NEW MINERAL NAMES*

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Brianyoungite*


Occurs as white rosettes (<100 μm) of thin, vitreous, transparent blades (~1-2 μm) that are elongate [010] and taper to a sharp point. Chemical analysis gave ZnO 71.47, CO3 9.90, SO3 6.62, H2O 10.70, sum 98.69 wt%, corresponding to Zn(CO3)(SO4∙OH), as there are structural indications that CO3 and SO4 occupy the same equivalent position. Hardness not determinable, perfect {100} cleavage and possibly also {001}, D > 3.93 and < 4.09, Dcalc = 4.11 g/cm³ for Z = 4, nonfluorescent, readily soluble with effervescence in dilute acids. Optically biaxial, α = 1.635, β = 1.650, straight extinction. TGA showed losses of 3.7 wt% to 240 °C (absorbed H2O), a major loss between 320 and 450 °C (simultaneous evolution of H2O and some CO2), and three losses between 450 and 900 °C (CO3 and SO4); total loss was 36.8 wt%. The infrared spectrum has major absorption bands for OH, CO3, and SO4. Electron diffraction patterns indicate orthorhombic symmetry (or monoclinic with β = ~90°), a = 15.724(3), b = 6.256(5), c = 5.427(5) Å as refined from the X-ray powder pattern; strongest lines are 15.44(100,100), 7.88(100,200), 5.25(20,300), 2.714(40,002,021), 2.577(20,202,221), 2.397(20,321,212), and 1.565(30,023,040,631).

The mineral occurs with gypsum on rubbly limestone within the oxidized zone of the Brownley Hill mine at Nenthead, Cumbria, England. Also found on specimens from the Smallcleugh mine, Nenthead, the Bastenberg mine at Ramsbeck, Germany, and at Vieille, Montagne, Hollogne, Belgium. The new name is for Brian Young (b. 1947), who collected the type specimen, now stored in the Royal Museum of Scotland. J.L.J.

Deanesmithite*


Electron microprobe analysis gave HgO 34.9, HgO 54.4, CrO3 8.6, S 5.3, less O = S 2.6, sum 100.6 wt%, corresponding to Hg2Cr6+O5S3, for O + S = 7, with HgO and HgO partitioned on the basis of the single-crystal X-ray structure determination (R = 0.0292). Occurs as orange-red, transparent, fan-shaped, prismatic aggregates to 0.5 × 0.5 mm; also as isolated bladed to acicular radiating clusters, and rarely tabular. Crystals are flattened on {100}, which is the major form, with minor {320}, {001}, {510}, {01T}, and numerous smaller forms. Striated {001}, good {110} and fair {001} cleavages, subconchoidal fracture, adamantine luster, orange-red streak, brittle to friable, H = <5, nonluminescent, Drel. = 8.14 g/cm³ for Z = 2 and the ideal formula. Optically biaxial, n = <2, pleochroic; dark bluish gray to light gray in reflected light, yellow-orange to orange-red internal reflections, weakly bireflectant, and weakly pleochroic. Triclinic symmetry, space group P̅1, a = 8.116(6), b = 9.501(8), c = 6.819(9) Å, α = 100.43(8), β = 110.24(8), γ = 82.80(8)°, as refined from the powder pattern (114-mm Debye-Scherrer, Cu radiation), with strongest lines of 5.729(001), 3.373(60,112,102,121), 3.008(100,122,212), 1.311,122,2031, 2.864(508,012,201,220,022), 2.774(50,221), 2.536(50,132), 2.486(50,310), and 2.425(60,221,032,302).

The mineral occurs with cinnabar and various other Hg minerals in a quartz + magnesite rock from a prospect pit near the former Clear Creek Hg mine, New Idria district, San Benito County, California. The new name is for Deane K. Smith of Pennsylvania State University. Type material is in the National Mineral Collection at the Geological Survey of Canada, Ottawa. J.L.J.

