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NEW MINERAL NAMES*

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Caratiite*

A. M. Clark, E. E. Fejer, and A. G. Couper (1984) Caratiite, a new sulphate-chloride of copper and potassium, from the lavas of the 1869 Vesuvius eruption. Mineralogical Magazine, 48, 537–539.

Caratiite is a sulphate-chloride of potassium and copper with ideal formula $K_4Cu_4O_2(SO_4)_4MeCl$ (where Me = Na and/or Cu); it formed as fine green acicular crystals in lava of the 1869 eruption of Mt. Vesuvius, Naples, Italy. Caratiite is tetragonal, space group $I4$; $a = 13.60(2)$, $c = 4.98(1)$ Å, Z = 2. The strongest lines of the powder pattern are [d Å, I, hkl]: 9.61(100)(110); 6.80(80)(200); 4.296(60)(310); 3.015(100b)(420,321); 2.747(70)(411); 2.673(60)(510); 2.478(60)(002); 2.388(70)(431,501); 2.281(60)(600). The mineral is uniaxial positive, $\omega = 1.598$, $\epsilon = 1.711$, with specific gravity 3.0_{meas} and 3.22_{calc}. The type specimen of caratiite is preserved at the British Museum (Natural History) as specimen number BM 1983, 74. **J.A.Z.**

Fredrikssonite*

P. J. Dunn, D. R. Peacor, W. B. Simmons, and D. Newbury (1983) Fredrikssonite, a new member of the pinakiolite series from Långban, Sweden, Geologiska Föreningens i Stockholm Förhandlingar, 105, pt. 4, 335–340.

Fredrikssonite (ideal composition $Mg_2Mn^{3+}(BO_3)O_2$) has been found on the dumps of the Långban Mine, Varmland, Sweden. Microprobe analysis yielded Al_2O_3 1.9, Fe_2O_3 5.4, Mn_2O_3 35.5, MgO 40.3%, ion microprobe gave an estimated B_2O_3 of 17.9%; sum 101.0%. This gives the formula $Mg_{1.93}(Mn^{3+}{}_{0.87}Fe^{3+}{}_{0.13}Al_{0.07})(BO_3)_{0.99}O_{2.05}$ (based on a total of three cations).

Powder and single-crystal X-ray diffraction show the mineral to be orthorhombic, space group $Pbam$ or $Pba2$, $a = 9.18(1)$, $b = 12.555(6)$, $c = 2.954(2)$ Å, Z = 4, $D_{calc} = 3.80$, $D_{meas} = 3.84(5)$ g/cm^3. The strongest X-ray lines (36 given) are 5.16(80)(120), 2.590(100)(240), 2.486(90)(201), 2.201(30)(250), 2.013(50)(321, 430), 1.570(30)(080, 441), 1.513(40)(521, 171). The mineral is the fourth polymorph with this composition; the others are pinakiolite, orthopinakiolite, and takéuchiite.

The mineral has been found in two assemblages. In one sample it was associated with calcite, adelite, brucite, and hausmannite; in another sample it was found with clinohumite, calcite, and jacobsite. Fredrikssonite is reddish brown and slightly transparent with vitreous luster, it is nearly opaque in one direction. The hardness is about 6 (Mohs). Small fragments show a poor cleavage and a second very poor cleavage. It is biaxial, positive, with $\alpha = 1.82(2)$, $\beta < 1.86$, and $\gamma \sim 1.99$; strongly pleochroic with X = golden brown and Z = dark reddish brown to black; absorption $Z > X$; dispersion strong, $r > v$; $Z = c$.

The name is in honor of Dr. Kurt A. Fredriksson of the Smithsonian Institution. Type material is at the Smithsonian Institution under catalogue numbers 149811 and 150341. **R.H.L.**

Georgechaoite*

R. C. Boggs and S. Ghose (1985) Georgechaoite $NaKZrSi_3O_9 \cdot 2H_2O$, a new mineral species from Wind Mountain, New Mexico. Canadian Mineralogist, 23, 1–4.

S. Ghose and P. Thakur (1985) The crystal structure of georgechaoite $NaKZrSi_3O_9 \cdot 2H_2O$. Canadian Mineralogist, 23, 5–10.

Electron microprobe analysis yields SiO_2 43.17, ZrO_2 29.51, Na_2O 7.42, K_2O 11.28, H_2O 8.63, sum 100.01%, corresponding to empirical formula $Na_{1.02}K_{0.96}(Zr_{0.99}Ti_{0.01}Fe_{0.01})Si_{3.01}O_9 \cdot 2.14H_2O$ and ideal formula $NaKZrSi_3O_9 \cdot 2H_2O$.

X-ray analysis shows the mineral to be orthorhombic, space group $P2_1nb$, $a = 11.836(4)$, $b = 12.940(6)$, $c = 6.735(4)$ Å, Z = 4, D_{calc} 2.689, D_{meas} 2.70(2) g/cm^3. The strongest XRD lines (28 given) are [d in Å(I)(hkl)] 6.46(73)(020), 5.95(70)(011), 5.83(32)(200,101), 5.67(52)(120), 3.12(100)(112,140), 2.894(19)(122), 2.829(22)(212,240,141), 2.201(21)(103,332,511,412), 2.049(19)(061,052). The crystals are colorless to white, up to 1 mm long, with conchoidal fracture, but no cleavage. H 5.

Georgechaoite is optically biaxial negative, with $\alpha = 1.578(1)$, $\beta = 1.597(1)$, $\gamma = 1.606(1)$, $2V_{meas} = 67°$, $2V_{calc} = 68°$, $X = a$, $Y = b$, $Z = c$.

