NEW MINERAL NAMES

Iron-alabandite

PAUL RAMDOHR. Eisenalabandin, ein merkwürdiger natürlicher Hochtemperatur-
(1957).

The mineral is cubic, with perfect cubic cleavage, and has the halite structure with
a₀ = 5.15 Å. It appears to be a solid solution, (Mn, Fe)S, with Mn slightly predominant over
Fe. It resembles tetrahedrite in polished section, but is harder. It was found in pyrrhotite in
the wollastonite-bearing phonolite quarry at Fohberg near Oberschafhausen, Kaiserstuhl,
Germany. Chalcopyrite and a little sphalerite were associated minerals. It was also found
with pyrrhotite in the native iron from the basalt at Bühl, Germany. The composition is
close to the limit of solubility of FeS in MnS.

Michael Fleischer

Sborgite

CURZIO CIPRIANI. Un nuovo minerale fra i prodotti boriferi di Larderello. Atti accad. nazl.
Lincei, Rend. classe sci. fis., mat. e nat. 22, 519-525 (1957).

Two analyses are given of incrustations formed in 1930 and in 1948 at the well-known
sofioni in Tuscany. They contain mainly Na₂SO₄ plus sodium borates, but the ratios Na₂O :
B₂O₃ (after deducting Na₂SO₄) were 1:3.17 and 1:3.81, indicating the presence of a borate
other than borax. X-ray powder data of the mixture, after deducting the lines of thenardite
and borax, agreed with the pattern of the well-known synthetic compound NaB₂O₄·5H₂O.

Synthetic crystals had G. 1.713 and were optically biaxial, positive, with α 1.431, β 1.438, 2V 35°, γ 1.507 (calcd.). Grains isolated from the crusts had α' 1.435, γ' 1.450-
1.460. Unindexed x-ray powder data are given for the synthetic compound; the strongest
lines are 4.60 (100), 3.30 (77), 3.20 (76), 2.572 (39), 3.56 (38), 3.54 (36), 6.88 (36).

Solubility data on the compound and on thenardite indicate that the temperature of
formation was between 32° and 60°.

The name is for Umberto Sborgi (1883-1955), Italian chemist, who published solu-

bility data on the system Na₂O-B₂O₃·H₂O.

M. F.

Uranium minerals from U.S.S.R.

Two Russian monographs on uranium minerals have become available recently: M. V.
Soboleva and I. A. Pudovkina (S. and P.), Mineraly Urana, Spravochnik (Uranium
Minerals Handbook), Moscow, 1957, 404 pp., and R. V. Getseva and K. T. Savel’eva
(G. and S.), Rukovodstvo po opredelenii uranovykh mineralov (Handbook for the determi-
nation of uranium minerals), Moscow, 1956, 260 pp. The following information is from
these books; most of the minerals were listed without any information except formula in

It is worthy of note that no locality names are given in either book. Nor are any refer-
ences given to the original descriptions.


Analyses by P. N. Dorofeev gave TiO₂ 59.12, 50.00; FeO 14.0, —; Fe₂O₃ 11.00, 32.96;
Cr₂O₃ 1.2, 8; Al₂O₃ 0.2, —; rare earths 11.58, n.d.; ThO₂ 0.16, 0.20; UO₂ 2.61, —; PbO
0.20, 0.21; V₂O₅ 0.37, —; SiO₂ 1.2, 0.3; sum 101.64%, —. A semiquantitative spectral analy-
sis gave also Zn 0.8, Zr 0.05—0.1, Nb, Ta none, Mn 0.8, Cu 1.0, K 1.0, La 2.5, Ce 3.5,
Y 1.3, and less Pr, Nd, Gd, Dy.
The formula deduced is 20FeO·8Fe2O3·4TiO2·UO2·74TiO2. The mineral is slightly soluble in H2SO4. Fusible with KOH or KHSO4. The DTA curve shows a broad endothermic effect near 200° and an exothermic effect at 530–670°.

Color black with brownish tint, luster resinous. G. 4.33 (pycnometer), hardness 6.6–7.2. Non-magnetic. Fracture conchoidal. Optically isotropic, translucent only in fine splinters, n (melts) 2.11, but 2.16 after being heated at 800°. Reflecting power 19–21, somewhat less in altered material.

