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New Mineral Names*

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**Ardaite**


The average of six electron microprobe analyses yielded Pb 56.50, Ag 0.83, Sb 22.48, S 15.56, Cl 3.76, sum = 98.36%. These data are in agreement with the formulas Pb26Sbl2S3aCls and Pb85Sbr6S3aCls, the latter of which is preferred by the authors. Previous descriptions of this phase by some of the same authors had referred to it as “chlorine falkmanite”.

Electron diffraction study indicated that ardaite is isostructural with a synthesized “A-phase” and the diffraction data fit a monoclinic cell with a = 21.97, c = 8.05 Å with a subcell C = 2c’ and B = 103°; b was determined to be 21.34 on the synthetic material only. X-ray powder diffraction data yield a = 22.09, b = 21.11, c = 8.05 Å, β = 103°01’, V = 3657.776 Å³, Z = 2. The strongest lines in two X-ray powder patterns are: 4.47*, 4.30, 3.80*(10)(61); 2.90, 2.83(3,7)(171); 2.11*, 2.00(10,4)(—); (*denotes galena reflections).

Ardaite occurs as fine-grained 50 µm aggregates of acicular crystals associated with galena, pyrostilpnite, anglesite, nadorite, and Cl-bearing robinsonite and semseyite, in the Madjarovo polymetallic ore deposit in Bulgaria. Optically, ardaite is anisotropic, greenish-gray, with distinct bireflectance. The reflectances are: mm (%) 440(31.3-33.2), 480(32.1-34.4), 520(32.3-35.1), 580(31.7-34.7), 620(31.1-33.9), 660(30.6-32.8), 700(30.3-31.8), 740(30.2-30.9). Ardaite is named for the Arda River, which flows through the Madjarovo deposit.

**Discussion**

A second occurrence of ardaite, published in 1981 (Can. Mineral., 19,419-422, Burke et al.), from Gruvasen, Bergslagen, Sweden, favored the formula (Pb,Fe)26Sb15S30Cl6. Microprobe analyses yielded: (mean and range) Pb 57.94 (55.25-58.55), Fe 0.31 (0.1-1.65), Sb 21.14 (21.2-21.55), S 15.44 (15.3-15.6), Cl 4.39 (4.25-4.55), sum = 99.52% (97.8-100.15%).

Additional data on the chlorine-bearing sulfosalts, including ardaite, has been published by Breskovska et al. (1981) in Bull. Mineral., 104, 757-762. P.J.D.

**Bannermanite**


Crystal structure study of a fumarolic vanadium mineral from Izalco Volcano, El Salvador, yielded the chemical formula (Na,K)1.61V5+,7+,V5+,6+,O15, where 0.10 ≤ x ≤ 0.46, Na > K. No other description is provided.

**Discussion**

The publication of a new name with no description beyond the chemical formula is regrettable. P.J.D.

**Dwornikite**


The average of 4 chemical analyses (by edax-xrf) yielded NiO 39.0, FeO 9.3, SO4 42.4, sum = 90.7% with H2O undetermined. The composition (Ni0.8Fe0.2)SO4 • H2O requires NiO 34.7, FeO 8.3, SO4 46.4, H2O 10.6, sum = 100.0%.

No single crystals were found. Least-squares refinement of powder data, based on known crystallographic data for synthetic material, yielded a monoclinic cell, space group C2/c with a = 6.39(3), b = 7.58(2), c = 7.47(4), β = 117.85°. The strongest lines in the powder pattern are 4.75(50)(111), 4.73(70)(110), 3.43(100)(111), 3.293(35)(021), 3.0247(200), 2.492(35)(022).

Dwornikite is white with a possible green tint. The refractive index is 1.63 (mean). The density is 3.34 (calc.); hardness and fracture could not be measured. Dwornikite forms aggregates of very fine-grained particles associated with patronite, sulfur, bitumen and other sulfates in a vanadium sulfide ore from Minasragra, Peru.

The name is for Edward J. Dwornik, mineralogist of the U.S. Geological Survey. P.J.D.

**Gobbinite**


Gobbinite

Wet chemical analyses, after deduction of carbonates of Ca and Cu, yielded: SiO2 52.17, 51.15; Al2O3 20.52, 21.09; Fe2O3 0.55, 0.32; MgO n.d., 0.50; CaO 1.00, 0.66; Na2O 10.71, 10.02; K2O n.d., 0.98; H2O 15.04, 15.29; sums = 100.00, 100.00%. These yield the chemical formula Na8(Cu,Mg,K2)Al6 Si10O32 • 12H2O.

