

NEW MINERAL NAMES

Polarite

A. D. GENKIN, T. L. EVSTIGNEEVA, N. V. TRONEVA, AND L. N. VYAL'SOV (1969) Polarite, Pd(Pb, Bi) a new mineral from copper-nickel sulfide ores. *Zap. Vses. Mineral. Obsch.* **98**, 708-715 [in Russian].

The mineral was previously described but not named by Cabri and Traill [abstr. *Amer. Mineral.* **52**, 1579-1580 (1967)]. Electron probe analyses on 3 samples (av. of 16, 10, and 15 points) gave Pd 32.1, 34.2, 32.8; Pb 35.2, 38.3, 34.0; Bi 31.6, 39.4, 33.4; sum 98.9, 102.8, 100.2 percent corresponding to Pd (Pb, Bi), ranging from Pd_{1.0} (Pb_{0.47} Bi_{0.60}) to Pd_{1.0} (Pb_{0.69} Bi_{0.48}).

X-ray powder data are close to those of synthetic PbBi. The strongest lines (26 given) are 2.65 (10)(004), 2.25 (5)(331), 2.16 (9)(124), 1.638 (5)(144). These are indexed on an orthorhombic cell with a 7.191, b 8.693, c 10.681 Å. Single crystal study could not be made.

In polished section, white with yellowish tint, birefringence not observed. Under crossed polars anisotropic with slight color effects from gray to pale brown. Maximum reflectance is given at 16 wave lengths (440-740 nm) 56.8 percent at 460 nm; 59.2 at 540; 59.6 at 580; 61.2 at 660. Microhardness (kg/mm²) was measured on 3 grains: 205-232, av 217; 168-199, av 180; 205-232, av 219.

The mineral occurs in vein ores of the Talnakh deposit amidst chalcopyrite, talnekhite, and cubanite, in grains up to 0.3 mm, intergrown with Pd₃Pb, CuPd₆ (Sn, Pb)₃ (stannopal-ladinite), nickeloan platinum, sphalerite, and native Ag.

The name is for the occurrence in the Polar Urals. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

Cuprostitbite

H. SØRENSEN, E. I. SEMENOV, M. S. BEZSMERTNAYA, AND E. B. KHALEZOVA (1969) Cuprostitbite, a new natural compound of copper and antimony. *Zap. Vses. Mineral. Obsch.* **98**, 716-724 [in Russian].

Microprobe analyses by S. B. Maslenkov gave (range of 3 analyses and average): Cu 43-55, 53.3; Sb 41-45, 42.0; Tl 3.0-3.5, 3.5; Ag 0-0.2, 0.1; S 0.27-2.0, 1.1, sum 100%. Spectrographic analysis by D. K. Shcherbachev showed also traces of Bi and Fe. The silver and sulfur are considered to be present as impurities. The analysis gives Cu_{2.10}Sb_{0.86}Tl_{0.4} or approximately Cu₂(Sb, Tl).

The X-ray pattern (E. B. K.) agrees well with that of Westgren and others [*Z. Phys. Chem.*, **B**, **3**, 6 (1929)] for synthetic Cu₂Sb. The strongest lines of the mineral are 2.82 (4)(110), 2.56 (5)(111), 2.07 (10)(112), 1.993 (4)(200), 1.424 (3)(014), 1.167 (4)(015, 312). The data are indexed on a tetragonal cell, with a 3.99 ± 0.005 , c 6.09 ± 0.01 Å, ρ (calc) 8.42 ($Z=2$). The mineral shows platy twinning.

The mineral is steel-gray with a distinct violet-red tint on fresh fracture, luster metallic. Fracture uneven; a cleavage in one direction is sometimes noted. Soft, microhardness 220 kg/mm². Under the microscope in reflected white light the mineral is violet-rose with strong anisotropy and high birefringence with colors from creamy white to dark rose-violet. Reflectances are given at 16 wave lengths, R_e and R_o (each av. of 3) are: 56.3, 51.8 percent at 460 nm; 4.68, 40.7 at 540 nm; 45.3, 40.8 at 580 nm; 52.9, 51.4 at 660 nm. The minima are at 580 nm. The mineral is optically positive 440-637 nm, optically negative 637-740 nm.

