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NEW MINERAL NAMES*

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Bergslagite*

S. Hansen. L. Fälth, and O. Johnsen (1984) Bergslagite, a mineral with tetrahedral berylloarsenate sheet anions. Zeitschrift für Kristallographie, 166, 73–80.

S. Hansen, L. Fälth, O. V. Petersen, and O. Johnsen (1984) Bergslagite, a new mineral species from Långban, Sweden. Neues Jahrb. Mineral., Monatsh., 257–262.

Descriptive analyses (Hansen, Fälth, Petersen, and Johnsen, 1984) defined bergslagite as a new mineral species with the following composition: CaO 28.57, BeO 13.0, As_2O_5 51.58, SiO_2 2.48, H_2O 6.0, sum 101.63 wt.%, corresponding to empirical formula $Ca_{0.99}Be_{1.02}(As_{0.87}Si_{0.08})_{0.95}O_{3.70}(OH)_{1.30}$, and ideal formula $CaBeAsO_4OH$.

Least squares refinement of powder XRD data, indexed on a monoclinic cell, resulted in the following cell dimensions: $a = 4.8818(9)$, $b = 7.809(1)$, $c = 10.127(1)$Å, $\beta = 90.16(1)°$, Z = 4. The strongest lines (51 given) include: 4.879(7)(100), 3.905(7)(020), 3.519(8)($\bar{1}02$), 3.200(10)(112), 3.046(7)(120), 2.917(7)(121). Single crystal XRD analyses indicated that the space group may be $P\bar{1}$ or $P2_1/c$. The structure, which consists of tetrahedral sheet anions and Ca^{2+} layers stacked along **a**, is isotypic with datolite and herderite (Hansen, Fälth, and Johnsen, 1984).

Bergslagite is colorless, whitish or grayish, and translucent, with vitreous luster, no observed cleavage, uneven fracture, H = 5, D(meas.) = 3.40 ± 0.02 g/cm³ and D(calc.) = 3.40 g/cm³. The mineral fluoresces in pale shades of green, yellowish-brown and blue under short-wave ultraviolet light. It is biaxial negative with $2V_\alpha = 70 \pm 2°$, $r < v$, $\alpha = 1.659$, $\beta = 1.681$, $\gamma = 1.694$ (all ±0.001, for $\lambda = 589$ nm). The optical orientation is: $X = \mathbf{a}$, $Y = \mathbf{b}$, $Z = \mathbf{c}$.

Bergslagite occurs as centimeter-size aggregates of elongated crystals in thin veins in fine-grained hematite ore. It is associated with tilasite, manganoan pyroxene (schefferite), manganberzeliite, svabite, barite and calcite. The type locality, Långban, Sweden, is situated in the Bergslagen region, which lends its name to the mineral. Type material is deposited in the Geological Museum, Copenhagen, Denmark. **J.A.Z.**

Eggletonite*

D. R. Peacor, P. J. Dunn, and W. B. Simmons (1984) Eggletonite, the Na analogue of ganophyllite. Mineralogical Magazine, 48, 93–96.

Microprobe analysis of the mineral gave SiO_2 41.5, Al_2O_3 7.6, FeO 3.0, MgO 0.4, ZnO 0.2, MnO 31.4, CaO 1.5, Na_2O 1.7, K_2O 1.3, H_2O 11.4 (by difference), sum 100.0%. By comparison with the isostructural mineral ganophyllite, the total octahedral and tetrahedral cations were assumed to be forty, leading to a normalized formula $(Na_{0.82}K_{0.40}Ca_{0.39}\square_{0.39})_{\Sigma 2.00}(Mn_{6.61}Zn_{0.08}Mg_{0.16}Fe_{0.61}Al_{0.56})_{\Sigma 8.02}(Si_{10.33}Al_{1.67})_{\Sigma 12.00}(O_{28.92}(OH)_{3.08})_{\Sigma 32.00}(OH)_{4.00} \cdot 10.66H_2O$. Determination of the exact water content and its structural role in eggletonite awaits the discovery of better material.

Precession and Weissenberg X-ray study shows the mineral to be monoclinic, space group $I2/a$ or Ia; unit cell $a = 5.554$, $b = 13.72$, $c = 25.00$Å, $\beta = 93.95°$, Z = 2; this is equivalent to the substructure of ganophyllite. The strongest lines (20 given) in the partially indexed powder pattern are 12.4(100)(002), 3.13(30)(116,13$\bar{4}$,008), 2.691(25)(not indexed), 2.600(20)(not indexed), and 2.462(20)(not indexed).

The mineral occurs as a rare constituent in small pegmatite or miarolytic cavities in nepheline syenite at the Big Rock Quarry, Little Rock, Arkansas. Associated minerals include albite, biotite, acmite, titanite, magnetite, natrolite, and apophyllite. Eggletonite is found as acicular radiating groups of prismatic crystals up to 1.5 mm in length that are elongated along [100] and twinned on {001}. It is dark to golden brown in color with a light brown streak. Luster vitreous, cleavage perfect {001}. H 3–4. D 2.76 (meas., heavy liquid), 2.76 (calc.). The mineral is brittle and is not fluorescent. Optically biaxial negative, $\alpha = 1.566(2)$, $\beta = 1.606(2)$, $g = 1.606(2)$, $2V = 9(3)°$. Weak dispersion $r < v$; optical orientation $X \simeq \mathbf{c}^*$, $Y \simeq \mathbf{a}$, $Z = \mathbf{b}$. Weakly pleochroic, $Y = Z$ = pale yellow brown, X = pale brown to colorless; absorption $Z \simeq Y > X$.

