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NEW MINERAL NAMES

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Carlsbergite

V. F. BUCHWALD AND E. R. D. SCOTT (1971) First nitride (CrN) in iron meteorites. *Nat. Phys. Sci.* 233, 113–114.

Microprobe analysis using pure metal standards of a single grain from the Descubridora meteorite gave Cr 76.3, Fe 1.9, Ni 0.3, Nn 0.04, Co 0.03, N 21.4% (by difference), correspondong to:

$$(Cr_{0.96}Fe_{0.022}Ni_{0.003}Mn_{0.0003})N.$$

Probe analyses of several grains from the Cape York meteorite gave Cr 76–78, Fe 0.1–1.8, N 20–25%.

Electron diffraction patterns were indexed on a cubic cell with a 4.16 ± 0.03 Å.; CrN from steel gave a 4.13 Å.

In reflected light, isotropic, light gray with a distinct rose-violet tint. Reflectance measurements were inaccurate because of the small size; they gave 481 nm, 49.5; 546, 41.5; 590, 41.0; 644, 40.5%. Hardness high, probably greater than 1,000 on the Vickers scale.

The mineral has been found in more than 70 iron meteorites, as oriented platelets in kamacite, typically 30×5×2 microns, and as grain-boundary precipitates a few microns in diameter. It has also been found ringing daubreelite, or, curiously, in association with equally small grains of sphalerite.

The name is in honor of the Carlsberg Foundation, Copenhagen, which supported the research. The Cape York meteorites are preserved in the Mineralogical Museum, Copenhagen, and the American Museum of Natural History, N.Y., with specimens in many other collections. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA.

Wakabayashilite

AKIRA KATO, KIN ICHI SAKURAI, AND KAZUMASA OHSUMI (1970) *in* Introduction to Japanese Minerals. *Geol. Surv. Japan,* 1970, 92–93.

Electron microprobe analyses of the inner and outer part of a single crystal from Nevada gave As 52.3, 54.5; Sb 8.3, 5.7; S 39.0, 39.5; sum 99.5, 99.7% resp., corresponding to $(As_{10.2}Sb_{1.0})S_{18}$ and $(As_{10.8}Sb_{0.7})S_{18}$.

X-ray study showed the mineral to be monoclinic, $P2_1$ or $P2_1/m$, a 25.17 ± 0.04, b 6.48 ± 0.01, c 25.24 ± 0.08 Å, β 120.0°, $Z = 6$. It is pseudohexagonal, with a cell a 25.2, c 6.48 Å. The strongest lines (priv. commun. from A. Kato) (indexed on the hexagonal cell) 6.33 (100)($22\bar{4}0$), 4.78 (50) ($41\bar{5}0$), 3.50 (50)($52\bar{7}0$), 3.24 (20)(002), 3.08 (25)($22\bar{4}2$), 2.55 (20)($42\bar{6}2$).

Color golden to lemon yellow, luster silky (for aggregates of fibers) to resinous. Streak orange-yellow, turns orange on grinding. H. $1\frac{1}{2}$. ρ. 3.96 meas.; calc. 4.06, 4.05 for the 2 analyses. Cleavages {100}, {010}, $\{10\bar{1}\}$ perfect. Flexible. Optically similar to orpiment, weakly anisotropic, strongly birefrigent, *n*'s close to those of orpiment. Internal reflections golden yellow.

The mineral occurs as minute fibers up to 0.5 cm. long, elongated along *b*, from the Nishinomaki mine, Gumma Prefecture, in druses of quartz. Associated minerals are realgar, orpiment, stibnite, and pyrite. A second occurrence is from the White Caps mine, Manhattan, Nevada, in fibers up to 2 cm. long or as prisms embedded in calcite, associated with realgar and orpiment.

The name is for Yaichiro Wakabayashi (1874–1943), mineralogist of the Mitsubishi Mining Co. Type material is deposited in the U. S. National Museum, Washington, the National Science Museum, Tokyo, and the Sakuria museum, Tokyo.

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

Kawazulite

AKIRA KATO (1970) *in* Introduction to Japanese Minerals. *Geol. Surv. Japan* **1970**, 87–88.