The mineral occurs as dense fine-grained aggregates up to 1.5 mm in diameter in a vein of ussingite, cutting sodalite syenites, Mt. Nakalak of the Ilimaussaq alkalic massif, Green-

land. Associated minerals are loellingite and antimonian silver, with very little chalcopyrite and chalcocite. It alters to incrustations and others of green, orange, and bright red color.

The name is for the composition.

Fukuchilite

YOSHIMICHI KAJIWARA (1969) Fukuchilite, Cu_3FeS_8 , a new mineral from the Hanawa Mine, Akita Prefecture, Japan. *Mineral. J. (Tokyo)* 5, 399-416.

Microprobe analyses of 5 samples using Cu and Fe as standards gave Cu 38.4-39.1, Fe 11.0-11.5%. Microprobe analyses of 19 samples using analyzed chalcopyrite as standard gave Cu 37.9-40.6, Fe 10.5-12.9, S 49.2-53.3%. Chemical analyses were also given of aggregates containing mainly pyrite, fukuchilite, and covellite. All these lead to a ratio of Cu/Fe close to 3; the ratio (Cu+Fe)/S ranges from 1.7 to 2.1. The formula is given as Cu_3FeS_8 but it is possible that there may be a deficiency in sulfur.

Single crystal study could not be made. X-ray powder data are given: (17 lines); the strongest lines are 3.21 (s)(111), 2.789 (vs)(200), 2.281 (m) (211), 1.685 (s)(311), indexed on a cubic cell with a 5.58 Å. The data are similar to those for pyrite, but suggest a lower symmetry. With $Z=1$, $\rho=4.80$.

Color dark brownish-gray, luster submetallic. Under the reflecting microscope very similar to bornite, color bright pinkish-brown in air, purplish-brown in oil. Reflectivity slightly lower than that of pyrite, distinctly higher than that of bornite. Polishing hardness slightly lower than that of pyrite. No internal reflections, no pleochroism, no anisotropy observed.

Heating experiments and DTA curves showed that fukuchilite decomposes at about 200° to pyrite+covellite.

The mineral occurs in barite-bearing gypsum (and/or anhydrite ores) as minute grains in interstices of small masses consisting of barite, covellite, and pyrite.

The name is for Nobuyo Fukuchi, 1877-1934, Japanese mineralogist and geologist. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

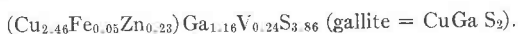
DISCUSSION.—If the mineral is cubic, it is a ferrian villamaninite [see *Amer. Mineral.* 47, 1222 (1962)]; type villamaninite is a nickelian variety.

“Carnevallite”, “Maigrue”, “Furmineral”, “LU”

B. H. GEIER AND J. OTTEMANN (1970) New primary vanadium-, germanium-, gallium-, and tin-minerals from the Pb-Zn-Cu deposit Tsumeb, South West Africa. *Mineral. Deposita* 5, 29-40.

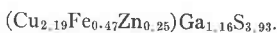
The minerals occur in minute grains (<0.5 mm) in ores between levels 29 (3027 ft) and 34 (3667 ft). The analyses are by electron microprobe, using renierite, briartite, sulvanite, gallite, cassiterite, and synthetic Ca_2S_3 as standards.

“Maigrue”—Analysis gave Cu 40.7, Fe 0.8, Zn 3.9, Ga 21.0, V 3.3, S 32.2, sum 101.8% corresponding to



Slightly harder than gallite. Reflectivity stronger than bornite, weaker than tennantite, color distinct may-green; bireflectance and anisotropism not observed. Associated with bornite, chalcocite, tennantite, renierite, pyrite, intergrown with gallite and vanadian germanite. The name is for the color.