The name is for Dr. Richard A. Eggleton of the Australian National University in recognition of his contributions to mineralogy, particularily the crystal chemistry of the stilpnomelane group to which eggletonite is closely related. Type material is preserved at the National Museum of Natural History, Smithsonian Institution, Washington. **J.E.S.**

Franconite*

J. L. Jambor, A. P. Sabina, A. C. Roberts, M. Bonardi, R. A. Ramik, and B. D. Sturman (1984) Franconite, a new hydrated Na–Nb oxide mineral from Montreal Island, Quebec. Can. Mineral., 22, 239–243.

An average of five microprobe analyses of partially dehydrated franconite gave Na_2O 7.9, CaO 1.0, SrO 0.1, Nb_2O_5 76.7, TiO_2 1.1, Al_2O_3 0.1, SiO_2 0.6, H_2O 12.5 (by difference), sum 100.0%. There are variations principally in the water and alkali contents; all analyses show minor to substantial alkali deficiencies; some analyses have up to 0.2 wt.% K_2O. The total water content of the mineral is 21–22 wt.%; partial water loss occurs in the vacuum conditions used for microprobe analyses. For the fully hydrated mineral the average composition deduced from the chemical analyses of five samples corresponds to $(Na_{1.706}Ca_{0.124}Sr_{0.007})(Nb_{3.851}Ti_{0.091}Al_{0.008}Si_{0.094})O_{11} \cdot 9H_2O$, or $(Na,Ca)_2(Nb,Ti)_4O_{11} \cdot nH_2O$. Water loss takes place in stages—a sample placed in a vacuum at 25°C lost 14.1 wt.% H_2O over a period of 20 hours. Upon heating, additional water losses were 3.75 wt.% between 25°C and 191°C, and 3.67 wt.% between 191°C and 502°C, for a total loss of 21.5 wt.%. Loss of water is accompanied by structural collapse; however, subsequent recrys-

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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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tallization occurs when a sample is placed in a humidified environment. These results indicate the presence of both absorbed and weakly-bound essential water in the franconite structure. Thermal decomposition at 500°C yielded $Na_2Nb_4O_{11}$.

Franconite is too fine-grained for single-crystal X-ray study, but an electron diffraction pattern obtained from a crystal showed an orthogonal array 12.7 × 6.4Å. With these values as starting points, indexing of the X-ray powder pattern gave the unit cell $a = 22.22(1)$, $b = 12.857(5)$, $c = 6.359(4)$Å, $\beta = 92.24(6)°$, Z = 4. The strongest lines (60 given) are 11.0(100)(200), 5.55(70)(400), 4.73(60)(301), 4.21(50)(130), 3.21(50)(040), and 3.18(60)(002).

Franconite occurs as white globules in vugs in a dawsonite-bearing sill in the upper levels of the Francon limestone quarry, St.-Michel district, Montreal, Quebec, Canada. Associated minerals include weloganite, calcite, and quartz. The globules (av. diam. 150 μm) consist of radiating, bladed crystals which show vitreous luster, white streak, basal parting, but no cleavage. H. not determined, D calc. = 2.71 g/cm³, D meas. = 2.72(1) g/cm³. The mineral is not fluorescent, does not effervesce in HCl, and is not readily consumed by this acid. Optically biaxial, negative, $\alpha = 1.72(1)$, β calc. = 1.78(1), $\gamma = 1.79(1)$, $2V = 35(5)°$ The blades have parallel or almost parallel, undulatory extinction. The plane of the bladed crystals contains *Z* parallel to the elongation and *Y* normal to it; *X* is perpendicular to the blades.

The name is for the quarry. Type material is preserved in the National Mineral Collection of the Geological Survey of Canada and at the Royal Ontario Museum, Toronto. **J.E.S.**

Kamitugaite*

M. Deliens and P. Piret (1984) Kamitugaite, $PbAl(UO_2)_5[(P,As)O_4]_2(OH)_9 \cdot 9.5H_2O$, a new mineral from Kobokobo, Kivu, Zaire. Bull. Minéral., 107, 15–19 (in French).

The average of eleven microprobe analyses on three different crystals yielded UO_3 71.76, Al_2O_3 2.39, PbO 9.86, P_2O_5 5.48, As_2O_5 2.12 and H_2O (diff.) 8.39. The formula, based on 22.5 oxygens in the anhydrous part, is $Pb_{0.90}Al_{0.96}(UO_2)_{5.10}[(P_{1.58}As_{0.38})O_4]_{\Sigma 1.96}(OH)_9 \cdot 9.5H_2O$.

X-ray study shows the crystal to be triclinic, space group $P1$ or $P\bar{1}$, $a = 10.98$, $b = 15.96$, $c = 9.068$Å, $\alpha = 95.1$, $\beta = 96.1$, $\gamma = 89.0°$, Z = 2, D calc. = 4.47 and D meas. = 4.03. The strongest X-ray lines (21 given) are 15.92(30)(010), 7.95(100)(020), 4.307(25)($10\bar{2}$), 3.972(80)(040), 3.493(20)($30\bar{1}$), 3.271(40)($2\bar{1}2$), 3.175(40)(050).

The mineral occurs as thin plates with a maximum length of 0.5 mm. Crystal forms are {100}, {010}, {001} and {101} with cleavages (010) and (001). Optically biaxial negative α calc. = 1.709, $\beta = 1.735$, $\gamma = 1.744$, $2V = 60°$, $X \sim \mathbf{b}^*$, $Y \angle \mathbf{a} \sim 2°$, $Z \sim \perp \mathbf{a}$ and $\mathbf{b}^*$. Pleochroism: *X* = colorless and *Y* = yellow. It is found in a quartz–albite–muscovite pegmatite associated with minor triangulite, threadgoldite, dumontite, and studtite.

