

## NEW MINERAL NAMES

### Gallite

H. STRUNZ, B. H. GEIER, AND E. SEELIGER. Gallit,  $\text{CuGaS}_2$ , das erste selbständige Galliummineral, und seine Verbreitung in den Erzen der Tsumeb- und Kipushi-Mine. *Neues Jahrb. Mineral., Monatsh.* 1958, No. 11-12, 241-264.

Galium has long been known to be present in amounts up to 1.85% in germanite from Tsumeb and various unidentified minerals have been thought to be gallium minerals. This is now proved to be the case.

Analyses by W. Reiner gave Cu 23.52, 35.52; Pb 14.25, 3.00; Zn 3.36, 2.76; Fe 3.41, 4.93; Ge 0.66, 0.45; Ga 23.06, 17.11; As 1.00, 0.90; S 24.16, 27.90;  $\text{SiO}_2$  4.05, 4.92, sum 97.47, 97.49%. Recalculation, deducting (based on microscopic counts) quartz 4.0, 4.9; renierite 13.4, 8.0; tennantite 1.0, 0.4; galena 14.0, 1.7; bornite —, 5.6; chalcocite —, 5.3; digenite —, 0.5; pyrite —, 0.8; and "arsenate" —, 2.0 give for the gallite Cu 26.9, 30.8; Pb 3.0, 2.3; Zn 4.6, 4.4; Fe 2.7, 4.9; Ga 35.4, 29.2; S 27.4, 28.4%, corresponding to  $\text{CuGaS}_2$ , with some substitution of Cu or Ga by Fe and Zn. The mineral was also synthesized by passing  $\text{H}_2\text{S}$  over an equimolar mixture of  $\text{Ga}_2\text{O}_3$  and  $\text{Cu}_2\text{O}$  at  $400^\circ$ ; the product gave an x-ray pattern identical with that of the mineral.

X-ray study by single crystal and powder photographs showed gallite to be tetragonal, structure like that of chalcopyrite, space group probably  $D_{2d}^{12}-I42d$ . The unit cell has  $a_0$  5.35,  $c_0$  10.48 Å,  $Z=4$ . Hahn *et al.* (*Z. anorg. allgem. Chem.* 271, 153-170 (1953)) found  $a_0$  5.34<sub>9</sub>,  $c_0$  10.47 Å for synthetic  $\text{CuGaS}_2$ . Twinning on {112} was observed. Indexed x-ray powder data are given; the strongest lines are 3.064 (10), 1.876 (7), 1.611 (6), 1.088 (6), 1.214 (5).

The mineral is gray, luster metallic, streak gray-black, hardness 3-3½, G. 4.40 (calcd.), the mineral sinks slowly in Clerici solution with G.4.2. The mineral polishes well; reflecting power 26% in air, 13% in oil, internal reflections not observed, anisotropy low. Twenty photomicrographs are given.

The mineral occurs in renierite and germanite and as exsolution lamellae along (100) and (111) of sphalerite; when the latter is replaced by germanite, galena, or tennantite these lamellae or gallite may remain. Gallite contains exsolution lamellae of sphalerite oriented on (001).

The mineral occurs at Tsumeb, S. W. Africa, also observed by Uytendogaardt from the Prince Leopold Mine, Kipushi, Belgian Congo, in a similar mineral assemblage.

The name is for gallium, of which this is the first mineral.

MICHAEL FLEISCHER

### Lusungite

L. VAN WAMBEKE. Une nouvelle espece minerale: la lusungite en provenance de la pegmatite de Kobokobo (Kivu-Congo Belge). *Soc. belge geol., paleontol., et hydrol., Bull.* 67, 162-169 (1958).

