

NEW MINERAL NAMES*

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Arcubisite,* unnamed mineral B

S. Karup-Møller (1976) Arcubisite and mineral B—two new minerals from the cryolite deposit at Ivigtut, south Greenland. *Lithos*, 9, 253-257.

Microprobe analyses of 6 grains gave the following ranges and averages: Ag 59.1-64.7, 62.1; Cu 4.3-6.8, 5.8; Bi 15.7-17.0, 16.7; Pb 0.8-3.1, 1.4; Fe 0.4-1.1, 0.7; Te 1.5-3.4, 2.2; S 11.5-13.7, 12.3; sum 99.4-102.9, 101.2 percent, corresponding to $Ag_{6.01}Cu_{0.95}Bi_{0.84}Pb_{0.07}Fe_{0.13}S_{4.01}Te_{0.18}$, or Ag_6CuBiS_4 . X-ray data could not be obtained. Reflectance color light gray with a faint olive-brown tint. Reflectances were measured in air and in oil at 12 wavelengths. In air, Rg and Rp were: 460 nm, 33.5, 33.8; 540, 33.7, 32.1; 580, 33.9, 31.4; 660, 33.4, 30.9 percent. Anisotropic, colors cream to bluish green. The mineral is etched by $FeCl_3$, $HgCl_2$, KCN solutions and by HNO_3 and HCl, but not by KOH solution.

The mineral occurs in galena or bordering it in anhedral grains of average diameter 0.05 mm, associated with hessite, aikinite, matildite, and berryite.

The name is for the components (argentum, cuprum, Bi, S). Type material is at the Mineralogical Museum, University of Copenhagen (no. 1973, 114).

Grains of mineral B with diameters less than 0.05 mm gave microprobe analyses Ag 68.6, 65.5; Cu 2.5, 1.5; Bi 0.3, 1.0; Pb 0.8, 1.5; Te 23.0, 25.4; S 5.8, 5.2; sum 101.0, 100.1 percent, corresponding to Ag_4TeS_4 . Anisotropy distinct. M.F.

Ferchekinite (iron chevkinite)

Zhang Rubai and Fan Liangming (1976) Iron chevkinite in a quartz syenite from a certain district in Hubei. *Geochimica*, 4, 244-250 (in Chinese with English abstract).

Chemical analysis gave: SiO_2 17.88, TiO_2 17.71, Fe_2O_3 7.08, Al_2O_3 0.47, Ta_2O_5 0.031, Nb_2O_5 0.23, TR_2O_3 36.26, ThO_2 3.61, CaO 2.66, FeO 10.50, MnO 0.024, MgO—, U_3O_8 0.42, ZrO_2 —, K_2O 0.08, Na_2O 0.58, H_2O+ 2.19, H_2O- —, sum 99.725 percent. The rare earths were: La 26.2, Ce 46.8, Pr 3.2, Nd 15.1, Sm 2.8, Eu 0.11, Gd 1.6, Tb 2.1, Dy 0.3, Ho—, Er 0.03, Tm—, Yb 0.04, Lu—, Y 1.6 percent. The formula based on



The mineral is metamict. The strongest powder lines of heated (900°C) material are (16 given): 3.17 (7), 2.85 (5), 2.70 (10), 2.17 (8), 1.96 (8). Material suitable for single-crystal work was not available.

* Minerals marked with an asterisk after the name were approved before publication by the Commission on New Minerals and Mineral Names of the International Mineralogical Association.

Color black. Luster pitchy on fresh surfaces and dull on weathered surfaces. Streak black with a green tint. Opaque, massive, fracture subconchoidal. Weak plasticity. G 4.53(5). Heated (900°C) material has a pork liver color with submetallic luster. VHN = 466.33-583.80 kg/mm². Cleavage absent on hand specimens. Thin-sections etched with HNO_3 showed one set of perfect cleavage.

DTA curve showed a weak endothermic peak at 525°C (dehydration) and a distinct exothermic peak at 825°C (recrystallization).

In reflected light the mineral is grayish white with indistinct pleochroism and reddish brown (with a green tint) internal reflection. Reflectance 12.5 percent (5720Å). $n = 2.02$ before heating, $n < (?>GYC)2.02$ after heating to 900°C.

The mineral occurs as globular masses (up to 1 kg) in a quartz syenite in a Archaean marble, Hubei, China, associated with orthoclase, albite, quartz, biotite, microcline, hornblende, garnet, zircon, ilmenite, titanomagnetite.