An unindexed x-ray pattern is given of material heated at 700°. The strongest lines are 1.452 (10), 1.616 (9), 2.892 (7), 2.772 (6), 2.272 (M. F.) (6), 1.821 (6).

Ufertite is known from one locality where it occurs in irregular masses and elongated crystals in biotite-gneisses and quartz-biotite schists, cut by veins of albite. It is associated with albite, sericite, calcite, hematite, and sulfides. Discovered by N. I. Balashov (S. and P.), by P. V. Veinerman and N. P. Balazhev in 1950 (G. and S.).

Discussion.—This appears to be a variety of davidite. The x-ray pattern is close to, but differs slightly from the variable patterns given by others for davidite.

Iriginite

Chemical analysis by V. A. Iskuyl, 1951, gave MoO3 38.62, UO3 41.91, UO2 none, CaO 0.46, loss on ignition 9.7, insol. 9.04, sum 99.73%, corresponding to UO2·2MoO4·4H2O. The formula is given by G. and S. as U5+(MoO4)(OH)4·4H2O.

The mineral occurs as very fine-grained dense yellow aggregates, sometimes forming pseudomorphs after brannerite. Luster dull. Hardness 4–5. G. 3.84. Fracture conchoidal to uneven. Indices of refraction, α 1.82, γ 1.93, birefringence very high. Gives a sharp x-ray pattern (57 lines are given) with strongest lines 3.222 (10), 1.129 (8), 2.625 (6), 2.142 (6), 1.836 (6), 1.249 (6), 1.206 (6), 1.188 (6), 1.165 (6), 6.390 (5), 1.693 (5), 1.533 (5). It is monoclinic according to G. and S.

The mineral was found by G. Yu. Epshtein in 1951, studied by Yu. V. Kazitsyn in 1954. It occurs in one deposit in granulated albite, associated with brannerite and with other U-Mo minerals. One of the latter occurs in yellow-green radial aggregates, weakly pleochroic, α 1.775, birefringence high, extinction parallel, H. 1–2.

Lermontovite

Analysis by A. Ya. Sheskolskaya, 1952, gave P2O5 20.40, UO3 14.53, UO2 36.53, CaO 1.00, R2O5 (apparently rare earth oxides M. F.) 1.67, SiO2 2.38, F none, sum 85.03%. The sample contained admixed molybdenum sulfate. G. and S. give the same analysis and also TeO (ThO2 M. F.) 1.55, sum 86.61% (adds to 86.58 M. F.).

Assuming quadrivalent uranium, the formula is given as (U, Ca, TR)3eOr4·6H2O.


Occurs under sharply reducing conditions in the zone of cementation of hydrothermal deposits, associated with molybdenum sulfate, marcasite, hydrous silicates, and “thallium ocher.”
NEW MINERAL NAMES

The mineral was first described by V. G. Melkov in 1952.

**Discussion.**—Needs further study.

Lodochnikite


Analysis by A. P. Bocherov, 1948, gave TiO$_2$ 42.05, UO$_2$ 35.41, UO$_2$ 16.45, ThO$_2$ 3.96, (Nb, Ta)$_2$O$_5$ 0.14, CaO none, MgO 0.68, Pbo 0.13, Fe$_2$O$_3$ 0.25, Al$_2$O$_3$ 0.12, SiO$_2$ 0.21, H$_2$O 0.04, loss on ignition 0.55, CO$_2$ 0.12 (G. and S. give S 0.12 instead), sum 100.11%, corresponding to 2(U, Th)O$_2$·3UO$_2$·14TiO$_2$. Difficulty soluble in HCl and HNO$_3$, slightly soluble in H$_2$SO$_4$, readily fusible with KHSO$_4$.

The mineral is black, with strong resinous luster. Opaque except in thin splinters. Streak black, slightly brownish. n (melts) = 2.16, after being heated, n = 2.19. Reflecting power 19%. Fracture conchoidal. Hardness 5–6. G. (pycnometric) 5.48, after being heated at 800° the mineral has G. 5.55. (The table of analytical data gives G. 5.88 M. F.) A DTA curve gave a sharp exothermal effect at 620–650°, and weak endothermal effects at about 700° and 860°.