The mineral occurs in the phosphate zone of the Kobokobo pegmatite. It is dark brown and is associated with goethite (limonite) and quartz. X-ray study showed it to be hexagonal rhombohedral, space group  $D_{3d}^6-R\bar{3}m$ ,  $a_0$   $7.04 \pm 0.007$ ,  $c_0$   $16.80 \pm 0.01$  Å,  $c_0/a_0 = 2.836$ ; rhombohedral cell  $a$  6.92Å,  $\alpha$   $61^\circ 12'$ . An indexed x-ray powder pattern is given; the strongest lines with intensities and ( $hkl$ ) are: 2.98 (100), (201); 5.77 (90), (101), (003); 3.53 (61), (110); 2.477 (40), (024). The pattern is very close to those of hidalgoite, svanbergite, and plumbogummite.

Analysis on 1 mg. was made by the x-ray fluorescence method with a helium chamber. It showed Fe, Pb, Sr, P major; Ba, Ca minor (less than 3%), Al, As, less than 1%; S absent.

The weight ratio PbO/SrO was determined to be 1.40, hence Sr predominates over Pb. The formula, by analogy to those of other members of the plumbogummite group, is  $(\text{Sr, Pb})\text{Fe}_3(\text{PO}_4)_2(\text{OH})_6 \cdot \text{H}_2\text{O}$ .

In thin section the mineral is yellow-brown, very slightly pleochroic, uniaxial, probably positive, birefringence 0.03–0.04; the indices could not be measured accurately because of admixed limonite, but were variable, 1.77–1.855, much higher than those of goyazite, the analogous Sr-Al, and plumbogummite, the analogous Pb-Al compounds.

The name is for the Lusungu River.

M. F.

### Birunite

S. T. BADALOV AND I. M. GOLOVANOV. Birunite—a new mineral of the thaumasite group. *Doklady Akad. Nauk Uzbekistan S.S.R.* 1957, 12, 17–21 (in Russian).

The mineral occurs as dull white fibrous incrustations 2–3 mm. thick bordering veinlets of thaumasite that fills fractures in enstatitic rock in one part of the Kurgashinkin deposit, Almalyk ore field. Analysis gave CaO 41.46, MgO 0.61, SiO<sub>2</sub> 26.70, CO<sub>2</sub> 15.51, SO<sub>3</sub> 3.33, H<sub>2</sub>O 12.17, sum 99.78%. This corresponds, after deduction of about 5% opal (seen under the microscope as very fine isotropic disseminations) to 8.5 CaSiO<sub>3</sub> · 8.5 CaCO<sub>3</sub> · CaSO<sub>4</sub> · 15H<sub>2</sub>O. Analysis of the associated thaumasite gave the usual formula CaSiO<sub>3</sub> · CaCO<sub>3</sub> · CaSO<sub>4</sub> · 15H<sub>2</sub>O. Birunite dissolves in 10% HCl much more slowly, leaves scarcely any residue, and forms a silica gel immediately, whereas thaumasite gives a precipitate of gypsum and gives a silica gel slowly.

The DTA curve shows a small endothermal break at 120–200°, another broad endothermal break at 550–720°, and an exothermal peak at 770–870° C. A heating curve shows a loss of about 12% H<sub>2</sub>O to 200° and further gradual losses from 300 to 800°.

Birunite has hardness 2, G. 2.36. It has one perfect cleavage. It is optically biaxial, positive, (orthorhombic?) with  $n_s$ ,  $\alpha$ 1.527,  $\gamma$ 1.531.

Un-indexed x-ray powder data are distinct from those of thaumasite, xonotlite, gypsum, calcite, and quartz. The strongest lines are 2.595 (10), 1.781 (10), 1.939 (8) (Given as 1.339, but between 2.037 and 1.841, hence probably a misprint. M.F.), 1.712 (4), 1.292 (3).

The name is “in honor of the great scientist of the Middle Ages in Uzbekistan—Abu-Raikhana al-Biruni.”

M. F.

### Imanite, Baikovite

A. V. RUDNEVA. New minerals of titaniferous slags. *Akad. Nauk S.S.S.R., Inst. geol. rudnykh mestorozhd., petrog., mineral., geokhim., Inst. khimii silikatov* 1958, 285–298 (in Russian).