Discussion

Ferchekinite (as it appears in the paper) and iron chevkinite (in English abstract) are unjustified names given to this iron-rich variety of chevkinite. It is a common practice in China that mineral varieties are named in the same manner as species. The general formula adopted by the authors deviates considerably from the formula,



generally accepted in the English literature (e.g. Fleischer, 1975 *Glossary of Mineral Species*). A recalculation of the analysis on the basis of 22 oxygen atoms gives



G.Y.C.

Ferrifayalite (= laihunite)

Ferrifayalite Research Group, Department of Geology, Peking University and Institute of Geology and Mineral Resources, Chinese Academy of Geological Sciences (1976), Ferrifayalite and its crystal structure. *Acta Geologica Sinica*, 2, 161-175 (in Chinese with English abstract).

Chemical analyses gave: SiO_2 31.00, 31.94, 31.07, 31.85; Fe_2O_3 43.57, 45.10, 44.24, 45.07; Al_2O_3 nd, nd, nd, 0.065; Cr_2O_3 trace, nd, nd, nd; FeO 25.50, 22.62, 23.64, 22.52; MgO nd, 0.99, 0.87, 0.47; CaO nd, nd, 0.21, 0.47; sum 100.07, 100.65, 100.03, 100.45. These correspond to $Fe_{1.128}^{2+}Fe_{1.59}^{3+}Si_{1.88}O_8$, $Fe_{1.13}^{2+}Fe_{1.70}^{3+}Mg_{0.08}Si_{1.88}O_8$, $Fe_{1.18}^{2+}Fe_{1.70}^{3+}Mg_{0.08}Si_{1.88}O_8$, and $Fe_{1.12}^{2+}Fe_{1.70}^{3+}Mg_{0.06}Si_{1.94}O_8$, or ideally $Fe^{2+}Fe^{3+}(SiO_4)_2$. Spectrographic analysis showed trace of Al, Ba, Ca, Cu, Mn, Yb, and Ti.

Weissenberg photographs showed the mineral to be orthorhombic, $Pb2_1m$, $Pbm2$, or $Pbmm$, but structure analysis established the space group $P2_1/b$; a 4.808(2), b 10.171(6), c 5.824(4)Å, α 90°. Strongest Guinier powder lines are (65 given): 3.488 (10B) (111, 120), 2.774 (9) (130), 2.521 (10) (022, 131, 040), 2.405 (7) (200), 2.246 (7) (140, 122), 2.175 (6) (211, 220), 1.745 (8) (240, 222), 1.456–1.449 (6) (004, 330 223), 1.407 (6) (331, 302). The lines are relatively diffuse.

The structure was solved by $0kl$ and $hk0$ Patterson syntheses, using 246 multiple-film visual intensities, and was refined by a method unfamiliar to the abstractor, $R(0kl) = 0.23$, $R(hk0) = 0.21$. The structure is essentially like that of olivine with Fe^{3+} in $M(1)$ and Fe^{2+} in (000) and (0 $\bar{0}$ 0) of $M(2)$ but leaving (00 \bar{z}) and ($\bar{z}\bar{z}\bar{z}$) sites vacant.

Color black, luster submetallic, streak blackish brown, non-fluorescent in cathode ray, X-ray, ultraviolet, and infrared. Mineral grains (0.25–0.7 mm, up to 1 mm) are anhedral, and few are subhedral tabular. VHN = 617–833 kg/mm², varies with orientation, Mohs hardness 5.5–6.5. Moderately magnetic, moderately electromagnetic. G meas 3.967, calc 4.099. Cleavage {100} distinct, {010} indistinct, and two additional sets intersecting at 60° and nearly perpendicular to (100).

Under reflected light the mineral is grey with distinct birefringence, anisotropic, pleochroic from gray to grayish black. Refractive indices calculated from measured refractivities are $n(546)$ 2.03, $n(589)$ 2.01 parallel to cleavage and $n(546)$ 2.04, $n(589)$ 2.03 perpendicular to cleavage.

TGA curve shows one exothermic peak at 700°C. Infrared (KBr pellets) absorption bands are 1120(m, sh = shoulder), 1045–1025(ms,sh), 985(s,sh), 945(vs), 870(s,sh), 840(m,sh), 620(m,sh), 575(m), 510(m,sh), 480(s), 460(s,sh).

