

## NEW MINERAL NAMES

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## Dzhezkazganite

E. M. POPLAVKO, I. D. MARCHUKOVA, AND C. SH. ZAK, A rhenium mineral in the ores of the Dzhezkazgan deposits. *Doklady Akad. Nauk SSSR*, **146** (2), 433-436 (1962) (in Russian).

High amounts of rhenium were found in lean copper and lead ores of the Dzhezkazgan deposits, Kazakhstan, prompting further studies (abs. in *Econ. Geol.* **55**, 607-609, 1960). Microscopic study showed the presence of an unknown mineral as collomorphic aggregates and fine veinlets in bornite and blue chalcocite; it replaces bornite. Brownish-gray in reflected light, reflecting power 25.7% for green, 27.2% for yellow, 27.4% for red. Microhardness 230 kg/sq mm. The mineral turns brown with  $\text{HNO}_3$  (1:1), does not react with  $\text{HCl}$  (1:1),  $\text{KCN}$  (20%),  $\text{H}_2\text{SO}_4$ ,  $\text{KOH}$  (20%),  $\text{FeCl}_3$ ,  $\text{HgCl}_2$ .

The mineral was concentrated by dissolving out bornite and blue chalcocite with  $\text{KCN}$ , galena with a solution of  $\text{NaCl} + \text{FeCl}_3$ . Electron probe analysis gave Re 40-50%, Cu 15-20% (Cu:Re = about 1:1), but some samples gave higher results (up to 80% Re), perhaps because they fused in the beam. The contents of Co, Fe, Ni, Zn, Mo, and Pb were less than 0.5-1.0%; Se and Te absent, As was present in thousandths of a percent. It is assumed that the third component is sulfur.

X-ray study of 3 samples gave lines only of associated minerals: bornite, galena, quartz, digenite, so the mineral is believed to be amorphous to x-rays.

The name is for the locality.

DISCUSSION.—There is evidently a rhenium mineral present (first one known), but the name is premature.

## Aksaite

L. N. BLAZKO, V. V. KONDRAT'eva AND YA. YA. YARZHEMSKII, Aksaite, a new hydrous magnesium borate. *Zapiski Vses. Mineralog. Obshch.* **91** (4), 447-454 (1962) (in Russian).

The mineral was found in fine-grained rock salt containing kieserite, anhydrite, and preobrazhenskite (*Am. Mineral.* **42**, 704, 1957) at Ak-sai (= white gulch), Kazakhstan. Analysis by M. M. Vil'ner gave  $\text{B}_2\text{O}_3$  61.4,  $\text{MgO}$  13.8,  $\text{H}_2\text{O}$  23.73, total 98.93%; by K. A. Baklanova  $\text{B}_2\text{O}_3$  61.13,  $\text{MgO}$  13.44,  $\text{H}_2\text{O}$  23.73,  $\text{R}_2\text{O}_3$  0.56, Insol. 0.56, total 99.42%; these correspond to  $2\text{MgO} \cdot 5\text{B}_2\text{O}_3 \cdot 8\text{H}_2\text{O}$ . Analysis of a sample from another, unstated locality by M. M. V. gave  $\text{B}_2\text{O}_3$  58.4,  $\text{MgO}$  14.6,  $\text{H}_2\text{O}$  22.2,  $\text{CaO}$  2.15,  $\text{SO}_3$  2.75, total 100.1%, corresponding to  $3\text{MgO} \cdot 7\text{B}_2\text{O}_3 \cdot 10\text{H}_2\text{O}$ . DTA study by K. A. Kostryukova showed an endothermal effect at 246-254°, an exothermal one at 662° C. Insoluble in water, readily soluble in  $\text{HCl}$ .

Laue and Weissenberg photographs showed the mineral to be orthorhombic, piezoelectric effects absent,  $D_{2h}^{15} - Pbcn$ , with unit cells from the first locality  $a$   $12.54 \pm 0.01$ ,  $b$   $24.28 \pm 0.02$ ,  $c$   $7.49 \pm 0.01$  kX, from the second locality  $a$   $12.52 \pm 0.01$ ,  $b$   $24.27 \pm 0.03$ ,  $c$   $7.47 < 0.01$  kX. The first contains  $\text{Mg}_{10}\text{B}_{50}\text{O}_{86} \cdot 40\text{H}_2\text{O}$  with G meas. 2.066, G calc. 2.072; the second contains  $\text{Mg}_{12}\text{B}_{60}\text{O}_{96} \cdot 40\text{H}_2\text{O}$  with G meas. 2.367, G calc. 2.293. X-ray powder data are given; the strongest lines are: 6.36 (10), 6.00 (8), 4.98 (6), 4.68 (9), 4.33 (6), 3.54 (9), 3.19 (9), 3.09 (7), 2.78 (8), 2.470 (5), 2.348 (6), 2.300 (5), 2.115 (5), 2.074 (5), 2.013 (6), 1.970 (7), 1.856 (6), 1.816 (6), 1.738 (5), 1.696 (5), 1.567 (5), 1.486 (6), 1.178 (6).