The name is for Kamituga, the mining center of Kivu. **J.D.G.**

Kiddcreekite*

D. C. Harris, A. C. Roberts, R. I. Thorpe, A. J. Criddle, and C. J. Stanley (1984) Kiddcreekite, a new mineral species from the Kidd Creek mine, Timmins, Ontario and from the Campbell orebody, Bisbee, Arizona. Can. Mineral., 22, 227–232.

Analysis by electron microprobe (average of four grains from Kidd Creek) gave Cu 39.3, Mo 0.3, W 19.9, Sn 12.4, Se 2.5, Te 0.1, S 25.4, sum 99.9, corresponding to $Cu_{5.97}Sn_{1.01}W_{1.01}S_{7.64}Se_{0.31}$. Two analyses from Bisbee material differed mainly in the selenium content, with an average analysis corresponding to $Cu_{5.98}Sn_{0.93}W_{0.96}S_{7.87}$. The ideal formula is Cu_6SnWS_8, the tungsten analogue of hemusite.

X-ray study shows the mineral to be cubic, unit cell $a = 10.856(2)$Å, Z = 4, D calc. 4.88 (for the Se-free mineral), D meas. 4.87. The strongest lines (19 given) are 6.29(100)(111), 1.919(60)(440), 3.138(50)(222), 5.41(30)(200), 3.270(20)(311).

The mineral occurs in a bornite-rich ore zone of the Kidd Creek mine as irregular grains, less than 100 μm across, associated with scheelite, clausthalite, tennantite, and tungstenite; and in the Bisbee locale associated with pyrite, colusite, stuetzite, and altaite. It is opaque and isotropic in reflected light. Grains are pale gray-brown or pale gray in reflected plane-polarized light, some having a purplish tint. Reflectance spectra are given from 400 nm to 700 nm, at an interval of 20 nm, for five grains. All five display minima at 400 nm, between 500 and 550 nm, and at 700 nm. The Kidd Creek grains are unique in displaying an upward kink at the red end of the spectrum, above 640 nm. This may be related to the selenium content of these grains. Reflectances for one Kidd Creek grain are; nm (%) 400(23.3), 420(24.0), 440(24.5), 460(24.8), 480(24.5), 500(23.5), 520(22.8), 540(22.8), 560(23.9), 580(24.5). 600(24.5), 620(24.3), 640(24.0), 660(25.3), 680(24.5), 700(23.5). Color values are tabulated for the five grains.

The name is for the Kidd Creek mine. Samples are preserved at the British Museum (Natural History); the National Mineral Reference Collection, Ottawa; and the Royal Ontario Museum, Toronto. **D.A.V.**

Nekrasovite*

V. A. Kovalenker, T. L. Evstigneeva, V. S. Malov, N. V. Trubkin, A. I. Gorshkov, V. R. Geinke (1984) Nekrasovite $Cu_{26}V_2Sn_6S_{32}$, a new mineral of colusite group. Mineral. Zhurnal, 6-2, 88–97 (in Russian).

Microprobe analysis (7 given) gave: Cu 44.18, Fe 4.11, Zn 0.10, V 1.93, Sn 11.40, As 3.03, Sb 4.20, Se 0.32, S 29.86, sum 99.13. The analyses correspond to the formula $Cu^{+}_{18}(Cu,Fe,Zn)^{2+}_{8}\ (V,Fe)^{3+}_{2}(Sn,As,Sb)^{4+}_{6}\ S^{2-}_{32}$. The mineral is the Sn analogue of colusite.

X-ray study shows the mineral to be isostructural with colusite. Nekrasovite is cubic, space group $\bar{4}3n$, $a = 10.73 \pm 0.05$Å, Z = 1, D calc. 4.62. The strongest X-ray lines (25 given) are: 3.09(10)(222), 1.894(8)(440), 1.617(6)(622), 1.230(5)(662).

The mineral is isotropic, it has pale-brown color with a pink shadow which is stronger than in colusite. Internal reflections are not observed. Reflectance measurements (440–740 nm in 20 nm steps) gave: 22.6, 23.8, 25.0, 25.6, 26.0, 26.4, 26.9, 27.4, 28.0, 28.6, 29.3, 29.6, 29.9, 30.0, 29.8, 29.9%. Brittle, microhardness 286–338 kg/sq. mm (20 g load).

Nekrasovite occurs with calcite, quartz, barite and sulfide minerals (tetrahedrite–tennantite, luzonite–famatinite, pyrite, chalcopyrite, . . .) in ore aggregates within propylitic andesites and dacites of Khayragatsch deposit (Kuraminskhiye Mts. Eastern Uzbekhistan, USSR). It forms small (below 100 μm) rounded grains situated among emplectite, chalcopyrite, laitakarite, and native bismuth. Nekrasovite can form subgraphic intergrowths with chalcopyrite and mawsonite.

The name is for Russian mineralogist I. Ya. Nekrasov. Type material is at the A. E. Fersman Mineralogical Museum Acad. Sci. USSR (Moscow). **J.P.**

Piypite*

L. P. Vergasova, S. K. Filatov, E. K. Serafimova, G. L. Starova (1984) Piypite $K_2Cu_2O(SO_4)_2$—a new mineral of volcanic sublimates. Doklady Akad. Nauk SSSR, 275, 714–716 (in Russian).

Wet chemical analysis gave: Na_2O 1.12, K_2O 20.03, Cu_2O 3.67, CuO 34.72, ZnO 0.62, PbO 0.27, SO_3 34.2, Cl 3.01, F 0.60, H_2O^- 1.70, insoluble residue 0.85, O = F + Cl 0.93, sum 99.94%, corresponding to $(K_{1.97}Na_{0.01}Pb_{0.01})_{1.99}(Cu_{2.02}Zn_{0.04})_{2.06}S_{1.98}O_9$. During the formula calculation F, NaCl, CuCl, and insoluble residue were excluded. Anion deficit was made up with oxygen by analogy with euchlorine and dolerophanite. IR spectrum shows the presence of SO_4 groups in the structure. Thermal analysis shows the beginning of desulfatization at 700°C.