The mineral occurs as a major component (up to 10 percent) in an Anshan-type-like Sinian (late Precambrian) magnetite deposit, Little Lai-he Village, Liaoning, China. The associated minerals are hypersthene, augite, hornblende, magnetite, plagioclase, and quartz.

Discussion

The mineral is identical to laihunite (*Am. Mineral.*, 62, 1065) the analyses of which appeared in the present paper as Analyses 1, 3, and 4. Two references to the laihunite papers were made in the footnotes but without any comments. The correctness of the structure is questionable as the Si–O distances (1.905, 1.845, 1.866, 1.570Å) are far outside the usual range of 1.604–1.651 (Brown and Gibbs, 1969).

The name “ferrifayalite” has already been used by Ginsburg *et al.* (1962) for a variety of olivine containing Fe_2O_3 47.18, FeO 12.53, and MnO 7.55 percent. This variety was later referred to as “ Fe^{3+} -ferroolivine” in Povarennykh (1972). G.Y.C.

References

- Brown, G. E. and G. V. Gibbs (1969) Oxygen coordination and the Si–O bond, *Am. Mineral.*, 54, 1528–1539.
Ginsburg, I. W. and others (1962) *Trudy Mineral. Muzeya*, 13, 28.
Povarennykh, A. S. (1972) *Crystal Chemical Classification of Minerals*, Plenum, New York-London.

Furongite

Hunan 230 Laboratory, Hunan 305 Geological Team and X-ray Laboratory, Wuhan Geological Institute (1976), Furon-

gite—a new uranium mineral found in China. *Acta Geol. Sin.*, 2, 203–204 (in Chinese).

Chemical analysis gave: UO_3 41.40, P_2O_5 18.54, SiO_2 0.80, Al_2O_3 13.67, Fe_2O_3 0.61, BaO 0.59, CaO 0.094, MgO 0.015, K_2O 0.11, H_2O^+ 14.54, H_2O^- 9.36, sum 99.729 percent, corresponding approximately to $Al_{13}(UO_2)_7(PO_4)_{13}(OH)_{14} \cdot 58H_2O$ with $Z = 1$, or simply $Al_2(UO_2)(PO_4)_2(OH)_2 \cdot 8H_2O$ (with $Z = 7$, GYC).

Single-crystal studies showed the mineral to be triclinic, $P1$ or $P\bar{1}$. a 17.87, b 14.18, c 12.18Å, α 67.8, β 77.5, γ 79.9°. Only 11 strongest powder lines are reported: 10.2 (100), 8.62 (80), 5.553 (30), 5.096 (30), 4.310 (50), 3.639 (40), 3.517 (30), 3.448 (25), 3.264 (30), 2.868 (35), 2.817 (30).

Color bright yellow to lemon yellow, translucent with vitreous luster. Brittle, radioactive, strong pale yellowish-green fluorescence in ultra-violet light. G meas 2.82–2.90, calc 2.848. Under the microscope the mineral is pale yellow, pleochroic. One set of very perfect and two sets of perfect cleavage. Oblique extinction with small extinction angle. Biaxial negative, $2V = 65^\circ$, α 1.543–1.549, β 1.564–1.567, γ 1.570–1.575.

The DTA curve shows one large endothermic peak at 170°C. The TGA curve shows that weight loss begins at 38°C, reaches maximum rate at 150–250°C. The DTG curve shows a large peak at 170°C.

The mineral was found in the oxidation zone of an illuvial-type uranium deposit in a Lower Cambrian carbonaceous shale, western Hunan, China. The mineral occurs as tabular crystals and as dense cryptocrystalline aggregates, associated with utahlite (variscite), evansite, opal, halloysite, limonite, and autunite. The name is derived from a poetic description of the Hunan province. Detailed descriptions of the mineral are in preparation. G.Y.C.

Hatrurite, nagelschmidite, unnamed calcium minerals

Shulamit Gross (1977) The mineralogy of the Hatrurim formation, Israel. *Geol. Survey Israel Bull.*, 70, 80 p.

