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# NEW MINERAL NAMES*

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## Alacranite*

V.I. Popova, V.A. Popov, A. Clark, V.O. Polyakov, S.E. Borisovskii (1986) Alacranite $As_8S_9$—A new mineral. Zapiski Vses. Mineralog. Obshch., 115, 360–368 (in Russian).

Analysis by electron microprobe (average) gave As 67.35, S 32.61, sum 99.96 wt%, yielding the formula $As_{7.98}S_{9.02}$, ideally $As_8S_9$. There is no visible reaction with HCl or $HNO_3$. In 5*M* KOH, the mineral turns brown; on heating it then disintegrates into brown-gray flakes and prolonged boiling turns these flakes dark brown. The melting temperature in air is 350 ± 5 °C.

X-ray studies show the mineral to be monoclinic, space group $P2/c$, $a = 9.89(2)$, $b = 9.73(2)$, $c = 9.13(1)$ Å, $\beta = 101.84(5)°$, Z = 2, $D_{calc} = 3.43$, $D_{meas} = 3.43 \pm 0.03$. The strongest lines (29 given) are 5.91(90)($\bar{1}11$), 5.11(80)(111), 4.05(70)($\bar{1}12$), 3.291(50)(022), 3.064(100)(310), 2.950(90)($\bar{2}22$).

The mineral occurs with realgar and usonite as flattened and prismatic grains up to 0.5 mm across, serving as cement in sandy gravel in the Uson caldera, Kamchatka. An earlier-described occurrence of the mineral, although it is not as well characterized, is in the Alacran deposit, Pampa Larga, Chile. There, the mineral is associated with realgar, orpiment, native As and S, stibnite, pyrite, greigite, arsenopyrite, arsenolamprite, sphalerite, and acanthite, within barite-quartz-calcite veins. Crystals of alacranite have pinacoidal prismatic habit, somewhat flattened on [100]. Major forms are {100}, {111}, and {$\bar{1}11$}; minor or weak forms are {110}, {011}, {411}. Striations parallel to [001] occur on {100} faces. The remaining faces appear dull or tarnished. Luster is adamantine, greasy, streak is orange-yellow, fracture is conchoidal and very brittle. The mineral is transparent, nonfluorescent, with imperfect cleavage on {100}. Indentation microhardness is 69 kg/mm² (20-g load), and H = 1.5. In transmitted light the mineral is orange-yellow, biaxial positive, $\alpha = 2.39(1)$, $\gamma = 2.52(2)$, nonpleochroic. In reflected light, light gray with rose-yellow internal reflection. Reflectance values (nm, $R'_1$, $R'_2$) are 400,14.0,13.0; 425,14.6,13.2; 450,14.8,13.3; 475,14.8,13.4; 500,14.5,13.3; 525,14.3,13.1; 550,14.5,13.2; 575,14.7,13.4; 600,14.8,13.5; 625,14.9,13.6; 650,15.0,13.7; 675,15.0,13.8; 700,15.1,13.9%.

The name is for the earliest described occurrence. Type material is at the Fersman Mineralogical Museum, Moscow, and the Il'menskii Preserve Museum, Miass. **D.A.V.**

## Althupite*

P. Piret, M. Deliens (1987) Uranyl and aluminum phosphates from Kobokobo. Althupite, $AlTh(UO_2)[(UO_2)_3O(OH)(PO_4)_2]_2(OH)_3 \cdot 15H_2O$, a new mineral. Properties and crystal structure. Bull. Minéral., 110, 65–72 (in French).

The average of 10 electron microprobe analyses gave $Al_2O_3$ 1.75, $ThO_2$ 10.25, $UO_3$ 68.22, $P_2O_5$ 9.86, and $H_2O$ (difference) 9.92 wt%, which compares well with the calculated values of the structural formula given above.

X-ray powder-diffraction studies and the structure determination on a single crystal show the mineral is triclinic, space group $P\bar{1}$, $a = 10.935(3)$, $b = 18.567(4)$, $c = 13.504(3)$ Å, $\alpha = 72.64(2)$, $\beta = 68.20(2)$, $\gamma = 84.21(2)°$, $V = 2434(1)$ Å³, Z = 2. The strongest X-ray diffraction lines (39 given) are 10.2(100)(100), 6.67(40)(120), 5.80(50)($\bar{1}21$), 5.08(70)(200), 4.91(40)(221), 4.41(50)($2\bar{2}1$,123), 4.07(40)($1\bar{4}0$), 3.395(40)(300), 3.071(40)(061), 3.000(40B), (342,$\bar{3}01$), 2.896(50)(044,324). The refined crystal structure ($R$ = 0.082 for 4220 reflections) consists of $[(UO_2)_3O(OH)(PO_4)_2]_n^{3n-}$ layers that characterize the phosphuran-

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

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ylite structure group. Layers are connected by two joined octahedra around Al, one tri-capped trigonal prism around Th, and one pentagonal bipyramid around U.

Althupite occurs as thin, transparent yellow tablets, with maximum length 0.1 mm along {001} and flattened on (100). $D_{meas}$ = 3.9(1) and $D_{calc}$ = 3.98 g/cm³. Optically it is biaxial negative; $\alpha = 1.620(3)$, $\beta = 1.661(2)$, $\gamma = 1.665(2)$, $2V_{meas} = 31(3)°$, $2V_{calc}$ = 34°; pleochroism, $X$ pale yellow, $Y$ and $Z$ darker yellow; dispersion, strong $r < v$, $X \approx [100]$, $Z \wedge c \approx 15°$.

The mineral occurs in a pegmatite with beryl and columbite at Kobokobo, Kiku, Zaire. The name alludes to the chemistry. Type material is deposited in the Musée royal de l'Afrique central, in Tervuren, Belgium. **J.D.G.**

### Bobfergusonite*

T.S. Ercit, A.J. Anderson, P. Černý, F.C. Hawthorne (1986) Bobfergusonite: A new primary phosphate mineral from Cross Lake, Manitoba. Can. Mineral., 24, 599–604.

Microprobe, Mössbauer spectroscopy, and TGA-EG analyses gave $Na_2O$ 6.8, MgO 0.3, CaO 1.2, MnO 31.7, FeO 0.3, ZnO 0.1, $Al_2O_3$ 7.5, $Fe_2O_3$ 6.9, $P_2O_5$ 45.2, $H_2O$ 0.3, total 100.3 wt%. The semiempirical formula, $(Na_{2.07}Mn_{0.53}Ca_{0.20}\square_{1.20})_{\Sigma 4}(Mn_{3.68}\ Al_{1.39}\text{-}Fe^{+3}_{0.81}Mg_{0.07}Fe^{+2}_{0.04}Zn_{0.01})_{\Sigma 6}P_{5.99}\ (O_{23.69}OH_{0.31})_{\Sigma 24}$ (basis 24 (O + OH)), considered with crystal-structure data, gives the ideal formula $Na_2Mn_5Fe^{+3}Al(PO_4)_6$ and Z = 4. Chemically distinct from members of the wyllieite and alluaudite groups.