Electron probe analysis gave Bi 55.4, Te 31.9, Se 9.9, S 0.1, sum 97.3%, corresponding to $Bi_{2.07}Te_{1.95}Se_{0.97}S_{0.03}$, or $BiTe_2Se$, the selenium analogue of tetradymite.

X-ray study showed the mineral to be rhombohedral, space group $R\bar{3}m$, $R3m$, or $R32$, a 4.24, c 29.66Å., $Z = 3$, G. calcd. 8.08. The strongest lines (private commun. from A. Kato) are 4.92 (40)(0006), 3.64 (30)$(01\bar{1}1)$, 3.12 (100)$(10\bar{1}5)$, 2.61 (20)$(10\bar{1}8)$, 2.31 (50)$(11\bar{2}0)$, 1.757 (20)$(02\bar{2}5)$.

Color silver to tin-white, luster metallic, streak light steel gray. Cleavage, basal perfect. Flexible. *H*. 1.5. Optically anisotropic, brownish-gray to gray. Pleochroism pinkish creamy white to white with a creamy tint. Reflectance 45–50%.

The mineral occurs as very thin foils up to 4 mm. across, with max. thickness of 50 microns, in a quartz vein of the Kawazu mine, Shizuoka Prefecture, Japan, associated with selenium-bearing tellurium.

The name is for the mine. Type material in in the Sakurai Museum, Tokyo, and the U. S. National Museum, Washington. The mineral and name were approved prior to publication by the Commission on New Minerals and Mineral Names, IMA.

Sodium betpakdalite

K. V. SKVORTSOVA, G. A. SIDORENKO, YU. S. NESTEROVA, G. A. ARAPOVA, A. D. DARA, AND L. I. RYBAKOVA (1971) Sodium betpakdalite and conditions of its formation. *Zap. Vses. Mineral. Obshch.* **100**, 603–611 (in Russian).

Analysis by Y. S. N. and G. A. A. gave MoO_3 50.22, As_2O_5 13.93, SO_3 none, Fe_2O_3 11.25, Al_2O_3 0.40, MgO 0.22, CaO 4.23, Na_2O 3.14, K_2O 0.20, SiO_2 0.20, $H_2O \pm$ 16.65, sum "100.48" (100.44%) corresponding to:

$$(Na_{1.71}Ca_{1.28})Fe_{2.05}(As_{2.05}Mo_{5.90})O_{28}\cdot 15.27H_2O,$$

or

$$(Na, Ca)_3Fe_2[(As_2O_4)(MoO_4)_6]\cdot 15H_2O.$$

It is closely related to betpakdalite [*Amer. Mineral.* **47**, 172 (1962)] and melkovite [*Amer. Mineral.* **55**, 320 (1970)]. The infra-red spectrum indicates the presence of molecular water.

The mineral is dissolved by dilute HCl, HNO_3, or H_2SO_4, decomposed by KOH and Na_2CO_3. The DTA curve shows a double endothermic break near 200° and an exothermic break at 490°. The loss of weight was 100° 3.6, 150° 9.0, 200° 3.6, 250° 0.8, 300° 0.8%. At 100° there was no change in structure; at 300° it became amorphous, at 480–800°, powellite and Fe_2O_3 were formed.

X-ray study showed the mineral to be monoclinic, a 11.28 ± 0.02, b 19.30 ± 0.02, c 17.67Å., β 94°30′, $Z \doteq 4$. The strongest X-ray lines (38 given) are 9.64 (6)(020), 8.73 (10)(002), 4.37 (5)(004), 3.629 (9)(301), 3.243 (7)(330), 2.940 (7)(006, 341), 7.752 (7)(342, 244, 304), 2.071 (7)(444), 1.836 (8)(423).

Color lemon-yellow, luster dull. G. 2.02 (suspension). Measurement of optical properties was difficult because of the small grain size, α 1.792, γ 1.810, $Z \wedge$ elongation $\doteq$ 38°, shows anomalous indigo-blue colors, pleochroism, X pale yellow, Z yellow.

