As\(_{1.3}\)S\(_{0.69}\))\(_{2.42}\). RhAs\(_2\) has been synthesized. J.L.J.

V-dominant pumpellylite


Green mica schist from the main ore zone of the Hemlo gold deposit, Ontario, contains abundant V-bearing pumpellylite-(Mg) with up to 13.6 wt% V\(_2\)O\(_5\); as well, a second pumpellylite-group mineral occurs sparsely as grains \(<15 \mu \)m in maximum dimension. V\(_2\)O\(_5\) in the seven reported electron-microprobe analyses of the second mineral ranges from 18.89 to 25.67 wt%; results for the most V-rich grain are SiO\(_2\) 33.22, TiO\(_2\) 1.13, Al\(_2\)O\(_3\) 4.55, Cr\(_2\)O\(_3\) 0.56, V\(_2\)O\(_5\) 25.67, total Fe as FeO 3.34, MnO 2.10, SrO 0.02, sum 91.37 wt%, corresponding to (Sr\(_{0.46}\)Ba\(_{0.54}\)(Mn\(_{2.98}\)Fe\(_{0.02}\)O\(_{3}\))\(_{2.00}\)Si\(_{0.97}\) for 5 cations; the ideal formula given above requires 8.62 wt% H\(_2\)O, and absorption bands in the infrared spectrum appear at frequencies characteristic of H\(_2\)O-OH. Yellow-brown in thin section. Single-crystal X-ray structural study (\( R = 0.048 \)) indicated orthorhombic symmetry, space group \( \text{Cmcm} \), \( a = 6.255(1), b = 9.034(2), c = 13.397(2) \AA, Z = 4 \). The structure is of the lawsonite type, with Al completely replaced by Mn\(^{2+}\), and Ca by Sr. The mineral, which is thought to be of hydrothermal origin, is from the Wessels mine, Kalahari manganese fields, South Africa. J.L.J.
pale brown; strong dispersion, \( r < v \). Closely associated with vanadian titanite and barian tomichite. The end-member composition is calculated as \( \text{Ca}_{x}(\text{V},\text{Mg},\text{Fe})_{y}(\text{V},\text{Al})_{z}\text{Si}_{2}\text{O}_{5}(\text{OH})_{n} \), with V dominant both in \( X \) and \( Y \) positions. J.L.J.

**New Data**

**Pseudoboleite**


X-ray crystal-structural study \((R = 0.049)\) gave tetragonal symmetry, space group 14/mmm, \( a = 15.24(2) \), \( c = 30.74(5) \AA, D_{\text{calc}} = 5.07 \text{ g/cm}^3 \) for \( \text{Pb}_{x},\text{Cu}_{y}\text{Cl}_{z}(\text{OH})_{w} \) with \( Z = 2 \). The formula, notably the absence of structural \( \text{HOH} \), is new. J.L.J.

**Rhodesite**


X-ray structural study \((R = 0.036)\) of rhodesite from Zeilberg, Unterfranken, Germany, gave orthorhombic symmetry, space group Pmmn, \( a = 23.41(6) \), \( b = 6.555(1) \), \( c = 7.050(1) \AA, D_{\text{calc}} = 2.268(1) \text{ g/cm}^3 \) for \( \text{HKCa}_{x}\text{Si}_{y}\text{O}_{w},6-x\text{HOH} \) with \( Z = 2 \). Similar results were obtained for rhodesite from Trinity County, California \((R = 0.055)\), and San Venanzo, Rieti, Italy \((R = 0.045)\). Electron microprobe analyses of the specimens from Zeilberg and Trinity County, and of another from Kimberly, South Africa, gave maximum \( \text{NaO} \) contents of 0.33 wt\%, and structural study indicated that no specific cation position is fully or largely occupied by \( \text{Na} \). The ideal formula is \( \text{HKCa}_{x}\text{Si}_{y}\text{O}_{w},6-x\text{HOH} \), where \( x = 0.75-1.0 \). The structure is closely related to those of delhayelite, hydrodelhayelite, macdonaldite, and monteregianite. J.L.J.

**Stillwellite**


X-ray structural study \((R = 0.015)\) of stillwellite-(Ce) gave trigonal symmetry, space group P\(3_{1} \), \( a = 6.844 \), \( c = 6.700 \AA, Z = 3 \). The common occurrence of [100] twins probably accounts for the space groups previously assigned to the mineral.

**Discussion.** Also reported as space group P\(3_{1} \), by P.C. Burns et al., who refined the structure to \( R = 0.027 \) (Geol. Assoc. Can.—Mineral. Assoc. Can. Program Abstracts, 17, p. A14, 1992). J.L.J.

