NEW MINERAL NAMES*

FRANK C. HAWTHORNE, MICHAEL FLEISCHER, EDWARD S. GREW, JOEL D. GRICE, JOHN L. JAMBOR, JACEK PUZIEWICZ, ANDREW C. ROBERTS, DAVID A. VANKO, JANET A. ZILCZER

Bastnaesite group minerals


Electron-microprobe analyses are given of secondary phosphates from the lower parts of karstic bauxites from Hungary and Yugoslavia, including bastnaesite-(Ce), bastnaesite-(La), synchysite-(Nd), monazite-(Nd) (see Am. Mineral., 68, 849), neodymian goyazite, and two new members of the bastnaesite group. The minerals occur as fine-grained fracture fillings. The analyses of hydroxyl-bastnaesite-(La) and hydroxyl-bastnaesite-(Nd) yield the following calculated formulas (CO₂ and H₂O calculated, not determined).

\[
\begin{align*}
\text{La}_{0.35} & \text{Ce}_{0.01} \text{Pr}_{0.01} \text{Nd}_{0.07} \text{Sm}_{0.06} \text{Eu}_{0.00} \text{Gd}_{0.09} \text{Ca}_{0.09} \cdot \text{CO}_2 \cdot \text{H}_2\text{O} \cdot \text{OH} \cdot \text{CO}_3 \\
\text{La}_{0.30} & \text{Ce}_{0.20} \text{Pr}_{0.01} \text{Nd}_{0.07} \text{Sm}_{0.05} \text{Eu}_{0.00} \text{Gd}_{0.03} \text{Dy}_{0.00} \text{Er}_{0.00} \text{Y}_{0.00} \text{Ca}_{0.03} \cdot \text{CO}_3 \cdot \text{OH} \\
\text{La}_{0.35} & \text{Ce}_{0.20} \text{Pr}_{0.01} \text{Nd}_{0.07} \text{Sm}_{0.06} \text{Eu}_{0.00} \text{Gd}_{0.03} \text{Dy}_{0.00} \text{Er}_{0.00} \text{Y}_{0.00} \text{Ca}_{0.03} \cdot \text{CO}_3 \cdot \text{OH} \\
\end{align*}
\]

Discussion. The new varieties are referred to as bastnaesite-(Nd), and bastnaesite-(La) in one place, and as hydroxyl-bastnaesite in another, within the paper. With the calculated values of CO₂ and H₂O, the first-given formula corresponds to hydroxyl-bastnaesite-(La), and the remaining three to hydroxyl-bastnaesite-(Nd). Complete analyses, X-ray data, and physical properties are needed to validate these as species. M.F.

Cuprorhidsite*


Analysis of the mineral (one of ten given) by electron microprobe gave Rh 39.6, Ir 10.3, Pt 6.8, Cu 7.55, Fe 5.31, S 29.8, sum 99.36%, corresponding to \((\text{Cu}_{0.51} \text{Fe}_{0.49})(\text{Rh}_{1.66} \text{Ir}_{0.23} \text{Pt}_{0.15})\text{S}_4\). Ideally, CuRh₂S₄. The mineral is not corroded by warm aqua regia.

X-ray study (powder method) shows the mineral to be cubic, space group \(Fd\overline{3}m\), \(a = 9.88(1)\ \AA, Z = 8, D_{calc} = 6.74. The strongest lines (18 given) are 3.00(100)(311); 2.48(70)(400); 1.90(80)(333,511); 1.75(80)(100)(400); 1.00(90)(844).

The mineral occurs as small (to 300 μm) inclusions in angular isoferrplatinum host grains that are, in turn, the result of Pt mineralization within alluvial deposits, found in the Aldan shield and in Kamchatka, eastern USSR. Other associated mineral inclusions are cuprorhodsite, malanite, native Os, iridium, laurite, erlichmanite, cooperite, sperrylite, chalcopyrite, and bornite. No cleavage. Color is iron black, metallic luster, gray in reflected light. Microhardness is 105 ± 140 kg/m², with 30-g load. Very brittle. Reflectances are [nm(%)] 460(35.0–37.5), 480(34.4–37.2), 500(34.0–37.1), 520(34.0–37.1), 540(33.6–37.2), 560(33.4–37.2), 580(33.1–37.5), 600(32.8–37.7), 620(32.6–37.8), 640(32.4–37.8), 660(32.2–37.8), 680(32.1–38.1), 700(32.0–38.4), 720(32.0–38.7), 740(32.0–38.8).