Bobfergusonite is monoclinic, space group $P2_1/n$, with $a$ = 12.773(2), $b$ = 12.486(2), $c$ = 11.038(2) Å, $\beta$ = 97.15°. The strongest lines of the X-ray powder pattern (53 given) are 3.054(100)($\bar{4}$11), 2.869(66)(411), 2.712(49)(042), 2.508(53) ($\bar{4}$32,024,$\bar{4}$13), 2.082(67)(610,060), and 1.575(43)(046,$\bar{8}$02). The mineral is structurally related to both the wyllieite and alluaudite group of minerals, and all three have very similar powder patterns. The structural types can be readily distinguished on the basis of precession single-crystal ($h0l$)* photographs.

The mineral occurs as abundant anhedral equant crystals that range in size from less than 1 mm to 1 cm long. Bobfergusonite is variable in color, ranging from green-brown to red-brown, is nonfluorescent, has a yellow-brown streak and a hardness of 4, is brittle, shows perfect {010} cleavage, and has a prominent {100} parting. The luster is resinous except on the parting surface, which shows a characteristic bronzy luster. $D_{meas}$ (Berman balance) = 3.54(1). $D_{calc}$ = 3.57. Optically biaxial positive; $\alpha$ = 1.694(1), $\beta$ = 1.698(1), $\gamma$ = 1.715(2), $2V_{meas}$ = 46.4(2)°, $2V_{calc}$ = 52°. The optical orientation is $Y \parallel b$ and $a \wedge X = +10°$ in the $\beta$ angle. Pleochroism is moderate with $X = Y$ = yellow-orange, $Z$ = orange. The mineral is transparent in thin fragments. The absorption is $Z > X \simeq Y$.

The mineral was found in nodules in the intermediate zones of an unnamed pegmatite at Cross Lake, Manitoba, Canada (lat 54°41′N, long 97°41′W). Associated phosphate minerals are beusite, fillowite, triplite, apatite, an unknown Mn phosphate, and minor alluaudite.

The name honors Robert Bury Ferguson, Professor Emeritus, University of Manitoba. Holotype material (grams) is preserved in the collections of the Mineralogical Museum, University of Manitoba, Winnipeg, Manitoba, Canada (M6083), and the Royal Ontario Museum, Toronto, Ontario, Canada (M42687). **A.C.R.**

### Chromferide*

M.I. Novgorodova, A.I. Gorshkov, N.V. Trubkin, A.I. Tsepin, M.T. Dmitrieva (1986) New natural intermetallic compounds of iron and chromium – Chromferide and ferchromide. Zapiski Vses. Mineralog. Obshch., 115, 355–360 (in Russian).

Analysis by electron microprobe gave Fe 88.91 (88.71–89.12), Cr 11.30 (11.06–11.55), Si not observed, sum 100.21 (100.18–100.26) wt%, yielding a suggested formula of $Fe_{1.5}Cr_{0.2}\square_{0.3}$, or $Fe_{1.5}Cr_{0.5-x}$, where □ represents vacancy.

X-ray study shows the mineral to be isometric, space group $Pm3m$, $a$ = 2.859(5) Å, Z = 1, $D_{calc}$ = 6.69. The lines (7 given) are 2.87(20)(100), 2.02(100)(110), 1.656(10)(111), 1.43(80)(200), 1.28(50)(120), 1.16(100)(211), 1.01(70)(220).

The mineral occurs as small grains (of submicrometer size; aggregates to hundreds of micrometers) in quartz veins within brecciated amphibolite and schist of the southern Urals. Associated minerals include native iron, copper, bismuth and gold, ferchromide, graphite, metal carbide (cohenite), halite, sylvite, and Cl-rich scapolite (marialite). Chromferide is opaque, light gray, ferromagnetic, with metallic luster and no cleavage. Microhardness (100-g load) is 260 ± 10 kg/mm², with weakly concave indentation shape. Reflectance values in air are (nm,%): 440,50.4; 460,51.4; 480,50.9; 500,52.6; 520,53.0; 540,55.3; 560,56.5; 580,56.9; 600,57.9; 620,58.3; 640,59.0; 660,60.0; 680,60.7; 700,60.8; 720,61.7; 740,61.9.

The name is for the chemical composition. Type material is at the Fersman Mineralogical Museum, Akademiya Nauk SSSR, Moscow. **D.A.V.**

### Ellenbergerite*

C. Chopin, R. Klaska, O. Medenbach, D. Dron (1986) Ellenbergerite, a new high-pressure Mg-Al-(Ti,Zr)-silicate with a novel structure based on face-sharing octahedra. Contrib. Mineral. Petrol., 92, 316–321.

The phengite quartzite layer of the Dora Maira crystalline massif, western Alps, locally contains near-end-member pyrope megacrysts, some of which exceed 20 cm in diameter. The garnet contains numerous mineral inclusions, among which ellenbergerite makes up to a few modal percent of the megacrysts. Ellenbergerite is typically millimeter-sized, anhedral, rarely as prisms up to 10 mm long with a hexagonal cross section. Transparent, purple to lilac color with a few grains showing a pink or smoky core; vitreous luster, H = 6.5, fracture easy and brittle; $D_{meas}$ = 3.15 for most grains, up to 3.22 g/cm³ for a few; $D_{calc}$ = 3.10 for a Ti-rich composition, 3.17 g/cm³ for a Zr-rich one (Z = 1). Nonfluorescent in ultraviolet light, faint bluish cathodoluminescence under the electron beam.

Electron-microprobe analyses (13 given) range from $SiO_2$ 32.51–38.61, $P_2O_5$ 0.00–8.27, $Al_2O_3$ 20.41–24.91, $TiO_2$ 0.52–4.10, $ZrO_2$ 0.00–3.10, MgO 21.80–25.80, FeO 0.15–0.43 wt%; a coulometric determination on a 6-mg sample gave 8.0 wt% $H_2O$. The analytical results and a crystal-structure determination ($R$ = 3.4%) indicate an ideal formula $(Mg_{1/3},Ti_{1/3},\ \square_{1/3})_2Mg_6Al_6Si_8O_{28}(OH)_{10}$ for the P-free end member. P incorporation is related mainly to SiAl ⇌ PMg substitution.

