

NEW MINERAL NAMES

M. FLEISCHER

Mackinawite

H. T. EVANS, JR., CHARLES MILTON, E. C. T. CHAO, ISIDORE ADLER, CYNTHIA MEAD BLANCHE INGRAM AND R. A. BERNER, Valleriite and the new iron sulfide, mackinawite. *U. S. Geol. Survey Prof. Paper* 475-D, 64-69 (1964).

A preliminary report was abstracted in *Am. Mineral.* 48, 215 (1963). New data given: The average of 16 analyses of material from the Mackinaw Mine gave Fe 63 ± 5 , Ni 3.1 ± 0.5 , S $34 \pm 4\%$, Cu not detected, stated to correspond nearly to $\text{Fe}_{0.96}\text{Ni}_{0.04}\text{S}$ (actual ratios $\text{Fe}_{1.06}\text{Ni}_{0.06}\text{S}$. M.F.). Indexed x -ray powder data are given (14 lines); the strongest lines are 5.03 (100)(001), 2.31 (90)(111), 1.809 (80)(112), 2.96 (70)(101), 1.838 (50)(200). These correspond to a tetragonal unit cell, space group $P4/nmm$, with a 3.675 ± 0.002 , c 5.030 ± 0.002 Å, G . 4.30 (from x -ray data). The x -ray data agree, with slight differences of spacings, to synthetic FeS described by Berner (*Science* 137, 669, 1962), to the synthetic iron sulfide "kansite" described by Meyer and others (*Corrosion* 14, 69-75, 1958) and to the unnamed mineral from Outokumpu, Finland, described by Kouvo and others (*Am. Mineral.* 48, 511-524, 1963). Much of the "valleriite" described in the literature is probably mackinawite. Both minerals are extremely anisotropic and strongly pleochroic, but differ slightly, valleriite appearing pale yellow to deep creamy brown, mackinawite pale pink to pinkish gray.

Unnamed (β -Be(OH)₂)

J. W. MONTOYA, G. S. BAUR AND S. R. WILSON, Mineralogical investigation of beryllium-bearing tuff, Honeycomb Hills, Juab County, Utah. *U. S. Bur. Mines Rept. Invest.* 6408, 1-11 (1964).

Analyses of 7 samples of tuff showed 0.14 to 2.36% BeO. A concentrate, sp. gr. 1.80-2.05, containing up to 6.5% BeO, contained acid volcanic glass, fluorite and unidentified isotropic grains. The glass and fluorite contained little Be; it is concluded that the isotropic grains, mean n 1.52, soluble in cold 1:1 HCl, are an amorphous Be mineral. A second mineral was found in heavy liquid concentrates from red tuff, which gave a material estimated to contain 80% unknown mineral, 15% volcanic glass, 5% combined calcite, fluorite, and montmorillonite, and a trace of an iron oxide mineral. The unknown mineral resembles gypsum in color, shape and birefringence. It has G 1.88-1.90, and is biaxial (-), with α 1.524, β 1.533, γ 1.540, $2V$ 84° , $r < v$. It is completely dissolved in one hour by cold 1:1 HCl. Analysis of the concentrate gave BeO 45%, CaO 2%, acid insol. 15%. The x -ray pattern matched closely that for synthetic beta-Be(OH)₂ reported by Seitz, Rosler and Schubert (*Zeit. anorg. Chem.* 261, 94-105, 1950). The strongest lines of the natural material (34 lines given) are 2.392 (100), 3.878 (55), 3.831 (41), 1.979 (20), 2.950 (19), 2.796 (18), 1.960 (16).

Molybdite

F. ČECH AND P. POVONDRA. Natural occurrence of molybdenum trioxide, MoO₃, in Krupka (Molybdite, a new mineral). *Acta Univ. Carolinae, Geologica*, 1963, 1, 1-14 (in Czech, with Russian and English abstracts)

The name molybdite is "resurrected" from the synonymy of ferrimolybdite, $\text{Fe}_2^{3+}(\text{MoO}_4)_3 \cdot 8\text{H}_2\text{O}$, and given to molybdenum trioxide, MoO₃, occurring as a natural mineral in Krupka (NW-Bohemia, Czechoslovakia).

Molybdenite was found in a quartz vein with molybdenite, near the contact with fine-grained topaz-quartz greisen. It occurs in the coarse-grained quartz in the cavities formed after total or partial "leaching" of molybdenite, or in their close vicinity. A tabular crystal of molybdenite altered on the surface into molybdenite also was found.