The mineral occurs in association with microcline, nepheline, analcime, aegirine, chlorite, catapleiite, and monazite in miarolitic cavities in a nepheline syenite at Wind Mountain, Otero County, New Mexico. It is named for Professor George Y. Chao of Carleton University, Ottawa, Canada. Type material has been deposited in the National Museum of Natural History, Smithsonian Institution.

Georgechaoite is isostructural with gaidonnayite, $Na_2ZrSi_3O_9 \cdot 2H_2O$. Its crystal structure has been refined to a residual R = 0.053, based on 1840 reflections measured on an automatic single-crystal X-ray diffractometer. It consists of sinusoidal single silicate chains, with six-tetrahedron repeat, running parallel to $[10\bar{1}]$ and [101] directions, which are cross-linked by regular $[ZrO_6]$ octahedra and highly distorted $[NaO_4(H_2O)_2]$ and $[KO_4(H_2O)_2]$ octahedra. **J.A.Z.**

Grischunite*

S. Graeser, H. Schwander, and B. Suhner (1984) Grischunite ($CaMn_2[AsO_4]_2$), a new mineral species from the Swiss Alps. Schweiz. Mineral. Petrogr., 64, 1–10 (in German with English abstract).

Grischunite (ideal composition $(Ca,Na)(Mn^{2+},Fe^{3+})_2(AsO_4)_2)$ has been found in manganese deposits near Falotta, Oberhalbstein, in the Canton Grisons in eastern Switzerland. Microprobe analysis yielded Na_2O 1.80, CaO 8.83, Fe_2O_3 5.39, MnO 27.23, As_2O_5 54.84; sum 98.09%. The low sum may be due to light elements or water not detected by microprobe. The infrared spec-

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

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trum gave typical arsenate absorptions at 850 and 777 cm^{-1} and only weak bands thought to be due to adsorbed water at 3420 and 1630 cm^{-1}.

Powder and single-crystal X-ray diffraction show the mineral to crystallize in the orthorhombic space group *Pcab*, $a = 12.913(6)$, $b = 13.48(1)$ and $c = 12.076(6)$ Å, Z = 12, $D_{calc} = 3.99$, $D_{meas} = 3.8(2)$ g/cm^3. The strongest X-ray lines (22 given) are 3.617(70)(320,032), 3.150(90)(141,232), 3.015(80)(004), 2.943 (60)(042,014), 2.839(100)(421,402).

The mineral is found with brandtite, sarkinite, Mn-berzeliite, tilasite, and various other manganese- and arsenic-rich minerals. It is formed by alteration of sarkinite, with which it is often intergrown. It occurs as dark red-brown crystals (up to 1 mm), anhedral grains, and lathlike crystals (elongated along **b**). The Vickers hardness is 450–550 kp/mm^2 (about 5 Mohs). The cleavage is perfect along (010), the luster is vitreous, and the streak is yellow red to yellow brown (lighter than the mineral). $2V$ is approximately +40–50°. The indices of refraction are $\alpha = 1.784$, $\beta = 1.785$, $\gamma = 1.790$ (all ±0.003). It is pleochroic with X = yellow green ($X \| b$), Y = yellow brown ($Y \| a$), and Z = dark red brown ($Z \| c$); absorption $Z \simeq Y \gg X$; dispersion $R \ll v$. **R.H.L.**

Gupeiite,* Xifengite*

Yu Zuxiang (1984) Two new minerals gupeiite and xifengite in cosmic dusts from Yanshan. Acta Petrologica Mineralogica et Analytica, 3, 231–238 (in Chinese with English abstract).

Gupeiite

The average of five electron microprobe analyses, using pure metals as standards, gave Fe 84.8, Ni 0.8, Mn 0.70, Si 14.1, sum 100.3%, corresponding to $Fe_{2.971}Ni_{0.027}Mn_{0.023}Si_{0.979}$ or ideally Fe_3Si.

The X-ray powder diffraction pattern of the cubic mineral is identical to that of the ordered synthetic phase α'-Fe_3Si (PDF 11-616). The space group, by analogy to α'-Fe_3Si, is *Fm*3*m*, with $a = 5.670(5)$ Å, Z = 4. The strongest X-ray lines are (16 given, including 6 β-lines) 3.26(30)(111), 2.83(30)(200), 2.00(90)(220), 1.706(20)(311), 1.415(60)(400), 1.156(100)(422), 1.003(70)(440).

The mineral is steel gray with black streak and metallic luster. It is brittle and strongly magnetic. It has no cleavage. D_{calc} 7.15, VHN (50–100) 494–514 kg/mm^2. Under reflected light the mineral is grayish white with a yellow tint. It is isotropic with no internal reflection. Reflectances in air are (λmm, *R*%) 402, 48.4; 439, 48.4; 480, 51.0; 495, 51.2; 546, 53.5; 590, 53.4; 624, 53.9; 644, 54.0; 657, 54.3.

Xifengite

The average of three electron microprobe analyses, using pure metals as standards, gave Fe 75.5, Ni 0.3, Mn 0.2, Si 23.7, sum 99.7%, corresponding to $Fe_{4.905}Ni_{0.018}Mn_{0.014}Si_{3.062}$ or ideally Fe_5Si_3.

The X-ray powder diffraction pattern is similar to that of synthetic Fe_5Si_3 (PDF 11-615) but is indexed on the basis of the hexagonal $P6_3/mcm$ cell of Mn_5Si_3 (PDF 3-1039) with $a = 6.759(5)$, $c = 4.720(5)$ Å, Z = 2. The strongest X-ray lines are (30 given) 2.21(60)(210), 2.00(100)(211), 1.94(80)(300), 1.92(80)(112), 1.375(50)(222), 1.282(80)(213), 1.244(50)(402), 1.050(60)(510), 1.042(50)(214), 1.010(50)(304).

