

## NEW MINERAL NAMES

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## Nickel

PAUL RAMDOHR (1967) The wide-spread paragenesis of ore minerals originating during serpentinization (with some data on new and insufficiently described minerals). *Geol. Rud. Mestorozhd.* 1967, No. 2, p. 32-43 [in Russian].

The mineral occurs in idiomorphic cubic grains up to 0.1 mm. in size inclosed in heazlewoodite from Bogota near Canala, New Caledonia. They are mostly euhedral cubes or intergrown cubes, sometimes twinned on (111). Analysis by microprobe shows Ni > 98%, with a little Co and even less Fe, and no noble metals, S, As, Pb, or Bi. The X-ray pattern is identical with that of synthetic Ni (cubic,  $Fm\bar{3}m$ ,  $a = 3.524 \text{ \AA}$ .,  $Z = 4$ ,  $G$ . 8.91 calcd). The unit cell is distinctly smaller than that of awaruite ( $a = 3.545 \text{ \AA}$ .). "The color, reflectivity, isotropy, and density all correspond to those of pure Ni." Color under the microscope somewhat more bluish-white than that of heazlewoodite. Weathers more rapidly than heazlewoodite.

The mineral was first observed by P. Picot, who was uncertain whether it was a natural material or a product of ore treatment. Ramdohr is convinced that the material is natural and that it was formed during low-temperature serpentinization.

The mineral was approved before publication by the Commission on New Minerals and Mineral Names, IMA.

## Berborite

E. I. NEFEDOV (1967) Berborite, a new mineral. *Doklady Akad. Nauk SSSR* 174, 189-192 [in Russian].

Analysis by I. A. Stolyarova on 36 mg. that contained up to 2-3% of hambergite and fluorite gave  $\text{Be}_2\text{O}_3$  23.5,  $\text{BeO}$  39.3, loss on ignition 33.2, total 96.0%. Spectrographic analysis showed Be, B and 1-1.5% F (CaF band). From the unit cell and  $G$ ., the molecular weight with  $Z = 1$  is calculated to be 120; the formula  $\text{Be}_2(\text{BO}_3)(\text{OH},\text{F}) \cdot \text{H}_2\text{O}$  is indicated.

DTA shows an endothermic reaction at 200-340°, with corresponding loss of weight of 13%, and another at 680-830°, corresponding to a loss of weight of 7%, and an exothermic reaction at 850-950°. Infusible but whitens before the blowpipe, gives off water in the closed tube. Not dissolved by HCl or  $\text{HNO}_3$ ; dissolved by HF and concentrated  $\text{H}_2\text{SO}_4$  when heated.

Laue photographs show symmetry class  $D_{3d}$ , probably  $D_3$ . The unit cell has  $a = 4.43 \pm 0.03$ ,  $c = 5.33 \pm 0.03 \text{ \AA}$ .,  $a:c = 0.8312$ . Goniometric measurements of crystals 0.1-0.5 mm in diameter gave  $a:c = 0.8332$ ; forms observed  $c$  (0001),  $l'$  (1122),  $q$  (10 $\bar{1}$ 1) (most common), also  $m$  (10 $\bar{1}$ 0),  $a'$  (1120),  $f'$  (33 $\bar{6}$ 4),  $g$  (11 $\bar{2}$ 1),  $p'$  (2 $\bar{1}$ 18), and  $f$  (63 $\bar{3}$ 4). Twinning was noted. The strongest X-ray lines are 5.3 (10)(0001), 3.11 (10) (10 $\bar{1}$ 1), 2.656 (10)(0002), 2.208 (8) (11 $\bar{2}$ 0), 2.044 (10) (11 $\bar{2}$ 1).

Colorless, luster vitreous, cleavage perfect (0001), fracture irregular.  $G$ .  $2.200 \pm 0.003$ .  $H$ . 3. Optically uniaxial, negative,  $\omega = 1.580 \pm 0.001$ ,  $\epsilon = 1.485 \pm 0.002$ . After moderate heating, remains uniaxial, negative, with  $\omega = 1.518$ ,  $\epsilon = 1.450$ ; after strong heating B. B. becomes nearly isotropic with  $n$  1.718.

The mineral was found in dumps of "old workings of one of the skarn deposits in the northwestern part of the (Soviet) Union," associated with hambergite, magnetite, vesuvianite, sphalerite, fluorite, helvite, and apatite. In part occurs as plates on films on magnetite and in fluorite and sphalerite, and in cavities in fluorite. Intergrowths with and reciprocal

overgrowths on hambergite were found. Goethite and smithsonite formed on surfaces of berborite.