Edoylerite*


Electron microprobe analysis gave Hg 51.6, HgO 27.9, CrO3 11.5, S 8.2, sum 99.2 wt%, corresponding to Hg5+Cr4+O5S3, ideally Hg5Cr4O5S3 as determined from a sin-
gle-crystal X-ray structure determination (not reported). Occurs as canary to orange-yellow, stellate to acicular groups, in which crystals are up to 0.5 mm long, elongate (opaque in masses), brittle, subconchoidal fracture, good (010) and fair (101) cleavages, nonfluorescent; photosensitive, turning olive green after a few months. 

**议论**

**Gaidonnayite, Ca analogue**


The mineral occurs as rims and complete pseudomorphs of eudialyte in a pegmatitic vein, about 50 cm thick, at Mannepakhk Mountain in the northwestern part of the Khibiny alkalic complex. Fine-grained; color patchy from light to dark reddish brown, not transparent, H = ~ 2, nonluminescent, n = 1.68–1.71. Electron microprobe analysis (one of three listed) gave SiO₂ 44.71, TiO₂ 2.15, ZrO₂ 24.75, FeO 0.82, La₂O₃ 0.07, MnO 2.44, CaO 6.73, SrO 1.37, MgO 0.40, Na₂O 2.26, K₂O 3.15, H₂O (by difference) 11.15, sum 100 wt%, corresponding to (Ca₀.₈Na₀.₂K₀.₂)₀.₆Sr₀.₄Mn₀.₄Zr₀.₆Ti₀.₄Fe₀.₀Fe₂₀.₀Si₂₀.₀O₈. H₂O. The X-ray powder pattern (114-mm camera, Fe radiation) is similar to that of gaidonnayite, and, by analogy, a = 11.768, b = 12.805, c = 6.67 Å; strongest lines are 5.899(60,011), 3.106(100,011), 2.942(50,013), 2.822(50,212), 2.208(50,313), 1.897(50,512), and 1.869(50,360). The infrared spectrum has an overall similarity to that of gaidonnayite, but with some differences that include the appearance of a multiplicity of absorption bands between 400 and 770 cm⁻¹.

**Discussion** This may be the Ca analogue of gaidonnayite, but the fine-grained, turbid nature of the material hinders proof of homogeneity. J.L.J.

**Harrisonite**


**Ershovite**


Electron microprobe analysis gave CaO 7.65, FeO 52.27, MgO 3.89, MnO 0.11, SiO2 15.99, P2O5 19.18, sum 99.09 wt%, corresponding to Ca19(Fe3+8Mg0.71-Mn0.01)2( Si9.96O34)( P0.99O1.22). Simplified as Ca(FeMg)(Si8O36)(PO4). Occurs as equidimensional, anhedral, yellow-brown to orange-brown grains averaging 0.2-0.5 mm; pale yellow streak, vitreous luster, translucent to transparent, brittle, conchoidal fracture, a very poor cleavage, \( H = \leq 5 \), \( D_{\text{meas}} = 4.02 \), \( D_{\text{calc}} = 4.01 \) g/cm³ for the simplified analytical formula, and \( Z = 3 \). Optically uniaxial negative, commonly biaxial with \( 2V = -5^\circ \) from strain, \( \omega = 1.770(5), \epsilon = 1.759(3) \), slightly pleochroic in pale yellow. Single-crystal X-ray structure study (\( R = 0.025 \)) indicated trigonal symmetry, space group \( R3m \); \( a = 6.240(2), c = 26.784(5) \) Å, as refined from a 114-mm Gandolfi pattern (Co radiation), with strongest lines of 3.507(32, 030), 2.983(100, 050), 2.816-2.11, 2.200(35, 511), 2.149(35, 043), 1.981(35, 512), and 1.586(33, 103). The new name is for J. M. Harrison (1915–1990), former director of the Geological Survey of Canada. The mineral occurs in an iron silicate + quartz + apatite-layered body thought to be a shaly, phosphatic iron formation that has been metamorphosed to the granulite facies. Type material is in the National Mineral Collection at the Geological Survey of Canada and at the Canadian Museum of Nature, Ottawa. J.L.J.