The mineral is steel gray with black streak and metallic luster. It is brittle and strongly magnetic. It has no cleavage. D_{calc} 6.45, VHN(50) 633–694 kg/mm^2. Under reflected light the mineral is gray with a yellow tint. It is moderately anisotropic from bluish gray to pale brown. Pleochroism is absent. Reflectances in air are (λmm, R_1%, R_2%) 402, 38.3, 37.9; 439, 38.4, 38.9; 480, 40.1, 39.8; 495, 42.0, 40.4; 546, 44.1, 43.0; 590, 46.2, 44.9; 624, 47.6, 44.7; 644, 45.3, 44.2; 657, 45.9, 45.3.

Both gupeiite and xifengite occur as cores of spheres 0.1–0.5 mm in diameter in placers in the Yanshan area, People's Republic of China. The spheres are composed of an outer shell of magnetite, wuestite, and maghemite, an inner shell of kamacite and taenite, and a core of either gupeiite or xifengite. Hongquiite (originally reported as TiO, Am. Min., 61, 184–185, 1976, but new data gave TiC) is often found in cores with gupeiite. The surface characteristics and the minerals present indicate the spheres to be extraterrestrial in origin. The names are for the eastern passageways, Gupeikou and Xifengkou, of the Great Wall. Type materials are preserved at the Institute of Geology, Chinese Academy of Geological Sciences, Beijing. **G.Y.C.**

Inaglyite*

N. S. Rudashevskii, A. G. Mochalov, V. D. Begizov, Yu. P. Men'shikov, and N. I. Shumskaya (1984) Inaglyite, $PbCu_3(Ir,Pt)_8S_{16}$, a new mineral. Zapiski Vses. Mineralog. Obshch., 113, 712–717 (in Russian).

Seven electron microprobe analyses gave Ir 38.7–50.5, Pt 11.5–21.1, Rh 0–2.54, Pb 8.39–9.15, Cu 6.69–7.36, Ni 0–0.08, S 19.7–21.4, sum 98.23–100.5, corresponding to $PbCu_3(Ir,Pt)_8S_{16}$, with Pb 1.00–1.12, (Cu 2.65–2.87, Fe 0.12–0.52, Ni 0–0.03), (Ir 5.00–6.32, Pt 1.38–2.66, Rh 0–0.63), S 15.58–16.18.

X-ray data showed the mineral to be hexagonal, space group *P*6/*m*, *P*6, *P*6/*mmm*, *P*622, or $P\bar{6}2m$, $a = 7.03 \pm 0.01$, $c = 16.44 \pm 0.01$ Å. The strongest X-ray lines (26 given) are 5.7(9)($0\bar{1}11$), 2.98(10)($0004,0\bar{1}13$), 2.438(8)($0\bar{2}24$), 1.753(7)·($1\bar{2}36,0119$). The mineral is closely related to konderite.

Color steel gray, luster metallic. Weakly anisotropic, no internal reflections. Cleavage in 2 directions. Brittle. Hardness 347–726, average 575 kg/mm^2. Reflectances are given at 16 wavelengths (nm, %): 420, 42.8, 41.6; 520, 41.6, 40.1; 580, 42.2, 40.2; 640, 42.7, 40.6; 700, 43.2, 41.4.

Inaglyite occurs as inclusions in isoferroplatinum from the Inagli alkalic-ultramafic massif, Yakutia. It forms irregular grains up to 150 μm, in intergrowth with erlichmanite, rarely with $Cu(Ir,Pt)_2S_4$; also occurs as a rim around iridosmine and laurite that are included within isoferroplatinum.

The name is for the locality. Type material is at the Museum of the Leningrad Mining Institute. **M.F.**

Kipushite*

P. Piret, M. Deliens, and J. Piret-Meunier (1985) Occurrence and crystal structure of kipushite, a new copper-zinc phosphate from Kipushi, Zaire. Can. Mineral., 23, 35–42.

The crystal structure of the new mineral kipushite was determined to an *R* value of 0.05. It is monoclinic, $P2_1/c$ with $a = 12.197(2)$, $b = 9.156(2)$, $c = 10.667(2)$ Å, and $\beta = 96.77(2)°$ (Z = 4). The six strongest reflections observed in the X-ray powder pattern (38 were observed) are ($d, I/I_0, hkl$) 4.03(100)(300, $12\bar{1}$), 2.554(90)(132), 2.970(60)($32\bar{1}$,130), 1.531(60b)($72\bar{3},13\bar{6}$, 036,060), 12.2(50)(100), 3.386(50)($12\bar{2}$,221,311).

The average of 14 microprobe analyses on two different grains yielded CuO 43.0, ZnO 24.4, P_2O_5 20.9, H_2O 11.1 (water determined by TGA), totalling 99.4 wt.%. This was interpreted as the ideal formula $(Cu,Zn)_6(PO_4)_2(OH)_6 \cdot H_2O$. The TGA curve shows continuous loss of water between 320 and 450°C. The Cu:Zn ratio is not fixed and was seen to vary between 2.6:1 and 1.1:1

in the grains analyzed. The calculated compatibility index was in the "superior" category.