The mineral occurs in the zone of oxidation of a molybdenum deposit, locality not stated, associated with goethite, natrojarosite, gypsum, opal, and ferrimolybdite as microcrystalline or powdery films and crusts. Electron microscope study shows that the crystals are a few microns in size and show a distinctly pseudohexagonal outline.

The name is for the relation to betpakdalite. Type material is deposited in the Mineralogical Museum of the Academy of Sciences, USSR, Moscow. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA.

Kittlite

Santiago Rivas (1970, 1971) Un mineral de mercurio poco conocido. *Rev. Minera Geol. Mineral, Soc. Argentina Min. Geol.* **29**, 56–57; **30**, 14–16.

The mineral occurs near Jagüel in the Llantenes region, province of La Rioja, Argentina. Color silver-gray, luster metallic, brilliant Opaque. Spectrographic analysis showed major Hg, Ag, Cu, S, and Se. X-ray powder data are given (9 lines); the strongest lines are 3.428 (vs), 2.103 (s), 1.787 (s), 1.368 (mw); this corresponds to a cubic mineral ($F\bar{4}3m$) intermediate between tiemannite and metacinnabar and closer to the latter. ρ 5.4, H 5–5.5.

The name is for Erwin Kittl, Argentine geologist.

Discussion—Insufficient data. The X-ray data correspond to a selenian metacinnabar, but the value of ρ is far too low.

Unnamed sulfobismuthide of Cu and Ag
(Pavonite (?), Benjaminite (?))

T. N. Shadlun, D. O. Ontoev, G. V. Basova, L. N. Vyal'sov, and I. V. Murav'eva 1963) A sulfobismuthide of copper and silver from the Dzhida deposit. *Zap. Vses. Mineral. Obshch.* **98**, 452–463 [in Russian; translated by Michael Fleischer]

The average of 5 probe analyses by L. A. Chernyaev gave Bi 65, Cu 6, Ag 3, S 25, sum 99%, corresponding to

$$(Cu, Ag)_{0.8}Bi_{2.2}S_5 \text{ or } (Cu, Ag)_2Bi_{5.1}S_{12.7}$$

with Ag:Cu ~ 1:3. The contents of Cu and Ag vary considerably within a single grain. The authors attribute this to an intergrowth of two isostructural phases, not differing by X-rays, that manifest themselves as a fine platy structure resembling polysynthetic twinning in polished sections.

X-ray powder data (24 lines) from 3 samples showed strongest lines 3.57–3.61 (5–6), 3.45–3.48 (6–10), 2.82–2.83 (9–10), 2.00–2.03 (5–9). Except for some differences in intensities, these data agree closely with the data of Nuffield (1954) on pavonite from Bolivia ($AgBi_3S_5$), less well with the data of Nuffield (1953) on benjaminite from Nevada and reasonably well with data for the compounds $AgBi_3S_5$ and $(Cu,Ag)_2Bi_4S_7$ synthesized by A. Yu. Malevskii.

"Approximate" indexing of the powder pattern gave *a* 13.41, *b* 4.03, *c* 16.30 Å, β 93° compared to single crystal data *a* 13.35, *b* 4.03, *c* 16.34 Å, β 94½° for pavonite (Nuffield, 1954).

The mineral is pale lead-gray, luster metallic, H. 2–2.5 (microhardness 165–214, av. 194 kg/sq. mm). The reflectances are close to those of aikinite.

Discussion.—Because pavonite and benjaminite cannot be unambiguously identified on the basis of X-ray powder data alone, further study to acquire single crystal X-ray data and more definite chemical results is evidently required.

Unnamed sulbosimuthide of Cu, Pb and Ag (Benjaminite (?))

L. M. LUR'YE, T. N. SHADLUN, YU. A. UGASTE AND L. N. VYAL'SON (1971) Lead, silver and copper sulfobismuthide from the benjaminite-pavonite group in Kaptarkhan ore deposit, East Karamazar, Central Asia. [*Int. Geol. Rev.* **13**, 1628–1641 (1971)].