**Tinticite**


Electron microprobe analysis gave \( \text{FeO}, 50.49, \text{P}_{2} \text{O}_{5}, 29.57, \text{V}_{2} \text{O}_{5}, 0.60, \text{SO}_{2}, 0.38, \text{sum} 81.04 \text{ wt\%}, \) corresponding to \( \text{Fe}_{5.95}\text{P}_{3.92}\text{V}_{0.00}\text{SO}_{0.04} \), simplified as \( \text{Fe}_{2}\text{P}_{2}\text{O}_{5} \). The original formula for tinticite, \( \text{Fe}_{(\text{PO}_{4})}(\text{OH})_{3} \), requires 19.16 wt\% \( \text{H}_{2}\text{O} \). Trial and error indexing of the powder diffractometer pattern \((\text{Cu} \text{ radiation})\) gave an orthorhombic cell with \( a = 20.85, b = 13.51, c = 15.82 \AA \). Strongest lines of the pattern are \( 6.87(27,012), 5.78(40,311,212), 4.62(30,411,322,212), 3.94(99,004), 3.31(70,041), 2.98(45,341), 2.36(25,352), \) and \( 1.94(25,164,118) \). The new cell and the original formula with \( Z = 16 \) give \( D_{\text{calc}} = 2.76 \text{ g/cm}^3 \), which is close to the original \( D_{\text{meas}} = 2.8 \text{ g/cm}^3 \).

**Discussion.** The formula, symmetry, and cell dimensions differ from those abstracted in Am. Mineral., 74, p. 1404, 1989. J.L.J.

**Tuperssuatsiaite**


The second occurrence of tuperssuatsiaite has permitted better definition of its properties and composition. The mineral is monoclinic, space group \( C2/c \) or \( Cc \), \( a = 13.92(7), b = 17.73(5), c = 5.30(3) \AA, \beta = 104.78(1) \); strongest lines of a (reindexed) Gandolfi powder pattern \((\text{Cu} \text{K} \alpha \text{ radiation})\) are \( 10.78(\text{vs},110), 4.12(\text{m},221), 3.39(\text{m},221,400), 2.63(\text{m},202,351), \) and \( 2.51(\text{m},222,261,312) \). Optically biaxial positive, \( \alpha = 1.5388(5), \beta = 1.5596(5), \gamma = 1.595(1), 2\beta = 1.595(1), 2\gamma = 103.5(1.5) \), \( 2\alpha = 103.6(2.6) \), \( \alpha < \beta = 20-22^\circ \) in the obtuse angle \( \beta, \beta = b, \gamma < c < 5-7^\circ \), pleochroism \( \alpha = \text{colorless}, \beta = \text{pale yellowish brown}, \gamma = \text{dark reddish brown} \). The average of ten electron microprobe analyses gave \( \text{Na} = 4.97, \text{K} = 0.06, \text{Mg} = 0.11, \text{Ca} = 0.08, \text{Fe} = 18.37, \text{Mn} = 0.51, \text{Zn} = 0.09, \text{Si} = 26.02, \text{Al} = 0.08, \text{Ti} = 0.11, \text{F} = 0.09, \text{Cl} = 0.13, \text{O (calc.)} = 39.62 \text{ wt\%} \), corresponding to \( \text{Na}_{0.35}\text{K}_{0.01}\), \( \text{Na}_{0.25}\text{Fe}_{1.01}\text{Mn}_{0.25}\text{Mg}_{0.04}\text{Ca}_{0.02}\text{Zn}_{0.02}\text{Si}_{0.56}\text{Al}_{0.03}\text{Ti}_{0.02}\text{O}_{26}(\text{OH})_{37}\text{F}_{0.00}\text{Cl}_{0.03}\text{O}_{25}\text{O}_{25}(\text{OH})_{37} \). The new empirical formula and cell give \( D_{\text{calc}} = 2.28 \text{ g/cm}^3 \). J.L.J.

**Discredited Minerals**

**Rezbanyite**

A sample $5 \times 3 \times 2$ cm of holotype or cotype rezbanyite from Vaskö, Rumania, is part of the original collection of S. Koch now housed in the Mineralogical Collection of the University of Szeged, Hungary. The material was used by Koch to redefine the composition of rezbanyite as Pb$_3$Cu$_2$Bi$_{10}$S$_{19}$. Electron microprobe analyses and Guinier X-ray powder patterns indicate that the material, which is homogeneous by optical microscopy, consists of a mixture of minerals in the bismuthinite-aikinite group (hammarite and krupkaite) and subordinate Cu-bearing cosalite. The results confirm previous studies (Mumme and Zák, Neues Jahrb. Mineral. Mon., 557–567, 1985) that indicate no mineral with the composition of rezbanyite is known.

**Discussion.** The authors conclude that rezbanyite should be discredited as a mineral name, but no application to do so was made to the CNMMN. J.L.J.

**Sulrhodite**


For the solid solution Rhs$_2$Ir$_3$S$_8$, the Rh-dominant and Ir-dominant members are named bowieite and kashinite, respectively. The previously proposed name sulrhodite for Rhs$_2$S$_3$ (Am. Mineral., 74, p. 1216, 1989) is discredited. J.L.J.