The mineral occurs in crystals elongated up to 7 mm on [001] and flattened on (100). Faces of the prismatic zone are striated parallel to [100]. The most characteristic forms are

{100}, {010} and {021}; faces of {001} are rare. There are probably cleavages on (100) and (010). Light-gray, colorless in small crystals. H about 2.5. Optically biaxial, negative,  $\alpha$  1.473,  $\beta$  1.508,  $\gamma$  1.528 (all  $\pm 0.001$ ),  $2V$  88°,  $Z=b$ ,  $X=a$ , elongation negative.

The name is for the locality.

**DISCUSSION.**—Appears to be a valid mineral, but the data on composition and density are unsatisfactory, perhaps indicating that the samples contained preobrazhenskite. Miss Mary E. Mrose has kindly called my attention to a paper by Lehmann and Papenfuss, *Zeit. anorg. Chem.* **301**, 228–232 (1959). These authors describe the synthesis of  $MgO \cdot 3B_2O_3 \cdot 5H_2O$  and give x-ray powder data which agree fairly well with those for aksaite except that they give two strong lines of higher d spacing not given for aksaite and that their pattern includes lines of  $MgO \cdot 3B_2O_3 \cdot 7.5 H_2O$ . They found  $G$  1.88. Using the unit cell given for aksaite and the formula  $MgB_6O_{10} \cdot 5H_2O$ , the unit cell contains  $Mg_3B_{48}O_{80} \cdot 40 H_2O$  and the calculated  $G$  is 1.96. It seems probable that this is the true composition of aksaite.

### Zavaritskite

E. I. DOLOMANOVA, V. M. SENDEROVA AND M. T. YANCHENKO, Zavaritskite (BiOF), a new mineral of the oxyfluoride group. *Doklady Akad. Nauk SSSR*, **146** (3), 680–682 (1962) (in Russian).

Samples of bismuthinite crystals collected by K. A. Nenadkevich from the Sherlova Gory deposits, E. Transbaikal, and obtained from the Mineralogical Museum, Academy of Sciences, U.S.S.R., were found to be pseudomorphs of bismutite and an unknown gray mineral after bismuthinite. The gray mineral had semi-metallic to greasy luster, translucent in very thin layers. Cleavage and hardness could not be determined. Under the microscope it is colorless, weakly birefringent,  $n$  2.213  $\pm$  0.005.

Analysis (by V.M.S.) of material containing a little bismutite and bismuthinite gave  $Bi_2O_3$  94.91,  $H_2O \pm 0.51$ , S 0.50, F 4.33,  $CO_2$  1.84, Pb, Cu Cl not found,  $R_2O_3$ , CaO,  $SiO_2$  trace, sum 102.11 — (O = F<sub>2</sub>, O = S) 2.07 = 100.04%. After deducting bismuthinite and bismutite, this corresponds to BiOF.

X-ray powder data (by M.T.Y.) are given. The strongest lines are, in A., 3.18 (8)(011), 3.09 (5)(002), 2.63 (5)(110), 2.01 (6)(112), 1.614 (8, broad, diffuse)(113), 1.478 (5)(122), 1.438 (7)(014), 1.305 (7)(213), 1.248 (6)(005), 1.223 (8, broad)(301), 1.185 (7)(130), 1.141 (9)(124), 1.126 (8)(115), 1.108 (9)(223), 1.070 (7)(033), 1.037 (9)(006), 1.028, 1.025 (10, broad, doublet)(133), 0.998 (10)(224). These data, except for the high intensities of the low-spacings, agree well with the data of Aurivillius, *Arkiv Kemi, Mineral*, **26B**(2) (1948) for synthetic BiOF. They are indexed on the space group he found,  $D_{4h}^{19}P4/nmm$ . From the powder data,  $a$  3.75,  $c$  6.23, both  $\pm 0.01$  Å,  $Z=2$ .  $G$  calc. 9.21, meas. 8.34, 7.88; measured by Aurivillius on synthetic, 9.0. The low values are explained as due to the fine-grained nature.

The mineral occurs in quartz-topaz-siderophyllite greisens.

The name is after Aleksandr Nikolaevich Zavaritskii, Russian petrographer.

### Bearsite

E. V. KOPCHENOVA AND G. A. SIDORENKO, Bearsite, the arsenic analogue of moraesite. *Zapiski Vses Mineralog. Obshch.* **91**, 442–446 (1962) (in Russian).

Microchemical analysis by L. I. Polupanova gave  $As_2O_5$  more than 25.5, BeO 16.75,  $Al_2O_3$  6.06,  $Fe_2O_3$  1.08, CaO 1.40, MgO 0.61,  $SiO_2$  1.64,  $H_2O$  more than 29.0%. Material was insufficient for a complete analysis. Spectrographic analysis showed also 0.0n% Mn, 0.00n% Ti. From the crystallographic similarity to moraesite, the formula is probably  $Be_2(AsO_4)(OH) \cdot 4H_2O$ .

The mineral occurs as fine incrustations and tangled white fibrous aggregates of crystals tenths to hundredths of a millimeter in size. Electron microscope photographs show them to be prismatic with longitudinal striations. G meas. above 1.8, lower than 2.0; G calc. 2.199. Optically biaxial (-),  $\alpha$  1.490  $\pm$  0.001,  $\beta$  close to  $\gamma$ ,  $\gamma$  1.502  $\pm$  0.001,  $c$ :  $\gamma$  = 8-10°.