Kipushite occurs as elongate aggregates of emerald-green prismatic crystals up to 3 mm in length in the oxidation zone of the Kipushi deposit in southern Shaba, Zaire. Common forms observed were {111}, {102}, $\{01\bar{2}\}$, and $\{11\bar{1}\}$. The mineral is transparent to translucent with a vitreous luster, no distinct cleavages, and an uneven fracture. The Moh's hardness is approximately 4, with $D_{meas} = 3.8$, $D_{calc} = 3.904$ g/cm^3. Optically it is biaxial negative with a small $2V$ ($2V_{calc} = 23°$); $\alpha = 1.693(2)$ (colorless); $\beta = 1.738(2)$ (blue), and $\gamma = 1.740(2)$ (bright blue) in sodium light. The sign of elongation and optical orientation were not determined.

Kipushite occurs in association with pseudomalachite, malachite, hemimorphite, pyromorphite, veszelyite, vauquelinite, libethenite, quartz, and iron oxides. The holotype specimen is registered at the Musee royal de l'Afrique central (Spec. No. 14.026). The name is for the Kipushi deposit, Zaire. **J.F.**

Konderite*

N. S. Rudashevskii, A. G. Mochalov, N. V. Trubkin, A. I. Gorshkov, Yu. P. Men'shikov, and N. I. Shumskaya (1984) Konderite, $PbCu_3(Rh,Pt,Ir)_8S_{16}$, a new mineral. Zapiski Vses. Mineralog. Obshch., 113, 703–712 (in Russian).

Ten electron-microprobe analyses gave (range and average): Rh 13.7–14.8, 14.2; Pt 23.9–26.6, 25.2; Ir 18.2–20.0, 19.2; Pb 8.78–9.94, 9.53; Cu 7.33–8.93, 8.25; Fe 0.24–0.35, 0.28; Ni 0.26–0.44, 0.38; S 23.5–23.9, 23.7; sum 99.50–101.88, 100.74%. The average corresponds to the formula $Pb_{1.00}(Cu_{2.81}Ni_{0.14}Fe_{0.11})_{3.05}(Rh_{2.99}Pt_{2.80}Ir_{2.16})_{7.95}S_{16.00}$.

X-ray study shows the mineral to be hexagonal, space group $P6/m$, $P6$, $P6/mmm$, $P622$, or $P\bar{6}2m$, $a = 7.024 \pm 0.02$, $c = 16.48 \pm 0.02$ Å. The strongest X-ray lines (25 given) are 2.98(10)$(02\bar{2}1)$, 2.85(5)$(02\bar{2}2)$, 2.459(9)$(02\bar{2}4)$, 1.763(10)$(12\bar{3}6)$, 1.715(5)$(22\bar{4}2)$. The mineral is closely related to inaglyite.

Konderite occurs as inclusions in Pt-Fe solid solution (Pt 84–85, Fe 7.9–8.1%) in the Konder alkali-ultramafic massif, Aldan Shield, Siberia, USSR, associated with erlichmanite. Reflectances (%) are given at 16 wavelengths (nm): 420, 45.1, 43.3; 520, 44.8, 42.5; 580, 45.8, 43.4; 640, 46.6, 44.2; 700, 47.4, 45.0. Hardness 372–793, ave. 592 kg/mm^2. Brittle. Color steel gray, luster metallic. No internal reflections. Cleavage in two directions average. Brittle.

The name is for the locality. Type material is at the Museum of the Leningrad Mining Institute. **M.F.**

Lonecreekite,* Sabieite,* and Clairite*

J. E. J. Martini (1983) Lonecreekite, sabieite, and clairite, new secondary ammonium ferric-iron sulphates from Lone Creek Fall Cave, near Sabie, Eastern Transvaal. Ann. Geol. Surv. S. Afr., 17, 29–34.

Lonecreekite

Chemical analysis of lonecreekite yielded Fe_2O_3 13.04, Al_2O_3 1.69, K_2O 0.02, $(NH_4)_2O$ 5.34, SO_3 33.49, H_2O 45.60, insoluble in HCl 0.77, sum 99.95, corresponding to empirical formula, $(NH_4)_{0.99}(Fe_{0.79}Al_{0.16})_{\Sigma 0.95}S_{2.03}O_8 \cdot 12.25H_2O$ and ideal formula, $NH_4Fe(SO_4)_2 \cdot 12H_2O$. The mineral is cubic, probable space group $Pa3$, with $a = 12.302$ Å, $Z = 4$, D_{meas} 1.693 g/cm^3, D_{calc} 1.691 g/cm^3. The strongest XRD lines (32 given) are [d in Å, I, hkl]: 7.12(70)(111), 5.505(50)(210), 5.027(25)(211), 4.356(100)(220), 4.107(60)(221), 3.289(65)(321), 1.945(20)(620). Lonecreekite is colorless and transparent with vitreous luster, isotropic, and $n = 1.483$. The name is taken from the locality, Lone Creek Fall Cave.

Sabieite

With composition Fe_2O_3 25.21, Al_2O_3 0.60, K_2O 0.62, $(NH_4)_2O$ 7.20, SO_3 54.40, insoluble in HCl 12.77, sum 100.80, sabieite has empirical formula, $((NH_4)_{0.83}K_{0.04})_{\Sigma 0.87}(Fe_{0.94}Al_{0.04})_{\Sigma 0.98}S_{2.03}O_8$ and ideal formula, $(NH_4)Fe(SO_4)_2$. This mineral is trigonal, possible space group $P321$, $a = 4.822$, $c = 8.1696$ Å, $Z = 1$. The strongest XRD lines (12 given) include 8.19(100)(001), 3.72(20)(101), 2.409(30)(110), 1.392(20)(300). Sabieite is a white powder of thin platelets with parallel extinction. The name is for the town nearest the locality of occurrence, Sabie.