Occurs as fine very light greenish yellow to nearly colorless flat needles or thin plates, up to $5 \times 1 \times 0.0X$ mm in size, forming irregular aggregates. Crystals are elongated and striated parallel to the c -axis, flattened on $\{010\}$; they are not suitable for goniometric measurements since they are not perfectly developed and on the goniometer they display only two reflecting faces of the $\{010\}$ form, in addition to these very narrow faces of the form $\{110\}$ were very rarely observed. Transparent, flexible, luster adamantine. Cleavage (100) perfect, (001) distinct. Perfect cleavage (010) , given in the literature for synthetic MoO_3 , could not be observed properly due to the thinness of crystals.

Chemical semimicroanalysis of molybdenite gave 66.2% Mo, *i.e.*, 99.3% MoO_3 . Spectrographic analysis showed also Si 0.X%, Al, Ca 0.0X%, Ag, Be, Bi, Cu, Fe, Mg, Mn, Pb, Zn traces.

Indexed x -ray powder data (41 lines) are given. The strongest lines are (in \AA): 6.90 (6) (020) , 3.80 (10) (110) , 3.45 (9) (040) , 3.25 $(10+)$ (021) , 1.294 (5) $(320, 232)$. The mineral is orthorhombic, unit cell dimensions calculated from powder data a 3.954, b 13.808, c 3.690 \AA , $a:b:c=0.286:1:0.267$; theoretical density based on $Z=4$ is 4.72. (the density of synthetic MoO_3 given in the literature is about 4.5).

Simultaneously with molybdenite a synthetic preparation of MoO_3 (Merck) as well as MoO_3 artificially prepared by the authors (roasting of molybdenite from Krupka) were investigated. All the data obtained show full identity of these three materials.

Molybdenite is biaxial (+), $2V$ very large, birefringence very high, extinction parallel, elongation positive; γ and $\beta > 2.0$, axial plane (100) , $Z=c$, $Y=a$, $X=b$.

Some crystals of molybdenite as well as vein quartz and greisen in their vicinity are coated with a fine yellow material. In some specimens this yellow earthy substance was identified as betpakdalite. No other minerals are associated with molybdenite. Molybdenite is a product of alteration of molybdenite in the hydrothermal or supergene phase.

All the observed properties of molybdenite from Krupka are in a good agreement with those of synthetic MoO_3 published so far in the literature. The morphological crystallography of MoO_3 was published by A. E. Nordenskiöld (*Öfvers. Kongl. Vetenskaps-Akad. Förh.*, 1860, 299–301) and by other authors (C. Hintze; *Handbuch der Mineralogie*, 1, Abt. 2, 1259–1263, 1915; V. Goldschmidt. *Atlas der Krystallformen*, 6, 1920), unit cell dimensions, crystal structure, physical and other properties by H. Bräkken (*Zeit. Krist.* 78, 485–487, 1931), N. Wooster (*Nature*, 127, 93; 128, 35, 1931; *Zeit. Krist.* 80, 504–512, 1931), G. Hägg and A. Magnéli (*Arkiv Kemi Min. Geol.* 19A, 1–14, 1945). X -ray powder data for molybdenite are identical with those given for synthetic MoO_3 , in XRDC (5-0506, 5-0507, 5-0508).

FRANTIŠEK ČECH

Schmeiderite

M. H. HEY, *Appendix to the second edition of an Index of Mineral Species and Varieties Arranged Chemically*: Brit. Museum Natural History, Dec., 1963.

Schmeiderite (p. 84)

"Selenate of Pb and Cu [$?$ $(\text{Pb}, \text{Cu})_2\text{SeO}_4(\text{OH})_2$] from the Condor mine, La Rioja, Argentina. Named provisionally by J. Olsacher. Specimen B.M. 1962, 217 (presented by R. Bideaux) gives an x -ray powder pattern suggesting isotypy with linarite."