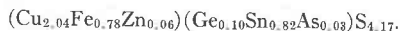
"*Carnevallite*"—Analysis gave Cu 35.9, Fe 6.8, Zn 4.2, Ga 20.9, S 32.5, sum 100.3%, corresponding to



The grains of the mineral are not larger than approximately 40 microns. In color it resembles freshly polished bornite and is hence, when associated with bornite, not easily detected. In polishing hardness it equals gallite, on which it is often observed as an overgrowth. The reflectivity is medium, stronger than bornite, and showing in air a peculiar mixed color between beige and pink. In oil it appears apricot-yellow to ochre. The bireflectance in air is weak (just perceptible) and sort of cloudy; in oil more distinct. Anisotropism is distinct, the colors are: greenish/dark and beige/dark. When the nicols are not correctly crossed, a dark red color appears shortly before the extinction. In oil the colors are: brass yellow and yellowish brown. Associated minerals as with "maigruen".

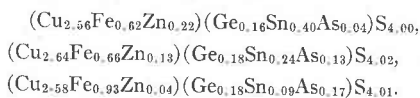
The name is not explained.

"*LU*"—(stannite-like mineral)—Analysis gave Cu 30.9, Fe 10.4, Zn 0.9, Ge 1.7, Sn 23.2, As 0.6, S 31.8, sum 99.5%, corresponding to



Occurs intergrown with "feuermineral" as inclusions up to 0.5 mm in massive tennantite. Color beige with violet tint in air, darker without violet tint in oil. Reflectivity lower than that of tennantite. In oil the bireflectance is weak, visible only where lamellae occur. Anisotropism weak in air, more distinct in oil, with colors: sand color dark grayish blue/dark red brown.

"*Feuermineral*"—(renierite-like mineral)—Three analyses gave Cu 40.9, 43.2, 42.8; Fe 8.7, 9.5, 13.6; Zn 3.7, 2.1, 0.7; Ge 2.9, 3.4, 3.4; Sn 12.0, 7.4, 2.6; As 0.7, 2.6, 3.4; S 32.3, 33.2, 33.2, 33.6; sum 101.2, 101.4, 100.1%: corresponding to



Resembles renierite in polishing hardness and color, but is more salmon-colored. Bireflectance is equally weak in both, but with crossed nicols, the "feuermineral" is much more strongly anisotropic with colors distinct light brown/dark brown with an orange tint and turquoise. At obliquely crossed nicols a fiery red is visible (whence the name). Polysynthetic twinning is frequent. Associated minerals: mainly tennantite, also pyrite, germanite, bornite, gallite, chalcocite, chalcopyrite, vanadian germanite.

DISCUSSION.—The authors state "that 'maigruen' and 'carnevallite' are regarded as gallites in which a considerable part of the Ga is replaced by Cu, Zn, and Fe, as well as V; nevertheless, they may represent without a doubt individual and new mineral species." This may be correct, but remains to be proved by X-ray study. In view of the complex relationships of the stannite group, it would have been much better to have used no names other than designations such as Mineral A, B, C, D.

Plumangite

D. ADIB AND J. OTTEMANN (1970) Some new lead oxide minerals and murchichtite from T. Khuni Mine, Anarak, Iran. *Mineral. Deposita* 5, 86–93.

Electron microprobe analyses, using galena and renierite as standards, gave Mn 32.7, Pb 30.1, Cu 8.6, Zn 1.3, O 26.2, sum 98.9%, corresponding to $(\text{Cu}_{0.8}\text{Zn}_{0.15})\text{O} \cdot \text{PbMn}_4\text{O}_{10}$.