Ellenbergerite is uniaxial negative; vividly pleochroic with $\omega$ colorless, $\epsilon$ colorless to deep lilac with color zoning. At 589 nm, $\omega$ = 1.6789(5) to 1.6553(5), $\epsilon$ = 1.6697(10) to 1.6538(10); highest $\omega$ values are for samples rich in Ti, and the color zoning is related to nearly complete Ti-for-Zr substitution; variations in $\epsilon$ are more dependent on the P content. The mineral is hexagonal, $a$ = 12.255(8), $c$ = 4.932(4) Å, space group $P6_3$; strongest lines of the X-ray powder pattern (114.6-mm camera, Cu radiation) are 3.61(50)(201), 3.54(75)(300), 3.06(55)(220), 2.653(70)(400), 2.186(55)(321).

The mineral occurs at Parigi, near Martiniana Po, Italy, in a phengite-pyrope quartzite outcrop containing coesite. Associated inclusions in the pyrope porphyroblasts are kyanite, talc, clinochlore, rutile, zircon, and a sodic amphibole close to glaucophane. The structure of ellenbergerite has face-sharing octahedra, resulting in a dense structure. The new name is for Prof. François Ellenberger, Paris, in recognition of his geological work in the western Alps. The type material is at the Ecole Nationale des Mines, Paris; cotype specimens are at the Galerie de Minéralogie, Université P. et M. Curie, Paris, and at the Institut für Mineralogie, Ruhr-Universität, Bochum, Federal Republic of Germany.

**Discussion.** The name ellenbergerite is intended by the authors to apply to both the titanian and zirconian varieties of the mineral. Also found, late in the study, is a P-rich variety with 16 wt% $P_2O_5$, space group $P6_3mc$, whose status remains to be clarified. **J.L.J.**

## Ferchromide*

M.I. Novgorodova, A.I. Gorshkov, N.V. Trubkin, A.I. Tsepin, M.T. Dmitrieva (1986) New natural intermetallic compounds of iron and chromium—Chromferide and ferchromide. Zapiski Vses. Mineralog. Obshch., 115, 355–360 (in Russian).

Analysis by electron microprobe gave Fe 12.60 (12.55–12.65), Cr 87.58 (87.53–87.63), Si 0.0, sum 100.18 wt%, yielding a suggested formula of $Cr_{1.5}Fe_{0.2}\square_{0.3}$, or $Cr_{1.5}Fe_{0.5-x}$, where □ represents vacancy.

X-ray study shows the mineral to be isometric, space group $Pm3m$, $a = 2.882(5)$ Å, Z = 1, $D_{calc} = 6.18$. The lines (8 given) are 2.88(10)(100), 2.04(100)(110), 1.66(50)(111), 1.44(60)(200), 1.29(50)(120), 1.17(90)(211), 1.02(70)(220), 0.77(80)(321).

The mineral occurs as small grains (of submicrometer size to aggregates hundreds of micrometers) in quartz veins within brecciated amphibolite and schist of the southern Urals. Associated minerals include native iron, copper, bismuth, and gold, chromferide, graphite, metal carbide (cohenite), halite, sylvite, and Cl-rich scapolite (marialite). Ferchromide is opaque, light gray, ferromagnetic, with metallic luster and no cleavage. Microhardness (100-g load) is 900 ± 20 kg/mm², with weakly concave indentation shape. Reflectance values in air are (nm,%): 440,55.2; 460,55.4; 480,56.2; 500,56.9; 520,58.0; 540,58.8; 560,59.5; 580,60.4; 600,61.0; 620,61.0; 640,61.8; 680,62.8; 700,63.2; 720,63.8; 740,63.8.

The name is for the chemical composition. Type material is at the Fersman Mineralogical Museum, Akademiya Nauk SSSR, Moscow. **D.A.V.**

## Kamiokite*

A. Sasaki, S. Yui, M. Yamaguchi (1985) Kamiokite, $Fe_2Mo_3O_8$, a new mineral. Mineral. Jour. (Japan), 12, 393–399.

The average of three electron microprobe analyses using $FeMoO_4$ and MnO as standards gave FeO 27.04, MnO 0.41, $MoO_2$ 71.24, sum 98.69 wt%, resulting in $(Fe_{2.01}Mn_{0.03})_{\Sigma 2.04}Mo_{2.98}O_8$ on a basis of O = 8. Powder and precession X-ray studies show the mineral to be hexagonal, $a = 5.782(2)$, $c = 10.053(3)$ Å, space group $P6_3mc$, Z = 2. The strongest diffraction-maxima in the powder pattern (20 given) are 5.03(100)(00.2), 3.55(90)(10.2), 2.509(75)(00.4,11.2,20.0), 2.430(55)(20.1), 2.006(40)(20.3) (diffractometer data) using Fe$K\alpha$ radiation and quartz as an internal standard.

The mineral is black, opaque, metallic to submetallic luster, black streak. In transmitted light, strongly anisotropic, no internal reflection. Low reflectivity in reflected light, strongly bireflectant from gray to olive-gray, and strongly anisotropic from light brownish gray to dark greenish gray. Reflectance values, in air, are 16.0–23.6 (480), 15.3–22.9 (546), 14.7–22.2 (589), 14.3–22.1 (657 nm). Perfect {0001} cleavage, even fracture, $VHN_{50} = 600(32)$, Mohs' H = 4.5, $D_{meas} = 5.96$, $D_{calc} = 6.02$ g/cm³. Kamiokite ranges up to 3 mm in diameter, as granular to thick, tabular hexagonal crystals.

The type locality is the Kamioka silver-lead-zinc mine, Gifu Prefecture, Japan, after which the mineral is named. The host deposits are stockworks of molybdenite-bearing quartz veinlets in granitic dikes and in migmatitic masses of dioritic composition. Associated minerals are quartz, molybdenite, K-feldspar, fluorite, ilmenite, and scheelite. The intimate presence of molybdenite, which commonly replaces kamiokite along edges and cleavage planes, implies that kamiokite is stable only at very low $f_{S_2}$ fugacities. The mineral is also found at the Mohawk and Ahmeek mines, Michigan.

Type material is at the Museum of the Geological Survey of Japan, Tsukuba, the National Science Museum, Tokyo, and the Sakurai Museum, Tokyo, Japan. **T.S.E.**

## Kamotoïte-(Y)*

M. Deliens, P. Piret (1986) Kamotoïte-(Y) a new uranyl and rare earth carbonate from Kamoto, Shaba, Zaïre. Bull. Minéral., 109, 643–647 (in French).