NEW DATA

Sarcopside

F. ČECH, K. PADĚRA AND P. POVONDRA. The sarcopside problem. *Acta Univ. Carolinae, Geol.*, 1962, 3, 145–157 (1963) (in English, with Czech and Russian abstracts)

Sarcopside from all known localities, *i.e.*, from the type locality at Michelsdorf (Silesia, Poland), Deering (New Hampshire, U.S.A.), and Domažlice (Bohemia, Czechoslovakia) appears by both optical and *x*-ray powder studies to be an intimate mixture of two different components, graffonite and sarcopside proper (sarcopside *sensu strictu*). The same results were obtained in the course of the investigation of two very intimately intergrown phosphates—sarcopside-graffonite aggregate—from a new locality at Otov (near Domažlice, Bohemia). A chemical analysis of this material CaO 4.43, MgO 0.23, MnO 19.43, FeO 34.26, ZnO 0.49, Fe₂O₃ 0.20, Al₂O₃ 0.06, P₂O₅ 40.46, H₂O⁺ 0.42, H₂O⁻ 0.45, F 0.01, insol. traces, sum 100.44%, G 3.65 leads to the chemical formula (Fe, Mn, Ca, Zn, Mg)₅(PO₄)₂. It follows from the chemical analyses of the sarcopside-graffonite aggregates from Domažlice (*Min. Abstracts*, 11, 51–52) and Otov that the ratio of RO:P₂O₅ is very near to 3:1, the same as for graffonite; the ratio of RO:P₂O₅ for sarcopside is very probably also 3:1, and its chemical formula is very likely R₃²⁺(PO₄)₂. E. F. Holden's chemical formula (Fe, Mn, Ca, Mg)₇(PO₄)₄D₂ for sarcopside, based on a chemical analysis of "sarcopside" (= sarcopside-graffonite aggregate) from Deering (*Am. Mineral.* 9, 205–207, 1924), is erroneous.

All data concerning sarcopside published so far are summarized and discussed. Sarcopside-graffonite aggregates from Michelsdorf, Deering, Domažlice, and Otov yield practically identical *x*-ray powder patterns. The strongest lines (for material from Michelsdorf) are (in Å): 6.06 (5), 3.94 (8), 3.53 (10), 3.03 (5), 2.82 (5), 2.56 (7), 2.48 (7), 1.769 (6b); the strongest lines for pure(?) sarcopside (from the same locality) are: 6.06 (5), 3.94 (8), 3.54 (10), 3.03 (4), 2.82 (7), 2.57 (7), 2.49 (5), 1.771 (4b).

The intergrowth of sarcopside with graffonite seems to be an oriented one. The relation of sarcopside to graffonite in their aggregates resembles graphic intergrowths of quartz and feldspar.

Sarcopside has a typically small to very small optical axial angle (it is practically uniaxial) with a (–) sign. The variation in the indices of refraction presumably results from isomorphous substitution by various cations. Sarcopside characteristically exhibits abundant polysynthetic twinning, similar to that in the plagioclases. It has two characteristic cleavage directions, good cleavage perpendicular to, and less distinct cleavage parallel to the long dimension of the individuals.

Two intergrown phosphates ("triplite and its heteromorphous modification(?)") from a pegmatite at Marchaney, near Tirschenreuth, Germany, described by H. Laubmann and H. Steinmetz (*Zeit. Kryst.* 55, 525–532, 1920) most likely also represent a mixture of sarcopside and graffonite. This statement is based only on optical properties of these two minerals.

Sarcopside needs a further study, especially a single crystal study and a chemical analysis of pure material. (*Editor's Note*: See also *Am. Mineral.* 49, 1149, 1964)

FRANTIŠEK ČECH

Chapmanite

F. ČECH AND P. POVONDRA. Study of chapmanite from Smilkov, near Votice (Bohemia, Czechoslovakia). *Acta Univ. Carolinae, Geol.*, 1963, 2, 97–114 (in Czech, with Russian and English abstracts)

Chapmanite was found at Smilkov, near Votice, Central Bohemia, as probably a hydrothermal mineral. It occurs in veinlets up to 3 cm wide cutting through gneisses containing

various amounts of admixed graphite. The color varies from olive-green to deep yellow. The olive-green material is compact and has a conchoidal to irregular fracture, H up to $2\frac{1}{2}$, G 3.75, streak greenish-yellow; the deep yellow material is very often powdery and has an earthy appearance and irregular fracture, H up to somewhat over 1, G 3.69, streak deep yellow.