It occurs in irregular colloform grains (<0.1 mm) and irregular networks, replacing murdochite along fractures. Grayish-white to gray in reflected light; slightly anisotropic with gray to bluish-gray colors. The reflectivity is higher than that of murdochite, the hardness lower. Shows slight zoning.

The name is for the composition.

DISCUSSION.—Further study is required, with comparison with cesarolite, quenselite, and coronadite.

Unnamed Lead Oxide ("Mineral X")

D. ADIB AND J. OTTEMANN (1970) Some new lead oxide minerals and murdochite from T. Khuni Mine, Anarak, Iran. *Mineral. Deposita*, 5, 86–93.

Electron microprobe analysis, using galena as standard, gave Pb 87.6, O 12.4%, near Pb_9O_{16} . The mineral occurs as minute single crystals of greenish-bluish white color with square outlines in the gangue with murdochite. Slightly harder than murdochite. Anisotropic with greenish-blue to blue colors. Differs from murdochite in reflectivity (not stated how).

Khuniite

D. ADIB AND J. OTTEMANN (1970) Some new lead oxide minerals and murdochite from T. Khuni Mine, Anarak, Iran. *Mineral. Deposita*, 5, 86–93.

Microprobe analysis, using wulfenite, crocoite, and renierite as standards, gave Pb 68.7, Zn 2.0, Cu 2.1, Fe 0.03, Mo 0.15, Cr 10.9, O 16.4, sum 100.28%, corresponding to $(Pb_{1.6}Zn_{0.2}Cu_{0.2})CrO_5$. The mineral occurs in tabular to short prismatic monoclinic crystals, up to 5 mm, often twinned, sometimes in masses up to 1 cm in diamter. One poor cleavage was observed.

Translucent, color honey-brownish-yellow, resembling descloizite. Streak and powder bright yellow. Luster vitreous to adamantine. ρ 5.9, H. 3–3.5, n 2.5x(sic). In reflected light color grayish-white similar to that of galena. Under crossed Nicols anisotropic with various bluish shades. Internal reflection orange-yellow, similar to, but more pronounced than that of wulfenite.

The mineral is intergrown with wulfenite, chromium, and murdochite; it has numerous inclusions of iron oxides.

The name is for the mine.

DISCUSSION.—X-ray powder data and structural study are required.

Chromium

D. ADIB AND J. OTTEMANN (1970) Some new lead oxide minerals and murdochite from T. Khuni Mine, Anarak, Iran. *Mineral. Deposita*, 5, 86–93.

Electron microprobe analysis, using crocoite as standard, gave Pb 76.0, Cr 9.5, O 14.6, sum 100.1%, corresponding to Pb_2CrO_5 or $2PbO \cdot CrO_3$. Crystals are monoclinic, a 7.08, b 2.84, c 7.60 (Å ?), β 122.5°, diffraction symbol a/mP /-. No X-ray powder data are given. Occurs in crystals generally about 2 mm size; some complexly intergrown masses of crystals are much larger. The crystals show varying distinct cleavages. Color deep red, translucent, streak orange-red. ρ 6.6 (Berman balance), H. 3–4 (estimated by comparison with murdochite). $n \sim 2.40$. In reflected light bluish-gray; reflectivity similar to but distinctly lower than that of galena. Under crossed Nicols with color varying from dark gray to greenish gray. Intense red internal reflections.

The mineral occurs with murdochite and khuniite; inclusions of wulfenite, iron oxides,

and khunite are very common. The name is for the analogy of composition $2\text{PbO} \cdot \text{CrO}_3$ with that of minium, $2\text{PbO} \cdot \text{PbO}_2$

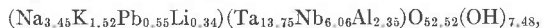
The authors point out that an unnamed mineral of the same composition was described by Bariand [*Bull. Soc. Fr. Mineral Cristallogr* **86**, 43 (1963)], from the Sebarz mine, Anarak district, Iran, associated with cerussite and diopside. It is carmine red, streak saffron yellow, and shows a distinct cleavage. It is monoclinic, $P2_1/n$, a 13, b 5.68, c 7.12 (all ± 0.02) Å, β $95^\circ 51'$ (no X-ray powder data or analysis given). They state “. . . his data do not correspond with ours.”