The Hatrurim Formation (“Mottled Zone”), outcropping at 9 localities, contains a complex assemblage, in sedimentary rocks, of fine-grained minerals characteristic of high-temperature contact metamorphic assemblages (rankinite, spurrite, larnite, bredigite, *etc.*). These are described, with many photomicrographs and SEM photographs, and electron microprobe analyses. The following new minerals are described:

1. *Hatrurite* (for the locality), $Ca_3O(SiO_4)$. Microprobe analysis by G. Socroun using wollastonite as standard gave SiO_2 26.1, CaO 72.8, Al_2O_3 0.4, TiO_2 0.3, Fe_2O_3 0.2, MgO traces, sum 99.8 percent. The mineral is rapidly decomposed by water. It occurs as pseudo-hexagonal crystals about 50 microns in diameter in larnite–brownmillerite–mayenite rock. The strongest X-ray lines are overlapped by those of larnite; the only lines that could be distinguished were 3.03 (m), 2.96 (vw), 1.767 (mw), 1.759 (vw), 1.484 (vw), 1.452 (vw). The mineral is colorless. Optically biaxial, neg., $2V$ small, birefringence about 0.006.

Synthetic Ca_3SiO_5 is well-known as one of the most important constituents of portland cement (“alite”). “Pure Ca_3SiO_5 is triclinic, but small amounts of foreign ions in solid solution cause it to become monoclinic or trigonal.”

2. *Nagelschmidite*, $Ca_3(PO_4)_2 \cdot 2 \alpha-Ca_2SiO_4$ [or more generally, $Ca_{3-4}(Si,P)_2O_8$, variable solid solution]. The name was long ago applied to synthetic material, and is now applied to the first natural occurrence. It occurs as anhedral grains up to 150 microns, associated with gehlenite, rankinite, perovskite, titanian andradite, and

magnetite. Probe analysis gave SiO_2 27.88, P_2O_5 8.27, CaO 27.88, Al_2O_3 0.03, Fe_2O_3 0.02, Cr_2O_3 0.03, MgO 0.05, SO_3 0.12, MgO 0.03, K_2O 0.84, Na_2O 0.82, sum 100.15 percent, corresponding to $(\text{Ca}_{3.78}\text{Na}_{0.06}\text{K}_{0.06})(\text{Si}_{1.58}\text{P}_{0.40})\text{O}_8$. In thin section shows a complex set of lamellae intersecting at angles close to 60° . Usually uniaxial positive, rarely biaxial positive with $2V$ nearly zero. Two phases were distinguished: (a) colorless, transparent phase with α 1.680, γ 1.698, main X-ray lines 2.66 (vs), 2.80 (s), 1.94 (m); (b) a cloudy phase, slightly yellow or brown and turbid, α 1.638, γ 1.652. X-ray study [3.45 (m), 2.83 (vs), 2.76 (m), 1.94 (m), 1.84 (m, diff.)] shows it to be a mixture of polymorphs, α - and β -modifications.

Synthetic nagelschmidite was reported to be optically biaxial, positive, $2V$ 0 – 20° , α 1.642–1.680, β 1.642–1.675, γ 1.661–1.690, G 3.065, cleavages {001} good, {110} fair [*Am. Mineral.*, 27, 680 (1942)].

3. *Unnamed CaAl₂O₇*. This mineral was found as an accessory mineral in larnite rock, associated with brownmillerite and mayenite. It occurs as laths or rounded grains up to 30 microns across. X-ray lines not overlapped by associated minerals are 4.44 (s), 3.59 (vw), 3.49 (vvs), 3.37 (vww), 3.08 (m), 2.53 (vw). The mineral has parallel extinction, low birefringence, biaxial, positive, $2V$ small. Goldsmith [*Am. Mineral.*, 34, 479 (1949)] gives for the synthetic compound monoclinic, nearly uniaxial, with n 1.617, 1.651.

4. *Unnamed Ca₂Al₂O₅·nH₂O*. The mineral was identified on the basis of its X-ray pattern (not given). A grain in spurrite–mayenite–brownmillerite rock gave on probe analysis Al_2O_3 41.9, CaO 45.7, Fe and Ti traces, H_2O (diff.) 12.4, corresponding to $\text{Ca}_2\text{Al}_2\text{O}_5 \cdot 1.8\text{H}_2\text{O}$ (dehydration in the electron beam is possible). Microscopic hexagonal plates about 4 microns across gave a longest X-ray spacing of 10.7Å, corresponding to the 8-hydrate of this well-known synthetic compound. The DTA curve shows endothermic breaks at 142° , 278° , and 690° , and an exothermic break at 355° .