Chemical analyses of both extreme varieties of chapmanite are given. They represent the first reliable analyses of this mineral, as a result of which in a certain measure theoretical assumptions concerning the proper valence states of antimony and iron (both three in chapmanite expressed by C. Milton, J. M. Axelrod and B. Ingram (*Am. Mineral.* **43**, 656–670, 1958) could be confirmed. Chemical analysis of the olive-green material gave SiO_2 27.63, Sb_2O_3 31.04, Fe_2O_3 38.98, Al_2O_3 0.22, H_2O^+ 1.89, H_2O^- 0.31, sum 100.07%. By comparison with the theoretical composition it is evident that this material shows a little lower content of Sb_2O_3 (–2.5%), whereas the Fe_2O_3 amount is proportionally higher. As the contents of SiO_2 and H_2O approach the theoretical values well enough it is supposed that in the chapmanite lattice part of the Sb is replaced by Fe^{3+} . On this assumption the formula of the olive-green chapmanite is $(\text{Sb}_{0.93}{}^{3+}, \text{Fe}_{0.07}{}^{3+})\text{Fe}_2^{3+}(\text{SiO}_4)_2(\text{OH})$, which agrees well with the theoretical formula $\text{SbFe}_2(\text{SiO}_4)_2(\text{OH})$. In the discussion of the formula of the studied mineral the content of Al_2O_3 was omitted intentionally, because it was not known to which position it should be assigned. T. L. Walker's (*Am. Mineral.* **9**, 66, 1924; *Univ. Toronto Studies, Geol. Ser.* **17**, 5–8, 1924) chemical formula for chapmanite, $5\text{FeO} \cdot 5\text{SiO}_2 \cdot \text{Sb}_2\text{O}_5 \cdot 2\text{H}_2\text{O}$, is erroneous. The analyzed deep yellow powdery material (SiO_2 26.34, Sb_2O_3 30.53, Fe_2O_3 38.13, Al_2O_3 0.50, H_2O^+ 3.62, H_2O^- 0.64, sum 99.76%) was evidently more hydrated or contaminated(?) by alteration products of chapmanite, megascopically not detectable.

X-ray powder patterns of chapmanite from Smilkov and from the type locality at the Keeley mine in Ontario, Canada, are practically identical. The strongest lines for the olive-green material from Smilkov are (in Å): 7.64 (9), 3.87 (9), 3.56 (10), 3.17 (10), 2.90 (9), 2.59 (7), 1.501 (6).

Differential thermal analysis curves exhibit first a weak endothermic reaction at 120°C . The following strong exothermic reaction is perceptibly doubled and has a main peak at 760 – 765°C . and a subordinate one around 800°C . A further, but very insignificant reaction is indicated by a very weak exothermic bend of the curves around 875°C . The x-ray powder pattern of the dark brick-red powdery material after the DTA of chapmanite can be easily interpreted as a mixture of tripuhyte and hematite.

Qualitative spectrographic analyses, thermobalance curves, some optical observations, electron micrographs, and genesis of chapmanite are also given.

FRANTIŠEK ČECH

Kehoeite

DUNCAN MCCONNELL, A zinc phosphate analogue of analcime: kehoeite. *Mineral. Mag.* **33**, 799–803 (1964).

On the basis of similarities in the x-ray powder patterns of analcime, pollucite, viséite and kehoeite, it is shown that kehoeite is isostructural with the other species. Re-calculation of Headden's analysis together with crystallochemical data indicate that the structural formula for kehoeite is: $\text{Zn}_{5.5}\text{Ca}_{2.5}(\text{Al}_6\text{P}_{16}(\text{H}_3)_{16})\text{O}_{96} \cdot 16\text{H}_2\text{O}$. The strongest lines in the indexed x-ray powder pattern ($\text{CuK}\alpha$) are: 3.35(10)(400), 3.13(10)(330, 411), 1.916(7)(543, 550, 710), 1.633(6)(653), and 4.28(5)(310). Fourteen other lines are given. All the d-spacings are compatible with a cubic (or pseudocubic) cell with $a = 13.7 \text{ \AA}$.

J. A. MANDARINO

DISCREDITED MINERALS

M. H. HEY, *Appendix to the second edition of An Index of Mineral Species and Varieties Arranged Chemically*. Brit. Museum Natural History, Dec. 1963.

Daviesite (p. 21)

Identical with hemimorphite (P. G. Embrey, private comm.).

Meerschaluminit (p. 40)

Identical with halloysite (R. J. Davis, private comm.).

Berezovite (p. 83)

Identical with or a carbonation variety of phoenicochroite (P. Bariand, private comm.).

Alumoferroascharite (= mixture)

L. I. SHABYNIN AND T. M. MITYUSHINA, New data on szaibelyite and on the so-called alumoferroascharite. *Zapiski Vses. Mineralog. Obshch.*, **93**, 1-12 (1964) (in Russian).