DISCUSSION.—Obviously requires further study, especially X-ray powder data and structural study.

Rankamaite

OLEG VON KNORRING, ATSO VORMA, AND P. H. NIXON (1969) Rankamaite, a new tantalum mineral from Kivu, Congo. *Bull. Geol. Soc. Finland* **41**, 47–56.

Analysis (by O. v. K.) of a sample containing a little muscovite gave Ta_2O_5 69.47, Nb_2O_5 17.40, Al_2O_3 3.40, Li_2O 0.11, PbO 2.63, Na_2O 2.31, K_2O 1.80, SiO_2 0.96, H_2O^+ 1.55, H_2O^- 0.35, sum 99.98%, corresponding to a unit cell content of



X-ray study showed the mineral to be orthorhombic, pseudo-tetragonal, space group $C222$, $Cmm2$, $Cm2m$, or $Cmmm$, with a 17.19, b 17.70, c 3.933 Å. The strongest lines (67 given) are 4.112 (34)(330), 3.935 (41)(001, 240), 3.467 (52)(150), 3.375 (60)(510), 3.011 (80)(350), 2.970 (100)(530), 2.791 (31)(260), 1.736 (32)(860, 841). The X-ray pattern is similar to those of synthetic compounds of “tungsten-bronze” type, such as $\text{SrTa}_4\text{O}_{11}$.

The mineral is white to creamy-white, felted, resembling silimanite. H . 3–4, ρ 5.5 (measured), 5.84 (calc) n_s are greater than 2.1, elongation positive, $Z=c$, X No. 100 c .

It occurs as water-worn pebbles found in heavy mineral concentrates from alluvial deposits, Mumba area, Kivu, eastern Congo., associated with simpsonite, manganotantalite, cassiterite, and muscovite. The source rock was probably a lithium pegmatite. The mineral was probably formed by the alteration of simpsonite.

The name is for Prof. Kalervo Rankama, Univ. of Helsinki. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

Unnamed lead iodate, Schwartzbergite

A. MUECKE (1969) Schwartzbergite und ein neues Jodat-Mineral. *Ref., Deut. Mineral. Ges. Semml. Berne, Sept. 9–12, 1969*, p. 35.

A mineral associated with schwartzbergite at the Mina Sta. Ana, Caracoles, Sierra Gorda, Chile, has composition $\text{Pb}_6(\text{Cl}_6\text{O}_2)(\text{IO}_3)_2$. It is tetragonal, space group probably D_{4h}^{19} , a 5.632 ± 0.002 , c 27.288 ± 0.007 Å, $Z=2$. ρ 6.83. Occurs in thin micallike yellow crystals with good cleavage $\{001\}$. It has been synthesized. Analysis of schwartzbergite gave the new formula $\text{Pb}_6(\text{IO}_3)_2\text{Cl}_6\text{O}_2$. It is tetragonal, space group probably D_{4h}^{19} , a 5.614 ± 0.002 , c 12.459 ± 0.002 Å, $Z=1$. ρ 7.09.

Unnamed Iron Phosphate

S. E. HAGGERTY (1970) A new iron phosphate mineral. *Carnegie Inst. Wash. Year Book* **68**, 330–332.

The mineral occurs as minute crystals (max. 300 μm) in open cavities interstitial to magnetite and hematite in the Laco magnetite lava flow, northern Chile. Electron microprobe analysis gave Fe 44.05, P 17.93, calculated to FeO 42.41, Fe_2O_3 15.71, P_2O_5 41.88%, formula $\text{Fe}_4(\text{PO}_4)_3$ ($=6\text{FeO} \cdot \text{Fe}_2\text{O}_3 \cdot 3\text{P}_2\text{O}_5$). Individual grains are compositionally homogeneous and no other elements heavier than Na were detected.