These are not mineral names. Descriptions with analyses, optics, and x-ray data are given of the synthetic compounds. Imanite,  $3\text{CaO} \cdot \text{Ti}_2\text{O}_3 \cdot 3\text{SiO}_2$ , is isotropic,  $n$ 1.905 ± 0.02. The name is from the initials of Institut Metallurgii, Akad. Nauk. Baikovite, for Academician A. A. Baikov, is a spinel, MgTi<sub>2</sub>O<sub>4</sub>. Weakly birefringent,  $n$  1.807 ± 0.002.

M. F.

### Freboldite

HUGO STRUNZ. Mineralogische Tabellen, 3rd Ed. 1957, p. 98.

The name freboldite, for Professor Georg Frebold, Hannover, is given to the unnamed cobalt selenide, probably CoSe, of Ramdohr and Schmitt, see *Am. Mineral.*, 41, 164–165 (1956).

M. F.

## Wyartite

C. GUILLEMIN AND J. PROTAS. Ianthinite et wyartite *Bull. soc. franc. mineral crist.*, **82**, 80-86 (1959).

The material referred to ianthinite by Bignand (1955) (see *Am. Mineral.* **40**, 943-944 (1955) and Frondel, U. S. Geol. Survey Bull. **1064**, 128-130 (1958)), is distinct from ianthinite and is named wyartite for Professor J. Wyart, professor of mineralogy at the Sorbonne.

Wyartite occurs in small crystals with (001) predominant, striated, and (110) (?) Color black to violet-black, greenish on alteration. Streak brownish-violet. Luster dull, on cleavage vitreous to sub-metallic. Opaque to translucent. Orthorhombic with  $a_0$   $11.25 \pm 0.03$ ,  $b_0$   $7.08 \pm 0.02$ ,  $c_0$   $20.98 \pm 0.05 \text{ \AA}$ .,  $Z=2$  (Bignand). Cleavage (001) perfect, also (010). Hardness 3-4. G. (by hydrostatic method)  $4.69 \pm 0.05$ ; Bignand's value 4.94 was obtained on partly dehydrated material. Optically biaxial, neg.,  $\beta$   $1.89 \pm 0.02$ ,  $\gamma$   $1.91 \pm 0.02$ ,  $2V$   $48^\circ$ , elongation negative. Strongly pleochroic, X (=c) gray, Y (=b) violet, Z (=a) (lavender blue).

Analysis gave  $\text{UO}_3$  70.7,  $\text{UO}_2$  10.1, CaO 6.3,  $\text{CO}_2$  3.4,  $\text{H}_2\text{O}$  9.7, sum 100.2%, corresponding to  $3\text{CaO} \cdot \text{UO}_2 \cdot 6\text{UO}_3 \cdot 2\text{CO}_2 \cdot 12-14 \text{H}_2\text{O}$ . Spectrographic analysis showed also traces of Mg.

A dehydration curve shows loss of weight occurring from  $20^\circ$  to  $260^\circ$ , constant weight to about  $600^\circ$ , and then a further loss, but the weight losses are not given. A D.T.A. curve shows endothermic breaks at  $80^\circ$  and  $160^\circ$  (dehydration), a small exothermic break at  $280^\circ$  (oxidation of  $\text{UO}_2$  ?), a small endothermic break at about  $960^\circ$  and an endothermic break at about  $1020^\circ$ .

Unindexed x-ray powder patterns are given; the strongest lines are at 10.39, 10.375 (vs), 3.27 (s-vs), 5.18, 5.205 (s), 3.53, 3.55 (m-ms), 3.46, 3.47 (m-ms), 3.35 (m-ms), 2.93, 2.99 (m-ms). Patterns (different) are given for samples heated at  $60^\circ$ ,  $150^\circ$ , and  $400^\circ$ .

Wyartite occurs at Sbkolobwé, Katanga, as an alteration product of a red alteration product of uraninite (wölsendorfit?). Wyartite alters much less readily than ianthinite.

M. F.

## Laitakarite

ATSO VORMA. Laitakarite, a new Bi-Se mineral in Orijarvi (in Finnish). *Geologi* **11**, No. 2, 11 (1959) and private communication from A. Vormaa.