Re-examination of samples from the same locality as the type material (*Am. Mineral.* **42**, 582-583, 1957) showed that about 25% of hydrotalcite was present in the szaibelyite. The DTA curve of the original description clearly shows breaks corresponding to those of hydrotalcite. Thus most of the Al_2O_3 reported is not present in the szaibelyite. In addition, part of the iron is present as extremely fine-grained magnetite and pyrrhotite.

Pravdite (= Britholite, partly altered)

G. A. TARKHANOVA, G. A. SIDORENKO AND N. N. KUZNETSOVA, The "new mineral pravdite." *Zapiski Vses. Mineralog. Obshch.* **93**, 106-110 (1964) (in Russian).

Pravdite was described (*Am. Mineral.* **48**, 709, 1963) as a calcium rare-earth aluminum silicate. Material from the same deposit is now found to consist of britholite with an alteration zone around it. The x-ray powder pattern of heated pravdite is shown to consist of lines of britholite plus lines of a (Ce, Th) O_2 phase, presumably formed from the alteration product, plus a few lines probably due to a hydromica. The original analysis of pravdite showed Al_2O_3 35.70, Fe_2O_3 1.84, RE_2O_3 18.40, ThO_2 4.90%. Re-analysis of a small sample of type pravdite gave $Al_2O_3 + Fe_2O_3$ 2.2, $RE_2O_3 + ThO_2$ 50.02%. Pravdite is therefore a somewhat altered britholite.

Warthaite and goongarrite (= mixtures of cosalite and galena)

M. RIEDER. X-ray powder data for two discredited minerals "warthaite" and "goongarrite." *Acta Univ. Carolinae, Geol* 1963, **2**, 115-119 (in English, with Czech and Russian abstracts)

R. M. Thompson (*Am. Mineral.* **34**, 459-460, 1949) discredited two minerals of chemical composition approximately $4PbS \cdot Bi_2S_3$, warthaite and goongarrite, both being intimate mixtures of cosalite and galena. His results were based on x-ray powder study, but no d-values were given. X-ray powder diffraction data for two specimens of "warthaite" and two specimens of "goongarrite" (material from the collections of the British Museum in London and of the Royal Ontario Museum in Toronto) given now by M. Rieder fully confirm the results of R. M. Thompson's investigation.

FRANTIŠEK ČECH

Ondřejite = probably a mixture of huntite and magnesite

K. PADĚRA AND P. POVONDRA. Das Vorkommen des Huntits und Magnesits aus den Grotten Zbrašov bei Teplice nad Bečvou (Teplitz a.d. Bečva—Mähren). *Acta Univ. Carolinae, Geol.* 1964, **1**, 15–24 (in German, with Czech abstract)

Chemical and spectrographic analyses, thermal and x-ray powder data for material from the type locality at Zbrašov (near Hranice, Moravia, Czechoslovakia) labelled "ondřejite" are given. This mineral appears to be a mixture of huntite, magnesite and probably β -sepiolite.

DISCUSSION:—Ondřejite was described as a new mineral in a preliminary report by J. V. Kašpar (*Věda přírodní* **23**, 132–137, 1944; *Am. Mineral.* **32**, 255, 1947). On the basis of a chemical analysis (sum 94.07% only) he proposed for this mineral a very complicated chemical formula $H_6Na_2Ca_2Mg_4(CO_3, SiO_3)_{10} \cdot H_2O$. F. Slavík (*Min. Abs.*, **9**, 261) assumed that ondřejite "would belong to be thaumasite group." It is not excluded that J. V. Kašpar's chemical analysis of ondřejite is doubtful and that the interpretation of the thermobalance curve also is suspect. A further study of the type ondřejite is needed.

FRANTIŠEK ČECH

ERRATUM

I would like to call attention to a small error in *Am. Mineral.* **49**, 1964 for the new mineral **marokite** on page 817. In the strong line data translated by Toulmin (5th paragraph down), the first 2.87 (very strong) should read 2.71. The second 2.87 (medium) is correct as it stands. The data in *Bull. Soc. Franc. Mineral.* read as follows.

2.71 FF	1.63 M
2.22 FF	1.58 M
2.29 F	1.49 M
2.07 F	1.48 M
2.87 M	1.080 M
2.56 M	

FRED A. HILDEBRAND