Megacyclite*


Electron microprobe analysis (average of four) gave Na19O 19.75, K₂O 3.62, SiO₂ 43.42, H₂O by difference 33.21, sum 100 wt%, corresponding to Na21K7.96-

Si9.96O34(OH)8·18.51H₂O, ideally Na14KSi13O18(OH)8·19H₂O. The mineral is colorless, transparent, dull vitreous luster, streak, sectile, adamantine fracture, perfect (100) and less perfect (011) cleavages, \( H = 2 \), \( D_{\text{meas}} = 1.82(5), D_{\text{calc}} = 1.87 \) g/cm³ for \( Z = 4 \). Dissolves easily in H₂O and whitens with prolonged atmospheric exposure. Optically biaxial negative, \( \alpha = 1.460(2), \beta = 1.478(2), \gamma = 1.481(2) \), \( 2V_{\text{meas}} = 43(1), 2V_{\text{calc}} = 44^\circ \). Strong dispersion, \( r > v \), \( b = Y, c \wedge X = 30^\circ \). Nonluminescent in ultraviolet light. The IR spectrum has absorption maxima at 3570, 3410, 1660, 1225, 1125, 1090, 1040, 995, 900, 865, 505, 470, and 450 cm⁻¹. Single-crystal X-ray study gave monoclinic symmetry, space group \( P2_1/c \); \( a = 24.91(5), b = 11.94(1), c = 14.92(2) \) Å, \( \beta = 94.47(9)^\circ \). The structural formula with \( Z = 2 \) is \( \text{Na}_{16}\text{K}_2[\text{Si}_{18}\text{O}_{36}(\text{OH})_{18}] \cdot 38\text{H}_2\text{O} \). The strongest powder diffraction lines (25 given) are 4.26(60, 511), 3.08(100, 124, 531), 2.938(708, 040, 802, 523), 2.649(609, 502), 2.400(35, 116, 216), and 2.289(35, 543, 144, 824, 615). The mineral occurs in the subsurface, unweathered, veined pegmatites of Mount Rasvumchorr, in the Khibinsk alkali massif, Kola Peninsula, Russia, as irregular grains from 1 to 3 mm in diameter, associated with fensaitite, redvite, orthoclase, and delhayellite. Other minor minerals include pectolite, eudialyte, scherbakovite, monosovite, lamprophylite, aenigmatite, aegirine, alkali amphibole, ramsivite, nacacpite, villiaumite, and natrite. The name, derived from the Greek for “large and cyclical,” alludes to the structure, in which there are unusual, large, ringlike groups consisting of 18SiO₄ tetrahedra. Samples are deposited at the Fersman Mineralogical Museum, Moscow.

Discussion. Preliminary data for the then-unnamed mineral were abstracted in Am. Mineral., 78, p. 676 (1993). D.A.V.

Parkinsonite*


Occurs as compact clusters or patches, to 3 mm, of bladed, red to purplish red crystals up to 100 × 300 μm. Electron microprobe analysis gave PbO 88.4, MoO₃ 8.0, Cl 4.4, O = Cl 1.0, sum 100.8 wt%, corresponding to \( \text{Pb}_3\text{Mo}_3\text{O}_{11}\text{Cl}_2 \) similar to that obtained from synthetic material. Translucent, scarlet to granidene red streak, sectile, adamantine fracture, \( H = 2-2.5 \), perfect (001) cleavage, also a fair cleavage on possibly (100) and indistinct on possibly (350); \( D_{\text{meas}} = 7.32 \) (synthetic material), \( D_{\text{calc}} = 7.39 \) g/cm³ for \( Z = 1 \). Optically uniaxial negative, with \( \omega = 2.58, \epsilon' = 2.42 \) calculated from reflection spectra. Single-crystal X-ray study indicated tetragonal symmetry, possible space groups \( I4/mmm, I4/mcm, I4/m2, I4/mcm, \) or \( I4/22, a = 3.988(1), c = 22.34(1) \) Å as refined from a Debye-Scherrer pattern (Cu radiation) with strongest lines of 3.507(32, 030), 2.983(100, 105), 2.816-2.78(110, 518), 1.989(75, 118), 1.658(51, 215), and 1.586(33, 103). The mineral occurs both at the Merehead quarry, Cranmore, Somerset, England, and at the Wesley mine, Didsbury, near Bristol, as a constituent of a lead oxychloride assemblage associated with manganese oxide veins in Carboniferous limestone. The new name is for R.F.D. Parkinson (b. 1928), who first found the mineral. Type material is in the Natural History Museum, London. J.J.I.