The name is for the chemical composition. Polished thin sections containing the mineral are at the Mining Museum, Leningrad Mining Institute. D.A.V.

* Minerals marked with asterisks were approved before publication by the Commission on New Minerals and Mineral Names of the International Mineralogical Association.

0003–004X/86/0910-1277$02.00

0003–004X/86/0910-1277$02.00

The average of 20 electron-microprobe analyses gave Ag 42.83, Hg 42.64, Zn 13.34, total 98.87%, which yields the empirical formula Ag$_{2.83}$Hg$_{2.65}$Zn$_{1.34}$.

Khatyrkite, *Cupalite,* unnamed ZnAl$_2$, unnamed Zn$_5$Al


The minerals occur in black slick washed from greenish-gray cover weathering from serpentinite, Listvenitovskiy stream, Khatyrskiy ultrabasic zone of the Koriaksko-Kamchatskaya fold area, eastern USSR (Koriakskiy Mts.). They are intimately intergrown, forming hexagonal close packing with Hg linearly co-ordinated and Ag trigonal-planar co-ordinated. The strongest X-ray diffraction lines (23 given) are 4.85(30), 3.45(50), 1.33(30), 2.76(100), 2.76(100), 2.46(80), 1.95(30), 1.45(35). X-ray study (Debye-Scherrer method) shows the mineral to be monoclinic, space group P2/c, a = 4.039(1), b = 8.005(2), c = 6.580(1), R = 0.035 for 552 independent observed reflections. The refined structure yields the empirical formula Ag$_{2.83}$Hg$_{2.65}$Zn$_{1.34}$.

A single-crystal, X-ray diffraction structure analysis shows the mineral to be monoclinic, space group P2$_1$/c, a = 6.95(1), b = 4.42(1), c = 6.95(1), Z = 2, D$_{calc}$ = 8.005(1) g/cm$^3$. The refined structure (R = 0.035 for 552 independent observed reflections) shows S atoms having a distorted hexagonal close packing with Ag linearly co-ordinated and Zn—Ag trigonal-planar co-ordinated. The strongest X-ray diffraction lines (23 given) are 4.85(30), 3.45(50), 1.33(30), 2.76(100), 2.76(100), 2.46(80), 1.95(30), 1.45(35). X-ray study (Debye-Scherrer method) shows the mineral to be monoclinic, space group P2$_1$/c, a = 4.039(1), b = 8.005(2), c = 6.580(1), R = 0.035 for 552 independent observed reflections. The refined structure yields the empirical formula Ag$_{2.83}$Hg$_{2.65}$Zn$_{1.34}$. A single-crystal, X-ray diffraction structure analysis shows the mineral to be monoclinic, space group P2$_1$/c, a = 6.95(1), b = 4.42(1), c = 6.95(1), Z = 2, D$_{calc}$ = 8.005(1) g/cm$^3$. The refined structure (R = 0.035 for 552 independent observed reflections) shows S atoms having a distorted hexagonal close packing with Ag linearly co-ordinated and Zn—Ag trigonal-planar co-ordinated. The strongest X-ray diffraction lines (23 given) are 4.85(30), 3.45(50), 1.33(30), 2.76(100), 2.76(100), 2.46(80), 1.95(30), 1.45(35). X-ray study (Debye-Scherrer method) shows the mineral to be monoclinic, space group P2$_1$/c, a = 4.039(1), b = 8.005(2), c = 6.580(1), R = 0.035 for 552 independent observed reflections. The refined structure yields the empirical formula Ag$_{2.83}$Hg$_{2.65}$Zn$_{1.34}$.

Cupalite

Microprobe analyses (nine grains) gave Cu 59.9-61.7, Al 29.3-30.4, Zn 7.66-9.35, sum 98.61-100.45%, with negative correlation between Cu and Zn, corresponding to (Cu,Zn)Al.