X-ray study shows the mineral to be tetragonal, diffraction class $4/mmm$, $a = 13.67(3)$, $c = 4.94(1)$Å, Z = 4, D calc. 3.0, D meas. 3.10±0.01. The strongest X-ray lines (32 given) are: 9.63(100)(110), 6.79(40)(200), 3.039(70)(420), 3.006(30)(321).

The mineral is emerald-green or dark-green to black. Streak yellowish-green, H 2.5. Perfect cleavage parallel to elongation faces. Luster strong, vitreous. Uniaxial, positive. In transmitted light transparent, pleochroic, $\varepsilon = 1.695$ deep green, $\omega = 1.583$ pale green. Elongation positive, straight extinction. Unstable in air. Decomposed by H_2O, forming residue. Readily soluble in dilute acids.

The mineral forms moss-like aggregates of imperfect long-columnar or acicular crystals up to 3-cm long and 1-mm across, often empty inside. It is associated with aphthitalite, dolerophanite, euchlorine, chalococyanite, and tenorite. Piypite occurs in 500°C fumarole incrustations in the area of Great Tolbachinsk Fissure Extrusion in Kamchatka, USSR.

The name is for Russian volcanologist B. I. Piyp. The place in which type material is preserved is not given. **J.P.**

Schulenbergite*

R. v. Hodenberg, W. Krause and H. Täuber (1984) Schulenbergite, $(Cu,Zn)_7(SO_4,CO_3)_2(OH)_{10}\cdot 3H_2O$, a new mineral. Neues. Jahrb. Mineral. Monatsch., 1984, 17–24 (in German).

Wet-chemical analysis of the mineral gave CuO 36.7, ZnO 28.1, SO_3 17.4, CO_2 0.8, H_2O 17.4, sum 100.4 wt.%, corresponding to $Cu_{4.00}Zn_{3.00}(SO_4)_{1.89}(CO_3)_{0.16}(OH)_{9.90}\cdot 3.43\ H_2O$ or idealized $(Cu,Zn)_7(SO_4,CO_3)_2(OH)_{10}\cdot 3H_2O$. Proportion Cu:Zn does not vary much, usually about 1:1. Carbonate always substitutes for small amounts of sulfate. Soluble in dilute HCl, H_2SO_4, HNO_3.

X-ray study shows the mineral to be trigonal, space group $P3$ (or $P\bar{3}$), unit cell $a = 8.249(1)$, $c = 7.183(1)$Å, Z = 1. The strongest X-ray lines (20 given) are 7.186(100)(0001), 3.581(40)$(0002,11\bar{2}1)$, 3.209(30)$(10\bar{1}2)$, 2.700(80)$(21\bar{3}0)$, 2.527(80)$(21\bar{3}1)$, 2.157(30)$(21\bar{3}2)$, 1.559(30)$(41\bar{5}0)$.

The mineral forms thin tabular crystals ($\{0001\}$, $\{11\bar{2}0\}$) of light green-blue color, often clustered, rosette diameter 0.2–0.3 mm max.; crystals have av. diameter 150 μm thickness 2 μm av. Streak pale green-blue. Luster pearly. No fluorescence. H about 2. D 3.28(3) meas., 3.38 calc. Optically uniaxial, negative, $\varepsilon = 1.623(2)$, $\omega = 1.640(1)$. Under the microscope colorless to weak green, sometimes faint dichroism with O slightly greener.

Related crystals are spangolite, namuwite, a 21.1Å, and a 8.2Å mineral phase.

The name is for the locality, dumps of the Glücksrad Mine near Oberschulenberg, Harz Mountains, Germany. Samples are preserved in the Institut für Kristallographie und Petrographie der Universität, Hannover, Germany, and the Ecole Nationale Superieure des Mines, Paris. **V.G.**

Schumacherite*

K. Walenta, P. J. Dunn, G. Hentschel, and K. Mereiter (1983) Schumacherite, a new bismuth mineral from Schneeberg in Saxony. Tschermaks Min. Petr. Mitt., 31, 165–173 (in German).

Microprobe analysis of the mineral gave Bi_2O_3 79.0, V_2O_5 10.9, As_2O_5 5.8, P_2O_5 3.6, H_2O (calc.) 1.0, sum, 100.3 wt.%, corresponding to $Bi_{3.03}(V_{1.07}As_{0.45}P_{0.45})_{\Sigma 1.97}H_{1.00}O_{9.97}$ or idealized $Bi_3O(OH)(VO_4)_2$. Proportions of V:As:P, esp. V:P, vary considerably. Heating to 800°C results in crystal structure changes similar to preisingerite, $Bi_3O(OH)(AsO_4)_2$.

X-ray study shows the mineral to be triclinic, space group $P\bar{1}$, unit cell $a = 10.05(3)$, $b = 7.46(3)$, $c = 6.90(3)$Å, $\alpha = 87.7(3)$, $\beta = 115.3(3)$, $\gamma = 111.5(3)°$, $v = 431$Å^3, Z = 2. The strongest X-ray lines (42 given) are 6.21 (40)(001), 4.57(60)$(1\bar{1}0,\bar{2}01)$, 4.13(40)$(1\bar{1}1)$, 3.28(100)$(\bar{2}21,\bar{2}02)$, 3.19(80)$(0\bar{2}1,111)$, 3.09(80)$(002,210,2\bar{1}1,\bar{1}12)$, 3.02(40)$(\bar{3}10)$, 1.976(50)$(\bar{3}31,0\bar{3}2,\bar{5}12,\bar{4}30,\bar{4}\bar{1}2)$, 1.861(40) $(0\bar{2}3,\bar{2}40,\bar{2}\bar{2}3,$ $122,320)$, 1.722(40)$(302,\bar{3}33)$.