Pringleite,* ruitenbergite*

A.C. Roberts, J.A.R. Stirling, J.D. Grice, P.C. Burns, B.V. Roulston, J.D. Curtis, J.L. Jambor (1993) Pringleite and ruitenbergite, polymorphs of \( \text{Ca}_6\text{B}_2\text{O}_{34}(\text{OH})_{22}\text{Cl}_4 \).

The minerals occur in a single hand specimen consisting mainly of halite, hilgardite-ll, and sylvite from the Mississippian Windsor Group evaporites at the Potash Company of America mine at Penobsquis, near Sussex, New Brunswick.

**Pringleite**

Occurs as colorless to pale yellow, platy to prismatic, subhedral to anhedral grains up to 2 mm (aggregates to 4 mm); vitreous luster, white streak, H = 3–4, brittle, good {110} cleavage, even to slightly conchoidal fracture, nonluminescent, rare simple twinning, D<sub>mean</sub> = 2.21(1), D<sub>calc</sub> = 2.11 g/cm³ for Z = 1. Electron microprobe analysis gave CaO 26.29, 824, 46.75, Cl 6.48, O = Cl 1.46, H₂O by difference 21.94, sum 100 wt%, corresponding to Ca₂B₂₃₋₅₅₆₋₅₉₁₆(OH)₂₄₋₅₆₁₄.1₁₇₆H₂O. Optically biaxial positive, α = 1.537(1), β = 1.548(1), γ = 1.570(1), 2V<sub>mean</sub> = 77(1), 2V<sub>calk</sub> = 71.4°, nonpleochroic, strong dispersion r << v; X || c, Y || a = 40° in γ acute, Z || b = 46° in γ obtuse. Single-crystal X-ray study indicated triclinic symmetry, space group P1 (structure to be reported), a = 12.759(6), b = 13.060(5), c = 9.733(4) Å, α = 102.14(4), β = 102.03(3), γ = 85.68(4)°, as refined from a 114-mm Gandolfi pattern (Co radiation). Strongest lines are 9.05-6.661(3) Å, P || 010, 4.85(50, 200), 4.44(80, 400), 3.99(50, 311), 3.52(60, 020), and 1.92(80, 031, 911, T32).


**Ruitenbergite**

Known only as a single, anhedral grain, 4 × 7 mm, which is associated with pringleite and is physically identical to it except that cleavage is {110}. Optically biaxial positive, α = 1.542(1), β = 1.545(1), γ = 1.565(1), 2V<sub>mean</sub> = 47(1), 2V<sub>calk</sub> = 42.5°, nonpleochroic, dispersion not determinable; X || b, Y || a = 25° in β obtuse, Z || c. X-ray single-crystal study indicated monoclinic symmetry, space group P2₁ (structure to be reported), a = 19.88(1), b = 9.715(4), c = 17.551(9) Å, β = 114.85(4)°, as refined from a 114-mm Gandolfi pattern (Co radiation). Strongest lines are 9.03(60, 200), 8.56(100, 110), 6.62(70, 210), 6.14(30B, 012, 212), 5.12(30, 310), 4.09(30, 410), 3.786(30, 320), 3.493(30, 222), 2.890(30, 2134(30B), and 2.037(30). The new name is for Gordon J. Pringle of the Geological Survey of Canada, Ottawa.