5. *Unnamed Ca₄Al₂O₇·nH₂O*. This was identified by the main X-ray spacings 8.1 (vs), 3.95 (m), and 2.88 (s), corresponding to the 13-hydrate. It occurs with no. 3 above, calcite, vaterite, aragonite, ettringite, and portlandite. The DTA curve shows an endothermic effect at 140 – 190° . The mineral occurs in thin hexagonal plates.

6. *Unnamed Ca(Al,Fe)₂O₄·nH₂O*. This occurs as a brown isotropic phase replacing brownmillerite. Probe analyses by F. Holoje and G. Socroun gave Fe_2O_3 37.7, 36.0; Al_2O_3 11.9, 19.2; Cr_2O_3 1.0, 0.7; TiO_2 3.5, 4.2; CaO 9.7, 10.4, MgO n.d., 1.9; SiO_2 (variable) 3.2–5.8, 0.6–3.0, sum 67.0–69.6; 73.0–75.4 percent. These give the formulas $\text{Ca}(\text{Fe}_{1.37}\text{Al}_{0.62}\text{Ti}_{0.20})\text{O}_4 \cdot 11.5\text{H}_2\text{O}$, and $(\text{Ca}_{0.8}\text{Mg}_{0.2})(\text{Fe}_{0.96}\text{Al}_{0.80}\text{Ti}_{0.22})\text{O}_4 \cdot 11.5\text{H}_2\text{O}$, and $(\text{Ca}_{0.8}\text{Mg}_{0.2})(\text{Fe}_{0.96}\text{Al}_{0.80}\text{Ti}_{0.22})\text{O}_4 \cdot 5.7\text{H}_2\text{O}$. Water is probably lost under the electron beam. The DTA curve shows a large endothermic break below 200° . The phase is amorphous to X-rays.

7. *Unnamed Ca₂Al₂O₅·3CaCO₃·32H₂O*. The mineral occurs as thin films in veins cutting calc–silicate–hydrate rocks and overgrowing ettringite crystals in optical continuity. It is uniaxial negative, ω 1.476, ϵ 1.456; synthetic material with 29 H_2O had ω 1.48, ϵ 1.456. The X-ray pattern is characterized by an intense line at 9.4Å, but most lines are overlapped by those of ettringite so that further confirmation is required.

8. *Unnamed α -Ca₂H₂SiO₄(OH)* (or $\text{Ca}_2\text{SiO}_4 \cdot \text{H}_2\text{O}$, dimorph of hillebrandite). This compound, well-known as a synthetic compound, is reported as a mineral for the first time; it occurs as a cavity-filling in melilite–larnite rocks, surrounded by tobermorite and jennite. Crystals are orthorhombic, prismatic, twinned. The strongest X-ray lines are 4.22 (vs), 3.90(s), 3.27 (vs). "Microprobe analysis confirms the ratio CaO/SiO_2 to be 2." DTA shows an

endothermic effect at 470 – 480° , an exothermic one at 880 – 900° . The mineral is biaxial, positive, birefringence 0.007. M.F.

Isoplatinocopper

Hong Shi (1976) Discovery of isoplatinocopper—a new mineral and its nomenclature. *Geochimica*, 4, 240–243 (in Chinese with English abstract).

Microprobe analyses gave: Pt 73.2, 73.8, 71.5, 69.7, 72, 68.5, 72, 73; Cu 30.6, 30.5, 29.7, 28.5, 31, 30.6, 31, 29; sum 103.2, 104.3, 101.2, 98.4, 103, 99.1, 103, 102 percent. These correspond to $\text{Pt}_4\text{Cu}_{5.16}$, $\text{Pt}_4\text{Cu}_{5.08}$, $\text{Pt}_4\text{Cu}_{5.16}$, Pt_4Cu_5 , $\text{Pt}_4\text{Cu}_{5.48}$, $\text{Pt}_4\text{Cu}_{5.48}$, $\text{Pt}_4\text{Cu}_{5.28}$, $\text{Pt}_4\text{Cu}_{5.04}$.