X-ray powder data are given for material heated one hour at 900–1000°. The strongest lines are 2.017 (7), 1.979 (7), 1.650 (7), 2.419 (6), 3.079 (5), 1.749 (5); 34 others are given.

Lodochnikite was discovered by Ya. D. Gotman in 1948 as veinlets in nepheline-microcline-muscovite rock, the veins also containing barite, siderite, hematite, and calcite.

The name is for the Soviet petrographer V. N. Lodochnikov.

Moluranite


Analysis by V. A. Iskuyl, 1951, gave MoO$_3$ 37.5, U$_2$O$_5$ 42.32, SiO$_2$ 4.56, H$_2$O 15.4, sum 99.78% (U$_6$ and U$_8$ not determined), according to S. and P.; MoO$_3$ 38.50, UO$_2$ 42.32, SiO$_2$ 4.56, loss on ignition 14.03, sum 99.41%, according to G. and S. Formula UO$_2$·2UO$_2$·5MoO$_3$·12H$_2$O (?) (S. and P.), 2UO$_2$·3MoO$_3$·11H$_2$O (?) (G. and S.). When heated to 500°, gives off water, turns yellow, and is transformed into iriginite. "Dissolves very poorly in acids."

Color black, translucent brown in thin fragments. Luster resinous. Hardness 3–4, brittle. Isotropic, n 1.97–1.98 (G. and S.), "approximately 1.79–1.98" (S. and P.) (misprint?). Under x-ray study, it is stated that the mineral has no crystal structure (G. and S.).

Occurs in fine fissures in granulated albitite, associated with molybdenite, chalcopyrite, and galena, which are incrusted on fissures, moluranite forming colloform accumulations in the central part with brannerite and with other U-Mo compounds. Known from one deposit.

The name is from the composition.

Obruchevite

G. and S., 1956, p. 140.

Found by Nefedov in 1941 and referred to ellsworthite. Analysis gave NiO (presumably Na$_2$O) 4.42, K$_2$O 0.48, CaO 2.86, FeO 3.85, SiO$_2$ 1.78, UO$_2$ 5.98, Ce$_2$O$_3$ 0.13, Y$_2$O$_3$
NEW MINERAL NAMES

19.14, TiO₂ 0.40, ThO₂ 0.80, Ta₂O₅ 10.25, Nb₂O₅ (should be Nb₂O₅̄) 10.06, H₂O 8.90, sum 69.05%. (The sum is given as 99.04; presumably either Ta₂O₅ should be 40.25 or Nb₂O₅̄ 40.06% M. F.) The formula is given as 3Na₂O·4(Ca,Fe)O·3Y₂O₃·(U, Th)O₂·5(Ta, Nb)₂O₈·2H₂O.


A rare mineral, found in granitic pegmatites, associated with allanite, garnet, feldspar, and unstudied niobates.

DISCUSSION.—This is evidently a variety of the pyrochlore-microlite group, which has the highest yttrium content yet found in this group.

M. F.

Orlite

S. and P., pp. 129-130; G. and S., p. 239.

Analysis by L. A. Kuznetsova, 1952, gave SiO₂ 12.08, UO₂ 43.57, PbO 0.65, As₂O₅ 0.25, PbO 32.45, CaO 0.76, BeO 0.22, MgO 0.84, Al₂O₃ 2.54, FeO·S 0.80 H₂O 2.97, H₂O+ 2.25, insol. 1.44, sum 100.82%. Of the H₂O+, 1.11% is lost at 200°, 0.85% to 300°, 0.29% to 1000°. The formula is given as 3PbO·3UO₃·4SiO₂·6H₂O. The mineral is soluble in HCl with separation of PbCl₂ and gelatinous silica.


Orlite is known from one locality where it is associated with uranophane and kasolite in the middle horizon of the oxidation zone of uranium deposits in liparite. It was found by V. G. Melkov and A. M. Sergeev in 1951.

The name is for the locality.

DISCUSSION.—Needs further study. Orlite corresponds very closely in composition and physical properties to kasolite, PbO·UO₃·SiO₂·H₂O. The x-ray pattern given for orlite is very close to that given for kasolite by Frondel, Riska, and Frondel, U. S. Geol. Survey Bull. 1036-G (1956), but differs from that given for kasolite by S. and P. The ns given for orlite are very different from those of kasolite.