The mineral forms yellow to yellow-brown crusts on quartz-rich vein specimens from Schneeberg, Saxony, Germany. Crystals are rare and smaller than 0.1 mm, tabular after $\{010\}$, with $\{110\}$,$\{101\}$. No cleavage; fracture conchoidal; luster more or less adamantine. H about 3. D 6.90 calculated from X-ray data.

Crystals are yellow, more or less transparent. Optically biaxial, probably positive, ns $\alpha = >2.20$, $\gamma = <2.30–2.42$ (all ±0.02), $\gamma - \alpha > 0.065$, $2V$ close to 90°. Optic plane nearly parallel $(11\bar{1})$. Extinction angles $X' \angle \mathbf{c}$ = about 22°, $Z' \angle \mathbf{a}$ = nearly 15°, both on (010).

The name is for the late Dr. Ing. Friedrich Schumacher, Professor in Freiberg and Bonn. Type material is preserved at the University of Stuttgart, Federal Republic of Germany. **V.G.**

Sweetite*

A. M. Clark, E. E. Fejer, A. G. Couper, and G. C Jones (1984) Sweetite, a new mineral from Derbyshire. Mineralogical Magazine, 48, 267–269.

Chemical analyses of sweetite, naturally occurring $Zn(OH)_2$, gave ZnO 84.3, H_2O 17.0, sum 101.3%, compared to theoretical values of ZnO 81.9, H_2O 18.1%. Wavelength dispersive analyses indicated that excess bulk ZnO may be due to nearly pure ZnO cores present in some crystals. Traces of Ca, Si, Pb, and Cd were also detected. Sweetite is soluble with slight effervescence in dilute HCl.

X-ray study revealed that the mineral is tetragonal, $P4_12_12$ or $P4_32_12$, with unit cell dimensions $a = 8.222(5)$, $c = 14.34(1)$Å, Z = 20. Of the 49 powder XRD lines given, the strongest are: 4.53(37)(112), 3.572(60)(004,202,211), 2.922(100)(213,220), 2.708(18)(105,204,222,301), 2.257(17)(215,224,321). These X-ray patterns do not match any of the known synthetic forms of $Zn(OH)_2$, which are orthorhombic or hexagonal phases.

Sweetite occurs as colorless or whitish bipyramids up to 1 mm in size scattered over the surface of colorless fluorite cubes. It is uniaxial negative, $\omega = 1.635$, $\varepsilon = 1.628$, and D (meas.) = 3.33, D (calc.) = 3.41.

The mineral was found in an oxidized vein of a limestone quarry at Milltown, near Ashover, Derbyshire. Sweetite is named for the late Jessie M. Sweet (1901–1979), curator of minerals at the British Museum, where the type specimens are now housed. **J.A.Z**

Urancalcarite*

M. Diliens and P. Piret (1984) Urancalcarite, $Ca(UO_2)_3CO_3(OH)_6\cdot 3H_2O$, a new mineral from Shinkolobwe, Shaba, Zaire. Bull. Minéral., 107, 21–24 (in French).

Analysis by electron microprobe (U and Ca), gas chromatography (CO_2) and TGA ($H_2O + CO_2$) yielded UO_3 78.68, CaO 4.36, CO_2 4.93, H_2O 10.61, sum 98.58. On the basis of 12 oxygens in the anhydrous part, the formula is 0.83 CaO. 2.93 UO_3. 1.19 CO_2. 6.27 H_2O or ideally as given above.

X-ray study shows the crystal to be orthorhombic, space group *Pbnm* or *Pbn2*$_1$, $a = 15.42$, $b = 16.08$, $c = 6.970$Å, Z = 4, D calc. = 4.10 and D meas. = 4.03. The strongest X-ray lines (26 given) are 8.06(100)(020), 7.00(30)(210), 4.02(80)(040,311), 3.488(70)(002), 3.193(50)(022), 2.829(40)(501), 2.101(50)(313,370).

The mineral occurs as bright yellow acicular crystals forming radiating aggregates to 4 mm in diameter. Fibers are elongated on [001] and flattened on (100). Crystal forms are {100}, {010} and {001}. There is no cleavage and H ~ 2 to 3. Optically biaxial negative, *ns* $\alpha = 1.660$, $\beta = 1.712$, $\gamma = 1.736$, $2V$ calc. = 67°, $X = \mathbf{a}$, $Y = \mathbf{b}$, and $Z = \mathbf{c}$. It is found on uraninite associated with uranophane, masuyite, and wyartite.

The name refers to the composition. **J.D.G.**

Unnamed Ag_3BiTe_2

G. C. Patterson and D. H. Watkinson (1984) Metamorphism and supergene alteration of Cu–Ni sulfides, Thierry mine, Northwestern Ontario. Can. Mineral., 22, 13–21.

Analysis of the mineral by electron microprobe gave Te 33.0, Bi 25.7, Ag 40.1, Ni 0.57, sum 99.4, corresponding to $Ag_{2.92}Bi_{0.97}Ni_{0.08}Te_{2.03}$. The ideal formula appears to be Ag_3BiTe_2.

The mineral occurs as small isolated grains, less than 0.1 mm in diameter, with chalcopyrite, pyrrhotite and pentlandite, in a breccia ore. Other associated minerals include merenskyite, moncheite, kotulskite, and stuetzite. One specimen contains the mineral intergrown with stuetzite. **D.A.V.**

Unnamed cobalt antimonide ($CoSb_2$)

M. A. Zakrzewski (1984) Ore minerals from the Getberg mine, Långban area, Sweden; the probable Co-analogue of nisbite. Neues Jahrb.Mineral. Monatsch., 145–154.