The mineral is cubic, $Fm\bar{3}m$, a 3.786Å. The X-ray diffraction lines are: 2.185 (10) (111), 1.895 (8) (200), 1.337 (7) (220), 1.142 (8) (311), 1.092 (6) (222). The mineral is white with a yellow tint. Luster metallic; non-magnetic; slightly ductile. Grain size in general is 0.05–0.1mm, the largest may reach 1.0mm. In reflected light the mineral is white with a yellow tint, isotropic. Reflectances are: 5200 58, 5800 61, 6400Å 61.5 percent. VHN(5g load) 170 (127–200)kg/mm². Mohs' hardness 3.5. G meas 14.5, calc ($\text{Pt}_4\text{Cu}_{5.20}$) 14.79, $Z = 4$.

The mineral occurs as hemispherical aggregates in a pyroxenite–pyroxene amphibolite (?) intrusive in the Yenshan region, China. Other platinum-group minerals are mainly cooperite, sperrylite, and mertieite with lesser amounts of polyxene, moncheite, merenskyite, and stibiopalladinite. The platinum-group minerals are disseminated in the interstices of rock-forming minerals and in the chlorite veins, associated with diopside, chlorite, and apatite.

Discussion

The cell contents, calculated from the analyses, volume, and density, range from 3.82 to 4.07 total Cu and Pt atoms. With $Z = 4$, the normalized formula of the mineral must be $\text{Pt}_{0.42-0.45}\text{Cu}_{0.58-0.55}$. The Cu–Pt phase diagram has a continuous f.c.c. solid solution at elevated temperatures [Hansen and Anderko, *Constitution of Binary Alloys* (1958)]. The cell edge of the mineral confirms that a simple linear relationship exists between Cu and Pt. Therefore the mineral is platinum copper and does not justify a species name. L.J.C., G.Y.C.

Janggunit*

Soon Jin Kim (1976) Janggunit, a new mineral from the Janggunit mine, Bonghwa, Korea. *J. Korean Inst. Min. Geol.*, 8, 117–125 (Korean with English summary).

Analysis gave MnO_2 74.91, MnO 11.33, Fe_2O_3 (total iron) 4.19, PbO 0.03, H_2O^+ 9.46, sum 99.92 percent. Traces of K, Ca, Ba, Mg, Cu, Zn, and Al were found. The analysis corresponds to Mn_4^{2+} ,₈₅ (Mn_2^{2+} ,₉₀ Fe_2^{3+} ,₃₀) $\text{O}_{8.09}$ (OH)_{5.91}, or Mn_5^{4+} ,_x(Mn,Fe^{3+})_{1+x} O_8 (OH)₆, $x \sim 0.2$. Infrared study showed the presence of (OH). A DTA curve shows endothermic peaks at 250 – 370° [formation of cubic ($\text{Mn},\text{Fe})_2\text{O}_3$, a 9.471Å] and at 955° (formation of hausmannite).

X-ray powder data are indexed on an orthorhombic cell with a 9.324, b 14.05, c 7.956Å, $Z = 4$, G 3.57 calc, 3.59 meas. The strongest lines (17 given) are 9.34 (s) (100), 7.09 (s) (020), 4.62 (m) (200,121), 4.17 (m) (130), 3.547 (s) (112), 3.101 (s) (300), 2.469 (m) (331).

The mineral is black with dull luster, streak brownish-black to dark brown. H 2–3. Opaque. Reflectance 13–15 percent. Birefringence distinct.

The mineral occurs as radiating groups of flakes, colloform bands, and dendritic or arborescent masses in the zone of supergene Mn oxides, associated with calcite, nsutite, and todorokite. The name is for the mine, M.F.

Parapectolite, "paraserandite"

W. F. Müller (1976) On stacking disorder and polytypism in pectolite and serandite. *Z. Kristallogr.*, 144, 401–408.

Electron diffraction patterns showed one pectolite sample from Rauschermühle, Germany, that gave a pattern like that of "parawollastonite." The name parapectolite is suggested. It is stated "No 'paraserandite' was found."

Discussion

The IMA Commission recommended in 1962 that the name parawollastonite be dropped. Obviously names like "paraserandite" for a compound not yet found should not be given. Parapectolite should be called pectolite-*M2abc* [see *Am. Mineral.*, 62, 411–415 (1977)]. M.F.

Unnamed $Pb_4Cu_4Bi_{10}S_{21}$, $Pb_7Cu_7Bi_9S_{24}$, $PbCuBi_7S_{12}$, $Ag_3Cu_3Bi_2S_6$

B. G. Kolkovski and Yu. S. Borodaeu (1974) Bismuth sulfosalts from the Vurli Bryag copper deposit, Burgas. *Minerogenezis (Bulg. Acad. Sci.)* 419–436 (Bulgarian with English summary).