Clairite

Analysis of clairite gave Fe_2O_3 31.42, Al_2O_3 0.10, Mn_2O_3 1.23, Na_2O 0.35, K_2O 0.03, $(NH_4)_2O$ 6.97, SO_3 43.86, H_2O 10.85, insoluble in HCl 4.41, sum 99.22, for an empirical formula, $((NH_4)_{1.95}Na_{0.08})_{\Sigma 2.03}(Fe_{2.87}Mn_{0.11}Al_{0.02})_{\Sigma 3.00}(SO_4)_4(OH)_{3.03} \cdot 2.88H_2O$, and an ideal formula, $(NH_4)_2Fe_3(SO_4)_4(OH)_3 \cdot 3H_2O$. Clairite is triclinic, $a = 9.368$, $b = 9.150$, $c = 52.610$ Å, $\alpha = 88.15°$, $\beta = 90°$, $\gamma = 118.36°$, $Z = 8$, D_{meas} 2.31 g/cm^3, d_{calc} 2.32 g/cm^3. Strongest of the 23 given XRD lines are 17.5(100)(003), 8.78(100)(006), 8.23(20)(100), 3.424(20)(228), 3.279(25)(0,0,16), 3.041(20)$(3\bar{2}0)$. The color is yellow, and the (001) cleavage is perfect. Optically birefringent, clairite has parallel extinction with $X \parallel c$, X = pale yellow, Z' = dark yellow and $\alpha = 1.595$, $\gamma = 1.607$. The mineral is named after Mrs. Claire Martini, the author's wife.

Discussion

The three minerals are of supergene origin and are formed by the oxidation of pyrite, which interacts with ammonia produced from the decay of organic matter. Lonecreekite is likely to crystallize from this solution if the pH is below one, and clairite if the pH value is around 2. Sabieite derives from the dehydration of lonecreekite. Type material of all three minerals is deposited in the Museum of the Geological Survey in Pretoria. **J.A.Z.**

Mammothite*

D. R. Peacor, P. J. Dunn, G. Schnorrer-Köhler, and R. A. Bideaux (1985) Mammothite, a new mineral from Tiger, Arizona, and Laurium, Greece. Mineralogical Record, 16, 117–120.

Microprobe analysis yielded Al_2O_3 2.3, CuO 14.9, PbO 57.6, Sb_2O_3 6.1, SO_3 7.7, Cl 5.7, H_2O (by difference) 7.0, less O = Cl 1.3, sum 100.0%, corresponding to the empirical formula $Al_{1.02}Cu_{4.22}Pb_{5.81}Sb_{0.94}S_{2.14}Cl_{3.62}H_{17.49}O_{26.38}$, and the ideal formula $AlCu_4Pb_6Sb(SO_4)_2Cl_4(OH)_{18}$.

X-ray analysis indicates the mineral is monoclinic, space group $C2$, Cm, or $C2/m$, $a = 18.89(3)$, $b = 7.22(1)$, $c = 11.31(2)$Å, $\beta = 112.43(18)°$, $Z = 2$, D_{calc} 5.25 g/cm^3. The strongest XRD lines (28 given) are [d in Å$(I/I_0)(hkl)$]: 10.4(60)(001), 6.67(90)(110), 6.08(60)$(11\bar{1})$, 4.72(80)$(40\bar{1},31\bar{1})$, 3.05(90)(221), and 2.896 (100)(600,203).

Blue, with H = 3, cleavage on {010}, and vitreous luster, mammothite is biaxial positive, $\alpha = 1.868$, $\beta = 1.892$, and $\gamma = 1.928$, $2V = 80°$. Pleochroism is moderate with varying hues of light blue; absorption is $Z < Y \leq X$.

The mineral occurs in association with anglesite and phosgenite at Tiger, Arizona, and with cerussite and phosgenite at Laurium, Attika, Greece. The name is for the Mammoth vein, Tiger, Arizona, and the town of Mammoth, Arizona. Type material has been deposited at the Smithsonian Institution and in the Mineralogical Museum of the University of Goettingen, West Germany. **J.A.Z.**

Mannardite*

J. D. Scott and G. R. Peatfield (1984) Mannardite, $Ba_x(Ti_6V^{3+}_2)O_{16}$ and redledgeite redefined as isostructural $Ba_x(Ti_6Cr^{3+}_2)O_{16}$. Geological Association of Canada/Mineralogical Association of Canada, Program with Abstracts, 9, 104.

Mannardite is tetragonal, $I4_1/a$, with $a = 14.356$ and $c = 5.911$ Å, Z = 4, and a hollandite-type structure. It is given, with the formula in the title, as the V^{3+} analogue of redledgeite. **P.J.D.**

Oyelite*

I. Kusachi, C. Henmi, and K. Henmi (1984) An oyelite-bearing vein at Fuka, the Town of Bitchu, Okayama Prefecture. J. Japan. Assoc. Min. Petr. Econ. Geol., 79, 267–275.

Chemical analysis of the mineral gave SiO_2 35.3, B_2O_3 4.8, Al_2O_3 0.3, CaO 41.2, Na_2O 0.1, $H_2O(+)$ 16.7, $H_2O(-)$ 0.7, CO_2 0.4, sum 99.5, corresponding to an empirical formula of $0.99CaO \cdot 0.10B_2O_3 \cdot 0.80SiO_2 \cdot 1.25H_2O$.

The cell dimensions calculated from the X-ray diffraction data are $a = 11.25$, $b = 7.25$, and $c = 20.46$ Å. The strongest of the 18 given XRD lines include (d in Å, I, hkl): 10.23(100)(002), 3.784(10)(204), 3.411(25)(006), 2.917(60)(222,206), 2.558(15)(008), 2.046(13)(0,0,10;424).