X-ray data, obtained using Weissenberg and rotation methods,
showed gobbinsite to be tetragonal with \( a = 10.145 \), \( c = 9.788 \AA \). Gobbin site is related to gismondite, merlineite,philippsite, gal- ronite and related synthetic Na-P zeolites. The strongest lines in the X-ray powder diffraction pattern are: \( 7.11(100),(110), 4.116(100)(211), 3.201(100)(310,301), 3.106(80)(103), \) and \( 2.699(80)(321,312) \).

Gobbin site occurs as white, chalky clusters of fibrous crystals, elongate on \( c \) and associated with gmelinite. D calc. = 2.147; D meas. = 2.194 (mixture). Optically, gobbinsite has parallel extinction, length slow, with indices of refraction \( \varepsilon = 1.489, \omega = 1.494 \) (both \( \pm 0.003 \)). Gobbin site is found near Hills Port, south of the Gobbin area in Co. Antrim, N. Ireland.

Gobbin site is named for the Gobbin area.

Type material is preserved in the Ulster Museum, Belfast.

**Unnamed Zeolite**

An impurity in gobbinsite and garronite which occurs as intergrowths parallel to \( c \), can be indexed on an orthorhombic cell with \( a = 14.22, b = 14.29, \) and \( c = 9.83 \AA \). These data are similar to, but different from, those of mellineite. This phase is probably related to a synthetic Ba-H phase of Taylor and Roy (Am. Mineral., 49, 656-682). P.J.D.

**Korshunovskite**


Microchemical analysis on 100 mg by S.P.P. gave \( \text{MgO} 37.62, \text{CaO} 4.69, \text{CO}_2 8.78, \text{Cl} 14.84, \text{H}_2\text{O}^+ 27.06, \text{H}_2\text{O}^- 9.36, \text{Fe}_2\text{O}_3 0.10, \text{SiO}_2 0.09, \text{Ti, Al, Mn, Na, K} - \text{none, total 102.54} - (O = Cl)_3 3.35 \approx 99.19\% \). The sample contained about 16\% magnesite and dolomite and a little magnetite and antigorite. After deducting these, the analysis corresponds to \( \text{Mg}_2\text{Cl(OH)}_3 \cdot 3.5\text{H}_2\text{O} \).

The X-ray pattern agrees with that of the compound \( \text{Mg}_2\text{Cl(OH)}_3 \cdot 4\text{H}_2\text{O} \), synthesized by Wolf and Walter-Levy, Acta Cryst. v. 6, no. 1 (1953). It is indexed on a triclinic cell with \( a = 8.54 \pm 0.03, b = 6.25 \pm 0.01, c = 7.42 \pm 0.01, \alpha = 101.4 \pm 0.3, \beta = 103.9 \pm 0.1, \gamma = 72.7 \pm 0.6^\circ, Z = 2 \). D calc. 1.787, meas. 1.798.

The strongest lines (42 given) are \( 8.04(10)(100), 4.032(7)(2N), 3.843(7)(5)(101), 3.41(7)(103), 3.343(5)(301), 3.201(6)(300), 2.978(9)(012) \), and \( 2.593(8)(001) \).

Colorless, transparent, elongated prismatic crystals, tenths of a mm long. H about 2. Biaxial, negative, \( 2V = 62^\circ, \) extinction 6-8° to the elongation, \( n_s = (0.001), \alpha = 1.516, \beta = 1.538, \gamma = 1.547, \) elongation negative.

The mineral occurs in the Korshunov iron-ore deposit, Irkutsk region, in a drill core from depth 770 meters as veinlets 1-2 mm wide, in dolomitic marble, also containing the chloro-borates ekaterinite and shabynite.

The name is for the locality. Type material is at the Fersman Mineralogical Museum, Acad. Sci. USSR, Moscow. M.F.
Rebulite


Chemical analyses (AAS and EMS respectively) gave Tl 32.41, 32.76; Tb 21.90, 22.88; As 20.00, 20.46; S-, 24.33; sum = −, 100.43%, which is interpreted as Tl5Sb5As2S22.