X-ray powder data are given for 3 samples (26 lines); the strongest lines are (av.) 3.311 (10), 3.207 (7), 2.540 (6), 2.082 (6), 1.599 (9), with some resemblance and some differences from lipscombite.

The mineral is opaque. It shows polysynthetic twinning. Under the microscope in reflected light strongly pleochroic and anisotropic with colors in oil immersion from yellow to bluish gray. Reflectance estimated to be 10–15%. Softer than magnetite. Takes a good polish. When heated breaks down at 500° C in air and also in evacuated silica tubes.

Unnamed “ β -quartz solid solution”

B. M. FRENCH AND H. O. A. MEYER (1970) Andalusite and “ β -quartz solid solution” in Macusani glass, Peru. *Carnegie Inst. Wash. Year Book* 68, 339–342.

A natural glass, presumably of volcanic origin, contains andalusite, quartz, chromite, gahnite, and small rosettes of “ β -quartz solid solution.” Electron microprobe analysis of this phase gave SiO_2 77.4, Al_2O_3 17.0, Li_2O about 5, $\text{Na}_2\text{O} < 0.1$, $\text{K}_2\text{O} < 0.1$, TiO_2 , FeO , MgO , CaO , none. The X-ray pattern (not given) corresponds to that of solid solutions of β -quartz type between $\text{LiAlSi}_2\text{O}_6$ and SiO_2 , with a 5.14, c 5.46 Å. The analysis gives (mole %) $\text{LiAlSi}_2\text{O}_6$ 62, (3SiO_2) 38.

Majorite

J. V. SMITH AND BRIAN MASON (1970) Pyroxene-garnet transformation in Coorara meteorite. *Science* 168, 832–833.

The range and average of 5 microprobe analyses gave Si 22–26 (24.3); Ti none, Al 0.4–1.6 (1.4); Cr 0.2–0.6 (0.45); Fe 12–14 (13.1); Mn none; Mg 15–22 (16.6); Ni 0.02–0.05 (0.03); Ca, K none; Na 0.4–0.6 (0.5%). Calculated to $\text{O} = 12.00$, this gives: (1) assuming Fe^{+2} :



(2) assuming Fe^{+3} :



The mineral is cubic, a 11.524 \pm 0.002 Å; the pattern is stated to be close to that pyrope; strongest lines are not given.

It occurs as purple grains (“several micrometers across”), often coarsely interwoven with pyroxene. Other associated minerals are ringwoodite, olivine, kamacite, and goethite.

The name is for Alan Major, who participated in the high-pressure synthesis of garnet from pyroxene composition. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA, for a garnet with essential Si in octahedral co-ordination, with over-all composition close to that of orthopyroxene.

Kôzulite

MATSUO NAMBU, KATSUTOSHI TANIDA, AND TSUYOSHI KITAMURA (1969) Kôzulite, a new alkali amphibole from Tanohata Mine, Iwate Prefecture, Japan. *J. Jap. Ass. Mineral., Petrologists Econ. Geol.* 62, 311–328 [Japanese with English abstr.].

Analysis gave SiO₂ 51.38, TiO₂ none, Al₂O₃ 1.69, Fe₂O₃ 2.85, FeO none, MgO 2.71, ZnO 0.03, MnO 27.96, CaO 1.12, BaO none, Na₂O 8.41, K₂O 1.36, H₂O⁺ 2.10, H₂O⁻ 0.06, F 0.08, sum 99.75(-O = F₂) 6.03 = 99.72%. This corresponds to



Precession photographs by N. Morimoto show the mineral to be monoclinic, space group *C2/m*, *a* 9.91 ± 0.02, *b* 18.11 ± 0.04, *c* 5.30 ± 0.02 Å, β 104.6 ± 0.1°, *Z* = 2. The strongest X-ray lines (23 given) are 8.512 (100)(110), 3.295 (17)(240), 3.153 (67)(310), 2.827 (31)(330).