The x-ray powder pattern (49 lines) is nearly identical with that of moraesite (*Am. Mineral.* **38**, 1126-1133, 1953); the strongest lines are 6.95 (10), 3.31 (8), 4.23 (6), 3.02 (6), 2.88 (5), 2.145 (5), 1.956 (5), 1.889 (5), 1.776 (5). From these, the unit cell is  $\alpha$  8.55,  $b$  36.90,  $c$  7.13,  $\beta$  97°49'  $\pm$  0.30',  $Z$  = 12.

The mineral occurs in the zone of oxidation of a polymetallic deposit in Kazakhstan, in which the hypogene ore contains arsenopyrite, molybdenite and galena, with lesser pyrite, sphalerite, realgar, and orpiment and a little pitchblende. The ores are associated with felsite porphyry containing beryl. Bearsite occurs at a depth of 15 m. coating pharmacosiderite and arsenosiderite. Other arsenates present include scorodite-mansfieldite, conichalcite, tyrolite, sodium uranospinit and metazeunerite. The exact locality is not given, as usual for deposits containing uranium.

The name is for the composition; this is the first known beryllium arsenate.

DISCUSSION.—Despite the lack of complete data, the x-ray data appear to define the composition.

#### Fenghuangite

PENG, CHI-JUI AND LIU, YUAN-LUNG, Fenghuangite, a new apatite-like mineral of cerium earths and thorium. *Scientia Sinica*, **11** (5), 677-686 (1962) (in English).

A preliminary report was abstracted in *Am. Mineral.* **45**, 754-755 (1960). Additional data are given. Analysis by Chung Chih-Cheng gave SiO<sub>2</sub> 13.76, P<sub>2</sub>O<sub>5</sub> 6.32, CO<sub>2</sub> 2.62, Al<sub>2</sub>O<sub>3</sub> 1.36, Fe<sub>2</sub>O<sub>3</sub> 0.31, ThO<sub>2</sub> 19.64, CeO<sub>2</sub> 12.98, Ce<sub>2</sub>O<sub>3</sub> 20.07, Y<sub>2</sub>O<sub>3</sub> 0.66, U<sub>3</sub>O<sub>8</sub> 0.40, CaO 10.43, MgO 0.08, SrO 0.50, PbO 0.10, Na<sub>2</sub>O 0.25, H<sub>2</sub>O<sup>-</sup> 4.82, H<sub>2</sub>O<sup>+</sup> 5.49, sum 99.79% (given as 99.97). Spectrographic analysis also showed Ti, Ba 0.03, Yb, B 0.003%. After deducting 0.31% Fe<sub>2</sub>O<sub>3</sub> as hematite and 0.25% Na<sub>2</sub>O, 0.41% Al<sub>2</sub>O<sub>3</sub>, and 0.48% SiO<sub>2</sub> as nepheline, and neglecting the H<sub>2</sub>O<sup>-</sup>, this corresponds to (Ca<sub>2-15</sub>Ce<sub>1-80</sub>Th<sub>0-75</sub>)<sub>4-8</sub> [(Si<sub>1-8</sub>P<sub>0-72</sub>C<sub>0-48</sub>)<sub>3-0</sub>O<sub>4</sub>](OH)·2.5H<sub>2</sub>O (apatite type). The mineral dissolves slowly in cold dilute HCl, readily in concentrated HCl, HNO<sub>3</sub>, and H<sub>2</sub>SO<sub>4</sub>.

Amorphous to x-rays. After being heated at 800-1050° it gives an apatite-like pattern with strongest lines 3.13 (10), 2.80 (10), 1.851 (5), 1.789 (5), 1.628 (5), corresponding to  $a$  9.58  $\pm$  0.01,  $\text{\AA}$  7.01  $\pm$  0.03  $c$ . G meas. 3.327, calc. 5.12.

The mineral occurs in urtite dikes in a biotite foyaitite, part of an alkalic igneous complex intruded into Cambrian limestone. Associated minerals are nepheline, melanite, aegirine, orthoclase and sphene. The locality is not given, except for the statement that the mineral is named for the locality.

DISCUSSION.—The authors call attention to the similarity to britholite, but consider their mineral to be different because of its high Th, the presence of CO<sub>2</sub>, and the lack of F. Although the thorium content is higher than previously reported for britholite (max. ThO<sub>2</sub> 9.77%), it is still subordinate to Ca and Ce, and the name is an unnecessary one for thorian britholite.

#### Gugiaite

CHI-JUI PENG, RUNG-LUNG TSAO AND ZU-RUNG ZOU, Gugiaite, Ca<sub>2</sub>BeSi<sub>2</sub>O<sub>7</sub>, a new beryllium mineral and its relation to the melilite group. *Scientia Sinica*, **11**, 977-988 (1962) (in English).