X-ray study (Debye-Scherrer method) showed the mineral to be orthorhombic, space group Cmcm, a = 6.95(1), b = 4.16(1), c = 10.04(1), Z = 10

Kirkiiite*


The average of six electron-microprobe analyses gave Pb 59.4, Bi 15.2, Sb 0.5, As 6.2, S 17.4, sum 98.7%, which yields the empirical formula Pb$_{59.4}$Bi$_{15.2}$Sb$_{0.5}$As$_{6.2}$S$_{17.4}$.
Philipsburgite*


Microprobe and TGA-EG analysis gave CuO 46.3, ZnO 18.2, $P_{21}$, $O_{4} \cdot 8.7$, $As_{2}O_{3}$ 16.3, $H_{2}O$ 9.9, sum 99.4%, corresponding to $Cu_{1.0+Zn_{0.5}As_{0.7}P_{0.3}O_{4} \cdot (OH)_{2} \cdot 4 \cdot 1.16H_{2}O$, or ideally (Cu,Zn)(As$_{0.7}$Po$_{0.3}$)(OH)$_{2}$H$_{2}$O with $Z = 4$. This is the arsenate analogue of kipushite.

X-ray study by precession and Weissenberg methods shows the mineral to be isostructural with kipushite, monoclinic, space group $P2_1/c$, cell dimensions $a = 12.33(8)$, $b = 9.20(4)$, $c = 10.69(3)$ $\AA$, $\beta = 96.92(35)°$. The strongest lines (56 given) are 12.2(80)(100), 4.05(90)(300,121), 3.405(50)(122,311,221), 2.666(60)(412,123,104,032), 2.559(100)(132,114,014).

Morphologically, philipsburgite crystals are slightly curved with chisel-like terminations, elongate on [010] with composite large faces (100) as the dominant form. The mineral commonly occurs as microscopic spherules with crystal terminations providing a rough exterior surface, and as druses varying from sparse to thick (0.5 mm) coatings. It is bright emerald green with a light-green streak, transparent in small crystals but semiopaque in massive aggregates, vitreous luster and no discernible cleavage or parting. It does not fluoresce in ultraviolet light. $H = 3–4$. Not particularly brittle. $D_{\text{calc}}$ (Berman balance, temperature, corrected) 4.07(1) $g/cm^{3}$, $D_{\text{calc}}$ (empirical formula) 4.04 $g/cm^{3}$. Optically biaxial negative, $\alpha = 1.729(2)$, $\beta = 1.774(2)$, $\gamma = 1.775(2)$, $2V_{\rho} = 16(2)°$. Moderate pleochroism: $Y = Z = \text{medium green}, X = \text{pale green}$. Absorption $Y = Z > X$. Dispersion strong, $r > v$; orientation is $b = Z$, $c \wedge Y = 7°$. An anomalous blue interference color is observed when (100) lies in the plane of the microscope stage.

Philipsburgite occurs sparingly in a secondary assemblage of unusual Cu-Pb-Zn arsenates and phosphates from the Black Pine mine, located in the Flint Creek Valley, John Long Mountains, approximately 14.5 km northwest of Philipsburg, Montana. Associated minerals include arthurite, baydonite, duftite, tsunembite, and veselyite as well as more common carbonates, arsenates, phosphates, sulfates, silicates, and antimonates.

The name is for the town of Philipsburg, near which the Black Pine mine is located. Type material is preserved at the Smithsonian Institution (NMNH 161201) and the Royal Ontario Museum (M 41000). A.C.R.

Srebrodolskitel*


Analysis of the mineral gives CaO 41.69, FeO$_{3}$ 56.50, MgO 1.19, MnO 0.90, Al$_{2}$O$_{3}$ not detected, sum 100.28%, corresponding to Ca$_{2+}$Fe$_{2}$Mn$_{3+}$Al$_{2}$O$_{12}$O$_{9}$ (Ti and Be were detected in a laser microspectroscopic analysis). It is soluble in HCl. No thermal effects were observed on the DTA curve (to 1000°C). Fusibility is about 4.5.