Semiquantitative electron microprobe analyses gave compositions in the range $Co_{0.63-0.85}Ni_{0.15-0.37}Sb_{1.36-2.22}As_{0.25-1.09}$, or ideally $(Co,Ni)(Sb,As)_2$. The mineral was found as elongate, 5 μm grains in a single ore specimen from the abandoned Getberg Pb–Zn–Cu mine near Långban, Bergslagen, central Sweden. These minute grains occur along the contact between bismuth and chalcopyrite, and in bismuth. Other associated minerals include breithauptite and bornite.

In polished section the mineral is bluish gray in reflected light in oil immersion. It is distinctly anisotropic, but less so than breithauptite. Reflection pleochroism was not observed. Comparison of reflectance in relation to bismuth and breithauptite in monochromatic light shows between 450 and 650 nm quite constant R values in the estimated range of 55–60%. The flat shape of the reflectance curve is similar to that of nisbite. The polishing hardness is higher than for chalcopyrite.

Although lacking X-ray data which were unobtainable, the mineral is suggested to be a cobalt analogue of both nisbite ($NiSb_2$) and seinäjokite $(Fe,Ni)(Sb,As)_2$ on the basis of its composition, optical properties, and restricted mode of occurrence. **J.E.S.**

Unnamed Na–Ca–Zr silicate

S. E. Haggerty (1984) The mineral chemistry of new titanates from the Jagersfontein kimberlite, South Africa: Implications for metasomatism in the upper mantle. Geochim. Cosmochim. Acta, 47, 1833–1854.

Inclusions listed as rare and accessory minerals in xenocrysts include an unidentified silicate, analysis of which yielded: ZrO_2 38.9, SiO_2 53.6, CaO 2.71, Na_2O 2.33, K_2O 0.02, Al_2O_3 0.14, FeO 0.07, BaO 0.29 weight percent; REE = 2.1 weight percent. Proposed formulae are $Na_{0.2}Zr_{1.5}Ca_{0.2}Si_7O_{18}$ or $Na_{0.6}Zr_{1.3}Ca_{0.2}Si_6O_{15}$. Associated minerals include a cerian barite (Ce_2O_3 = 11 wt.%), and banded Zr–Fe titanates. **P.J.D.**

Unnamed Na–Ca-Double Sulfate

R. v. Hodenberg and F.-D. Miotke (1983) Some special salt crystal formations in South-Victoria-Land, Antarctica, and first results of the investigation of a new mineral, a Na–Ca-double sulfate. Kali u. Steinsalz, Bd. 8, 11, 374–383 (in German).

Chemical analysis of a salt mineral mixture (0.61 g) gave its approximate composition with Na–Ca-double sulfate 54%, astrakanite 34%, darapskite 8%, halite 2%, and thenardite 1%. Calculated formula of the double sulfate is $Na_2Ca_2(SO_4)_3 \cdot 3H_2O$.

Based on a powder-Guinier X-ray study, the strongest lines (37 given) are 5.51(70), 3.035(90), 2.925(90), 2.883(100), 2.791(100), 2.753(100), 2.653(80).

The mineral occurs in moist, fragile crusts on rocks at the shore of Lake Bonney, and in a 2 cm thick, moist salt-sand soil horizon at Mt. Elektra, Olympus Range. Felty crystal needles are < 100μm long. Soluble in water and some immersion liquids.

Crystals are optically biaxial, probably positive, *ns* $1.487(5) \cong \alpha < \beta \ll \gamma \cong 1.498$. Parallel extinction, γ parallel needle axis.

Structure is expected to be related to eugsterite and hydroglauberite. Synthesis is planned with the necessary collection of additional crystallographic data. **V.G.**

Unnamed Sb-analogue of colusite and nekrasovite

V. A. Kovalenker, T. L. Evstigneeva, V. S. Malov, N. V. Trubkin, A. I. Gorshkov, V. R. Geinke (1984) Nekrasovite $Cu_{26}V_2Sn_6S_{32}$, a new mineral of colusite group. Mineral. Zhurnal, 6-2, 88–97 (in Russian).

The authors propose a ternary diagram with colusite $Cu_{26}V_2As_6S_{32}$, nekrasovite $Cu_{26}V_2Sn_6S_{32}$ and unnamed $Cu_{26}V_2Sb_6S_{32}$ at the corners as the classification scheme for the colusite group. Three of the analyses of minerals from nekrasovite type locality (Kuraminskhiye Mts., Eastern Uzbekhistan, USSR) fall within the unnamed $Cu_{26}V_2Sb_6S_{32}$ field, although they are situated close to the nekrasovite field. Microprobe analysis (3 given) gave: Cu 48.53, Fe 0.90, V 3.18, Sn 6.80, As 3.87, Sb 8.27, Ge 0.14, Mo 0.53, S 29.73, sum 101.95. No more data are given, although Kovalenker et al. state that the mineral is structurally similar to colusite. **J.P.**

Unnamed brockite-like mineral

M. Kizilyalli, D. S. Jones, N. Evin, and H. Göktürk (1983) X-ray diffraction data for a distorted brockite and its solid state reactions with Na_2CO_3. Journal of the Less Common Metals, 93, 433–440.

A mineral of the type $(Ca,Ba,Th,Ln)(PO_4,CO_3) \cdot H_2O$ (Ln = rare earth), which was found in the Beylikahir region of Turkey, was originally thought to be brockite, a phosphate mineral of alkaline earths, thorium and rare earths. However, the

X-ray diffraction and structural properties of the phases differ. While brockite is hexagonal, the new, unnamed mineral is monoclinic with unit cell parameters $a = 7.979(5)$, $b = 10.096(6)$, $c = 9.105(5)$Å, $\beta = 108.65(5)^\circ$. The lower symmetry gives the new phase a more complicated powder XRD pattern, since additional lines are present. Strongest lines include (31 given; total of 47 observed): 3.453(100)($\bar{2}02$), 3.326(60)($\bar{1}02$,122), 3.038(50)(130,220).