The name is for the composition. The mineral was approved before publication by the Commission on New Minerals and Mineral Names, IMA.

#### Unnamed yttrium arsenate

A. S. RADTKE AND C. M. TAYLOR (1967) A new (?) yttrium rare-earth iron arsenate mineral from Hamilton, Nevada: *U. S. Geol. Surv. Prof. Pap.* **575-B**, 108–109.

A microprobe analysis calculated to oxides gave  $Y_2O_3$  27.4,  $Ce_2O_3$  4.7,  $Nd_2O_3$  3.5,  $Dy_2O_3$  2.5,  $Gd_2O_3$  2.3,  $Er_2O_3$  2.3,  $Sm_2O_3$  0.8,  $La_2O_3$  0.8,  $Yb_2O_3$  0.6,  $Pr_2O_3$  0.5,  $Ho_2O_3$  0.1,  $CaO$  0.7,  $Fe_2O_3$  8.4,  $TiO_2$  0.5,  $V_2O_5$  0.7,  $MnO_2$  0.2,  $As_2O_5$  26.5,  $P_2O_5$  0.2,  $H_2O$  (by difference) 17.3%, corresponding approximately to  $3(Y,Ce,etc)_2O_3 \cdot Fe_2O_3 \cdot 2As_2O_5 \cdot 14H_2O$ . The mineral occurs as euhedral wedge-shaped grains 50 by less than  $10 \mu$  in size, within magnetite grains in manganoan calcite. Other minerals present are zircon, argentinean todorokite, and chlorargyrite. X-ray data could not be obtained. *H.*  $3-3\frac{1}{2}$ , on the basis of the relief compared with that of magnetite. In reflected light anisotropic medium brownish-gray.

The only known rare-earth arsenate is retzian (*Dana's System*, **2**, 795).

#### Suolunite

YUNG-HWEI HUANG, Suolunite, a new mineral: *Geol. Review*, **23**, no. 1, p. 7 (1965) [in Chinese, from a translation kindly furnished by Professor H. F. W. Taylor].

See previous abstract [*Amer. Mineral.* **52**, 560–561 (1967)] of another paper (where the formula is misprinted; it should have been  $Ca_2H_2Si_2O_7 \cdot H_2O$  or  $Ca_2H_4(Si_2O_7)O$ ). Data not previously given: analysis by Tsing-Fung Wu  $SiO_2$  43.38,  $CaO$  42.95,  $H_2O^+$  13.17,  $K_2O$ ,  $Na_2O$ ,  $SrO$  traces, sum 99.50%, corresponding to  $CaSiO_3 \cdot H_2O$ . A DTA curve shows a strong endothermic effect at  $440^\circ$ . The strongest X-ray lines are 4.03, 3.11, 2.80Å. Space group  $C^{19}_2 - Fdd2$ ,  $a = 11.15 \pm 0.03$ ,  $b = 19.67 \pm 0.05$ ,  $c = 6.08 \pm 0.02A$ ,  $Z = 16$ . Color pure white, vitreous to resinous luster, no cleavage.

The mineral occurs as fine-grained granular material in a vein 2–3 cm. wide cutting harzburgite rocks in the center of an ultrabasic rock mass at a depth of about 100 meters in Inner Mongolia. The name is for the locality.

#### Chromdisthene

V. S. SOBOLEV AND N. V. SOBOLEV (1967) Chromium and chromium-containing minerals from deep xenoliths of kimberlite pipes: *Geol. Rudn. Mestorozhd.* **1967**, no. 2, p. 10–16 [in Russian].

Kyanite occurring in kimberlite pipes of Yakutia showed wide variation in chromium content, the maximum found being  $Cr_2O_3$  12.86%. This had  $\gamma = 1,772$  (read from a graph M.F.). No other data are given. The mineral is referred to as "chromdisthene."

DISCUSSION.—Unnecessary name for chromian kyanite.

#### Plumalsite

G. YA. GORNYI, M. G. DYADCHENKO, AND T. A. KUDYKINA, A new mineral, plumalsite: *Dopovidi Akad. Nauk Ukr. RSR, Ser. B, Geol. Geofiz. Khim.* **1967**, No. 6, p. 514–517 [in Ukrainian; transl. by Dorothy Vitaliano].