The average of 2 probe analyses of specimens consisting of very fine intergrowths of the sulfobismuthide and a number of secondary minerals gave Bi 59.4, Cu 28, Pb 12.7, Ag 9.9, S 15.2 after recalculating to sum 100%. This corresponds to

$$Pb(Cu,Ag)_{2.2}Bi_{4.6}S_{7.7}$$

with Cu:Ag ~ 1:2.

X-ray powder data (15 lines) from 2 samples showed strongest lines 3.518–3.52 (3–2), 3.423–3.432 (3), 2.842–2.850 (10), 2.004–2.001 (8). The data are in reasonable agreement with the data of benjaminite from the type locality in Nye County, Nevada (Nuffield, 1953).

The mineral is steel-gray, luster metallic and similar to aikinite in reflected light. It occurs as bladed aggregates (to 1.5 cm. in size) and veinlets, surrounded and intersected by secondary minerals.

Discussion.—Benjaminite cannot be unambiguously identified by X-ray powder data alone. The Kaptarkhan mineral requires single crystal X-ray data to determine its identity and analyses on clean material to establish its composition.

Congolite

Emil Wendling, Renate V. Hodenberg, and Robert Kühn (1972) Congolit, der trigonale Eisenboracit. *Kali Steinsalz* **6**, 1–3.

Analysis (by the laboratory of Mines de Potasse d'Alsace) gave B_7O_{13} 55.73, Cl 6.90, Fe^{2+} 30.42, Mn 0.90, Mg 1.21, CaO 0.43, Fe_2O_3 0.37, Al_2O_3 3.00, SiO_2 0.53, NaCl 0.66, KCl 0.40, sum 100.55%, corresponding to $(Fe_{2.68}Mg_{0.24}Mn_{0.08})ClB_7O_{13}$.

When heated, a gradual decrease of birefringence occurred at 232.5 ± 2°, indicating a transformation. Synthetic material is reported by Schmid to show transformation of rhombohedral to monoclinic at 255°, to orthorhombic at 270°, and to a cubic phase at 337°.

Guinier photographs showed the mineral to be rhombohedral, space group $R3c$ or $R\bar{3}c$, a (hex.) 8.6225 ± 0.0015, c (hex) 21.054 ± 0.005, a_{rh} 8.6042Å, α 60°10′, $Z = 6$. The synthetic Fe compound had a_{hex} 8.6240, c_{hex} 21.0489Å. (Schmid, 1969). The strongest X-ray lines (hexagonal indices)(46 lines given) are 3.05 (80)(024), 2.725 (100)(116, 122), 2.158 (60) (220), 2.153 (60)(208), 2.061 (75)(131, 223), 2.058 (75)(217), 1.838 (70)(042, 226), 1.834 (70)(0210), 1.761 (60)(404), 1.629 (50)(410, 324), 1.364 (60)(244), 1.361_5 (60)(22-12), 1.242 (50)(600, 428).

The mineral occurs as fine-grained material in the insoluble residue of a drill core from Congo (Brazzaville, Africa). It is pale red, transparent. Optically uniaxial, neg., ϵ 1.731 ± 0.002, ω 1.755 ± 0.005. ρ not measured, presumably close to that of ericaite (3.50_3, new measurement).

The mineral is a dimorph of ericaite; the latter is biaxial, positive, with a 8.608 ± 0.002, b 8.608 ± 0.002, c 12.165 ± 0.003Å. (material from Riedel-Hänigsen). Some so-called ericaite (from Bischofferode) is trigonal, *i.e.* congolite.

The name is for the country of occurrence.

Unnamed Iron Arsenate, Unnamed Cu-Bi-V mineral

Oleg von Knorring (1971) Notes on minerals from the Karibib area in South West Africa. *Univ. Leeds Res. Inst. African Geol. Ann. Rep.* **15**, 63.

An iron arsenate occurs as spindle-shaped yellow rosettes or asbestiform veinlets in loellingite from a lithium pegmatite. Spectrographic analysis showed major Fe, minor As, Si, traces of Li, Na, Ca, Mg, Mn, Cu, Al, Bi. The strongest X-ray lines (14 given) are 6.35 (100) 5.34 (43), 3.49 (53), 3.18 (68), 2.804 (60), 2.835 (71). Associated minerals are eosphorite, scorodite, and quartz.