**Seelite**


The mineral occurs in the oxidation zones of the Talmessi mine in central Iran and the Rabjac U deposit near Lodève, Hérault, France. Electronic microprobe and CHN analyses (Rabjac) gave MgO 4.28 (4.09), UO₂ 65.37 (62.43), As₂O₅ 14.00 (13.41), As₂O₃ 6.98 (6.67), H₂O 13.40 wt%, where values in parentheses are after correction for dehydration under the electron beam, and As<sup>5+</sup>–As<sup>3+</sup> was partitioned according to the X-ray structure determination. The corrected results correspond to Mg₆(AsO₄)₄(As₂O₅)₃·4H₂O, with x about 0.7. Occurs as tufted spherules and rosettes of bright yellow tabular crystals elongate [010], flattened on (100), showing {100} and {001} prism faces terminated by {010} or by {011} and {011}. Vitreous luster, irregular fracture, white streak, H = 3, nonfluorescent, D<sup>calc</sup> = 3.70, D<sub>mean</sub> = 3.60 (Talmessi) and 3.71 g/cm³ (Rabjac) for Z = 2. Optically biaxial negative with indices (Talmessi and Rabjac, respectively) α = 1.602(1), 1.610(2), β = 1.737(3), 1.730(4), γ = 1.753(3), 1.740(4), 2V<sub>mean</sub> = 41.0(5), 30(3°), 2V<sub>calk</sub> = 37.5, 34°, OAP (010), Z || c = 5(1°), extreme dispersion r < v, strongly pleochroic with X || a (colorless), Y || b (yellow), Z || c (yellow). Single-crystal X-ray study indicated monoclinic symmetry, space group C2/m, a = 18.205(7), b = 7.062(3), c = 6.661(3) Å, β = 99.65(5°) as refined from the powder pattern (Talmessi) which has strongest lines of 9.05–100.200, 4.85(50, 200, 111), 4.44(80, 400), 3.99(50, 311), 3.52(60, 020), and 1.92(80, 031, 911, T32).

The new name is for mineral collectors Paul (1904–1982) and Hilde Seel (1901–1987). Type material is in the Royal Institute of Natural Sciences of Belgium in Brussels (Rabjac), and in the Mineralogical Collection, Pierre and Marie Curie University, Paris (Talmessi).

**Discussion.** The initial paper on the X-ray structure of the Talmessi mineral was abstracted as unnamed Mg₂(AsO₄)₄·4H₂O in Am. Mineral., 78, p. 453 (1993). Another paper on the structure is reported to be in preparation. J.L.J.

**Tiettaite**


Analysis by electron microprobe, recalculated to 100 wt% after subtracting rausumite inclusions, gave Na₂O 19.21, K₂O 9.93, CaO 0.30, Fe₂O₃ 4.05, TiO₂ 3.91, SiO₂ 47.65, H₂O 14.95, sum 100.00 wt%, corresponding to (Na₁₂₋₅,K₄₋₂)₂(Fe₆₋₅,Fe₂₋₁,Al)₂Ti₂₋₁₂₂₂₂₂₂₂₂₂₂₉₀(OH)₂₋₀.₈₁₋₁.₄₈₁H₂O, ideally (Na,K)<sub>2</sub>Fe₂Ti₂Si₆O₂₉(OH)₆·2H₂O. Grayish white, transparent, with vitreous or silky luster, tarnation with prolonged exposure to air. Perfect (100) and (010) cleavages, stepline fracture, H = 3, nonluminescent, soluble in weak HCl and HNO₃, D<sub>mean</sub> = 2.42(2),
\( D_{\text{calc}} = 2.39 \text{ gm/cm}^3 \). Thermal analysis showed endothermic effects at 120, 270, and 360 °C. Colorless in thin section, biaxial negative, \( \alpha = 1.532(2), \beta = 1.548(2), \gamma = 1.559(2), 2V_{\text{mes}} = 79(1), 2V_{\text{calc}} = 79^\circ \), average dispersion \( r < v \). Cleavage fragments have straight extinction with positive or negative elongation, orientation \( a = X, b = Y, c = Z \). The IR spectrum has absorption maxima at 475, 545, 638, 870, 925, 980, 1060, 1100, 1690, and 3600 cm\(^{-1}\). Single-crystal X-ray studies showed the mineral to the orthorhombic, space group \( \text{Cmcm}, \text{Cmca}, \) or \( \text{C2mc}, \)

\[
a = 29.77(1), b = 11.03(2), c = 17.111(5) \text{ Å}
\]

The strongest lines (40 given) are 10.38(100,110), 4.516(75,313), 3.220(65,604), 3.097(80,315,623,820), 2.972(65,912), and 2.773(90,134,913).