The mineral was found as thin veinlets (<2 mm.) in quartz-anthophyllite-cordierite rock at Orijarvi mine, S. W. Finland, associated with native Bi, chalcopyrite, sphalerite, molybdenite, native Ag, pyrite, and galena. Weissenberg and powder photographs show it to have space group  $R \bar{3}m$ ; the unit cell has  $a_0$  4.225,  $c_0$  39.93 Å. (hexagonal setting),  $A_{rh}$  13.53 Å.,  $\gamma$   $17^\circ 58'$  (rhombohedral setting). It is isostructural with josite. The formula is Bi (Se,S) with S:Se about 1:2. G. 7.93. The mineral is named for Aarne Laitakari, director of the Geological Survey of Finland.

M. F.

Unnamed ( $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ )

CARLO GARAVELLI. Presenza di cloruro ferrico esaidrato fra i minerali di neoformazione del giacimento elbano di Rio Marina. *Periodico mineral (Roma)*, **27**, 211-214 (1958).

Sea water, driven by storms into pyritic deposits of Rio Marina, Elba, caused alteration of pyrite to copiapite and other sulfates and the formation of orange-red incrustations containing gypsum, NaCl, and birefringent crystals with indices above that of methylene iodide. Chemical analysis of the mixture ( $\text{Fe}_2\text{O}_3$  10.2%) corresponded to  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$  after deduction of gypsum, NaCl,  $\text{CaCl}_2$ , and  $\text{MgCl}_2$ . The x-ray powder pattern (not given) is said to agree closely with the A.S.T.M. data for  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ , especially the lines at 6.00, 4.00, 3.16, and 1.95.

M. F.

### Unnamed

M. D. DORFMAN. New data on minerals of Yukspor in the Khibina Tundra. *Voprosy Geol. i Mineral Kol'skogo Poluostrova* (Problems of geology and mineralogy of the Kola Peninsula), *Akad. Nauk S.S.R., Kola Filial*, 1, 146-164 (1958) (in Russian).

In 1951 a railroad tunnel through Yukspor Mt. was begun. It cut a series of ijolite-urtite rocks and 3 nepheline-aegirine-feldspar pegmatites were cut in which several apparently new minerals were found.

### Mineral No. 2

This mineral occurs as grayish-yellow pseudomorphs after eudialyte in masses up to 2.5 cm. in diameter. Cleavage indistinct. Hardness 3-3½. Luster greasy or silky. *G.* 2.89. Optically uniaxial, neg.,  $\omega$  1.625,  $\epsilon$  1.622.

Analysis by Z. I. Goroshchenko and E. E. Kostyleva gave SiO<sub>2</sub> 45.98, TiO<sub>2</sub> 0.28, ZrO<sub>2</sub> 11.94, Al<sub>2</sub>O<sub>3</sub> 0.28, Fe<sub>2</sub>O<sub>3</sub> 0.07, FeO 2.68, MnO 3.49, MgO 0.18, CaO 10.62, SrO 0.44, TR<sub>2</sub>O<sub>3</sub> 3.83, Na<sub>2</sub>O 11.16, K<sub>2</sub>O 1.36, (Nb,Ta)<sub>2</sub>O<sub>5</sub> 2.40, CO<sub>2</sub> 2.51, P<sub>2</sub>O<sub>5</sub> none, S 0.08, Cl<sub>2</sub> 0.42, H<sub>2</sub>O<sup>-</sup> 0.16, H<sub>2</sub>O<sup>+</sup> 1.37, sum 99.25—(O=Cl<sub>2</sub>) 0.09=99.16%. A little catapleite was present, filling fractures. X-ray spectrographic determinations of the individual rare earths are given. The formula is (Na, Ca, TR, etc)<sub>6</sub>ZrSi<sub>6</sub>O<sub>18</sub>(OH, Cl). An analysis of the eudialyte gives the same formula, but shows somewhat more Si, Na, and Ca and less Mn, Nb, and rare earths. The mineral is easily fusible to a yellow vesicular glass. Soluble in acids with gelatinization.