Analyses of green and yellow varieties of the mineral gave  $SiO_2$  27.42, 28.32;  $TiO_2$  0.42, 0.39;  $Fe_2O_3$  2.33, 1.52;  $Al_2O_3$  9.22, 10.33;  $MgO$  0.28, 0.31;  $CaO$  2.70, 2.36;  $RE_2O_3 + ThO_2$  0.44, 0.48;  $PbO$  56.01, 56.22; loss on ignition 0.64, 0.64; sum 99.46, 100.57%, corresponding

to  $(\text{Pb,Ca,Mg})_4(\text{Al,Fe})_2(\text{SiO}_3)_7$ . A little mica and quartz may have been present. Easily fusible, easily decomposed by concentrated HCl with separation of silica.

Electron diffraction patterns by V. I. Trefilov and Yu. V. Yedneral showed the mineral to be orthorhombic, with unit cells computed from these patterns to be  $a=4.90$ ,  $b=4.90$ ,  $c=4.08\text{A}$ . (yellow),  $a=4.90$ ,  $b=4.90$ ,  $c=4.06\text{A}$ . (green),  $Z=1$ . The strongest lines (18 given) are for the green and yellow varieties, resp., 4.90 (m), 4.90 (m); 4.06 (vs), 4.08 (vs); 3.62 (s), 3.64 (m); 2.93 (vw), 2.78 (m-ms); 2.42 (s), 2.43 (m-ms); 2.02 (ms), 2.03 (vw); 1.92 (vw), 1.96 (s).

Color usually green or yellow of various shades, sometimes colorless or black (from inclusions). Luster vitreous,  $H$ . 5–6,  $G$ . 4.35 (green), 4.38 (yellow). Under the microscope transparent, no cleavage,  $n$  considerably higher than 1.782.

The mineral occurs as sharply angular platy fragments in continental deposits and the upper part of the weathered crust of crystalline rocks over a large area of the Ukrainian Shield. It is evidently of supergene origin.

The name is for the composition (Pb,Al,Si).

DISCUSSION.—Further study is needed, including the relation to alamosite,  $\text{PbSiO}_3$ . The name is too close to plumosite and to the rock name plumasite.

## NEW DATA

### Auricupride, Unnamed copper-silver mineral

PAUL RAMDOHR (1967) The wide-spread paragenesis of ore minerals originating during serpentinization (with some data on new and insufficiently described minerals): *Geol. Rudn. Mestorozhd.* 1967, no. 2, p. 32–43 [in Russian].

Auricupride (or cuproauride) has generally been considered to be an alloy of gold and copper with composition approximating  $\text{AuCu}_3$ ; copper and gold form a complete series of solid solutions at high temperature. Ramdohr states that in addition to such alloys, natural material from gold concentrates (locality not specified) and from serpentinized rocks at Laksia and Pefkos, Cyprus, contain the distinct phases, considered to be intermetallic compounds,  $\text{Cu}_3\text{Au}$  and  $\text{CuAu}$ .  $\text{Cu}_3\text{Au}$  is distinguished by its characteristic violet-rose color, hardness notably higher than that of gold, and better polishability.  $\text{CuAu}$  is softer, and has a typical gold-yellow to rose color without the violet tone. Both are commonly coated by gold. It is suggested that the name auricupride be reserved for the compound  $\text{Cu}_3\text{Au}$ , the other phase not being named as yet.

### Benjaminite

E. F. MINTSER (1967) Benjaminite,  $(\text{Cu,Ag})_2\text{Pb}_2\text{Bi}_4\text{S}_9$ . *Dokl. Akad. Nauk SSSR* 174, 675–678 [in Russian].

The mineral, intergrown with emplectite as grains 0.02 to 0.5 mm, is described from the copper-bismuth ore of the Andrasman deposit, Kuramin Range, Central Asia. Duplicate analyses of three grains from two sections by electron-probe microanalyser give (weight %) Cu 6.0, 6.0, 5.5, Ag 3.0, 3.5, 4.0, Pb 25.0, 26.0, 23.0, Bi 49.0, 50.0, 47.0, S 17.0, 17.0, 16.0 with a formula close to  $(\text{Cu,Ag})\text{Pb}_2\text{Bi}_4\text{S}_9$ , as assigned to benjaminite by Shannon.

X-ray powder data, of samples picked from analysed grains—strong lines 3.464(10), 2.932(7), 2.885(4), 3.037(2), 2.280(2), 2.179(2), 2.074(2) (114 mm camera) and 2.97(10), 3.50(9), 2.05(5), 3.25(4), 3.11(3), 2.21(3), 3.74(2), 2.11(2) (57.3 mm camera)—are surprisingly inconsistent and are not in good agreement with any of the three sets of published data for Nye County benjaminite.