Rebulite is dark gray with metallic luster, brownish red streak. D (meas.) 4.81, D (calc.) 4.40. Crystals exhibit the forms {100}, {001} and {111}. Single crystal X-ray study showed rebulite to be monoclinic, space group P21/c, with a = 17.44 Å, b = 7.36, c = 32.02 Å, β = 105.03°, Z = 4. No powder data are given. Rebulite is associated with small, light-red crystals of TlHgAs3S6 and TlHgAs5S12 at Allchar, Macedonia, Yugoslavia.

Discussion

The publication of the name of a species whose full description has not been published, and which was not submitted to the IMA for approval, is regrettable. P.J.D.

Shafranovskite*


Analysis by N.A.M. gave SiO2 47.52, TiO2 0.12, Al2O3 0.39, Fe2O3 1.85, (1.70), FeO 6.10 (6.00), MnO 14.50, (14.17), MgO 0.34, CaO 0.61, Na2O 10.24, K2O 7.82, H2O 9.78, sum 99.27%. The figures in parentheses are from partial analysis of the same sample by M. E. Kazakova. This corresponds to the formula (Na3.65,K1.82,Ca0.12,Mn2.58)Si6O24·6H2O, or ideally, VOs,6·6H2O. A. Livingstone (1982) Stanleyite, a new vanadium sulphate mineral from Peru. Mineral. Mag., 45, 163–166.

The X-ray pattern was indexed by analogy to that of the synthetic compound K3Li2Ta2O5 and orthorhombic with a = 17.25, b = 17.73, c = 3.95 Å, Z = 1, D calc. 6.90. The strongest lines (45 given) are 6.15(220), 3.95(10)(001,240); 3.47(150); 3.03(9)(350,530); 2.79(5)(260); 1.97(46)(002,248).

The mineral is colorless, luster adamantine. No cleavage. Microhardness 800–860 kg/sq.mm at 20 g load. Strongly anisotropic and birefringent. Reflectances (max. and min.): 486 nm, 13.5, 12.8, 589, 13.3, 12.3; 656, 11.3, 11.3%. In cathode rays, luminesces weak blue.

The mineral occurs in granitic pegmatites, Kola Peninsula, as acicular crystals up to 0.1 mm long in microlite and in cessebitantite and along grain boundaries of these minerals with simpsonite and stibiotantalite.

The name is for the Russian mineralogist A. F. Sosedko (1901–1957). Type material is in the Fersman Mineralogical Museum, Acad. Sci. USSR, Moscow, and in its Kola Branch, Apatite. M.F.

Sosedkoite*


Microprobe analysis (standards lorenzenite, wadeite, diopside, pyrope, hematite, synthetic Ta2O5, Nb2O5, PbO, and PbSe) gave Ta2O5 91.25, Nb2O5 2.71, Ta2O5 0.47, Al2O3 1.96, CaO 0.10, Na2O 1.15, K2O 2.79, sum 100.43% corresponding to (K3.06Na8.55C8.00)6.00(Al5.92Ta20.65Nb2.03Sn0.14)21.62O60, or (K,Na)5Al2(Ta,Nb)2O60. Li is less than 0.1% by atomic absorption analysis.

The X-ray pattern was indexed by analogy to that of the synthetic compound K3Li2Ta2O5, as orthorhombic with a = 17.25, b = 17.73, c = 3.95 Å, Z = 1, D calc. 6.90. The strongest lines (45 given) are 6.15(220), 3.95(10)(001,240); 3.47(150); 3.03(9)(350,530); 2.79(5)(260); 1.97(46)(002,248).

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Discussion

It is hard to see how K12Li4Ta2O5 and (K,Na)5Al2Ta22O60 can be indexed on the same basis. M.F.

Stanleyite*


The average of 9 microprobe analyses yields: V2O5 36.6, SO3 34.7, SiO2 0.4, Al2O3 0.3, TiO2 0.1, FeO 0.3, MgO 0.2, NiO 0.4, CaO 0.1, K2O 0.5, Cl 0.1, sum = 73.7%, with H2O (determined by TGA) = 3.0%. These results, normalized on the basis of directly determined SO3 and H2O values (due to H2O volatilization during microprobe analysis) yield a calculated formula V5(10)(001)5SO9.99O3·5.78H2O, or ideally, VOSO4·6H2O.