X-ray powder data by A. P. Denisov are given for Mineral No. 2 (47 lines) and for eudialyte (17 lines); these are stated to show that the minerals are different. The strongest lines of mineral no. 2 are 3.196 (10), 2.862 (10), 1.783 (10, broad), 2.153 (9, broad), 1.986 (8), 2.980 (7).

DISCUSSION.—The x-ray pattern for mineral no. 2 agrees very closely (except that all lines above 4.78 are missing) with the pattern given for eudialyte by Claringbull in the A.S.T.M. file. The mineral is therefore simply eudialyte.

### Mineral No. 3

The mineral is gray to greenish-gray (if aegirine is present), finely foliated. Luster vitreous, pearly on the perfect cleavage. Brittle. Hardness about 4. *G.* 2.578. Orthorhombic, extinction parallel, biaxial, positive,  $ns$   $\alpha$  1.5285,  $\beta$  1.5313,  $\gamma$  1.5323,  $2V$  29°, elongation with respect to the perfect cleavage negative. Pectolite replaces the mineral along cleavages.

Analysis by L. D. Nikitina of material containing some inclusions of pectolite, aegirine, and stilpnomelane (?) gave SiO<sub>2</sub> 46.36, TiO<sub>2</sub> 0.07, Al<sub>2</sub>O<sub>3</sub> 6.48, Fe<sub>2</sub>O<sub>3</sub> 0.67, FeO n.d., MgO 0.14, MnO 0.08, BeO 0.17, CaO 14.55, SrO 0.12, TR<sub>2</sub>O<sub>3</sub> 0.11, Na<sub>2</sub>O 6.88, K<sub>2</sub>O 17.94, F 2.81, Cl 3.47, S 0.66, H<sub>2</sub>O<sup>+</sup> 1.23, H<sub>2</sub>O<sup>-</sup> 1.06, sum 102.80 (given as 102.20% M.F.). From this is deducted O=F<sub>2</sub> 1.18, O=Cl<sub>2</sub> 0.78, O=S 0.33 (given as 0.03 M.F.), total 100.51% (given as 100.21% M.F.). Spectrographic analysis showed also Y, Ba, and Cu. The formula is (K,Na)<sub>4</sub>Ca<sub>2</sub>(Al,Fe)(Si<sub>5,9</sub>Al<sub>0,1</sub>)(O,OH,F)<sub>18</sub>·0.6NaCl. The mineral fuses easily, even in the alcohol flame (m.p. 850-900°), to a glass with  $n$  1.534. Dissolves in acids with the separation of gelatinous silica. The D.T.A. curve shows no breaks.

X-ray powder data by A. P. Denisov are given (52 lines). More than half of these match lines of pectolite, given for comparison. The strongest lines and those of pectolite are 3.077-10 (3.08-9), 2.904-9 (2.89-10), 3.474-8 broad (—), 2.477-7 (2.42-5), 1.928-7 (1.933-2), 1.864-7 (1.869-5), 1.769-7 (1.77-7), 1.532-6 (1.539-7).

### Mineral No. 4

Mineral 4 occurs in perthite-like intergrowths with pectolite; individual grains are 0.01-0.05 mm. Water-clear, luster vitreous. Optically biaxial,  $\alpha$  1.481,  $\gamma$  1.490,  $2V$  60-66°; not orthorhombic.