The average of 19 electron-microprobe analyses on several crystals gave $UO_3$ 63.39, $Y_2O_3$ 6.19, $Nd_2O_3$ 2.36, $Sm_2O_3$ 1.91, $Gd_2O_3$ 2.10 and $Dy_2O_3$ 1.64, $CO_2$ (by chromatography) 7.24, $H_2O$ (loss at 800 °C minus %$CO_2$) 14.30, sum 99.13 wt%, which on the basis of 21 oxygen atoms corresponds to $4.07UO_3 \cdot 0.92(Y,Nd,Gd,Sm,Dy)_2O_3 \cdot 3.02CO_2 \cdot 14.5H_2O$, or ideally $4UO_3 \cdot (Y,Nd,Gd,Sm,Dy)_2O_3 \cdot 3CO_2 \cdot 14.5H_2O$.

Single-crystal and X-ray powder-diffraction studies show the mineral to be monoclinic, space group $P2_1/n$, $a = 21.22(1)$, $b = 12.93(1)$, $c = 12.39(1)$ Å, $\beta = 115.3(1)°$, Z = 4. The strongest X-ray diffraction lines (39 given) are 8.49(80)(011), 6.48(100)(020), 3.93(35)(213,$21\bar{3}$), 3.49(40)(222,$22\bar{3}$), 3.054(60)(402,$40\bar{4}$), 2.762(40)(422,$42\bar{4}$), 2.132(40)(811,$81\bar{5}$), 1.749(40)(614,$61\bar{7}$).

The mineral occurs as crusts of elongate (to 5 mm), bright yellow blades on uraninite. Good cleavages on {001} and {$\bar{1}01$}, $D_{meas} = 3.93$ and $D_{calc} = 3.94$ g/cm³. Optically it is biaxial negative with $\alpha = 1.604(2)$, $\beta = 1.667(2)$, $\gamma = 1.731(3)$, $2V_{calc} = 87°$; pleochroism, $X$ colorless, $Y$ pale yellow-green, $Z$ bright yellow; absorption $Z > Y > X$, $X = b$, $Y \wedge c = 25°$, $Z = a$.

The mineral was found in the copper-cobalt deposit of Kamoto, southern Shaba, Zaire; hence its name. Type material is deposited in the Musée royal de l'Afrique central, in Tervuren, Belgium. **J.D.G.**

## Keiviite-(Y)*

A.V. Voloshin, Ya.A. Pakhomovsky, F.N. Tyusheva (1985) Keiviite-(Y)—A new yttrian diorthosilicate, and thalenite from amazonite pegmatites of the Kola Peninsula. Diortho- and triorthosilicates of yttrium. Mineralog. Zhurnal, 7 (6), 79–94 (in Russian).

Four microprobe analyses of crystals on keiviite-(Yb) and those filling fissures in quartz and fluorite gave, respectively, $Y_2O_3$ 40.86, 45.86, $Yb_2O_3$ 15.36, 11.81, $Er_2O_3$ 6.50, 4.40, $Lu_2O_3$ 2.61, 1.05, $Tm_2O_3$ 1.99, 1.11, $Dy_2O_3$ 1.53, 2.92, $Ho_2O_3$ 0.85, 1.27, $Tb_2O_3$ 0.10, 0.00, $Gd_2O_3$ 0.08, 0.62, CaO 0.00, 0.30, $SiO_2$ 30.85, 30.49, total 100.73, 99.83 wt%, corresponding to $(Y,Yb)_2Si_2O_7$. The X-ray powder pattern of the mineral is identical with that of keiviite-(Yb), so monoclinic symmetry and space group $C2/m$–$C^3_{2n}$ were assumed by analogy. Unit-cell data: $a = 6.845(5)$, $b = 8.960(5)$, $c = 4.734(3)$ Å, $\beta = 101.65(5)°$, Z = 2. The strongest X-ray lines (65 given) are 4.65(90)(001), 3.23(100)(021), 3.04(80)($\bar{2}$01), 2.280(70)($\bar{1}$12,131). Three weak lines have *hkl* values that do not correspond to the assumed space group.

The mineral is colorless to white. Streak white, luster glassy. No fluorescence; yellow-green cathodoluminescence. H = 4 to 5, $VH_{20} = 1400$, $VH_{40} = 1200$ kg/mm². No cleavage, uneven fracture. $D_{meas} = 4.45$, $D_{calc} = 4.48$. Biaxial negative, $2V_{meas} = 56(2)°$, $2V_{calc} = 55°$, $\alpha = 1.713(1)$, $\beta = 1.748(1)$, $\gamma = 1.758(1)$(589 nm). $X \wedge c = 4°$, $Y \wedge a = 7°$, $Z = b$, $r < v$.

Keiviite-(Y) forms prismatic crystals, 0.05 to 1 mm long and less than 0.15 mm thick, situated on keiviite-(Yb) or in fissures in quartz and fluorite, associated with thalenite, xenotime, bastnäsite and kuliokite-(Y). The mineral was found in amazonite pegmatites of the Kola Peninsula (USSR). The name is derived from keiviite-(Yb). Type material is at the A. E. Fersman Mineralogical Museum, Akademiya Nauk SSSR (Moscow). **J.P.**

## Kuliokite-(Y)*

A.V. Voloshin, Ya.A. Pakhomovsky, F.N. Tyusheva, Ye.V. Sokolova, Yu.K. Egorov-Tismenko (1984) Kuliokite-(Y)—A new yttrium-aluminium fluoride-silicate from amazonite pegmatites of the Kola Peninsula. Mineralog. Zhurnal, 8(2), 94–99 (in Russian).

Chemical composition of the mineral is variable (five microprobe analyses are given); results for crystals filling fissures in pegmatites and for inclusions in fluorite are, respectively, $Y_2O_3$ 31.01, 57.95, $Yb_2O_3$ 21.06, 1.77, $Er_2O_3$ 8.16, 1.40, $Dy_2O_3$ 4.18, 0.83, $Lu_2O_3$ 2.28, 0.33, $Gd_2O_3$ 0.30, 0.19, $Tm_2O_3$ 1.90, 0.24, $Ho_2O_3$ 1.23, 0.29, $Al_2O_3$ 6.51, 7.69, $SiO_2$ 14.56, 18.86, $O \equiv F_2$ 4.88, 5.37, $H_2O$ (by difference) 2.10, 3.06 wt%, corresponding to $(Y, REE)_4Al(SiO_4)_2(OH)_2F_5$. Some of the crystals are zoned, with Y content increasing outward. Individual crystals are up to 0.5 mm in maximum dimension.