Two analyses by Lan-Chuan Chang and Feng-liang Chiang gave resp., SiO<sub>2</sub> 45.26, 44.90; Al<sub>2</sub>O<sub>3</sub> 1.08, 2.17; Fe<sub>2</sub>O<sub>3</sub> 0.03, 0.11; BeO 8.89, 9.49; MgO 0.39, 0.38; MnO 0.11, 0.07;

CaO 42.94, 40.09; Na<sub>2</sub>O n.d., 0.72; K<sub>2</sub>O n.d., 0.20; H<sub>2</sub>O<sup>-</sup> 0.02, 0.36, H<sub>2</sub>O<sup>+</sup> 0.40, 0.90; F n.d., 0.25, Cl 0.73, 0.18; P<sub>2</sub>O<sub>5</sub> n.d., 0.08; TiO<sub>2</sub> 0.02, trace; (Zr, Hf)O<sub>2</sub> 0.45, n.d., sum 100.32, 99.94, -(O=F<sub>2</sub>, Cl<sub>2</sub>) 0.17, 0.15=100.15, 99.79%. These correspond to (Ca, Na)<sub>2</sub>Be(Si, Al)<sub>2</sub>(O, OH)<sub>7</sub>. The mineral is dissolved by hot 1:1 HCl, HNO<sub>3</sub>, or H<sub>2</sub>SO<sub>4</sub> with separation of some gelatinous silica.

The mineral occurs as thin tetragonal tablets with prominent base *c* {001}, and other forms *ε* {011}, *p* {111}, and narrow faces of *m* {110}. Rotation and Weissenberg photographs show it to be tetragonal, space group *P*42, *m*, with *a* 7.48 ± 0.02, *c* 5.044 ± 0.003 Å, *c/a* = 0.6743. The crystals are strongly piezoelectric. Indexed *x*-ray powder data (37 lines) are given; the strongest lines are 2.765 (10), 1.709 (7), 1.485 (7).

Gugiaite is colorless and transparent, luster vitreous. Cleavages {010} perfect, {001} distinct, {110} poor, fracture irregular. *H* about 5, *G* 3.034, calc. from *x*-ray data 3.03. Optically uniaxial (+), *ω* 1.664, *ε* 1.672, both ± 0.001.

The mineral occurs near the village of Gugia in skarn rocks, as tablets mostly 2–3 mm. across and 0.3–0.5 mm. thick in cavities and disseminated in melanite. Other minerals present are orthoclase, vesuvianite, aegirine, sphene, apatite and prehnite.

The name is for the locality.

DISCUSSION.—The authors point out that this is a member of the meliilite group close to meliphanite, (Ca, Na)<sub>2</sub>Be(Si, Al)<sub>2</sub>(O, F)<sub>2</sub>, differing in containing much less Na and F. Since the analyses of meliphanite show a considerable range, but always with Ca > Na, it would seem simpler to extend this name to this near end-member; this would make the new name unnecessary.

#### Beta-alumohydrocalcite

ANTONI MORAWIECKI, *β*-alumohydrokalcyt z Nowej Rudy na Dolnym Śląsku. *Przegląd Geol.* 9 (7), 382 (1961) (in Polish).

Analysis of an air-dried fibrous mineral occurring in fissures of Carboniferous shales gave Al<sub>2</sub>O<sub>3</sub> 28.87, Fe<sub>2</sub>O<sub>3</sub> none, Cr<sub>2</sub>O<sub>3</sub> 0.37, V<sub>2</sub>O<sub>3</sub> 0.06, TiO<sub>2</sub> 0.01, MgO, MnO none, FeO 0.16, CaO 17.42, Na<sub>2</sub>O 0.01, CO<sub>2</sub> 26.28, H<sub>2</sub>O<sup>+</sup> 25.78, insol. in HCl 1.20, SiO<sub>2</sub> 0.06, sum 100.22%, corresponding to CaAl<sub>2</sub>(CO<sub>3</sub>)<sub>2</sub>(OH)<sub>4</sub>·3H<sub>2</sub>O. *H* 3.5, *G* 2.218–2.45. DTA showed a strong endothermic effect at 200–350° with peak at 270°, and a small endothermic effect at 800–900°. The *n*s are 1.553 and 1.567, elongation positive, symmetry from the optical properties orthorhombic. This corresponds closely to alumohydrocalcite (*Dana's System*, 7th Ed., 2, 280) except in being orthorhombic.

DISCUSSION.—Requires verification by *x*-ray study.

#### Fabianite

H. GAERTNER, K.-L. ROESE AND R. K. KÜHN, Fabianit = CaB<sub>3</sub>O<sub>5</sub>(OH), ein neues Mineral. *Naturwissenschaften*, 49, 230 (1962).

R. KÜHN, K.-L. ROESE AND H. GAERTNER, Fabianit CaB<sub>3</sub>O<sub>5</sub>(OH), ein neues Mineral. *Kali u. Steinsalz*, 3, 285–290 (1962).

Analysis of separated crystal fragments gives CaO 32.1, B<sub>2</sub>O<sub>3</sub> 57.9, H<sub>2</sub>O 5.2, SO<sub>3</sub> 2.2, Fe<sub>2</sub>O<sub>3</sub> 0.6, sum 98.0%. After deducting some CaSO<sub>4</sub> and Fe<sub>2</sub>O<sub>3</sub> this corresponds to 2CaO·3B<sub>2</sub>O<sub>3</sub>·H<sub>2</sub>O or to CaB<sub>3</sub>O<sub>5</sub>(OH). The mineral is nearly insoluble in water, soluble in HCl and HNO<sub>3</sub>.