Oyelite from Fuka occurs as nearly parallel aggregates of acicular crystals with lengths of 1–3 mm. Associated minerals include bultfonteinite, scawtite, xonotlite, and calcite. The mineral is white in color with vitreous luster on the hand specimen and colorless in thin section. Its refractive indices are $\alpha = 1.602$, $\beta = 1.606$, and $\gamma = 1.613$. H = 5. $D_{meas} = 2.62$ g/cm³.

The mineral is named in honor of Dr. Jiro Oye, late professor of mineralogy of Okayama University. This mineral was previously reported and described as 10 Å tobermorite [Heller and Taylor (1956) H.M.S.O. London 37–38; Kusachi et al. (1980) J. Miner. Soc. Japan, 14, 314–322]. **J.A.Z.**

Sodium-pharmacosiderite*

D. R. Peacor and P. J. Dunn (1985) Sodium-pharmacosiderite, a new analogue of pharmacosiderite from Australia, and new occurrences of barium-pharmacosiderite. Mineralogical Record, 16, 121–124.

Sodium-pharmacosiderite (ideal composition $Na_2(OH)[Fe^{3+}_4(AsO_4)_3(OH)_4] \cdot 7H_2O$) has been found in Marda, Western Australia. Microprobe analysis yielded As_2O_5 39.5, Fe_2O_3 38.2, K_2O 2.9, and Na_2O 6.3%. Water was determined by the Penfield method to be 19.3%. This gives a sum of 106.2%. The high sum is thought to be due to H_2O loss during sample preparation and analysis. The above results were normalized to 100% (with 19.3% H_2O) and give As_2O_5 36.7, Fe_2O_3 35.5, K_2O 2.7 and Na_2O 5.8%. On the basis of Fe = 4 atoms, this gives $(Na_{1.68}K_{0.52})Fe^{3+}_4(AsO_4)_{2.87}(OH)_{5.59} \cdot 6.84H_2O$.

Powder and single-crystal X-ray diffraction show the mineral to be cubic, space group $P\bar{4}3m$, $a = 8.012(1)$ Å, $D_{calc} = 2.90$, $D_{meas} = 2.79(4)$ g/cm³. The strongest X-ray lines (23 given) are 7.99(100)(100), 4.61(50)(111), 4.00(40)(200), 3.27(80)(211), 2.831(60)(220), 2.668(30)(221,300), 2.532(50)(310), 2.416(60)(311) and 1.604(30)(500,430).

The mineral is found with yellow pharmacosiderite, scorodite, arseniosiderite, and a yellow powdery member of the jarosite group in dissolution vugs in arsenopyrite. Quartz is present with the arsenopyrite. Sodium-pharmacosiderite is pale green. The mineral is brittle, showing an uneven fracture and very imperfect {001} cleavage (fracture and cleavage surfaces show a vitreous luster). The hardness is about 3 (Mohs). It is isotropic with an index of refraction of 1.705(4).

The name is in allusion to its composition and its relationship to pharmacosiderite. Type material is at the Smithsonian Institution. **R.H.L.**

Tiptopite*

J. D. Grice, D. R. Peacor, G. W. Robinson, J. van Velthuizen, W. L. Roberts, T. J. Campbell, and P. J. Dunn (1985) Tiptopite $(Li,K,Na,Ca,\square)_8Be_6(PO_4)_6(OH)_4$, a new mineral species from the Black Hills, South Dakota, Canadian Mineralogist, 23, 43–46.

Tiptopite (ideal composition $(Li,K,Na,Ca,\square)_8Be_6P_6O_{24}(OH)_4$) has been found in the Tip Top mine located near Custer, South Dakota. Analysis by microprobe (for Ca, Al, P, Na, K, and Mn), by atomic absorption (for Be and Li), and by TGA (for H_2O) yielded Li_2O 4.5, Na_2O 6.1, K_2O 9.9, BeO 15.1, CaO 4.3, MnO 0.2, Al_2O_3 0.3, P_2O_5 55.1, and H_2O 3.4%; sum 98.9%. This gives the formula $(Li_{2.68}K_{1.87}Na_{1.75}Ca_{0.68}Mn_{0.02})(Be_{5.38}P_{0.57}Al_{0.05})P_{6.00}O_{23.52}[(OH)_{3.37}(PO_4)_{0.35}]$.

Powder and single-crystal X-ray diffraction show the mineral to be hexagonal, space group $P6_3/m$ or $P6_3$, $a = 11.655(5)$, $c = 4.692(2)$ Å, Z = 1, $D_{meas} = 2.65(2)$ g/cm³. The strongest X-ray lines (53 given) are: 3.808(40)(120), 3.652(40)(111), 3.364(50)(030), 2.966(100)(121), 2.525(90)(040), 2.348(70)(002), 2.223(60)(041), 2.077(50)(231), 1.943(40)(330), 1.606(40)(142) and 1.459(60)(161,440). Structurally the mineral appears to be related to cancrinite, and the ideal composition is given in a format consistent with the cancrinite group.

The mineral is found in two different phosphate assemblages. In one of these it is associated with whitlockite, red and yellow montgomeryite, englishite, hurlbutite, red to orange roscherite, whiteite, robertsite or robertsite-mitridatite, fairfieldite, and fransoletite. In the other assemblage it is found with mitridatite, light brown to colorless montgomeryite, eosphorite-childrenite, hurlbutite, englishite, dark olive-green roscherite, whiteite, fairfieldite, whitlockite, and another new mineral. Both these assemblages are in the outer intermediate zone of a pegmatite. The zone contains microcline perthite, triphylite, quartz, and muscovite with minor beryl, albite, fluorapatite, elbaite, and columbite-tantalite.