The powder pattern corresponds closely to that for synthetic Ca$_{2}$Fe$_{2}$O$_{3}$ and by analogy with the synthetic compound, the mineral was assigned orthorhombic symmetry and space group $Pmmn$; unit cell $a = 7.201(3)$, $b = 14.752(3)$, $c = 5.594(3)$ $\AA$, $V = 447.27$ $\AA^3$, $Z = 4$. The strongest lines (39 given; 0k0 intensities enhanced by preferred orientation) are 7.381(10)(020), 3.690(10)(040), 2.797(6)(002), 2.710(6)(200), 2.676(10)(141), 1.946(7)(202), and 1.844(10)(080).
Srebodolskite occurs in petrified wood baked by burning coal in mines of the town Kopeyska (Chelyabinskiy coal basin in the southern Ural). The baked petrified wood consists of an anhydrite shell enclosing earthy masses of portlandite, carbonates, and aggregates of srebodolskite in grains generally less than 0.1 mm across. Srebodolskite is derived from the calcining of ankerite. The mineral is black in aggregate and its streak is grayish-brown. It transmits brown red in thin slivers. Crystals are platy on (010), cleavage noted on {h0l}. Luster of crystals is adamantine, that of aggregates, metallic. Weakly magnetic. H = 5.5. D = 4.04(1) g/cm³ (pycnometric), 4.03 g/cm³ (calculated from X-ray data). Optically biaxial negative (α), pleochroism weak. Optical properties are hard to measure because mineral is strongly colored brown yellow and brown red; α = 2.24, β = 2.25, γ = 2.27. Faces of the square (010) tablets intersect at angles of about 92°30' and 87°30'; optic plane is perpendicular to (010), and X is parallel to [010] and bisects the larger angle. Not fluorescent in ultraviolet.

The mineral is named in honor of the Soviet Ukrainian mineralogist B. I. Srebodolskiy (born in 1927). Samples are at the A.E. Fersman Mineralogical Museum of the USSR Academy of Sciences, Moscow. E.S.G.

**Turneaureite***


Microprobe analysis (holotype, Långban) gave CaO 43.8, PBO 0.7, MnO 1.9, As₂O₅ 44.9, P₂O₅ 6.1, Cl 3.2, F 1.2, less O = CI, F 1.2, sum 100.6%, corresponding to (Ca₉₋₀₇,Mn₀.₃₂,Pb₀.₀₂)[(As₂O₅)₀.₈₁(PO₄)₀.₁₉]Cl₁₋₀₄ with Z = 2. Similar analyses are reported for Franklin and Balmat localities. The mineral is the CI analogue of sylvite Ca₉⁻₀₇As₂O₅F and johnbaumite Ca₈₋₀₇(As₂O₅)OH, the arsenic analogue of chlorapatite Ca₉⁻₀₇(PO₄)₂Cl, and the Ca analogue of morelandite Ba₉⁻₀₇(As₂O₅)Cl and mimetite Pb₅(As₂O₅)Cl₂.

X-ray study by precession and Weissenberg methods shows the mineral to be hexagonal, space group P6₃/m (by analogy with other members of the apatite group), unit cell a = 9.810(4), c = 6.868(4) Å. No deviations from hexagonal symmetry were detected. The strongest lines (38 given) are 3.98(50)(111), 3.43(60)(002), 2.907(100)(211), 2.826(90)(300,112), 2.670(50)(202), 1.864(40)(213).

Turneaureite occurs at Långban as colorless, slightly turbid, prismatic crystals up to 1.5 mm long. The forms present are (1010) and (0001). The mineral has a white streak and a vitreous to slightly greasy luster. H = 5. Fracture uneven, cleavage not observed. Dₙₐₐₙ (heavy liquids) = 3.60(5), Dₙₑₑₙ = 3.63 g/cm³. Fluoresces bright orange in shortwave ultraviolet radiation. Phosphorescence is weakly discernible in massive material from Franklin, but not observed on crystals from the other two localities. Optically uniaxial negative, ω = 1.708(3), ε = 1.700(3) (sodium light).