Microprobe analyses are given of 4 minerals found in chalcopyrite-hematite-quartz ores. No X-ray data are given.

(1) Analyses of 3 grains gave Cu 10.5, 10.4, 10.3; Pb 32.4, 32.2, 32.0; Bi 42.1, 43.2, 44.0; S 16.6, 16.6, 16.7; sum 101.6, 102.4, 103.0 percent, corresponding respectively to $Pb_7Cu_{7.42}Bi_{9.03}S_{24.15}$, $Pb_7Cu_{7.42}Bi_{9.31}S_{24.50}$, $Pb_7Cu_{7.35}Bi_{9.52}S_{23.59}$.

(2) Analysis gave Cu 7.1, Pb 21.2, Bi 31.4, S 17.3, sum 97.0 percent, corresponding to $Pb_4Cu_{4.36}Bi_{9.60}S_{21.08}$.

(3) Analysis gave Cu 3.9, Pb 9.6, Bi 67.8, S 18.5, sum 99.8 percent, corresponding to $PbCu_{1.30}Bi_{6.94}S_{12.09}$.

(4) Analysis gave Ag 28.8, Cu 18.4, Bi 38.6, S 16.7, sum 102.5 percent, corresponding to $Ag_{2.88}Cu_{3.14}Bi_2S_{6.02}$. This mineral occurs rimming emplectite. Color grayish-white with purple. Reflectances at 470, 555, 593, and 664 nm are:

(1) 38.3–39.2, 40.6, 39.0; 41.1–38.3; 40.7, 38.2;

(2) 37.3, 47.8, 45.8, 43.6;

(3) 33.4, 34.3, 31.1, 30.4;

(4) –, 33.5, 34.3, 29.5. M.F.

New Data

Mawsonite-(Ge) (=germanium mawsonite) "Feuermineral" =germanian mawsonite

Joachim Ottemann, Bernhard Nuber, and B. H. Geier (1977) A germanium and zinc-bearing variety of mawsonite from the Tsumeb deposit. *Chem. Erde*, 36, 110–117.

Microprobe analyses gave Cu 40.9, 43.2, 42.8; Fe 8.7, 9.5, 13.6; Zn 3.7, 2.1, 0.7; Sn 12.0, 7.4, 2.6; Ge 2.9, 3.4, 3.4; As 0.7, 2.6, 3.4; S 32.3, 33.2, 33.6; sum 101.2, 101.4, 100.1 percent. X-ray data correspond to those of the strongest lines of mawsonite; the mineral is cubic or pseudo-cubic with $a = 10.710 \pm 0.005 \text{ \AA}$. It was previously described as "Feuermineral" (*Am. Mineral.*, 55, 1812). M.F.

Triclinic roscherite

L. Fanfani, P. F. Zanuzzi and Anna Rosa Zanzari (1977) The crystal structure of a triclinic roscherite. *Tschermaks Mineral. Petrogr. Mitt.*, 24, 169–178.

The crystallography of roscherite is more complicated than previously thought. Single-crystal X-ray work on material from Foote Mine (North Carolina) gave triclinic symmetry. The unit cell corresponding to the one adopted for monoclinic roscherite has $a = 15.921$, $b = 11.965$, $c = 6.741 \text{ \AA}$, $\alpha = 91^\circ 04'$, $\beta = 94^\circ 21'$, $\gamma = 89^\circ 59\frac{1}{2}'$, space group $C\bar{1}$. The X-ray study indicates the formula $(Me_{2/3}^{2+}\square_{1/3})\square_1Ca_2Me_4^{2+}Be_4(PO_4)_6 \cdot 6H_2O$, while that proposed for monoclinic roscherite is $(Me_{2/3}^{2+}\square_{1/3})_2Ca_2Me_4^{2+}Be_4(PO_4)_6(OH)_6 \cdot 4H_2O$. The atomic arrangements of both varieties of roscherite are very similar. The lowering of symmetry is caused by the segregation of the trivalent cations into only half of the sites of a monoclinic point position. Crystallochemical considerations suggest that the symmetry of roscherite does not depend on the kind of trivalent cations occupying the 6-coordinated position, but rather by the ratio between trivalent and divalent metal ions. (slightly modified authors' abstract) A.P.