Single-crystal X-ray study showed the mineral to be triclinic, space group $P1$–$C_i^1$, $a = 8.606(6)$, $b = 8.672(8)$, $c = 4.317(3)$ Å, $\alpha = 102.79(6)$, $\beta = 97.94(5)$, $\gamma = 116.66(6)°$, Z = 1. The strongest X-ray lines (80 given) are 3.710(90)(200), 3.490(90)(111), 2.793(100, broad)(310,210), 2.459(80, broad)(300), 1.702(80)(141). The IR spectrum has absorbance maxima at 3445 and 3420 cm⁻¹ related to OH groups. The mineral is colorless, transparent. Streak white. No fluorescence; yellow-green cathodoluminescence. Weak {010} cleavage, H = 4–5. $D_{meas} = 4.3(5)$, $D_{calc} = 4.26$. Macroscopically identical with thalenite. Biaxial negative with $2V_{meas} = 19(1)$, $2V_{calc} = 29°$, $r > v$, $\alpha = 1.656(1)$, $\beta = 1.700(1)$, $\gamma = 1.703(1)$ (589 nm), $X \wedge a = 7°$, $Y \wedge b = 28°$, $Z = c$.

Kuliokite-(Y) occurs in amazonite pegmatites as inclusions in violet fluorite or as platy crystals in fissures in fluorite and quartz. Associated minerals are thalenite, xenotime, kainosite, and bastnäsite. The name is for the Kuliok River, Kola Peninsula. Type material is at the A. E. Fersman Mineralogical Museum, Akademiya Nauk SSSR (Moscow), and at the Mining Museum of the Leningrad Mining Institute (Leningrad). **J.P.**

## Kuzminite*

V.I. Vasilev, Yu.G. Lavrentev, N.A. Palchik (1986) Kuzminite $Hg_2(Br,Cl)_2$—A new natural mercury halide. Zapiski Vses. Mineralog. Obshch., 115, 595–598 (in Russian).

Microprobe analyses (average of four) gave Hg 77.00, Br 16.60, Cl 5.66, total 99.26 wt%, corresponding to $Hg_{2.06}(Br_{1.22}Cl_{0.72})_{1.94}$. The similarity of the X-ray powder pattern of kuzminite to those of calomel and synthetic $Hg_2Br_2$ indicates tetragonal symmetry, space group $I4/mmm$, $a = 4.597(5)$, $c = 11.034(8)$ Å. The strongest X-ray lines (17 given) are 4.26(50–60)(101), 3.25(100)(110), 2.76(40)(004), 2.103(50)(114). The mineral is similar to calomel: colorless, bluish gray or dull white, sometimes with weak brown tint. Powder aggregates are yellowish or creamy white. Good {100} cleavage; uneven fracture. H ≤ 2; microhardness (20-g load) 25 kg/mm² (average of 15 ranging from 21 to 29 kg/mm²). Density was not measured. Soluble in warm HCl, readily soluble in aqua regia, darkens in KOH. In transmitted light the mineral is indistinguishable from calomel: transparent, anisotropic, uniaxial positive, refractive index >2.00, strong double refraction, slight pleochroism from light yellow to very pale brown. In reflected light, strong bireflectance: $R_1$ gray, $R_2$ grayish white. $R_1$ lower than $R_2$, similar to those of eglestonite. Yellowish gray, grayish brown, and bluish gray anisotropic effects. Internal reflection colorless or weak yellow.

The mineral occurs in the Kadyrel mercury ore deposit (TUVA ASSR, southern Siberia). It forms 0.3–0.5 mm irregular to elongate grains; aggregates up to 2.0 mm and powdery masses occur in calcite veins and are associated with eglestonite, lavrentevite, calomel, native Hg, corderoite, cinnabar, and iron hydroxides.

The name is for Russian mineralogist A. M. Kuzmin. Type material is at the Central Siberian Geological Museum (Institute of Geology and Geophysics of Siberian Division of Soviet Academy of Sciences, Novosibirsk, USSR). **J.P.**

## Luanheite*

Shao Dianxin, Zhou Jianxiong, Zhang Jianhong, Bao Daxi (1984) Luanheite—A new mineral. Acta Mineral. Sinica, 4, 97–101 (in Chinese, English abstract).

Electron-microprobe analyses of five compositionally homogeneous grains gave an average and (range) of Hg 37.9 (35.55–39.72), Ag 62.4 (59.47–63.84), Fe 0.00 (0.00–0.02), Co 0.05 (0.02–0.07), Ni 0.00 (0.00–0.01), Cu 0.01 (0.00–0.02), Te 0.10 (0.06–0.15), sum 100.46 (99.01–100.26) wt%. The empirical formula varies from $Ag_{3.08}Hg_{0.92}$ to $Ag_{2.96}Hg_{1.04}$, ideally $Ag_3Hg$. The mineral occurs as irregular spherical aggregates, 0.1 to 0.6 mm in diameter, each having an uneven surface and a thin, black oxidized coating. The spheres consist of granular to tabular grains, up to 10 μm long, with a metallic luster, black streak, and H = ~2.5 (VHN 44–75); $D_{meas} = 12.5$ g/cm³; malleable. In reflected light, milky white with slight reflection pleochroism from pinkish parallel to the elongation to milky white normal to it; anisotropism very weak. Maximum and minimum reflectance values obtained from three grains measured at two wavelengths in air (WC standard) are 546, 64.2–70.5; 589, 64.9–74.

The strongest lines of the X-ray powder pattern (Fe radiation, 57.3 mm camera) are 2.830(70,112), 2.000(60)(212), 1.495(100)(223), 1.204(90)(307), 1.134(70)(501), 1.105(60)(330), 1.010(60)(512). Cell dimensions calculated from the powder pattern are hexagonal, $a = 6.61$, $c = 10.98$ Å; Z = 6.

Luanheite occurs in a gold placer in Hebei Province, China, and was named after its locality, a river. Associated minerals are native gold, lead, zinc, and mercurian silver. Luanheite has been found intergrown with mercurian silver and with silicates. Type material is preserved at the National Geological Museum, the Chinese Academy of Geological Sciences, Beijing, China. **J.L.J.**

## Mannardite*

J.D. Scott, G.R. Peatfield (1986) Mannardite $[Ba \cdot H_2O](Ti_6V_2^{3+})O_{16}$, a new species, and new data on redledgeite. Can. Mineral., 24, 55–66.