Tiptopite is found as divergent fascicles and radial sprays of colorless needles with vitreous luster. The crystals are 1 to 2.0 mm long and less than 0.1 mm wide, they are prismatic and sometimes have cavernous tubes at the ends. The mineral is brittle with no apparent cleavage and an uneven fracture. The hardness was not determined. It is not fluorescent. It is uniaxial positive with $\omega = 1.551(1)$ and $\epsilon = 1.559(1)$ (Na light λ 589 nm).

The mineral is named for the locality. Cotype specimens are at the Smithsonian Institution, Washington, D.C., National Museum of Natural Sciences, Ottawa, Canada, and the Museum of Geology, South Dakota School of Mines, Rapid City, South Dakota. **R.H.L.**

Unnamed borate

P. J. Dunn, D. R. Peacor, W. B. Simmons and D. Newbury (1983) Fredrikssonite, a new member of the pinakiolite series from Långban, Sweden. Geologiska Föreningeus i Stockholm Fördhandlinger, 105, pt. 4, 335–340.

Microprobe analysis of a specimen from Nordmark, Sweden, gave Al_2O_3 0.2, Fe_2O_3 3.9, Mn_2O_3 25.0, Sb_2O_3 9.6, MnO 24.9, MgO 20.9%. The mineral is apparently related to the pinakiolite group (based on powder X-ray data); because of this, B_2O_3 was calculated to be 15.2%. This gives a total of 99.7%. The chemical formula is $(Mg_{1.19}Mn_{0.81})(Mn^{3+}_{0.73}Sb^{3+}_{0.15}Fe^{3+}_{0.11}Al_{0.01})(BO_3)O_2$ based on Σ (Mg,Mn,Fe,Al,Sb) = 3 atoms.

Single crystal X-ray data of two crystals give different results. There is some variation along **a*** while *b* and *c* ($\simeq$12.45 and $\simeq$6.0 Å respectively) were well defined.

The mineral occurs as broken, thin bladed, black crystals in calcite. **R.H.L.**

Unnamed $Cu(Ir,Pt)_2S_4$

N. S. Rudashevskii, A. G. Mochalov, V. D. Begizov, Yu. P. Men'shikov, and N. I. Shumskaya (1984) Inaglyite, $PbCu_3(Ir,Pt)_8S_{16}$, a new mineral, Zapiski Vses. Mineralog. Obshch., 113, 712–717 (in Russian).

The mineral occurs in intergrowth with inaglyite as inclusions in isoferroplatinum in the Inagli Alkalic-ultramafic massif, Yakutia, U.S.S.R. Microprobe analysis gave Ir 40.5, Pt 22.6, Rh 2.23, Pb 0.33, Cu 9.70, Fe 0.55, Ni 0.08, S 22.7, sum 98.69%, corresponding to $(Cu_{0.87}Fe_{0.06}Ni_{0.01})(Ir_{1.21}Pt_{0.66}Rh_{0.13})S_{4.00}$.

Discussion

Perhaps related to malanite? **M.F.**

Unnamed sulfosalt

M. Innocenti, P. Lattanzi, and G. Tanelli (1984) Mineralogy and environment of formation of the Cu-Pb-Zn (Ag,Sb,As) mineralizations in the Niccioleta deposit. Rend. Soc. Ital. Mineral. Petrol. 39, 657–667 (in English).

Electron microprobe analysis gave Pb 35.9, Cu 11.6, Fe 7.6, As 1.0, Sb 19.5, S 23.3, sum 98.9%, corresponding to $Pb_{2.15}Cu_{2.27}Fe_{1.69}Sb_{1.99}As_{0.17}S_{9.00}$, or approximately $Pb_2(Cu,Fe)_4(Sb,As)_2S_9$. It occurs as a thin veinlet cutting a pyrite crystal in the Niccioleta deposit, Tuscany, Italy. Color in oil olive gray, resembling tetrahedrite; birefringence and anisotropy weak, no internal reflections. **M.F.**

New data
Sabinaite

G. Y. Chao and X. Jieniang (1985) Sabinaite: a new occurrence and new data. Can. Mineral., 23, 17–19.

A new occurrence of sabinaite at Mont St. Hilaire, Quebec, has allowed revision of the chemical formula, unit cell, and optics of this mineral.

Sabinaite is monoclinic, space group *C2/c* or *Cc*. Cell parameters are a = 10.171(5); b = 6.623(4); c = 17.976(9) Å; β = 94.32(4)°. The six strongest reflections in the X-ray powder pattern, indexed from precession films, are $(d,I/I_0,hkl)$8.96(100)(002), 3.251(50)(021), 2.990(50)(006), 2.017(45)$(42\bar{1})$, 2.239(40)$(22\bar{5})$, and 1.795(35)(00·10). Utilizing this space group, the new cell, and the previously published observed density of 3.36 g/cm³ (Can. Mineral., 18, 25–29) a new chemical formula was determined based on 8 oxygen equivalents (Z = 4) rather than the original 33 oxygen atoms (Z = 8). Electron microprobe analysis of the new material yields ZrO_2 40.64, HfO_2 0.45, TiO_2 10.91, Na_2O 19.53, CaO 0.02, and CO_2 (calc.) 27.56, for an analytical total of 99.11 wt.%, and an analytical formula of $Na_{4.02}(Zr_{1.99}Hf_{0.01})(Ti_{0.87}Zr_{0.12})O_4(CO_3)_4$. The new ideal formula is $Na_4Zr_2TiO_4(CO_3)_4$; D_{calc} = 3.48 g/cm³. The compatibility indices for both the Mont St. Hilaire material and the original material recast to the new cell and formula are excellent to superior.