An unidentified Cu–Bi–V mineral occurs near Karibib associated with kettnerite, cuprite, and malachite. It has strongest X-ray lines 7.0, 5.64, 3.59, 3.00, 2.67, 1.63, and 1.53.

Komarovite

A. M. Portnov, G. K. Krivokoneva, and T. I. Stolyarova (1971) Komarovite, a new niobosilicate of caldium and manganese. *Zap. Vses. Mineral. Obshch.* **100**, 599–602 (in Russian).

Analysis by T. I. S. by microchemical methods on 150 mg. gave SiO_2 23.50, TiO_2 2.50, Nb_2O_5 47.00, Al_2O_3 1.00, Fe_2O_3 1.50, Mg, rare earths, Ba not detd., MnO 5.00, CaO 4.70, Na_2O 0.85, K_2O 0.30, H_2O 12.00, F 1.21, sum 99.56 − (O = F_2) 0.51 = 99.05%. This corresponds to—

$$(Ca_{0.43}Mn_{0.36}Na_{0.14}K_{0.03})(Nb_{1.82}Ti_{0.16}Al_{0.16}Al_{0.10}Fe_{0.10})Si_2O_9(O_{0.88}F_{0.33})\cdot 3.5H_2O$$

or

$$(Ca, Mn)Nb_2Si_2O_9(O, F)\cdot 3.5H_2O.$$

The DTA curve shows a wide endothermal effect in the range 150–500° (loss of water). The infra-red absorption curve shows water present as H_2O.

Comparison of chemical analyses and X-ray data indicates komarovite to be the Ca–Mn–Nb analogue of labuntsovite (K–Ba–Ti) [*Amer. Mineral.* 41, 163 1956)] and of nenadkevishite (Na–Ca–Nb) [*Amer. Mineral.* 40, 1154 (1955)].

The X-ray data are indexed on an orthorhombic unit cell with a 21.30 ± 0.07, b 14.00 ± 0.05, c 17.19 ± 0.07Å., $Z = 18$, ρ 3.0 (measured), 2.96 (calculated). The strongest X-ray lines (42 given) are 12.2 (70)(110), 6.35 (35)(310), 5.44 (30)(022), 3.16 (100)(620, 530, 034), 3.118 (42)(134, 621), 2.832 (30)(325, 415, 630), 2.740 (37) (135, 604), 2.715 (044, 216, 434), 1.783 (47)(266, 473, and others).

Color pale rose, luster dull, streak white, H. 1.5–2. Cleavage {001}, fair. Optically biaxial, positive, *ns* α 1.750, β 1.766, γ 1.85 ± 0.02, 2V 48°, $X = a$. $Z = b$.

The mineral occurs in alkalic rocks of Karnasurt Mt., Kola Peninsula, USSR, associated with late albite and redeposited fine-grained natrolite. It is foliated, platy, filling fractures in natrolite. It is filmed by hydrous manganese oxides.

The name is for cosmonaut V. M. Komarov, who was killed during his return from a space flight on April 23, 1967. Type material is in the Mineralogical Museum of the Academy of Sciences, USSR, Moscow. The mineral and name were approved in advance of publication by the Commission on New Minerals and Mineral Names, IMA.

NEW DATA

Benjaminite, 6 Unnamed Sulfosalts

Yu. S. Borodaev and N. N. Mozgowa (1971) New group of the sulfbismuthides of Ag, Pb and Cu. *Proc. Symp. Int. Mineral. Assoc.—Int. Assoc. Genesis Ore Deposits, Japan, 1970; Soc. Min. Geol. Japan Spec. Issue* 2, 35–41 (in English).