Turneaureite occurs sparingly at the Långban mine, Varmland, Sweden, as euhedral crystals associated with calcite and andradite on massive andradite-magnetite ore. At Franklin, New Jersey, it occurs as abundant grayish-white anhedral masses up to 5 x 3 x 2 cm in size, associated with magnetite, andradite, and manganese calcite. The mineral is also found in manganese-rich siliceous marble exposed on the 2500 level of the Balmat #4 mine, New York, where it occurs as subhedral, isolated crystals intimately associated with donpeaceorite, tirodite, ferrian braunite, dravite, anhydrite, and manganoan dolomite. All three occurrences are in high-grade marble terranes, and turneaureite may be a metamorphic mineral confined to the amphibolite and granulite facies.

The mineral is named for Dr. Frederick Steward Turneaure, Professor Emeritus at the University of Michigan, in recognition of his contributions to the mineralogy and geology of economic mineral deposits. Type material is preserved at the Smithsonian Institution under catalogue numbers C6270-1 and C6270-2 (Franklin), 134981 (Långban), and 159862 (Balmat). A.C.R.

**Usonite***


Microprobe analyses (average of 3) gave As 64.65, S 34.09, total 98.74%, corresponding to As₂S₃₋₀₀₅. The mineral melts at 310 ± 5°C, decomposes with 5-mol KOH to dark-brown powder, which dissolves during boiling. No reaction with HCl and HNO₃. Heating in a closed tube produces a white to yellowish (in greater distance) sublimate.

X-ray data showed the mineral to be monoclinic, P2₁/m, a = 7.98(1), b = 8.10(1), c = 7.09(1) Å, β = 100.14(3)°, Z = 2, Dₙₑₑₙ = 3.385. The strongest lines (30 given) are 5.81(10)(101), 5.31(6)(011), 3.602(8)(120), 3.100(6)(121), 2.905(8)(202), 2.820(6)(220).

Crystals of usonite are up to 0.3 (max. 0.5) mm long, yellow, transparent, prismatic parallel to [001]; dominant forms are {110}, {011}, {101}, with fine [111] striations on [110]. Crossline twins occur (twinning plane [011], axis [100]). In some samples, the crystals of usonite are intergrown with prismatic realgar and isometric α-arsenic sulfide crystals.


The mineral occurs with realgar and α-arsenic sulfide in realgar-enriched sand-gravel and gravel-pebble tuff sediments at 10–30 cm depth, Uson caldera, Kamchatka (USSR). Usonite was found in artificial slicks. The name is for the locality.

Type specimens are at the A. E. Fersman Mineralogical Museum, Acad. of Sci. (Moscow) and at the Laboratory of Mineralogy of the Ilmenskij National Park (Miaisk). J.P.

**Vincinnite***


The average of six electron-microprobe analyses gave Cu 40.90, Fe 14.63, Sn 7.33, As 3.43, Sb 1.60, S 31.85, total 99.74%, which yields the empirical formula Cu₁₀₋₁₆Fe₄₋₁₅Snₓ₋₀₉₈(Asₓ₋₀₇,Sbₓ₋₀₂₇)S₁₅₋₇₄ on the basis of a total of 32 atoms.
Single-crystal and X-ray powder-diffraction studies show the mineral to be tetragonal (pseudocubic), possible space groups P4/ mmm, P422, or P442, a = c = 10.697(6) Å, Z = 2, D_{calc} = 4.29 g/cm³. The strongest X-ray diffraction lines (25 given) are 4.49(7), 4.11(10), 3.65(8), 3.17(9). Symmetry and structure were not determined. The mineral occurs as very fine (1-3 μm) acicular grains and aggregates (to 20 μm) enclosed in galena and sphalerite of the Kvaisinsk lead-zinc ores, South Osetinsk ore district. Associated minerals include freibergite, chalcopyrite, native silver and antimony, arsenopyrite, and tetrahedrite. In the microscope, the chlorosulfosalt has a green-gray tint, strong anisotropy and double refraction, and carmine-red internal reflections both in immersion oil and in air. Reflectances are (nm, R, R₂) (400)36.3, 35.1; (420)36.2, 34.9; (440)36.1, 34.6; (460)35.9, 34.2; (480)35.5, 33.7; (500)35.1, 33.3; (520)34.7, 32.8; (540)34.1, 32.3; (560)33.6, 31.7; (580)33.0, 31.2; (600)32.4, 30.6; (620)31.8, 30.1; (640)31.2, 29.7; (660)30.5, 29.2; (680)30.0, 28.7; (700)29.5, 28.3. D. A. V.