M. F.

Przhevalskite


Analysis by A. Ya. Sheskol'skaya, 1947, gave P₂O₅ 11.47, UO₂ 46.55, PbO 21.06, H₂O 6.69, Al₂O₃ 3.48, and SiO₂ 4.10, sum 93.35%. (G. and S. omit the Al₂O₃, add "insol. 1.99%" and give also PbO 21.66, but their sum is 0.6% too high.) This gives after deducting meta-halloysite, the formula Pb(UO₂)₂(PO₄)₂·2H₂O. The mineral has been synthesized at pH 4.2. It is readily soluble in acids.

Orthorhombic. G. and S. state that synthetic przhevalskite has the crystal structure of torbernite. The mineral occurs in foliated aggregates of tabular crystals, ranging in size from 0.1 to 1 mm. Cleavage (001), "clearly expressed." Color bright yellow with a faint greenish tint. Luster adamantine, pearly (S. and P.), strong, vitreous (G. and S.). G. and hardness not given. Optically biaxial, negative, with ns α 1.739, β 1.749±0.002, γ 1.752±0.002, γ-α 0.013-0.014, 2V about 30° (S. and P.); α 1.739, β 1.749-1.750, γ 1.752-1.753, 2V medium (G. and S.). Extinction parallel, elongation negative. Pleochroic with X colorless, Y pale yellow, Z deep yellow.

M. F.

The mineral is rare, occurring in the oxidation zone of a pitchblende-sulfide deposit with torbernite, autunite, dumontite, renardite, uranophane, metahalloysite, hydrous oxides of iron and manganese, and wulfenite.

The mineral was first described by V. G. Kruglov in 1946. It was named for N. M. Przhevalsk.

DISCUSSION.—The x-ray pattern differs from those of the other lead uranium phosphates, and the optical data differ from all of these except renardite. The x-ray pattern has some resemblance to those of members of the metatorbernite group.

M. F.

Sogrenite


An organo-uranium complex. Two analyses gave C 18.27, 20.46; H 2.40, 2.32; S not detd., 1.18, ash 59.27, 59.26%. Microchemical analyses of the inorganic part by L. A. Kuznetsova, 1949, gave CaO 7.57, 8.16; MnO 0.09, 0.07, MgO 0.89, 0.30; PbO 0.48, 0.19; Al₂O₃ 12.70, 4.59; Fe₂O₃ 13.48, 2.98; UO₂ 11.80, 19.99; SO₃ 3.42, —; S —, 1.96; SiO₂ 4.01, 1.72; ThO₂ none, none; P₂O₅ 6.27, 13.88; As₂O₃ none, not detd; V₂O₅ none, not detd.; H₂O — ; H₂O⁺ 10.82, 16.70 (total H₂O), ignition loss 19.93, 28.75, sum 97.50, 99.29 (given as 98.75%). Dry distillation gave gases and water 20.8, coke 49.2%, tar none.


In the air tarnishes, cracks, and turns to a brown friable mass. If then moistened, it swells and again shows a strong luster.

Sogrenite was discovered by E. A. Nachaev and A. A. Arsen’ev in 1949. It occurs in ankerite-calcite veins cutting Proterozoic limestones and is associated with chlorite, chaledony, pyrite, sphalerite, and galena.

DISCUSSION.—The editor of the monograph by S. and P. remarks, “Sogrenite, like thucholite and carburan, is not a mineral, but is referred to the series of organic materials adsorbing different inorganic materials.”

M. F.

Ferutite


A note on this name was printed in Am. Mineral. 41, 163–164 (1956); the name applies to the davidite-like mineral from Mozambique described by Bannister and Horne, Mineral. Mag. 29, 101–112 (1950). It is not clear from the data given which measurements are on Mozambique, which on Russian material.

Analysis gave TiO₂ 59.11, UO₂ 6.19, UO₃ 5.24, FeO + Fe₂O₃ 26.00, PbO 3.46, CeO₂ trace, sum 100.00% (recalculated? M. F.). Black with resinous to semi-metallic luster, translucent brown to reddish-brown in thin splinters. Fracture conchoidal. Hardness 5.7–6.1 (absolute microhardness 544–667 kg./mm²). G. 4.46. Isotropic, metamict.