X-ray powder data (31 lines given) are indexed on an orthorhombic cell with a = 12.12, b = 9.71, and c = 14.92 Å, V = 1755.843 with Z = 8. The strongest lines in the powder diffraction pattern are: 4.98(90)(003), 4.69(80)(202), 4.41(60)(013), 4.20(100)(212), 3.81(60)(220), 3.73(60)(310), 0.04.

Stanleyite is blue and occurs as 1.5 mm fragments or efflores-
NEW MINERAL NAMES

**Vozhminite**


Microprobe analyses (standards metallic Ni, Co, Fe, As, and Sb and analyzed pyrite and troilite) of 22 points in 2 samples gave (range and average) Ni 48.9-57.1, 52.7; Co 1.78-9.09, 5.56; Fe 0.01-0.36, 0.05; Sb 10.8-11.9, 11.3; As 12.8-13.4, 13.1; S 15.5-17.4, 16.8; sum 98.13-100.35, 99.51Vo, corresponding to (Ni₃.₃₃Co₆.₆₇) (As₆.₆₇Sb₆.₃₃)S₆ or (Ni,Co)₃(As,Sb)₆S₆.

The X-ray pattern was indexed on a hexagonal cell with a = 17.46±0.04, c = 7.20±0.01Å, Z = 18, D calc. = 6.2. The strongest lines (FeKα radiation, 40 lines given) are 8.7(10)(120), 3.07(9)(3032), 2.717(6)(5560), 2.303(7)(6170), 2.111(9)(2242), 1.776(10)(8190).

Color yellowish with a brown tint, streak black, luster metallic. In reflected light rose-orange color. Reflectances, Re and Rα, resp.; 460 nm, 45.0, 39.2; 540 nm, 50.9, 47.5; 640 nm, 55.0, 52.8; 720 nm, 57.7, 54.6%. Microhardness (load 100 g) 240-300, av. 270 to 348-480, av. 436 kg/sq.mm, depending on the orientation. One distinct cleavage was noted.

The mineral occurs in serpentinites of the Vozhmin massif, N. E. Karelia, in heazlewoodite ore, associated also with tucelite, magnetite, geversite, and native Cu.

The name is for the locality. Type material is at the Museum of the Leningrad Mining Institute. M.F.

**Unnamed Mg₂TiO₄**


Electron microprobe analysis yielded TiO₂ 38.58, Al₂O₃ 2.75, FeO 6.26, Fe₂O₃ 11.82, MnO 0.41 MgO 39.09, CaO 0.31, sum = 99.21%, with Fe²⁺ and Fe³⁺ apportioned on the basis of spinel stoichiometry. This corresponds to ~86% of the Mg₂TiO₄ end member. This is the Mg analogue of ulvöspinel.

This phase occurs as <0.1 mm opaque, black grains, the size of which precluded determination of optical and physical properties. The mineral occurs in a thermally metamorphosed limestone in east Greenland, and is associated with calcite, forsterite, periclase, spinel and geikelite. P.J.D.

**Unnamed Ni₅S (Sn,Te,Sb)**


Electron microprobe analysis of an inclusion in heazlewoodite yielded: Ni 51.3, Fe 0.7, Co 0.1, Cu 2.7, Sn 14.3, As nil, Sb 7.1, Te 12.3, S 7.9, sum = 96.4%. This gives the formula (Ni₃.₇₆Fe₆.₆₅Co₆.₆₁Cu₀.₃⁰) (Sn₆.₅₂Te₆.₅₁Sb₆.₂⁵)S₆. Its gray color and extreme anisotropy are close to mackinawite. P.J.D.

**Unnamed CaFCl**


Fluorite crystals from the Tury Auz Mo-W deposit, northern Caucasus, contain inclusions containing brine (mostly CaCl₂, NaCl, KCl, FeCl₂) and also solid inclusions of a colorless, birefringent mineral up to 0.12 mm in diameter, which was separated by means of a steel needle. Its X-ray pattern corresponded to that of synthetic CaFCl (ASTM no. 24-186). The strongest lines (24 given) are 2.75(5), 2.57(10), 2.14(5), 1.94(4), 1.56(5), 1.55(5). The material is unstable in air, leaving a residue of fluorite.

Synthetic CaFCl is tetragonal, isostructural with matlockite, P4/nmm, a = 3.891, c = 6.823Å, Z = 2, D 3.039 (calc.). M.F.