A DTA curve shows a sharp endothermal break at about 950° C. X-ray study indicates that braunite+glass is formed at this temperature.

The mineral is reddish-black to black, streak light purplish brown, luster vitreous. *H.* 5, ρ 3.30 measured, 3.36 (calc). Cleavage {110} perfect. Optically biaxial, negative, *n_s* α 1.685 (Na), β 1.717 (mean), γ 1.720, 2*V*(Na)–34–36°, *X* 35 *c* = 25°, dispersion very weak, probably *r*∧*v*. Strongly pleochroic, *X* yellow-brown, *Y* reddish-brown, *Z* dark brown, absorption *Z* > *Y* > *X*.

The mineral occurs as banded aggregates of short prismatic crystals up to 3.5 × 2.0 × 1.5 mm in the Mn deposit of the Tanohata Mine, where sedimentary beds have been metamorphosed by the intrusion of granodiorite. Associated minerals are braunite, rhodonite, manganese alkali pyroxene and amphibole, and quartz.

The name is for Shukusuke Kôzu (1880–1955), professor at Tohoku University, for his many contributions to the study of rock-forming minerals. Type material is preserved at Tohoku University. The mineral and name were approved before publication by the Commission on New Minerals and Mineral Names, IMA.

NEW DATA

Scandian Ixiolite

L. F. BORISENKO, N. V. MAKSIMOVA, AND M. E. KAZAKOVA (1969). Scandian ixiolite, a new variety of tantalate-niobate of composition (A, B)_nO_{2n}. *Dokl. Akad. Nauk SSSR* 189, 619–622 [in Russian].

O. V. KNORRING, TH. G. SAHAMA, AND M. LEHTINEN (1969). Scandian ixiolite from Mozambique and Madagascar. *Bull. Geol. Soc. Finland* 41, 75–77.

Ixiolite type minerals with high scandium contents from Mozambique and Madagascar are described independently by the two groups of authors (B. M. and K.) and (K., S. and L.), respectively. Chemical analyses and unit-cell dimensions (from X-ray powder diffraction patterns) are as follows:

	Madagascar		Mozambique	
	1 Antisirabe area	2 Betanimena	3 Naquissupa	4 (loc. not given)
CaO	—	—	—	n.f.
MgO	—	—	—	n.f.
MnO	9.65	1.51	1.76	1.70
FeO	6.84	5.77	6.16	6.30
Fe ₂ O ₃	1.32	8.29	5.65	10.82

	Madagascar		Mozambique	
	1 Antisirabe area	2 Betanimena	3 Naquissupa	4 (loc. not given)
Sc ₂ O ₃	2.10	5.10	7.50	5.04
RE ₂ O ₃	2.12	n.f.	n.f.	1.30
Al ₂ O ₃	—	—	—	—
SiO ₂	—	—	—	n.f.
TiO ₂	6.54	8.23	9.32	5.42
ZrO ₂	—	—	—	3.30
PbO	0.07	—	—	—
UO ₂	0.71	—	—	—
SnO ₂	0.20	3.08	6.30	3.80
Nb ₂ O ₅	63.28	21.77	24.74	23.25
Ta ₂ O ₅	5.82	45.02	38.68	38.77
H ₂ O ⁻	0.05	—	—	n.f.
H ₂ O ⁺	0.67	—	—	n.f.
Insol.	0.12	0.08	0.10	—
Total	99.49	98.85	100.21	99.70
<i>Crystallography</i>				
<i>a</i>	4.741 Å	4.702 Å	4.725 Å	4.706 Å
<i>b</i>	5.722	5.668	5.696	5.680
<i>c</i>	5.123	5.091	5.101	5.1
Source	K.S.+L.	K.S.+L.	K.S.+L.	B.M.+K.