Two x-ray patterns are given of material heated at 1000°; these differ considerably in intensities. The strongest lines of one are 1.687 (10), 2.480 (7), 3.246 (6), 2.885 (6), 2.242 (5), 1.797 (5), 1.124 (5), 1.088 (5).
New mineral names

Ferutite was found in sands containing magnetite, rutile, zircon, apatite, and tourmaline.

The name is for the composition.

Discussion.—Not certainly distinct from davidite.

M. F.

Unnamed Phosphate Analogue of Walpurgite


Qualitative tests showed the presence of Bi, U, PO₄, and H₂O, with traces of Na and K. Decomposed by nitric acid. The mineral is yellow, with vitreous luster, hardness high, brittle. Found as stellate aggregates, up to 1 mm. Extinction nearly parallel, elongation positive, m₁ 1.722 ± 0.002, m₂ 1.783.

The mineral was first described by V. G. Melkov in 1946. It occurs in the near-surface part of the zone of oxidation.

M. F.

Sodium Autunite


Analyses of 2 samples by O. V. K. and V. I. Litenskov gave UO₃ 61.9, 62.53; P₂O₅ 15.56, 14.69; Na₂O 5.62, 6.88; CaO 1.2, 0.14; MgO 0.43,—; SiO₂ 1.6,—; CO₂ 0.24,—; Al₂O₃ 0.32,—; Fe₂O₃ 0.97,—; H₂O 9.02,—; H₂O⁺ 4.05, 14.84 (total H₂O), sum 100.91, 99.08%. These give the ratios UO₃:P₂O₅:Na₂O:CaO·H₂O = 1.91:1.00:1.02:6.66 and 2.1:1.06:7.9. The mineral is readily soluble in acids. Gives off water in the closed tube, turning straw-yellow and porous.

The mineral occurs in lemon-yellow and lettuce-yellow plates with perfect cleavage on (001) and a less perfect one on (100). Sometimes in foliated and radiating masses. Brittle, hardness 2–2½. G. 3.584, calcld. for 8H₂O 3.89. Luster pearly on (001), vitreous on other faces. Luminesces strongly in yellow-green under ultra-violet light. Fresh crystals are uniaxial, neg., with nₘ 1.578, ε 1.559, pleochroism weak, O light yellow, E pale yellow. After two days exposure at 35–40°, the nₘ were ε 1.585, ε 1.564.

X-ray study showed the mineral to be tetragonal, P4/nmm, with a 6.97, ε 8.69Å, c/a = 1.245; the unit cell contains Na₂ (UO₃)₂(P₂O₅)₂·8H₂O. Data are also given for synthetic calcium- and H-autunites. Indexed x-ray powder data are given; the strongest lines are 3.67 (10), 2.675 (8), 1.566, 1.540 (8, broad), 3.23 (7), 1.639 (7), 1.364 (7).

The mineral occurs "in one of the granodiorite massifs of the U.S.S.R." A member of the meta-autunite group, well known as a synthetic compound (Fairchild, Am. Mineral. 14, 7–8 (1929)).

M. F.

Sodium uranospinite


Microchemical analysis gave UO₃ 58.29, P₂O₅ 20.84, CaO 1.87, MgO trace, Na₂O 3.91, K₂O none, SiO₂ 2.39, Al₂O₃ 0.91, H₂O⁺ 3.49, H₂O⁻ 6.00, sum 99.92%. Spectrographic analysis showed small amounts of Pb, Zn, Mo, Cu, Zr, and Mn. The analysis corresponds to UO₃:As₂O₃·P₂O₅·Na₂O·CaO·H₂O = 2.0:1.0:0.97:5.2, with Na₂O:CaO = 2:1. The mineral dissolves readily in dilute acids or in Na₂CO₃ solution. A D.T.A. curve shows a strong endothermal effect at about 200°.
The mineral occurs in fine, tabular to elongated crystals with lengths up to 1.5-2 cm., as radial fibrous aggregates, and as square crystals pseudomorphous after metazeunerite (sometimes with a core of metazeunerite). Crystal faces are corroded and could not be measured. Color yellow-green to lemon- and straw-yellow. Luster vitreous, pearly on (001). Cleavage (001) perfect, (010) and (100) distinct. Hardness 2½. G. (pycnometer) 3.846. Optically anomalously biaxial, neg., 2V very small, with ns α 1.585, γ 1.612. Sometimes weakly pleochroic with X colorless, Y and Z yellowish. Luminiscence strongly yellow-green in ultra-violet light. X-ray study shows the mineral to be tetragonal with a0=7.12, c0=8.61 (not stated whether A. or KX), c/a=1.2092. Unindexed x-ray powder data are given and compared with those of Mrose. The strongest lines are 8.48 (10), 3.68 (10), 3.292 (9), 1.837 (9), 1.987 (8), 1.634 (8), 5.45 (7), 2.673 (7).