The mineral occurs in unweathered (subsurface) ultramafic pegmatites at both Mount Rasvumchorr and Mount Koashva, Khibinsk alkaline massif, Kola Peninsula, Russia. Associated minerals are orthoclase, nepheline, sodalite, aegirine, villiaumite, natrite, ramsite, phosphite, francolite, vuonnemite, astrophyllite, shcherbakovite, kaza- kovite, kashvite, eroshovite, olympite, sidorenkte, djerfisherite, and shafrovskite. The mineral forms rounded friable aggregates up to 1 cm, containing acicular hairs elongate [001] and flattened [100]. The name is for the Saamk word \( \text{tietta} \), meaning science or knowledge (and also used as the name of the first scientific station of the USSR Academy of Sciences in Khibinsk). Samples are at the Fersman Museum, Moscow, and the Kola Science Center, Apatity. D.A.V.

**Tsaregorodtsevit**


Electron microprobe analysis (average of three) gave Si 31.03, Al 6.45, N 3.2, O 45.6, sum 86.28 wt%. The presence of CH is not confirmed through gas chromatography, IR-spectroscopy, and laser Raman microanalysis. The ideal formula is \( \text{N(CH}_3\text{)}_4[\text{Si}_2\text{Si}_3\text{Al}_5\text{O}_{12}] \). The mineral is insoluble in boiling sulfuric, nitric, or hydrofluoric acid, and partly dissolves with prolonged boiling in phosphoric acid. Thermal analysis showed exothermic effects at 630, 700, 790, and 930 °C, and an endothermic effect at 660 °C. Weight loss commences at 660 °C, with am- monia liberation. The IR spectrum resembles that of \( \text{SiO}_2 \), with absorption lines near 1420 and 1480 cm\(^{-1}\), and, of course, the band at 660 cm\(^{-1}\). Weight loss commences at 630, 700, 790, and 930 °C, and an endothermic effect at 120, 270, and 360 °C. Colorless in thin section, biaxial negative, \( \alpha = 1.696(3), \beta = 1.715(5), \gamma = 1.715(5), \) no pleochroism, strong dispersion \( r < v \), polycrystalline twinned parallelepiped parallel to the elonga- tion. X-ray powder studies gave monoclinic symmetry, space group \( \text{P2/m}, a = 8.37(1), b = 7.01(2), c = 13.72(2) \text{ Å}, \beta = 96.6(2)^\circ \). Single-crystal study was hindered by the twinning. The strongest powder lines (38 given) are 3.41(80, 004), 3.22(80,204,703,321), 2.83(100,314), 2.81(100,422), 2.24(70), 1.750(60), and 1.703(50).

The mineral occurs within biotite-quartz hornfels at the margin of a Sn-bearing granite massif on the northern slope of the Inyl'chek mountains, southeastern Khirghiz, where it forms radial aggregates up to 15 mm associated with rhodonite, quartz, tephroite, galena, hübnerite, chal- copyrite, sphalerite, stannite, rhodochrosite, a Cl-bearing manganese silicate, cassiterite, celsian, fluorite, helvite, neotocite, schorl, pyrite, and pyrophyllite. The name is for the mineralogist and collector Viktor Ivanovich Stepanov (1924–1988). Samples are at the Vernadskii Geological Museum, Moscow, the museum of the Il'menskii Nature Reserve (Maiss), and the Fersman Mineralogical Museum, Moscow. D.A.V.
**Watanabeite***


Electron microprobe analysis gave Cu 41.1, Ag 0.1, Mn 0.3, As 15.4, Sb 14.3, Bi 2.4, S 26.2, sum 99.8 wt%, corresponding to (Cu_0.93Mn_0.03Ag_0.01)_{23.98} (As_1.25Sb_0.75Bi_0.01)_{22.06}Sr_{1.98} for 11 atoms, ideally Cu_(As,Sb)_2Sr. Silvery lead gray color, lead gray streak, no cleavage, uneven fracture, brittle, VHN<sub>0.01</sub> = 253–306, megascopically indistinguishable from tetrahedrite-group minerals. D<sub>calc</sub> = 4.666(2), D<sub>cr</sub> = 4.66 g/cm<sup>3</sup> for Z = 16. Gray in reflected light, resembling tetrahedrite; weakly anisotropic and bidirectional, revealing a mosaic of nearly rectangular grains and elongate grains to 50 μm. Maximum and minimum reflectance percentages (SiC standard) in air and in oil are, respectively, 32.5, 31.1, 16.3, 546 nm, 31.1, 30.3, 16.1, 589 nm, and 30.0, 29.3, 15.0, 14.5 (650 nm). The unit cell calculated from the X-ray powder pattern is orthorhombic, a = 14.51(1), b = 13.30(1), c = 17.96(1) Å; strongest lines (diffractometer, Co radiation, 76 lines given) are 3.36(7,115,402), 2.999(100,422,006), 1.594(20,424,151), 1.833(40,428), and 1.546(15B,4.2.10). The stronger lines are indexable on a tetrahedrite-like cubic cell with a = 10.37.