The mineral has a steel-gray color, strong metallic lustre, white color with faint yellow-

ish tint in reflected light, weak birefringence in air, distinct in immersion, strong anisotropism with blue to pale brown colors, no observed cleavage. It appears homogeneous at 750 $\times$ . The reflecting power is 41–43%, microhardness 161–179. Etch reactions show: HNO<sub>3</sub> (1:1) slight browning, FeCl<sub>3</sub> (20%) rapid formation of brown coating, KOH (20%) iridescent then pale red-brown coating, HCl (1:1) no reaction.

DISCUSSION.—Good chemical evidence that this mineral has the composition assigned to benjaminite by Shannon [abstr. *Amer. Mineral.* 10, 334 (1925)]. The X-ray powder data do not establish that this mineral is identical with any mineral found at Nye County, Nevada [see Nuffield, *Amer. Mineral.* 38, 550–552 (1953).] Single crystal X-ray study of Mintser's material is required to confirm the identification. Probe analyses of Nuffield's crystals from Shannon's specimen are required to complete the characterization of benjaminite.

L. G. BERRY

#### Lindstromite, Hammarite, Gladite, Rezbanyite

ERIC WELIN (1966) Notes on the mineralogy of Sweden. 5. Bismuth-bearing sulphosalts from Gladhammar, a revision. *Arkiv Min. Geol.* 4, Nr. 13, 377–386.

Reexamination of minerals of the bismuthinite-aikinite (Bi<sub>3</sub>S<sub>12</sub>-Cu<sub>4</sub>Pb<sub>4</sub>Bi<sub>4</sub>S<sub>12</sub>) series from Gladhammar shows that all have a common substructure, with cell dimensions similar to those of the end members. A scheme is proposed for explaining the structures of the intermediate members which involves  $a$  values that are integral multiples of  $a = 11.1 \text{ \AA}$  for bismuthinite. Among natural material three examples of the larger cells have been found, two with tripled  $a$ , with Cu and Pb close to the ideal proportions of 1.33 and 2.66 in the given formula unit; and one with quintupled  $a$  with Cu and Pb close to the ideal proportion of 2.40. Welin recommends that all names of intermediate members founded only on chemical analyses, such as lindstromite, hammarite, gladite, and rezbanyite, should be disregarded.

A. PABST

#### Vrbaite

R. CAYE, P. PICOT, R. PIERROT, AND F. PERMINGEAT (1967) Nouvelles données sur la vrbaite, sa tenure en mercure. *Bull. Soc. Franc. Mineral. Cristallogr.* 90, 185–191.

Vrbaite has been considered to be TlSbAs<sub>2</sub>S<sub>6</sub> on the basis of a single analysis (1912). A new microprobe analysis gave S 22.1, As 20.5, Sb 8.2, Hg 20.5, Tl 28.8, sum 100.1%, corresponding to Tl<sub>4</sub>Hg<sub>3</sub>Sb<sub>2</sub>As<sub>8</sub>S<sub>20</sub>. X-ray powder data and new measurements of reflectivity are given.

#### Unnamed antimony oxychloride

G. BELLUOMINI, M. FORNASERI, AND M. NICOLETTI (1967) Ossicloruri naturali e sintetici d'antimonio. *Period. Mineral. (Rome)* 36, 147–195.

Systematic experiments on the hydrolysis of SbCl<sub>3</sub> at boiling temperatures showed that a phase Sb<sub>8</sub>O<sub>11</sub>Cl<sub>2</sub> is stable at Cl<sup>-</sup> concentrations of 0.08 to 0.1N. This phase was found to be identical with the natural antimony oxychloride described in 1947 by Fornaseri [abstr. *Amer. Mineral.* 35, 335 (1950)]. Single crystal study by F. Sgarlatta showed the mineral to be triclinic,  $P\bar{1}$ ,  $a = 18.92$ ,  $b = 4.03$ ,  $c = 10.31 \text{ \AA}$ ,  $\alpha \sim 90^\circ$ ,  $\beta = 110^\circ$ ,  $\gamma \sim 90^\circ$ . G. calcd. 5.49, meas. 5.3. X-ray powder data are given; the strongest lines of the natural phase are 4.394(65), 3.190(100), 3.041(50), 2.822(50), 2.677(60), 2.598(30), 2.544(30). The DTA curve shows a strong endothermic peak at 540°. Crystals are biaxial, negative, elongation positive, extinction angle  $Z/\wedge b$  ranges from 0° to 14°.