The mineral occurs in the oxidation zone of a primary hydrothermal deposit containing pitchblende, arsenopyrite, pyrite, and galena in carbonatized Devonian felsite-porphyry and tufaceous breccia. Oxidation caused the formation of realgar, orpiment, scorodite, mansfieldite, metazeunerite, troegerite, and arseniosiderite. Sodium uranospinite is the most abundant secondary U mineral. It is sometimes replaced by uranophane. Arseniosiderite forms pseudomorphs after the uranium micas. The locality is not given, as usual.

A member of the meta-autunite group, known as a synthetic compound (Mrose, *Am. Mineral.* 36, 322 (1951), 38, 1157 (1953)).

M. F.

**NEW DATA**

**Anthoinite**


Anthoinite was described in 1947 as Al₂O₃·2WO₃·3H₂O (*Am. Mineral.* 33, 385 (1948)). Study of type material shows it to be a valid mineral. Electron microscope pictures show tabular crystals up to 3 microns in size. Birefringence was noted under high magnification, n 1.81–1.82. A D.T.A. curve shows a large endothermic reaction at 515°, a large and sharp exothermic reaction at 620°, and a small exothermic reaction at 820°. The powder pattern has many lines, including strong ones (in A.) at 4.195, 3.070, 3.052, medium ones at 5.66, 3.979, 1.936, 1.862. These could not be indexed on an orthorhombic cell, but were indexed, not entirely satisfactorily, as monoclinic, with a0 9.33, b0 8.17, c0 13.68 Å, beta 95° 40'. The mineral may be triclinic.

M. F.

**Scarbroite**


Scarbroite was described by Vernon (*Phil. Mag.* 5, 178 (1829)) as a soft white material with G. 1.48 containing Al₂O₃ 42.75, SiO₂ 7.90, H₂O 48.55, Fe₂O₃ 0.80%. It has since been generally considered to be a mixture of clays with an aluminum oxide. Material from vertical fissures in sandstone at South Bay, Scarborough, was re-examined. It is white, compact, fine-grained, and quite soft. Spectrographic analysis shows aluminum and silicon (the latter shown by x-ray to be present largely as quartz) and only traces of other elements. G. approx. 1.85, mean n 1.509. The x-ray patterns are slightly variable and somewhat diffuse. The strongest lines are 8.64 (10) (broad), 4.32 (8), 1.430 (8) (broad), 6.52 (7), 5.97 (7), 4.72 (7), 3.71 (7), 2.219 (7), 1.450 (7), 8.30 (6), 5.00 (6), 4.44 (6), 4.29 (6), 3.48 (6), 2.816 (6), 2.443 (6), 2.360 (6); 27 other lines are given. The pattern is tentatively indexed with a
hexagonal cell with $a_0=34.5$, $c_0=17.3$ Å, the 8.74 Å line being 0002. Heating to 120° for 2 days or dehydration over $P_2O_5$ changed the pattern slightly, probably due to a small reduction in c. On heating to 130–140° a different pattern is obtained which is indexed as hexagonal, with $a_0=31.0$, $c_0=12.8$ Å. Further heating causes the $x$-ray reflections to become more diffuse and fainter, and the $c$-axis shrinks to 11.3 Å at 228°. Heating at higher temperatures breaks down the structure completely, no $x$-ray pattern being obtained up to 900°, where a diffuse pattern of gamma-$Al_2O_3$ was obtained.

Further work on this apparently new aluminum oxide hydrate is in progress.