Electron-microprobe analysis using $BaSO_4$ (Ba), $V_2O_5$ (V), $TiO_2$ (Ti), chromite (Cr,Fe?) of 15 spots on 5 grains (and SIMS analysis for $H_2O$) gives an average analysis of BaO 19.5, $TiO_2$ 59.0, $V_2O_3$ 15.4, $Cr_2O_3$ 2.6, $Fe_2O_3$ 0.7, $H_2O$ 2.1, sum 99.3 wt%, which on an anhydrous basis of 16 O results in $[BA_{1.03}\ (H_2O)_{0.95}](Ti_{5.98}V_{1.66}^{3+}Cr_{0.28}Fe_{0.07}^{3+})O_{16}$.

Powder and precession X-ray studies show the mineral to be tetragonal, space group $I4_1/a$, $a = 14.356(4)$, $c = 5.911(3)$ Å, Z = 4. The strongest diffraction-maxima in the powder pattern (30 given) are 3.201(100)(420), 2.473(70)(312), 2.224(50)(332), 1.887(70)(352), 1.690(50)(660), 1.586(80)(732) using Fe-filtered Co$K\alpha$ radiation.

Mannardite's properties are similar to ilmenite's: jet-black, adamantine luster, white streak. In reflected light, opaque with no observable internal reflection; pale reddish brown with light to dark brown bireflectance, strongly anisotropic from light pinkish gray ($R_o$) to dark brownish gray ($R_e$). Selected average reflectance values are [nm, air ($R_o$,$R_e$), oil ($R_o$,$R_e$)]: 470(15.6,16.8)(4.2,5.0), 550(15.1,17.4)(4.0,5.6), 590(15.1,18.0)(4.1,6.0), 650 (15.2,18.5)(4.1,6.3) (given every 10 nm). Indices of refraction calculated from the reflectance data are $\omega = 2.26(1)$, $\epsilon = 2.42(1)$.

Mannardite crystals are up to 5 mm in length, are elongate and striated parallel to *c*, and show prominent {100} cleavage and uneven to subconchoidal fracture. H = 7, $D_{meas} = 4.12$, $D_{calc} = 4.28$ g/cm³.

Mannardite is associated with quartz, barytocalcite, norsethite, barite, and sulvanite in quartz-carbonate veins that cut a Devonian shale and siltstone sequence on the Rough Claims, north of Sifton Pass, northern British Columbia, Canada. Mannardite also has been found at the Brunswick no. 12 orebody, Bathurst, New Brunswick, Canada.

Mannardite is related to redledgeite, both of which are members of the cryptomelane group. It is named for the late Dr. G. W. Mannard, president of Kidd Creek Mines Ltd. Type material is at the Royal Ontario Museum, Toronto, Canada, and at the British Museum (Natural History). **T.S.E.**

## Mendozavilite*

S.A. Williams (1986) Mendozavilite and paramendozavilite, two new minerals from Cumobabi, Sonora. Boletín de Mineralogía (Soc. Mexicana Mineral.), 2, 13–19.

Wet-chemical analyses of 1407 μg (for Fe, P, Ca, Al, Na, Mg, Mo, Cl) and again of 3097 μg (for Fe and P) gave $Fe_2O_3$ 14.31, $Al_2O_3$ 0.76, CaO 2.48, $Na_2O$ 1.25, MgO 0.35, $P_2O_5$ 6.78, $MoO_3$ 50.47, Cl 0.26, $H_2O$ 21.62, less O ≡ Cl 0.06, sum 98.22 wt%, corresponding to a proposed idealized formula $Na(Ca,Mg)_2[Fe_6(PO_4)_2(PMo_{11}O_{39})(OH,Cl)_{10}] \cdot 33H_2O$.

The strongest X-ray diffraction lines (19 listed) obtained with a 114-mm Gandolfi camera are 11.56(30), 9.46(80), 8.77(100), 5.436(30), 3.676(50), 3.118(40), 1.820(50), 1.552(40) Å. Because of problems of low symmetry (not higher than monoclinic), the results could not be indexed with the Ito method. The pattern deteriorates into a confusing blur of very faint lines at low values. If the mineral is ground prior to study, additional lines appear in the pattern. Mendozavilite is not a molybdate, but is a compound of a heteropolyacid P-Mo radical.

The mineral occurs in the bright yellow oxide zone of the Cumobabi molybdenum pegmatite deposit southwest of Cumpas, Sonora, Mexico. The mineral occurs chiefly on quartz and is associated with a great number of secondary molybdenum minerals, among them paramendozavilite. The mineral forms abundant masses in this zone. Crystals average 20 μm and are well formed.

Mendozavilite is Empire yellow, inclining to orange (RHS 11A to 14A), with a bright yellow streak and vitreous luster. H = 1.5, $D_{meas} = 3.85$. No fluorescence. The mineral is readily soluble in all common acids (HCl, $HNO_3$, $H_2SO_4$), even in dilute form at room temperature. Its optical properties are biaxial positive with $\alpha = 1.762$, $\beta = 1.763$, $\gamma = 1.766$ and $2E_{meas} = 5–15°$; extremely strong dispersion $r > v$, pleochroic in pale yellow with $Z > Y > X$. In thin section, mendozavilite resembles beudantite. The optics indicate low symmetry.

The name is derived from the Phelps Dodge geologist H. Mendoza Avila who found the first specimen. Type material is at the British Museum of Natural History in London. **E.A.J.B.**

## Moydite*

J.D. Grice, J. vanVelthuizen, P.J. Dunn, D.E. Newbury, E.S. Etz, C.H. Nielsen (1986) Moydite $(Y,REE)[B\ (OH)_4](CO_3)$, a new mineral species from the Evans-Lou pegmatite, Quebec. Can. Mineral., 24, 665–673.

Averaged microprobe analysis gave $Y_2O_3$ 35.0, CaO 0.5, $Ce_2O_3$ 0.8, $Nd_2O_3$ 1.3, $Sm_2O_3$ 1.2, $Gd_2O_3$ 3.4, $Dy_2O_3$ 3.8, $Ho_2O_3$ 1.9, $B_2O_3$ 14.4, $CO_2$ 17.7, $H_2O$ 20.0 (by difference), sum 100.0 wt%, corresponding to $(Y_{0.84}Ca_{0.02}Ce_{0.01}Nd_{0.02}Sm_{0.02}Gd_{0.04}Dy_{0.04}Ho_{0.02})_{\Sigma 0.85}[B_{0.84}O_4H_{4.95}](C_{0.84}O_3)$ on the basis of O = 7 or, ideally, $(Y,REE)\ [B(OH)_4](CO_3)$ and Z = 8. This theoretical formula is the result of the integration of electron-microprobe, crystal-structure, secondary-ion mass spectrometry, and Raman microprobe analyses.