The XRD data indicate that this unnamed mineral has a distorted brockite structure closely related to the monazite structure. True brockite heated to 800–900°C acquires a monazite-type structure. Introduction of large cations such as Ba into a calcium thorium phosphate appears to distort such a monazite structure and to increase the cell dimensions. The cell parameters of this unnamed distorted brockite are related to the ThO_2 and monazite structures as follows: $a \approx 2\frac{1}{2}a_{ThO_2}$, $b \approx 2\frac{1}{2}b_{monazite}$, $c \approx 2\frac{1}{2}c_{monazite}$. **J.A.Z.**

New Data

Ganophyllite

P. J. Dunn, D. R. Peacor, J. E. Nelen, and R. A. Ramik (1983) Ganophyllite from Franklin, New Jersey; Pajsberg, Sweden; and Wales: new chemical data. Mineralogical Magazine, 47, 563–566.

Reexamination of ganophyllite from Franklin, New Jersey; Pajsberg, Sweden; and the Benallt mine, Wales, has confirmed the previously described crystal structure and has yielded the tentative formula $(K,Na,Ca)_2Mn_8(Si,Al)_{12}(O,OH)_{32}(OH)_4 \cdot 8H_2O$.

An average of ten microprobe analyses for Franklin samples gave SiO_2 40.4, Al_2O_3 7.9, FeO 0.3, MgO 0.2, ZnO 0.6, MnO 34.1, CaO 1.5, BaO 0.3, K_2O 2.6, Na_2O 1.1, H_2O 11.0 (by difference), sum 100.0%. Using published unit cell parameters ($a = 16.59$, $b = 27.08$, $c = 50.36$Å, $\beta = 94°10'$) and a newly determined density (2.77 g/cm^3), the following calculated formula is obtained in which the octahedral and tetrahedral cations are summed to 20.0: $(K_{0.83}Na_{0.56}Ca_{0.39}Ba_{0.03}\square_{0.19})_{\Sigma 2.00}$ $(Mn_{7.25}Fe_{0.06}Mg_{0.08}Zn_{0.12}Al_{0.49})_{\Sigma 8.00}$ $(Si_{10.16}Al_{1.85})_{\Sigma 12.01}$ $(O_{28.90}(OH)_{3.10})_{\Sigma 32.00}$ $(OH)_{4.00} \cdot 8.90H_2O$.

For a Pajsberg sample, microprobe analysis yielded SiO_2 40.0, Al_2O_3 7.9, FeO 0.4, MgO 0.5, ZnO 0.2, MnO 34.0, CaO 1.0, BaO 0.6, K_2O 3.2, Na_2O 1.3, H_2O 10.9 (by difference), sum 100.0%. Using published unit cell parameters ($a = 16.60$, $b = 27.13$, $c = 50.18$Å, $\beta = 93.96°$) and the same density value, the following calculated formula is obtained: $(K_{1.03}Na_{0.66}Ca_{0.28}Ba_{0.03})_{\Sigma 2.00}$ $(Mn_{7.27}Fe_{0.09}Mg_{0.19}Zn_{0.04}Al_{0.41})_{\Sigma 8.00}(Si_{10.10}Al_{1.93})_{\Sigma 12.03}(O_{28.96}(OH)_{3.04})_{\Sigma 32.00}$ $(OH)_{4.00} \cdot 8.39H_2O$.

Both calculated formulae are reasonably close to the ideal composition. However, the amount of water in ganophyllite is not yet well defined. There is little solid solution among octahedral cations, and the Si:Al ratio is nearly constant. All examined ganophyllites are K-rich. The mineral is relatively invariant in composition from locality to locality. **J.E.S.**

Garronite

R. Nawaz (1983) New data on gobbinsite and garronite. Mineralogical Magazine, 47, 567–568.

A new X-ray diffraction study of fibrous crystals of garronite shows it to be orthorhombic and not tetragonal. Unit-cell dimensions are $a = 9.89$, $b = 10.30$, and $c = 9.93$Å. While the complicated single crystal data do not allow for a space group determination, the unit cell is stated as clearly being body-centered. **J.E.S.**

Gobbinsite

R. Nawaz (1983) New data on gobbinsite and garronite. Mineralogical Magazine, 47, 567–568.

Recent examination and X-ray study of untwinned gobbinsite, originally described as being tetragonal (Am. Mineral., 68, 642–643), shows it rather to be orthorhombic but strongly pseudotetragonal. Space group *Pnmm*, *Pnm*2_1, or *Pn*2_1*m*; unit cell $a = 9.80$, $b = 10.15$, $c = 10.10$Å, with **c** and *X* parallel to elongation. Twinning intergrowths originally assumed to be on (101) are now thought to occur on (110) in order to explain the doubling of diffraction spots on rotation and Weissenberg films. **J.E.S.**

Mandarinoite

F. C. Hawthorne (1984) The crystal structure of mandarinoite, $Fe_2^{3+}Se_3O_9 \cdot 6H_2O$. Can. Mineral., 22, 475–480.

Crystal structure determination of mandarinoite from Idaho (monoclinic, $P2_1/c$, $a = 16.810(4)$, $b = 7.880(2)$, $c = 10.019(2)$Å, $\beta = 98.26(2)^\circ$) was solved by direct methods with $R = 6.4\%$ for 2101 observed reflections. The new formula, given in the title, has two more H_2O than given in the initial description. **P.J.D.**

Onoratoite

S. Menchetti, C. Sabelli, and R. Trosti-Ferroni (1984) The structures of onoratoite, $Sb_8O_{11}Cl_2$ and $Sb_8O_{11}Cl_2 \cdot 6H_2O$. Acta Cryst., C40, 1506–1510.