Good crystals, 0.3–25 mm in size. Goniometric measurements show monoclinic symmetry with axial ratio *a*:*b*:*c* = 0.7960:1:0.6261, *β* = 113°10'; habit prismatic, forms (001), (100), (120), (110), (320), (011), (021). Colorless, brownish-yellow fluorescence. Cleavage (011). *H* 6. *G* 2.796. Optically biaxial, (–), with *α* 1.608, *β* 1.637, *γ* 1.650, 2*V* 65°. Dispersion *v* > *r*, very low, *Y* = *b*, *Z* = *a*, *X* ∩ *c* 23.3°. *X*-ray powder data are given, the

strongest lines are 3.27(10), 2.075(7), 2.026(7), 3.97(4), 3.04(4), 2.926(4), 2.149(4), 2.020(4), 1.944(4). Fabianite is not isotypic with synthetic  $\text{CaB}_3\text{O}_6(\text{OH})$  (see *Acta Cryst.* 15, 207, 1962). No single crystal *x*-ray-data are given.

Occurs in a rocksalt drill core at Rehden near Diepholz, Germany, associated with halite, anhydrite, howlite and szaibelyite.

The name is for Hans-Joachim Fabian, geologist, Wintershall AG., Erdölwerke Niedersachsen.

HUGO STRUNZ

### Wenkite

J. PAPAGEORGAKIS. Wenkit, ein neues Mineral. *Schweiz. mineral. petrogr. Mitt.* 42, 269–274 (1962).

Analysis by H. Schwander on purified powder gave  $\text{SiO}_2$  31.0,  $\text{Al}_2\text{O}_3$  19.8,  $\text{CaO}$  10.0,  $\text{SrO}$  0.8,  $\text{BaO}$  27.6,  $\text{Na}_2\text{O}$  0.6,  $\text{K}_2\text{O}$  0.7,  $\text{H}_2\text{O}$  2.3,  $\text{SO}_3$  6.7, Cl trace, sum 99.5%. This corresponds to the slightly simplified formula  $(\text{OH})_5(\text{SO}_4)_2\text{Ba}_{4.5}\text{Ca}_{4.5}\text{Al}_9\text{Si}_{12}\text{O}_{42}$  or  $3x(\text{Ba}, \text{Ca})_3[(\text{OH}, \frac{1}{2}\text{SO}_4)_3|\text{Al}_3\text{Si}_4\text{O}_{14}]$ .

The new mineral occurs in light gray prismatic crystals, up to 5 cm in length. Hexagonal with  $a$  13.528,  $c$  7.471 Å,  $c/a$  0.5523, probable space group  $D_{6h}^{2h}-P6/mmm$ . Optically uniaxial (–), in some cases anomalously biaxial,  $2V$  up to  $10^\circ$ ,  $\epsilon$  1.589,  $\omega$  1.595.  $H$  6.  $G$  3.13. Prismatic cleavage very poor. *X*-ray powder data are lacking, but some relation to cancrinite is mentioned.

Occurs between barite layers and calc-silicate rock as product of strong metamorphism in the marbles of Candoglia, northern Italy.

The name is for Professor E. Wenk, University of Basel, Switzerland.

Some of the above mentioned data have already been published as belonging to an unnamed new mineral (see *Am. Mineral.* 45, 255, 1960).

DISCUSSION.—A recalculation of the formula gives 53.3 oxygen in the unit cell, on the basis of 54 oxygen:  $(\text{Ba}, \text{K})_{4.5}(\text{Ca}, \text{Na}_{4.5})[(\text{OH})_4\frac{1}{2}(\text{SO}_4)_2|\text{Al}_9\text{Si}_{12}\text{O}_{42}]$ .

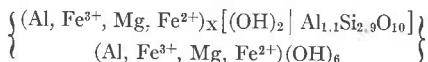
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### Sudoite

W. v. ENGELHARDT, GERM. MÜLLER AND H. KROMER. Diotaedrischer Chlorit ("Sudoit") in Sedimenten des Mittleren Keupers von Plochingen (Württ.). *Naturwissenschaften*, 49, 205–206 (1962).

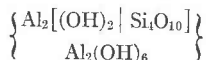
A mixture of a new non-expanding clay mineral with an irregularly interstratified clay mineral from the Knollenmergel-Keuper at Lützelbach near Plochingen was investigated.

From  $d_{001} = 14.23$  Å it was determined to be a chlorite, and from the position of the 060 reflection, giving  $b = 8.94$ – $9.02$  Å, and from the strong intensity of the 003 reflection, it was determined to be a dioctahedral chlorite. From an unpublished analysis of this mixture and from the position of the 001 reflection, the authors give the formula



with  $X$  and  $Y$  between 2 and 2.5.

This mineral forms a series with an unnamed dioctahedral phyllosilicate of the chlorite group, published by G. Müller, *Neues Jahrb. Min., Monatsh.* 1961, 112–120:



$a$  5.14,  $b$  8.95,  $d_{001}$  14.22;  $\alpha$  1.574,  $\beta \sim \gamma$  1.580,  $2V_a$  small. Analysis and thermal behavior

were published. Formed by hydrothermal alteration of a Permian quartzporphyrytuff of the Kesselberg area near Triberg in the Black Forest.