Unnamed Pb-Sb-Te sulfosalt


Galena, geocronite, jordanite, sphalerite, arsenopyrite, and a Te-bearing lead sulfosalt occur in ore from the main lode of the Precambrian Rajpura-Dariba deposit, Udaipur, Rajasthan, India. A 114.6 mm Debay-Scherrer powder pattern and a microprobe analysis (av. of five with ranges and standards unstated) are the only data given for the tellurian mineral. Strongest lines of the powder pattern are 3.43(100), 2.98(90), 3.20(85), 3.55(40), 2.24(40), 2.91(35), approximating those of geocronite. The microprobe average composition is Pb 60.14, Sb 12.78. As 1.10, Te 9.47, S 17.33, total 100.82%, reported as Pb₁₂³(Sb₁₀As₉S₉)₂Te₀₀S₀₅ with Te in substitution for S.

Discussion. Possibly a tellurian-bearing geocronite, but data are insufficient to characterize the mineral. Cell dimensions calculated from the powder pattern are only slightly larger than those of geocronite. If geocronite is taken as Pb₁₂(Sb₆As₃S₉), the tellurian mineral is Pb₁₂³(Sb₁₀As₉)_₂Te₀₀S₀₅—not close enough to assume the two are related. J. L. J.

Unnamed uranium silicate


Analysis by electron microprobe gave UO₂ 83.60, SiO₂ 7.17, TiO₂ 1.03, CaO 3.76, PbO 1.34, FeO 0.07, MnO 0.07, Al₂O₃ 1.20, Na₂O 0.01, SO₂ 0.16, sum 98.41%. This gives the formula (U₂.₄Ca₂.₄Pb₂.₀₃)₄(Si₂.₉₅Al₃.₄₂)O₆ or U₄Si₄O₆.

The mineral occurs in the Balkan metallogenic zone mainly in uranium silicate spherulites intergrown with pitchblende (uraninite), coffinite, and two other unnamed uranium silicates, apparently as an alteration of uraninite. In reflected light, the mineral is dark gray, reflectance 12 to 13%. Microhardness 620 to 650 kg/mm². No X-ray data are given.

Discussion. The mineral is apparently a new species. The two other unnamed uranium silicates with which it occurs were previously reported from Yugoslavia and Austria, in an article that was recently abstracted (Am. Mineral., 68, 1040–1041). D. A. V.

Unnamed uranium-titanium silicate


Analysis by electron microprobe gave UO₂ 67.00, ThO₂ 0.43, SiO₂ 4.97, TiO₂ 18.90, CuO 0.27, PbO 0.27, MgO 0.06, CaO 1.11, BaO 0.34, Na₂O 0.21, K₂O 1.25, sum 94.81%. Regarding Ba, Na, K, and possibly Ca as impurities, and normalizing to 100% (justified by assuming the mineral to be metamict), this analysis gives U₃.₄₀Th₀.₄₀Ti₁.₈₅Si₂.₃⁰O₅.₄₀, or ideally U₃Ti₃SiO₁₄. No X-ray data are available.

The mineral occurs as fine-grained aggregates of less than 10
μm, disseminated in tinguaites of the Campoc dec Cerkadoc alkaliine massif, Brazil. It is associated with coffinite, zircon, monazite and Ce-La-U oxides. No optical data are given.

**Discussion.** The paper also describes three other uranium-titaniun silicates from various uranium deposits (Dog Mine, Ambrosia Lake deposit, U.S.A.; Mitterberg deposit, Austria; Witwatersrand deposit, South Africa). These other phases were previously described and abstracted (Am. Mineral., 68, 1041). No new data are given except the following: In reflected light their color is gray, similar to brannerite, with increased Si content giving a blue tint and increased Ti giving a weak reddish tint. Reflectances are 9–12%, indistinguishable from brannerite. Luminescence intensity increases with U content and decreases with increased Ti and Si content. D.A.V.

**New Data**

**Lithium-hydrorhodonite**


Lithium-hydrorhodonite was systematically described by Ito (1972), and the crystal determination was presented by Murakami et al. (1977). Crystals from the same locality (from a high-grade regional metamorphic rock from India) were used in both studies.