Benjaminite of Shannon (1924) was discredited by Nuffield (1953) and revalidated by Minister (1967) [see *Amer. Mineral.* 53, 350–351 (1968)]. Optical and X-ray study of Mintser's material now shows that it consists mainly of berryite with small amounts of matildite and lindstromite. Electron microprobe analyses and X-ray data are given of 6 unnamed phases. Three give nearly $(Ag,Cu)_3Bi_7S_{12}$; the others $AgCu_4Bi_7S_{13}$, $Ag_5Cu_2PbBi_{13}S_{24}$; and $(Ag,Cu)_4PbBi_6S_{12}$.

Dittmarite

M. E. Mrose (1971) *U. S. Geol. Surv. Prof. Pap.* **750-A**, A115.

Chemical and X-ray study shows that dittmarite (*Dana's System, 7th Ed.,* **2**, 699), previously assigned the formula $(NH_4)Mg_5H_4(PO_4)_5\cdot 8H_2O$, is actually (NH_4) $MgPO_4\cdot H_2O$. It is orthorhombic, space group $Pmn2_1$, a 5.606, b 8.758, c 4.788Å., $Z = 2$, ρ calc. 2.19.

Chilenite

A. H. Clark (1971) On the status of chilenite. *Neues Jahrb. Mineral., Monatsh.* **1971,** 341–344.

Chilenite (Ag_6Bi?) was described from Chile by Domeyko (1845); Short (1931) found that a specimen from the type locality was a mixture of silver and cuprite. Clark describes material from the Arco de Oro deposit, Zapallar district, Atacama Province, Chile (not the type locality). Microprobe analysis gave Ag 72.61 ± 1.0, Bi 22.67 ± 0.5, Cu 3.92 ± 0.2%, corresponding to $Ag_{6.2}Cu_{0.75}Bi$. The mineral occurs ovoid grains not exceeding 20 microns in diameter, scattered through cerussite near the galena-cerussite interface. Color slightly yellowish-white, reflectance 77–81%, weakly anisotropic with dark blue-gray to grayish-white polarization colors. The mineral is very soft and polishes poorly. X–ray data could not be obtained.

Keldyshite

Dr. Gunnar Raade has kindly called my attention to an error in the abstract in *Amer. Mineral.* **55,** 1072–1073 (1970). It was there stated that Laue photographs indicated triclinic symmetry, space group probably $P\bar{1}$, a 6.66, b 8.83, c 5.43 Å., α 92°45′, β 94°13′, γ 72°20′. These data refer not to keldyshite but to the second unidentified phase present. I regret the error.

DISCREDITED MINERALS

Trudellite

M. E. Mrose (1971). *U. S. Geol Surv. Prof. Pap.* **750–A,** A115.

X–ray and chemical study of type trudellite from the Cerro Pintados, Chile (*Dana's System, 7th Ed.,* **2,** 131), supposedly $Al_{10}(SO_4)_8\ Cl_{12}(OH)_{12}\cdot 30H_2O$, show that it is a mixture of natroalunite and chloraluminite ($AlCl_3\cdot 6H_2O$).

Lagoriolite

D. Nemec (1971) Nicht-Existenz des hypothetisch Alkaligranats "Lagorioloith". *Neues Jahrb. Mineral., Monatsh.* **1971,** 432–436.

Morozewicz in 1898 [*Dana's System, 6th Ed., App. I,* p. 28 (1899)] thought that he had synthesized a sodium-rich member of the garnet group, $(Na_2, Ca)_3\ Al_2(SiO_4)_3$, which he named lagoriolite. Repetition of his syntheses gave no garnet; nosean was identified.

The existence of the "lagoriolite molecule" was also postulated by Kralova and others [*Sbornik Vyssh. Skoly Chem. Technol. Praze* **4,** 257–283 (1960); **5,** 37–60, 61–68 (1961); *Geologie* **10,** 141–151 (1961)] on the basis of 18 analyses of garnets from Czech localities (especially from Obri dul) with Na_2O 1.48–10.95, K_2O 0.35–3.93%. New analyses of 7 garnets (5 from Obri dul) showed Na_2O 0–0.24, K_2O 0–0.32%. The analyses by Kralova are therefore in error, mostly due to analytical error, (partly due to the presence of scapolite), and lagoriolite does not exist.