G. Müller (1962) proposes "súdoite" as a name for this dioctahedral series of phyllosilicates, as chlorite is the name of the analogous trioctahedral series. Both series are the súdoite-chlorite group.

Named in honor of Prof. T. Sudo, Tokyo.

DISCUSSION.—Brydon (1961) has published results on a similar mineral from alberni soils in Canada and S. Caillere (1962) from bauxites in France. A further publication of G. Müller is announced.

HUGO STRUNZ

### Hydrohalloysite

J. ERDÉLYI. Hydrohalloysit (Hydroendellit ?), ein neues Mineral der Halloysitgruppe aus dem Mátra-Gebirge (Ungarn) und von Baia Mare (Nagybánya) *Chemie Erde* **21**, 321–343 (1962) (in Roumanian).

A specimen from Baia Mare (Nagybánya), collected by M. Palfy in 1913, is a porcelain-like white material with conchoidal fracture.  $H$  1.5,  $G$  2.35,  $n$  1.537. Analysis:  $SiO_2$  42.16,  $Al_2O_3$  36.86,  $Fe_2O_3$  0.09,  $CaO$  0.15,  $H_2O$  6.03 (up to  $150^\circ$ ), 0.04 ( $150$ – $200^\circ$ ), 0.81 ( $200$ – $300^\circ$ ), 12.94 ( $300$ – $700^\circ$ ), 0.67 ( $700$ – $1000^\circ$  C.),  $P_2O_5$  0.24, sum 99.99%. The water up to  $300^\circ$  (6.88%) is regarded as adsorption and interlayer water, between  $300$ – $700^\circ$  as OH in octahedral coordination, above  $700^\circ$  (0.67%) as OH in tetrahedral coordination, corresponding to the formula  $Al_{3.904}Fe^{3+}_{0.006}[(OH)_8 | Al_{0.108}Si_{3.892}O_{9.628}(OH)_{0.372}] \cdot 2H_2O$ .

From powder diagrams  $a$  5.136,  $b$  8.904,  $c$  9.758 Å,  $\beta$   $92^\circ 18'$ ,  $Z=1$ ;  $d$  values are given.  $G$  calc. 1.9.

The specimen from Mátraháza, Mátra mountains, recently collected by Gy. Varga, from a fissure in andesite, is a yellowish-green collomorphic mass.  $H$  1–1.5,  $G$  2.30,  $n$  1.547.  $SiO_2$  42.34,  $TiO_2$  0.03,  $Al_2O_3$  34.49,  $Fe_2O_3$  1.55,  $FeO$  0.15,  $CaO$  0.21,  $H_2O$  8.11 (up to  $150^\circ$ ), 12.81 ( $150$ – $700^\circ$ ), 0.54 ( $700$ – $1000^\circ$  C.),  $P_2O_5$  0.04, sum 100.27%. Formula  $(Al_{3.770}Fe^{3+}_{0.110}Fe^{2+}_{0.012}Ca_{0.018})[(OH)_8 | Al_{0.036}Si_{3.964}O_{9.660}(OH)_{0.340}] \cdot 2H_2O$ .

DISCUSSION.—In most silicates, for instance in unaltered olivine, there is always some (O, OH) substitution, even greater than in these halloysite specimens, and no new names are necessary (see *Am. Mineral.* **44**, 1328, 1959).

HUGO STRUNZ

### Nordstrandite

J. R. D. WALL, E. B. WOLFENDEN, E. H. BEARD AND T. DEAMS, Nordstrandite in soil from West Sarawak, Borneo. *Nature*, **196** (4851), 264–265 (1962).

J. C. HATHAWAY AND S. O. SCHLANGER, Nordstrandite from Guam. *Nature*, **196** (4851), 265–266 (1962).

These two papers report occurrences of nordstrandite,  $Al_2O_3 \cdot 3H_2O$ , first synthesized by R. A. van Nordstrand *et al.*, *Nature*, **177**, 713 (1956) and named by Papee *et al.*, *Bull. soc. chim. France*, 1958, p. 1301. Analyses: Sarawak (P. J. Moore, analyst), material containing a little goethite and quartz,  $Al_2O_3$  60.0,  $Fe_2O_3$  4.35,  $H_2O$  32.7,  $CaO$  0.66,  $MgO$  0.44,  $SiO_2$  1.24, total 99.39%; Guam; (A. Sherwood, analyst)  $Al_2O_3$  63.97,  $Fe_2O_3$  0.25,  $H_2O^-$  1.59,  $H_2O^+$  29.05, total 99.00%. Loss on ignition 31.92%. The mineral is optically biaxial (+); Sarawak,  $\alpha$  1.580,  $\beta$  1.581 (calc.),  $\gamma$  1.613,  $2V$   $18^\circ$ ,  $Z:c=32^\circ$ ; Guam,  $\alpha$  1.580,  $\beta$  1.580,  $\gamma$  1.596 (all  $\pm 0.004$ ),  $2V$  low.  $H$  3 (Guam).  $G$  2.43 (Sarawak), 2.436 (Guam). Cleavage basal, perfect (Sarawak). Colorless to coral-pink and reddish-brown (due to goethite). Forms thick tabular crystals ( $<10$  to 75 microns, and up to 250 microns), which

lie on the basal plane and are rhombic in plan, with angles near  $60^\circ$  and  $120^\circ$  (Sarawak). Also in aggregates up to 1 mm (Sarawak), 0.4 mm (Guam).