X-ray single-crystal precession study shows that the mineral is orthorhombic, space group *Pbca* with $a = 9.080(9)$, $b = 12.222(9)$, $c = 8.911(6)$ Å. $D_{meas}$ (heavy liquids) = 3.13(3), $D_{calc} = 3.01(8)$. The strongest X-ray powder lines (30 given) are 6.11(10)(020), 4.50(9)(002,200), 3.179(7)(202), 3.054(3)(040), 2.818(5)(222), 2.749(3)(311,141,113), 2.525(4)(042,240), 2.203(3)(242), 2.091(3)(341,313,152,143), and 1.855(3)(062,260).

Moydite occurs as a rare secondary mineral in cavities within massive quartz at the Evans-Lou mine, Lot 32, Range VI, Val des Monts Township, Papineau County, Quebec, Canada. Associated minerals are hellandite, kainosite, lokkaite, xenotime, and fergusonite. The mineral occurs as platy aggregates, often with subparallel growth. Individual crystals are clear yellow with vitreous luster and have dimensions up to 1 × 1 × 0.05 mm thick; dominant forms are {010} and {111}, with minor development of {100} and {001}. Moydite is soft, brittle, exhibits conchoidal fracture, has a good cleavage on {010} and a poor cleavage on {101}, is nonfluorescent, and is not readily soluble in 30% HCl. Optically biaxial negative, $\alpha = 1.588(2)$, $\beta = 1.681(1)$, $\gamma = 1.690(1)$, $2V_{meas} = 32(3)°$ and $2V_{calc} = 34°$. The optical orientation is $X \parallel b$, $Y \parallel a$, and $Z \parallel c$. The mineral is colorless in thin fragments and shows neither pleochroism nor absorption but has weak dispersion, $r > v$.

The name is for Mr. Louis Moyd, Curator Emeritus at the National Museum of National Sciences, Ottawa. Type material consists of several single crystals in the collections of the National Museum of Natural Sciences, Ottawa, Ontario, Canada (NMNS 50771), and the Smithsonian Institution (162936). A cotype specimen has approximately 15-mm-sized crystals on a quartz matrix (NMNS 50772). **A.C.R.**

### Parabariomicrolite*

T.S. Ercit, F.C. Hawthorne, P. Černý (1986) Parabariomicrolite, a new species, and its structural relationship to the pyrochlore group. Can. Mineral., 24, 655–663.

Electron-microprobe analysis (Brazilian material) gave $Na_2O$ 0.4, $K_2O$ 0.3, SrO 0.8, BaO 10.5, PbO 0.4, $Nb_2O_5$ 1.5, $Ta_2O_5$ 80.6, sum = 94.5 wt%; crystal-structure arguments indicate 5.2 wt% $H_2O$, to give a sum of 99.7 wt%. The ideal chemical formula is $BaTa_4O_{10}(OH)_2 \cdot 2H_2O$ with Z = 3.

The mineral is rhombohedral, space group $R\bar{3}m$ with $a$ = 7.4290(6) and $c$ = 18.505(2) Å. The strongest lines of the X-ray powder pattern (37 given) are 6.18(50)(003), 3.172(65)(021), 3.085(41)(006), 3.040(100)(202), 2.641(50)(024) and 1.591(42)(226). The crystal structure was solved by crystal-chemical arguments, augmented by the X-ray powder-diffraction data, and is a layer structure derived from that of pyrochlore.

Parabariomicrolite is translucent, white to pale pink, with a white streak and a vitreous to pearly luster. H = 4, $D_{calc}$ = 5.97. The mineral is nonfluorescent and brittle and has well developed {001} and {101} cleavages. Optically anisotropic with all indices of refraction greater than 2.0. Individual crystals range from 0.01 to 0.1 mm in size.

Parabariomicrolite occurs as topotaxic replacements of microlite, and more rarely as open-space fillings, in oxide-mineral assemblages of the Alto do Giz pegmatite, Rio Grande do Norte, Brazil. Associated minerals include simpsonite, tantalite, manganotantalite, tapiolite, natrotantite, alumotantite, stibiotantalite, beryl, spodumene, and petalite. A second occurrence is noted from near Lake Kivu, Zaire.

The name is in allusion to its chemical similarity with bariomicrolite. Type material is housed in the collections of the Royal Ontario Museum, Toronto, Ontario, Canada (M22607), and the Smithsonian Institution, Washington (104739). **A.C.R.**

### Paramendozavilite*

S.A. Williams (1986) Mendozavilite and paramendozavilite, two new minerals from Cumobabi, Sonora. Boletín de Mineralogía (Soc. Mexicana Mineral.), 2, 13–19.

Wet-chemical analyses of 1054 μg (for Fe, P, Ca, Mg, Mo, Na, Al, Cl) and again of 2636 μg (for Fe and P) gave $Fe_2O_3$ 13.36, $Al_2O_3$ 4.65, CaO 0.59, $Na_2O$ 0.54, MgO 0.16, $P_2O_5$ 10.32, $MoO_3$ 42.01, Cl 0.65, $H_2O$ 28.05, less O ≡ Cl 0.15, sum 100.18 wt%, corresponding to a proposed idealized formula $NaAl_4[Fe_7(PO_4)_5(PMo_{12}O_{40})(OH)_{16}] \cdot 56H_2O$.

The strongest X-ray diffraction lines (24 given) are 14.36(100), 12.90(40), 10.18(60), 9.48(100), 7.98(50), 7.38(70), 6.56(50) Å. Because of problems of low symmetry (not higher than monoclinic), the results could not be indexed with the Ito method. The pattern (obtained with a 114-mm Gandolfi camera) deteriorates into a confusing blur of very faint lines at low values. If the mineral is ground prior to study, additional lines appear in the pattern. Paramendozavilite is not a molybdate, but is a compound of a heteropolyacid P-Mo radical.

The mineral occurs in the bright yellow oxide zone of the Cumobabi molybdenum pegmatite deposit southwest of Cumpas, Sonora, Mexico. The mineral occurs only in biotite-rich pegmatite gangue and is associated with a great number of secondary molybdenum minerals, among them mendozavilite. The mineral forms abundant masses in this zone. Prismatic crystals have one perfect cleavage and polysynthetic twinning parallel to the cleavage plane.

Paramendozavilite is pale yellow (Aureolin RHS 12C) with a very pale yellow streak and vitreous luster. H = 1, $D_{meas}$ = 3.35. The mineral is soluble in all common acids (HCl, $HNO_3$, $H_2SO_4$), even in dilute form at room temperature. Its optical properties are biaxial negative with $\alpha = 1.686$, $\beta = 1.710$, $\gamma = 1.720$ and $2E_{meas} = 60°$; extinction oblique to cleavage and twinning planes.