The empirical formula, $\text{Li}_{6.08} \text{Na}_{0.02} \text{Mn}_{1.01} \text{Mg}_{0.11} \text{Ca}_{0.04} \text{Fe}^{3+}_{0.2} \text{Al}_{0.01} \cdot \text{Si}_2 \text{O}_8 \cdot (\text{OH})$, corresponds to an ideal formula, Li$_x$Mn$_y$Si$_z$O$_{8+y}$ (OH), for endmember Li-hydrorhodonite, and to a structural formula of $\text{M}^+\text{M}^0\text{Si}_2\text{O}_8$ (where $\text{M}^+ = \text{Li}_{x+y}$, $\text{M}^0 = \text{the remaining cations}$).

X-ray analyses show the natural crystals to be triclinic, $P\overline{1}$, $a = 7.530(3)$, $b = 11.736(5)$, $c = 6.710(3)$ Å, $\alpha = 92.58(3)^\circ$, $\beta = 95.14(3)^\circ$, $\gamma = 106.16(3)^\circ$, $Z = 2$, $D_a = 3.52$ g/cm$^3$. Powder xrd data (obtained only for synthetic Li$_{10}\text{Mn}_4\text{Si}_2\text{O}_8$ (OH)) yielded the following strongest lines (57 given; $d$ in Å, $\hbar k l$): 3.166(66)(020), 3.154(56)(110), 3.088(46)(002), 2.952(70)(112), 2.922(70)(022), 2.700(90)(022), 2.219(70)(013).

The structure was refined from 4292 reflections to $R = 0.038$ ($R_w = 0.045$), was found to be isotypic with the nambulite structure. However, the $\text{M}^0$ atom is essentially coordinated by six oxygen atoms that form a distorted octahedron. The mean $\text{M}^0$–O bond length is 2.26 Å. Of five independent octahedral positions per cell, Mg is preferentially located at a specific position, M(3).

J.A.Z.

**Roubaultite**

D. Ginderow, F. Cesbron (1985) Structure de la Roubaultite, $\text{Cu}_2(\text{UO}_2)_2\text{(CO}_3\text{)}_2\text{O}_2(\text{OH})_2\cdot4\text{H}_2\text{O}$. Acta Crystallogr., C41, 654–657.

The crystal structure of roubaultite was solved and refined to $R = 4.1\%$ for 2246 observed reflections; the correct formula is $\text{Cu}_2(\text{UO}_2)_2(\text{CO}_3\text{)}_2\text{O}_2(\text{OH})_2\cdot4\text{H}_2\text{O}$, the presence of (CO$_3$)$^{2-}$ groups not having been recognized in the previously proposed formula. F.C.H.

**Uklonskovite**


New data have been obtained for uklonskovite, Na$_2$Mg(SO$_4$)$_2$·2H$_2$O. The rare minute crystals found in the lower levels of the Cetine mine, Tuscany, Italy, comprise the second known occurrence.

The crystals are monoclinic, $P2_1/m$, with $a = 7.202(1)$, $b = 7.214(1)$, $c = 5.734(1)$ Å, $\beta = 113.23(1)^\circ$, $Z = 2$, and $D_{calc} = 2.414$ g/cm$^3$. The strongest powder xrd lines (of 35 given) are $[d$ in Å, $\hbar k l]$ : 6.608(78)(100), 5.270(60)(001), 3.505(100)(101), 3.399(46)(200), 3.154(56)(111), 2.970(54)(121).

The structure was refined to $R = 0.023$ for 655 automatic diffractometer–observed data. The Mg octahedra are corner linked to form chains along $b$. The Na polyhedra and the SO$_4$ groups connect the chains to each other, mainly in the $c$ direction, so the structure can be described as a (100) sheet structure. In this occurrence, F replaces the OH of the earlier description of the mineral. J.A.Z.

**Discredited Minerals**

**Taylorite (= ammonian arcanite)**


Examination of the published chemical, optical, and X-ray data of the potassium-ammonium sulfate mineral taylorite shows it to be an ammonium arcanite. Taylorite has been discredited as a species by the I.M.A. Commission. A.C.R.