X-ray powder data agree closely for Sarawak (S), Guam (G), and synthetic material. The strongest lines are for (S) and (G), resp.: 4.78 (vs), 4.789 (100); 2.261 (s), 2.263 (15); 4.33 (s), 4.322 (12); 4.206 (s), 4.207 (10); 4.153 (s), 4.156 (7); 2.392 (s), 2.392 (9); 2.016 (s), 2.016 (8); 1.899 (s), 1.901 (8); 1.779 (ms), 1.781 (5); 1.440 (ms), 1.4395 (5).

The material was found in soil from the edge of sinkhole in a limestone cliff at Gunony Kapor near Bau, western Sarawak. The origin is uncertain; it may have been formed by weathering of dacitic rock. In Guam it occurs in secondary solution cavities in limestone, mainly in the basal part near the contact with deeply weathered basalt flows.

#### Mackinawite

H. T. EVANS, JR., R. A. BERNER AND CHARLES MILTON, Valleriite and mackinawite (abs.). *Geol. Soc. Am., Program 1962 Meeting*, p. 47A.

A mineral very similar to valleriite in physical properties but containing no copper has been identified from the Mackinaw Mine, Snohomish County, Washington. It is tetragonal, space group  $P4/nmm$ ,  $a$  3.68,  $c$  5.03 Å, containing 2FeS. It is probable that much of the valleriite reported in the literature is mackinawite. Valleriite is rhombohedral, space group  $R\bar{3}$  or  $R3m$ ,  $a$  3.80,  $c$  34.3 Å, formula close to  $\text{CaFeS}_2$ .

The name is for the mine.

DISCUSSION.—The data given are inadequate to characterize a new species.

#### Djurleite

EUGENE H. ROSEBOOM, JR., Djurleite,  $\text{Cu}_{1.96}\text{S}$ , a new mineral. *Am. Mineral.* **47**, 1181-1184 (1962).

NOBUO MORIMOTO, Djurleite, a new copper sulphide mineral. *Mineral. Jour. (Japan)*, **3**, 338-344 (1962).

These papers describe the same mineral, shown by x-ray study to be identical with Djurle's synthetic  $\text{Cu}_{1.96}\text{S}$ -III. Additional data given by Morimoto are G 5.63. Probably orthorhombic. An analysis of material containing digenite gave  $\text{Cu}_{1.91}\text{Fe}_{0.01}\text{S}$ . Additional localities are Ani Mine, Akita Pref., Japan; Osarizawa Mine, Japan; Rendaije Mine and Nakauri Mine, Shizuoka, Japan.

#### Westgrenite

OLEG VON KNORRING AND MARY E. MROSE, Westgrenite and waylandite, two new bismuth minerals from Uganda. *Geol. Soc. Am. (abs.), Program 1962 Meeting*, p. 156A-157A.

Analysis of pink material gave  $\text{Ta}_2\text{O}_5$  45.49,  $\text{Nb}_2\text{O}_5$  5.65,  $\text{Bi}_2\text{O}_3$  40.40,  $\text{CaO}$  1.46,  $\text{SrO}$  0.92,  $\text{Na}_2\text{O}$  0.08,  $\text{K}_2\text{O}$  0.09,  $\text{Al}_2\text{O}_3$  0.80,  $\text{FeO} + \text{MnO}$  0.22,  $\text{Li}_2\text{O}$  0.25,  $\text{SiO}_2$  0.36,  $\text{H}_2\text{O}^+$  4.16,  $\text{H}_2\text{O}^-$  0.04, sum 99.92%, corresponding to  $(\text{Bi}, \text{Ca})(\text{Ta}, \text{Nb})_2\text{O}_6(\text{OH})$ . X-ray study shows it to be cubic,  $a$   $10.485 \pm 0.001$  Å,  $Z=8$ , isostructural with the pyrochlore group. The strongest x-ray lines are 3.03<sub>0</sub> (100), 6.06 (71), 3.16 (50), 2.620 (35), 1.855 (35), in excellent agreement with synthetic  $\text{BiTa}_2\text{O}_6\text{F}$ .

The mineral occurs as yellow, pink, or brown veinlets, formed by replacement of bismutotalite during late hydrothermal crystallization of the lithium pegmatite at Wampewo Hill, Busiro County of Buganda, Uganada. It has dull resinous luster, uneven fracture, H 5., G approx. 6.5 meas., 6.83 calc. Isotropic, with  $n > 2.00$ . Infusible and insoluble in acids.

The name is for Professor Arne Westgren of Sweden, who synthesized  $\text{BiTa}_2\text{O}_6\text{F}$ .

DISCUSSION.—The name was approved before publication by the Commission on New Minerals and Mineral Names, I.M.A.

### Waylandite

OLEG VON KNORRING AND MARY E. MROSE, Westgrenite and waylandite, two new bismuth minerals from Uganda (abs.). *Geol. Soc. Am. Program 1962 Meeting*, p. 156A–157A.