The new name is for Takeo Watanabe (1907–1986). The mineral is associated with quartz from a hydrothermal vein and is monomineralic except for minute inclusions of emepectite, native bismuth, and tennantite. Type material is in the National Science Museum, Tokyo, the University Museum of the University of Tokyo, and the Natural History Museum, London. J.L.J.

**New Data**

**Fiedlerite-1A,** *fiedlerite-2M,*

S. Merlino, M. Pasero, N. Perchiazzi (1994) Fiedlerite: Revised chemical formula [Pb<sub>3</sub>Cl<sub>4</sub>F(OH)<sub>r</sub>H<sub>r</sub>O<sub>r</sub>OD description and crystal structure refinement of the two MDO polytypes. Mineral. Mag., 58, 69–78.

Fiedlerite, known previously only from Laurion (Laurium), Greece, also occurs in Etruscan iron slags at Baratti, southern Tuscany, Italy. Electron microprobe analyses of the mineral from both localities showed the presence of 2.01–2.59 wt% F, which approximates one atom in the formula unit and indicates that the original formula, Pb<sub>3</sub>Cl<sub>4</sub>(OH)<sub>r</sub>H<sub>r</sub>O, should be revised to Pb<sub>3</sub>Cl<sub>4</sub>F(OH)<sub>r</sub>H<sub>r</sub>O. Single-crystal X-ray structure study of the mineral from both localities showed the presence of order-disorder relationships; the two crystals with the maximum degree of order were found to be triclinic (1A, Baratti, R = 0.092) and monoclinic (2M<sub>1</sub>, Laurion, R = 0.061) polytypes. The 1A polytype has the space group PT, a = 8.574(3), b = 8.045(4), c = 7.276(2) Å, α = 89.96(4), β = 102.05(4), γ = 103.45(4); the 2M<sub>1</sub> polytype has the space group P2<sub>1</sub>/a, a = 16.681(4), b = 8.043(3), c = 7.281(2) Å, β = 102.56(4). J.L.J.

**Iowaite**


Well-crystallized iowaite occurs in cavities in carbonatite at the Palabora open-pit mine, Transvaal, and platy crystals are up to 2 cm across. Perfect micaceous cleavage {0001}, H = 2½, D<sub>calc</sub> = 2.09, D<sub>cr</sub> = 2.04 g/cm<sup>3</sup> for Z = 33. Optically uniaxial negative, ω = 1.561(2), ε = 1.543(2); intense pleochroism O = pale yellow, E = deep blue-green. Single-crystal X-ray structure study (R = 0.017) indicated trigonal symmetry, space group R3̅m, a = 3.1183(9), c = 24.113(8) Å. Electron microprobe and C analyses plus TGA gave MgO 35.3, Fe<sub>2</sub>O<sub>3</sub> 24.6, Cl 7.0, CO<sub>2</sub> 0.4, H<sub>2</sub>O (to 200 °C) 11, total volatiles 41 wt%, which gives a formula close to (Mg<sub>0.9</sub>Fe<sub>2.0</sub>)Fe<sup>2+</sup>(OH) <sub>4</sub>[Cl<sub>1.4</sub>(OH) <sub>0.8</sub>(CO<sub>3</sub>) <sub>0.06</sub>]·4H<sub>2</sub>O, ideally Mg<sub>x</sub>Fe<sub>2</sub>(OH) <sub>16</sub>Cl<sub>2</sub>·4H<sub>2</sub>O. The new results indicate that iowaite is the chloride analogue of pyroaurite. J.L.J.