The new material is optically biaxial positive with *ns* α = 1.720(2); β = 1.79(1); γ_{calc} = 1.90 and $2V_{meas}$ = 82(1)° in sodium light. Optical orientation is $Y = b$, $X \Lambda c$ = 13° in the obtuse β. Dispersion is moderate with $r > v$.

Sabinaite at Mont St. Hilaire occurs in crystals tabular on (001) and slightly elongated on **a**. Forms present include {001}, {010}, {100}, and {110}. The morphology indicates the presence of a center of symmetry and therefore, *C2/c* is the more probable space group. Cleavage is perfect on {001} and distinct on {010}. **J.F.**

Sahlinite

R. C. Rouse and P. J. Dunn (1985) A re-examination of sahlinite from Långban, Sweden. Neues Jahrb. Mineral, Mh. 3, 127–131.

Sahlinite $[Pb_{14}(AsO_4)_2O_9Cl_4]$ from Långban, Sweden has been re-examined, yielding unit cell parameters and space group information. It is monoclinic, space group *Cc* or *C2/c* with a = 12.710(13), b = 22.498(8), c = 11.360(9) Å and β = 118.99(3)°; D_{calc} 8.096, $D_{meas.}$ 8.00. Z = 4. The presence of a strong tetragonal subcell having space group *I*422, *I*42*m*, *I*4*mm* or *I*4/*mmm* and parameters A_1 = 3.89, A_2 = 4.04, C = 22.50 Å, $\alpha = \beta$ = 90° and γ = 90.5° was noted. The pseudo-fourfold axis of the tetragonal cell coincides with the twofold axis of the monoclinic supercell. The six strongest X-ray lines (39 are given) are 3.011(10)$(\bar{3}52)$, 2.946(10)(152,222), 2.814(9)(080), 2.249(7)(0·10·0), 1.985(5)$(\bar{5}35)$ and 1.754(8)$(\bar{2}85$,065,0·12·2,392) (*d*(Å), *I, hkl*). Powder pattern lines were indexed with the aid of precession films.

Sahlinite is found only at Långban in thin, pale yellow platelets up to 2 mm in size associated with calcite, hausmannite, manganhumite, and forsterite. Cleavage is perfect on {010}. Microprobe analysis verifies earlier published wet-chemical analyses.

A discussion of sahlinite's relationship to the minerals of the bismuth oxyhalide group is given. **J.F.**

Stringhamite

F. C. Hawthorne (1985) The crystal structure of stringhamite. Tschermaks. Mineral. Petr. Mitt., 34, 15–24.

Crystal structure analysis, refined to R = 3.7% for 1009 observed reflections, indicates that the correct formula is $Ca[CuSiO_4](H_2O)$, instead of the previously proposed formula with two H_2O per formula unit. **P.J.D.**

Zaherite

H. De Bruiyn, A. E. Schoch, G. J. Beukes, L. D. C. Bok, and W. A. Van der Westhuizen (1985) Note on cell parameters of zaherite. Mineral. Mag., 49, 145–146.

A 30% discrepancy between published values for calculated and measured cell volumes has prompted this re-evaluation of the data on zaherite [$Al_{12}(SO_4)_5(OH)_{26}\cdot 20H_2O$]. Recalculated cell parameters which resolve the volume discrepancy are a = 18.475(0.942), b = 19.454(0.591), c = 3.771(0.231) Å^3, α = 95° 14.40′(1° 6.60′), β = 91° 28.80′(2° 7.38′), γ = 80° 14.40′(1° 9.24′), V = 1330.10(8.27) Å^3. New indices for the six strongest X-ray lines (26 are given) are (d(Å), I_{rel}, hkl) are 18.12(100)(100), 4.61(8)(410), 3.22(8)(160,$\bar{5}$20), 4.82(6)(140,330), 9.56(5)(020), 9.08(4)(200,120). **J.F.**

NOTICES

MAC Short Course on Silicate Melts

May 17–18, 1986

The Mineralogical Association of Canada is sponsoring a short course, May 17–18, 1986, in Ottawa, Canada. Silicate Melts: Their Properties and Structure Applied to Problems in Geochemistry, Petrology, Economic Geology, and Planetary Geology will be preceding the GAC-MAC Annual Meeting. For details, contact C. M. Scarfe, Department of Geology, University of Alberta, Edmonton, Alberta, Canada T6G 2E3; telephone (403)432-2740.

J. D. Hanawalt Powder Diffraction Award

The award is sponsored by the JCPDS—International Centre for Diffraction Data. It is to be presented every three years for an important, recent contribution to the field of powder diffraction. The award will consist of a certificate and $1000. The awardee is expected to submit an abstract and present a paper on the work being recognized at the IUCr Satellite Meeting on X-Ray Powder Diffractometry, Perth, Western Australia, August 20–22, 1987. Travel expenses to the meeting will be provided.

The award was first presented in 1983 to Dr. Ludo Frevel at the Denver X-Ray Conference. Work that is eligible for consideration for the second presentation of the award must have been published between January 1, 1980, and August 31, 1985. There are no restrictions as to age, experience, or nationality of the recipient.

The 1986 selection committee members are Walter Eysel (Universitat Heidelberg), Benjamin Post (Polytechnic Institute, New York), Brian O'Connor (Western Australian Institute of Technology), Catharine Foris (DuPont), and Camden Hubbard (U.S. National Bureau of Standards). The selection committee will welcome suggestions, nominations, and documentation of accomplishments for possible recipients through April 30, 1986, from any interested persons. These can be sent to any committee member or directly to the chairman, C. R. Hubbard, A257 MATL, National Bureau of Standards, Gaithersburg, Maryland 20899, USA (telex 894493).

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