**Kettnerite**


Additional data (see *Am. Mineral.* 42, 121 (1957)) are given. Microchemical analysis on about 0.1 g. gave Bi$_2$O$_3$ 67.9, CaO 8.3, CaF$_2$ 10.6, CO$_2$ 12.6, H$_2$O 0.5, sum 99.9%, corresponding to (CaF)(BiO)CO$_3$. Spectrographic analysis showed very little Pb, and traces of Al, Cu, Fe, Mg, Mn, and Si. Rotation and Weissenberg photographs gave space group $P4/nmm$, $a_0$ 3.79±0.02, $c_0$ 13.59±0.03 Å, $c_0/a_0$ 3.59, $c/a$ (goniometric) 3.57. The mineral occurs as 0.2–0.3 mm. plates on quartz or fluorite. The forms [001] (predominant), [111], and [10-10] were observed. Hardness “not too high.” Optically uniaxial negative, or biaxial with very small optical angle, $n_0=2.05$. The strongest $x$-ray lines and intensities are 2.89 70, 1.732 9, 1.589 9, 1.893 8, 2.104 7, 1.278 6; 16 other lines are given. The mineral is closely related to bismutite (BiO)$_r$CO$_r$ and beyerite, Ca(BiO)$_r$(CO$_r$)$_2$.

**Häggite**


Black crystals separated from a drill core in sandstone from Carlile, Wyoming, gave $x$-ray patterns corresponding to two minerals, one closely related to doloresite, the second a new mineral. It is monoclinic, space group $C_{2h}-C2/m$, $a_0=12.17±0.05$, $b_0=2.99±0.01$, $c_0=4.83±0.02$ Å, $\beta=98° 15'±5'$. The unit cell contains $H_2V_2O_6$, as deduced from the structure (no chemical analysis). The formula may be written $V_5O_{9+}V_2O_4$·$3H_2O$ or $V_5O_8$ (OH)$_4$.

The name is for Professor Gunnar Hägg, University of Uppsala, Sweden.

**Frolovite**


The mineral occurs in limestones of Middle Devonian age in the Novo-Frolovsk contact-metasomatic copper deposits, Tur'insk region, northern Urals. It is associated with calciborite (*Am. Mineral.* 41, 815 (1956)), calcite, garnet, and magnetite, and replaces calciborite.

The color is white with a grayish tent, luster dull, translucent in fine splinters. Hardness 3.5, brittle. G. 2.14, Luminescences violet in cathode rays (calciborite luminesces green). Optically biaxial, positive, $n_0$ alpha 1.572, gamma 1.586, both ±0.003, 2V about 75°, birefringence 0.014. Extinction sometimes undulatory.

Analysis by T. A. Zvereva gave $B_2O_3$ 34.20, CaO 28.70, MgO 0.72, H$_2$O (cryst.) 32.90,
SO$_3$ 1.78, Fe$_2$O$_3$ 0.10, SiO$_2$ 0.57, sum 99.03\%, which corresponds, after deducting about 3% gypsum, to Ca$_2$B$_2$O$_7$·2.5H$_2$O. Spectrographic analysis showed also about 0.1\% As, Zn, Sr, and about 0.01\% Mn, Ti, Nb, Cu, P, V, Yb. The mineral is insoluble in water, easily soluble in warm acids. A DTA curve showed an endothermal effect at 190°, corresponding to the loss of water of crystallization.

Unindexed x-ray powder data by G. A. Sidorenko are given. The strongest lines and intensities (A., K\(\alpha\)) are 6.084 (10), 3.858 (9), 3.471 (8), 2.357 (8), 2.522 (7), 2.330 (7), 2.654 (6), 2.036 (6); 15 additional lines are given.

The name is for the locality.

**DISCUSSION**

Petrova does not mention that J. H. van't Hoff synthesized some fifty years ago two distinct modifications of Ca$_2$B$_2$O$_7$·4H$_2$O. The x-ray powder data given are close to those found in the laboratory of the U. S. Geological Survey on a sample synthesized at 70° by Dr. W. T. Schaller, which corresponds to van't Hoff's $\beta$—Ca$_2$B$_2$O$_7$·4H$_2$O. Dr. Schaller informs me (private communication), that he measured alpha 1.563, beta 1.572, gamma 1.586, 2V 70°, birefringence 0.023. This suggests that Petrova's alpha was really the beta index.

The mineral is not close to any known and probably belongs in Class 25 of Dana's System, 7th Ed., Vol. II, near pinnoite.