Onoratoite, previously described as triclinic (Am. Mineral. 53, 351; Am. Mineral., 54, 1219) is now described as monoclinic, space group $C2/m$, with $a = 19.047(35)$, $b = 4.0530(3)$, $c = 10.318(3)$Å, $\beta = 110.25(4)^\circ$. The crystal structure was refined to $R = 0.054$ for 828 observed reflections. **P.J.D.**

Owyheeite

Y. Moëlo, N. Mozgova, P. Picot, N. Bortnikov and Z. Vrublevskaya (1984) Crystalchemistry of owyheeite: new data. Tschermaks Min. Petr. Mitt., 32, 271–284 (in French).

Microprobe analyses of owyheeite from thirteen ore deposits shows significant variations in the major elements Pb (42.9 to 45.7 wt.%), Ag (5.7 to 6.8 wt.%) and Sb (28.3 to 29.8 wt.%). Minor elements commonly include Cu (to 0.45 wt.%) and As (to 0.30 wt.%); less commonly include Sn (to 0.35 wt.%) and Bi (to 2.51 wt.%) and rarely include Tl (to 0.35 wt.%) and Se (to 0.15 wt.%). The solid solution field outlined in this study may be described by the formula $Pb_{10-2x}Sb_{11+x}Ag_{3+x}S_{28}(-0.13 \leq X \leq +0.20)$. This expression does not include the initial formula proposed by Shannon (1921), $Pb_5Ag_2Sb_6S_{15}$. The variations in the concentration of major elements correlates with the chemical composition of the associated sulfosalts.

Four samples were studied by electron diffraction and they gave a super cell of 23 × 27 × 8Å. **J.D.G.**

Rhabdophane

J. F. W. Bowles and D. J. Morgan (1984) The composition of rhabdophane. Mineral. Mag., 48, 146–148.

The composition of rhabdophane, previously described as a hydrated phosphate of cerium and other rare earth elements, has been reexamined. These analyses of material from the type locality, together with a review of other specimens described in the literature, indicate that Ce is not always the dominant rare earth element. Depending on the sample and its occurrence, one or more of the elements neodymium, lanthanum, or yttrium may dominate over cerium, and significant amounts of gadolinium or samarium may also be detectable. **J.A.Z.**

Ruizite

F. C. Hawthorne (1984) The crystal structure of ruizite, a sorosilicate with an $[Si_4\varnothing_{13}]$ cluster. Tschermaks Mineral. Petr. Mitt., 33, 135–146.

Crystal structure analysis led to the new formula $Ca_2Mn_2^{3+}[Si_4O_{11}(OH)_2](OH)_2(H_2O)_2$. The structure contains a linear cluster, $[Si_4O_{11}(OH)_2]$. Ruizite is monoclinic, space group $A2$, with $a = 11.984(3)$, $b = 6.175(2)$, $c = 9.052(2)$Å, $\beta = 91.34(2)°$. The structure was refined to $R = 5.6\%$. **P.J.D.**

Sarcolite

A. Livingstone (1984) Fluorine in sarcolite: additional history and new chemical data. Mineral. Mag., 48, 107–112.

New chemical analyses of sarcolite utilized gravimetric, colorimetric, atomic absorption, and electron microprobe techniques. The preferred analysis gave SiO_2 34.70, TiO_2 0.05, Al_2O_3 19.07, FeO 0.58, MgO 0.20, CaO 34.25, SrO 0.74, MnO 0.03, Na_2O 4.10, K_2O 0.60, CO_2 0.29, P_2O_5 3.69, Cl 0.01, H_2O^+ 0.01, F 1.94, sum 100.26 – (O = F) = 99.44%. This corresponds to $Na_{1.38}Ca_{6.0}(Ca_{0.37}K_{0.13}Fe_{0.08}Sr_{0.07}Mg_{0.05})_{\Sigma 0.70}Al_{3.90}Si_{6.02}P_{0.54}O_{26.20}F_{1.06}C_{0.06}$, or $Na_2Ca_{12}(Ca,K,Fe,Sr,Mg)_2Al_8Si_{12}(P,Si)O_{52}F_2$. The new analyses document both a significant fluorine content, previously unknown, and a phosphorus level twice that previously recognized.

Sarcolite occurs in ejected blocks of Mount Somma, Northern Italy, associated with aegirine, calcite, diopside, grossular–andradite garnet, gehlenite, microsommite, nepheline, olivine (Fo_{84}), phlogopite, and wollastonite. It forms either as clear glassy or flesh-pink irregular masses to 2 cm long or as distinct void-filling crystals to 2.5 cm. New determinations yield an average D 2.95. D calc. is 2.925, using tetragonal $a = 12.32$, $c = 15.480$Å. Optically positive, ns $\omega = 1.600$, $\varepsilon = 1.615$. Infrared spectra show absorption between 1400 and 1500 cm^{-1}, tentatively assigned to CO_3^{2-} ions in the mineral.

The name is from the Greek root for "flesh", and type material is in the British Museum (Natural History). **D.A.V.**

Tintinaite

Y. Moelo, J. Jambor and D. Harris (1984) Tintinaite and associated sulfosalts from Tintina, Yukon: the crystal chemistry of the kobellite series. Can. Mineral., 22, 219–226 (in French).

Three microprobe analyses of tintinaite gave Pb 40.97, Cu 2.21, Sb 34.96, Ag 0.12, S 21.33, sum 99.59%, corresponding to $Pb_{10.6}Sb_{15.3}Cu_{1.8}Ag_{0.2}S_{34.5}$ or simply $Pb_{11}Sb_{15}Cu_2S_{34.5}$. The Cu was not determined in previous analyses yet it is crystal-chemically important as it occupies the 4-fold coordinated site of the kobellite-like structure. **J.D.G.**