Analysis by A. V. Mokretsova of such intergrowths gave  $\text{SiO}_2$  56.90,  $\text{TiO}_2$  0.04,  $\text{Al}_2\text{O}_3$  10.26,  $\text{Fe}_2\text{O}_3$  0.27,  $\text{FeO}$  0.22,  $\text{MnO}$  0.44,  $\text{MgO}$  0.15,  $\text{CaO}$  16.70,  $\text{Na}_2\text{O}$  6.14,  $\text{K}_2\text{O}$  6.16,  $\text{H}_2\text{O}^-$  0.22,  $\text{H}_2\text{O}^+$  2.63,  $\text{F}$  0.31, sum 100.44— $(\text{O}=\text{F}_2)$  0.13 = 100.31%. Deducting pectolite (all the  $\text{CaO}$ ,  $\text{Na}_2\text{O}$ ,  $\text{MnO}$ , and corresponding amounts of  $\text{SiO}_2$  and  $\text{H}_2\text{O}$ ), this is said to give the formula  $2\text{K}_2\text{O} \cdot 3\text{Al}_2\text{O}_3 \cdot 7\text{SiO}_2 \cdot 3(\text{H}_2\text{O}, \text{F})$ . (The  $\text{SiO}_2$  is half the correct value; the calculation gives nearly  $\text{K}_2\text{Al}_3\text{Si}_7\text{O}_{18}(\text{OH}, \text{F})_3$  M.F.). The mineral dissolves in  $\text{HCl}$ . In the closed tube it gives off no water.

A D.T.A. curve of the intergrowth gave endothermic breaks at 339–425° and 747–770°; the latter is characteristic of pectolite.

An  $x$ -ray powder diagram by A. P. Denison (61 lines) gave the following considered to be characteristic of Mineral No. 4 and not pectolite 3.249-10, 1.765-7, 3.491-5, 1.456-6, diffuse, and many weaker lines.

#### Mineral No. 5, Mineral No. 6

These are listed as being associated with Mineral No. 3. No data are given except that Mineral No. 5 is rose-colored, Mineral No. 6 coppery-yellow.

M. F.

#### Cousinite

J. F. VAES. Cousiniet, een nieuw uraanmineral. *Geologie en Mijnbouw*, 20, 12, 449 (1958)

The mineral occurs at the Shinkolobwe Mine, Katanga, as an alteration product of ore containing uraninite and molybdenite. It is in thin black blades with high vitreous luster. Analysis on 270 mg. gave  $\text{UO}_2$  55.25,  $\text{MoO}_3$  28.35,  $\text{PbO}$  4.60,  $\text{MgO}$  4.10, loss on ignition 6.64, insoluble 2.43, sum 101.37%. After deducting the lead and a corresponding amount of  $\text{MoO}_3$  as wulfenite, identified as present, and assuming that the loss in weight on ignition is low because of a gain in weight of 3.27% due to oxidation of  $\text{UO}_2$  to  $\text{UO}_3$ , this gives the formula  $\text{MgO} \cdot 2\text{MoO}_3 \cdot 2\text{UO}_2 \cdot 6\text{H}_2\text{O}$ . If the loss in weight is used in the calculation, the formula has  $4\text{H}_2\text{O}$ .

No physical properties or  $x$ -ray data are given, nor is the origin of the name stated.

DISCUSSION.—Insufficient data. Compare with moluranite, *Am. Mineral.* 43, 380 (1958).

M. F.

#### DISCREDITED MINERALS

##### Amphitalite (=mixture, mostly augelite)

AKE HENRIQUES. Amphitalite, a mixture. *Arkiv. Mineral. Geol.* 2, 369 (1958).

Optical and  $x$ -ray examination of the type material (Dana's System, 7th Ed., v. II, p. 873) shows it to be a mixture of augelite with apatite, lazulite, rutile, kyanite, quartz, and mica.

M. F.

##### Tetragaphosphite (=Laculite) Rhodophosphite (=manganian Apatite)

AKE HENRIQUES, Tetragaphosphite discredited. *Arkiv. Mineral. Geol.*, 2, 371–372 (1958).

Optical and  $x$ -ray study of the type material described by Igelstrom in 1896 shows that tetragaphosphite is lazulite and that rhodophosphite is a manganian apatite.

M. F.

#### CORRECTION

Mrs. Daphne D. Ross has kindly called my attention to an error in the abstract on seidozerite, *Am. Mineral.* 44, 468 (1959). The strongest  $x$ -ray lines there listed are actually for lävenite. The strongest lines for seidozerite are 2.97 (10), 2.87 (7), 1.830 (7), 2.58 (4), 1.633 (4). I regret the error.

M. F.