**Smirnovskite**


The mineral occurs in cassiterite-feldspar-quartz veins of the Etykinsk deposits, eastern Transbaikalia, in two distinct generations, associated with quartz, amazonite, topaz, zinnwaldite, fluorite, and especially with cassiterite.

Two complete and two partial chemical analyses are given:

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<td>H$_2$O$^+$</td>
<td>6.87(b)</td>
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<tr>
<td>U$_3$O$_8$</td>
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<td>103.39(c)</td>
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- (O = 2F)  
  2.09  | 1.41  
  101.30 | 100.00 

G.  
4.68
NEW MINERAL NAMES

Analyst T. L. Pokrovskaya L. B. Tumilovich T. L. P. A. Y. Sheskolk skaya
Color Dirty-brown Mixed Dirty-brown Pale Brown

(a) Presumably TR₂O₃. (b) Penfield method. Another method gave 5.40 (c) Given as 102.39.

These give (Th, Ca, Ce)(P, Si, Al)(OH)(O, OH, F)₄ with P:Si = 66:29 in No. 1 and 37:47 in analysis 2. These are compared with the analyses of aeurlite (Dana's System, 6th Ed., p. 489, 1027); smirnovskite differs in the higher content of P₂O₅, rare earths, and F. Spectrographic analyses showed also Ba, Pb, As, Mn, Sn, and Sr.

The mineral occurs in square to diamond-shaped (in cross-section) crystals up to 1.5 cm. in diameter. The color is mostly reddish- to dirty-brown, also orange, yellow, colorless Luster greasy, fracture conchoidal, hardness near 5. G. 4.68 (dirty-brown). Mostly isotropic with n 1.702–1.718 (brown or red), 1.685 (colorless); anisotropic reddish-brown material had ns 1.678, 1.682 and were uniaxial positive. The birefringence of some crystals was up to 0.015.

A D.T.A. curve shows an endothermic effect at 100–280° and a small exothermic effect at 600–700°.

The mineral is metamict, giving only a few diffuse lines. When the mineral was heated at 800° for 4 hours, it gave good pattern of thorite with a₀ 5.56Å. A similar mineral is noted from pegmatites of eastern Kazakhstan. It is uniaxial, positive, n 1.664, birefringence 0.018. It contains no rare earths.

The name is for the late Sergi S. Smirnow.

DISCUSSION

This is apparently a phosphate-rich metamict thorite or thorogummite. The differences from aeurlite do not seem to me to be sufficient to justify a new name.

M. F.

Jagoite


Jagoite is a rare mineral found around 1943 in hematite ore in the “Camberra” stope. It occurs as fine-grained micaceous aggregates of plates, commonly surrounded by a zone of black melanotekite. Other associated minerals are quartz and an unidentified mineral.

Analysis (by R. B) gave SiO₂ 22.35, BeO 0.12, Al₂O₃ 0.50, Fe₂O₃ 7.00, TiO₂ 0.10, MgO 0.60, FeO none, MnO 0.88, CaO 0.65, PbO 64.26, Na₂O 0.61, K₂O 0.37, Cl 3.25, H₂O⁺ 0.17, H₂O⁻ 0.19, F none, active O none, sum 101.05 = (O = Cl₂) 0.73, 100.32%. This corresponds to (Pb, Ca, Mn, Na, K)₂₆(Fe, Al, Mg)₂₆(Si, Al, Be)₂₆O₄(OH, Cl)₈.

Jagoite is yellow-green, streak yellow. Luster vitreous, shining on cleavage surfaces. H. 3, G. 5.43. Non-fluorescent in ultra-violet light. The mineral is optically uniaxial, negative, refringence around 2.0, birefringence 0.025. Non-pleochroic.

Laue photographs show jagoite to be trigonal. Oscillation, rotation, and equi-inclination photographs were of poor quality because the plates of jagoite are easily deformed. The hexagonal unit cell has a₀ = 8.65 ± 0.03, c₀ = 33.5 ± 0.1 Å, possible space groups P3 and P3. Cleavage (0001) perfect. Unindexed x-ray powder data are given; the strongest lines are 3.40 (10), 2.80 (8), 4.16 (5), 2.99 (5), 2.50 (4).

The name is for John B. Jago, mineral collector, of San Francisco.

M. F.