Analysis gave  $P_2O_5$  22.15,  $SiO_2$  4.68,  $Al_2O_3$  29.27,  $Bi_2O_3$  28.28,  $CaO$  2.93,  $H_2O^+$  12.34,  $H_2O^-$  0.55, total 100.20%, corresponding to  $(Bi, Ca)Al_3[(PO_4, SiO_4)]_2(OH)_6$ . X-ray study shows it to be rhombohedral,  $R\bar{3}m$ ,  $a$  6.9649 ± 0.0008,  $c$  16.256 ± 0.001 Å,  $Z=3$ , isostructural with the plumbogummite group. The strongest x-ray lines are 2.93 (100), 5.66 (71), 3.48<sub>3</sub> (50), 1.885 (40), 2.16<sub>8</sub> (35).

Waylandite is white, compact, fine-grained, luster vitreous to dull, fracture uneven, H 4–5, G 3.86 (calc.). Optically uniaxial (–),  $ns$  not determinable. It occurs as veinlets and marginal crusts as a replacement of bismutotantalite in the lithium pegmatite at Wampewo Hill, Busiro County of Buganda, Uganda.

The name is for E. J. Wayland, first director of the Uganda Geological Survey.

DISCUSSION.—The name was approved before publication by the Commission on New Minerals and Mineral Names, I.M.A.

## NEW DATA

### Ixiolite

E. H. NICKEL AND J. F. ROWLAND, Ixiolite redefined: a tantalite substructure. *Geol. Soc. Am., Program 1962 Meeting* (abs.), p. 111A–112A.

Ixiolite, first described in 1857, has generally been considered to be tapiolite. X-ray study of material from the type locality, Skogböle, Finland, shows it to be orthorhombic,  $a$  5.163,  $b$  5.738,  $c$  4.747 Å, space group  $Pnab$ ,  $G$  7.14, unit cell content  $(Ta, Nb, Sn, Mn, Fe)_4O_8$ . The unit cell is similar to that of tantalite, but with  $c$  one-third as large, and the cations are disordered, whereas in tantalite they are ordered in A (Fe, Mn) and B (Ta, Nb) positions.

### Melanophlogite

B. J. SKINNER AND D. E. APPLEMAN, Melanophlogite, a cubic polymorph of silica (abs.). *Geol. Soc. Am., Program 1962 Meeting*, p. 145A.

Melanophlogite, previously thought to be a pseudomorph of quartz, containing S, after cristobalite or fluorite, is found to be a new form of  $SiO_2$ , cubic, space group  $P4_32$ ,  $a$  13.402 ± 0.004 Å,  $G$  2.05; the unit cell contains approximately 48  $SiO_2$ . Infra-red study shows that the S, C and H reported are present as  $H_2S$ ,  $CO_2$ ,  $H_2O$  and hydrocarbons trapped in vacuoles. When the material is heated to 800°, the hydrocarbons decompose to give black amorphous carbon; the  $G$  and  $a$  are unchanged, but the  $n$  changes from 1.467 to 1.425 ± 0.003.

### Heterogenite

M. H. HEY, Cobaltic hydroxide in nature. *Mineral. Mag.*, **33**, 253–259 (1962).

Heterogenite, which has about 60 years' priority over "stainerite", has been restudied. New analyses confirm the fact that the cobalt is present as  $Co^{3+}$  as reported in the original description of Frenzel in 1872. The formula is given as  $CoO \cdot OH$ , not  $Co(OH)_2$  as stated by Orzel *et al.* (see *Am. Mineral.* **43**, 1223–4, 1958).

X-ray powder data (20 lines, Co-K $\alpha$  radiation) are indexed according to the unit cell of



synthetic  $\text{CoO}\cdot\text{OH}$  determined by Kondrashev and Fedorova (*Compt. Rend. Acad. Sci. U.S.S.R.* **94**, 229, 1954). Strongest lines (in Å) are: 4.40 (vvs), 2.315 (vs), 1.804 (s), 1.427 (ms), 2.428 (m) and 1.356 (m). Synthetic  $\text{CoO}\cdot\text{OH}$  is rhombohedral,  $R\bar{3}m$  with  $a$  4.676 Å,  $\alpha$  35°28', and contains one formula unit (hexagonal cell has  $a$  2.849,  $c$  13.130 Å). The mineral is isostructural with  $\text{NaHF}_2$ , not with goethite, lepidocrocite, manganite or groutite.

For the synonymy of heterogenite, see the abstracts on Discredited Minerals which follow.

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#### DISCREDITED MINERALS

Stainierite, transvaalite, mindigite, trieuite, boodtite  
(all = heterogenite)

Heubachite (= nickelian heterogenite)

Schulzenite (= cuprian heterogenite)

Winklerite (= mixture of heterogenite, basic cobaltous)  
( carbonate, malachite, and pharmacolite.)

M. H. HEY. Cobaltic hydroxide in nature. *Mineral. Mag.*, **33**, 253-259 (1962).

On the basis of  $x$ -ray powder patterns, both new and in the literature, the names listed above are relegated to the synonymy.

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Prof. Hans Schneiderhöhn, born February 6, 1887, died May 8, 1962.

Anatolii Georgievich Betekhtin (1897-1962), prominent Russian mineralogist and economic geologist, died April 21, 1962.

Herbert E. Merwin, died January 28, 1963, at the age of 84.

G. B. Lemlein, Russian crystallographer, died November 15, 1962.