(n.f. = not found).

The analyses conform closely to M₄O₈, where *M* denotes the sum of the cations. Space group *Pbcn*. ρ (anal. 4) = 5.6 (meas), 6.09 (calc); discrepancy is attributed by B. M. + K. to inclusions and porosity. The X-ray powder diffraction pattern is similar to that of ixiolite, but with line shifts corresponding to smaller cell dimensions.

In polished section, the mineral is weakly birefracting. Microsclerometer hardness (anal. 4) is 640 kg/mm² (100 g load). Color dull greyish-black; streak dark brown.

On heating at 1100°C, B.M. + K. report that some extra lines, reminiscent of wodginite, appear, and the X-ray powder diffraction pattern can then be indexed on a monoclinic cell with *a* 4.698, *b* = 5.630, *c* = 5.046 Å, β = 90°24'.

The mineral occurs in pegmatites as rounded nodules up to 3 cm in diameter, consisting of rosettes of poorly developed crystals that are tabular parallel to (100).

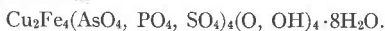
E. H. Nickel.

Arthurite

A. H. CLARK AND R. H. SILLITOE (1969) Arthurite from Potrerillos, Atacama Province, Chile. *Mineral. Mag.* **37**, 519–520

R. J. DAVIS AND M. H. HEY (1969) The cell-contents of arthurite redetermined. *Mineral. Mag.* **37**, 520–521

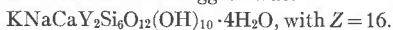
A new occurrence of arthurite is described. Restudy showed the space group to be $P2_1/c$; the cell contents previously given *Amer. Mineral.* 50, 522 (1965) were not in accord with those required. A new electron probe analysis by S. J. B. Reed gave CuO 17.5, Fe₂O₃ 27.6, As₂O₃ 36.5, P₂O₅ 5.5, SO₃ 3.2%. Recalculation of this and the former analyses leads to the formula.



Ashcroftine

P. B. MOORE, J. M. BENNETT, AND S. J. LOUISNATHAN (1969) Ashcroftine is not a zeolite! *Mineral Mag.* 37, 515-517

Ashcroftine *Amer Mineral.* 18, 78, 358-359 (1933) was found by microprobe analysis to contain major yttrium with minor amounts of other rare-earths and only traces of aluminum. X-ray study gave the space group as $I4/mmm$, $I4mm$, $I422$, or $I\bar{4}m2$, with a 24.044, c 17.553 Å. Assuming that the original analysis was correct, but replacing Al by Y, a tentative formula is suggested as:



Asbecasite

ELIO CANNILLO, GIUSEPPE GIUSEPPEZZI, AND CARLA TADINI (1969) The crystal structure of asbecasite. *Atti. Accad. Naz. Lincei Rend. Cl. Sci. Fis. Mat. Natur.* 46, 457-467.

X-ray study confirmed the unit cell previously found [*Amer. Mineral.* 52, 1583-1584 (1967)]; the mineral is trigonal, space group $P3cl$, a 8.36 ± 0.02 , c 15.30 ± 0.03 Å. The formula is given as $\text{Ca}_2(\text{Ti}, \text{Sn})(\text{As}_6\text{Si}_2\text{Be}_2\text{O}_{20})$, $Z = 2$.

Simonellite

ELISABETTA FORESTI AND LODOVICO RIVA DI SANSEVERINO (1969) X-ray crystal and molecular structure of an organic mineral: simonellite, 1, 1-dimethyl-7-isopropyl-1, 2, 3, 4-tetrahydrophenanthrene. *Atti Accad. Naz. Lincei Rend. Cl. Sci. Fis. Mat. Natur.* 47, 41-54.

Simonellite has space group $Pnaa$, a 9.231, b 9.134, c 36.01 Å, $Z = 8$.