The name is derived from the similarity of the mineral to mendozavilite. Type material is at the British Museum of Natural History in London. **E.A.J.B.**

### Rhodizite

A. Pring, V.K. Din, D.A. Jefferson, J.M. Thomas (1986) The crystal chemistry of rhodizite: A re-examination. Mineral. Mag., 50, 163–172.

The material from Ambatofinandrahana, Ankarata Mountains, Madagascar (lat 20°33′S, long 46°49′E) has the formula $(K_{0.46}Cs_{0.36}Rb_{0.06}Na_{0.02})_{\Sigma 0.90}Al_{3.99}Be_4(B_{11.35}Be_{0.55}Li_{0.02})O_{28}$ and represents the K analogue of rhodizite, ideally $(Cs,K)Al_4Be_4(B,Be)_{12}O_{28}$. [Note: The formula given in Fleischer's *Glossary of Mineral Species,* Fifth Edition (1986) with $(Ca,K)Al_4Be_4(B,Be)_{12}O_{28}$ is incorrect.] The mineral is cubic with $a$ = 7.318(1) Å and has the space group $P\bar{4}3m$.

**Discussion.** Pertinent data should be sent to the Commission on New Minerals and Mineral Names, IMA, for accreditation as a new mineral species. **A.C.R.**

### Simonkolleite*

K. Schmetzer, G. Schnorrer-Köhler, O. Medenbach (1985) Wülfingite, ε-$Zn(OH)_2$, and simonkolleite, $Zn_5(OH)_8Cl_2 \cdot H_2O$, two new minerals from Richelsdorf, Hesse, F.R.G. Neues Jahrb. Mineral. Mon., 1985, 145–54.

Electron-microprobe analysis (for Zn, Fe, and Cl) and wet-chemical analysis (for $H_2O$) gave ZnO 73.63, FeO 1.25, Cl 11.73, $H_2O$ 16.21, less O ≡ Cl 2.65, sum 100.17 wt%. The presence of water was established by infrared spectroscopy. The results are in agreement with the ideal formula $Zn_5(OH)_8Cl_2 \cdot H_2O$.

The strongest X-ray diffraction lines (27 listed) obtained with a 114.6-mm Debye-Scherrer camera are 7.87(100)(003), 5.33(30)(101), 4.01(30)(104), 3.58(40)(105), 3.16(40)(110), 2.725(50)(201), 2.672(60)(202), 2.372(40)(205). Synthetic $Zn_5(OH)_8Cl_2 \cdot H_2O$ is hexagonal, space group $R\bar{3}m$. The refined unit-cell dimensions of the natural material are $a$ = 6.334(2), $c$ = 23.58(1) Å, $V$ = 819.46 Å³, Z = 3. $D_{calc}$ = 3.35, $D_{meas}$ = 3.20(5) g/cm³.

Simonkolleite is natural zinc hydrochloride II. The mineral occurs as a natural weathering product of Zn-bearing slags in an old slag-heap of the Richelsdorf foundry, Hesse, F.R.G. Associated phases are zinc (most probably not of natural origin) and the following natural weathering products: wülfingite, hydrocerussite, diaboleite, zincite, and hydrozincite. Simonkolleite forms tabular to lamellar hexagonal crystals up to 1 mm in diameter. Perfect cleavage parallel to (0001); no fracture observed. The mineral is colorless, transparent to translucent, with a white streak and vitreous luster. H is about 1½. Soluble in dilute acids. Simonkolleite is uniaxial positive with $\omega = 1.657(1)$, $\epsilon = 1.700(1)$.

The name is in honor of the mineral collectors Werner Simon and Kurt Kolle, both of Cornberg near Michelsdorf, who submitted the samples for investigation. Type material is preserved in the mineralogical collections of the Universities of Göttingen and Heidelberg. **E.A.J.B.**

## Stronalsite*

H. Hori, I. Nakai, K. Nagashima, S. Matsubara, A. Kato (1987) Stronalsite, $SrNa_2Al_4Si_4O_{16}$—A new mineral from Rendai, Kochi City, Japan. Mineral. Jour. (Japan), 13, 368–375.

The average of five microprobe analyses gave $SiO_2$ 39.13, $Al_2O_3$ 32.70, CaO 0.17, SrO 15.72, BaO 2.29, $Na_2O$ 9.99, sum 99.91 wt%, corresponding to $(Sr_{0.94}Ba_{0.09}Ca_{0.02})_{\Sigma 1.05}Na_{1.99}Al_{3.95}Si_{4.01}O_{16}$ based on O = 16. Color and streak white, luster vitreous, no cleavage, not fluorescent in long- or short-wave ultraviolet light, H = 6½, $D_{meas} = 2.95$, $D_{calc} = 2.95$ g/cm³ from the empirical formula with Z = 4. Optically colorless in thin section, biaxial positive, $\alpha = 1.563(2)$, $\beta_{calc} = 1.564$, $\gamma = 1.574(2)$, $2V_{meas} = 32°$; $a = Y$, $b = Z$, $c = X$. X-ray single-crystal study indicated orthorhombic symmetry, space group *Ibam* or *Iba*2, $a = 8.415(4)$, $b = 9.901(4)$, $c = 16.729(9)$ Å. Strongest lines of the powder pattern (68 listed) are 4.179(38)(200), 3.765(40)(211), 3.502(80)(114), 3.204(100)(220), 3.183(50)(024), 3.069(40)(130), 2.992(40)(222), 2.881(70)(132), 2.632(35)(125), 2.067(50)(332).

Stronalsite occurs as veinlets in a basic metatuff xenolith enclosed in serpentinite at Rendai, Kochi City, Japan, and in serpentinite at Mount Ohsa, Okayama Prefecture, Japan. Stronalsite is the Sr analogue of banalsite and is named for the composition. Type material is preserved at the Department of Geology, National Science Museum, Tokyo.

**Discussion.** A separate description of stronalsite was reviewed in *Am. Mineral.*, 72, 222–230; because of the incompleteness of the data, the review incorporated information from the original IMA submission. This new review summarizes the definitive description of the mineral and also is intended to re-affirm that IMA submissions are to be treated, without exception, as confidential information. **J.L.J.**

## Sturmanite*

D.R. Peacor, P.J. Dunn, M. Duggan (1983) Sturmanite, a ferric iron, boron analogue of ettringite. Can. Mineral., 21, 705–709.

Chemical analyses gave CaO 25.6, $Fe_2O_3$ 8.84, $Al_2O_3$ 1.13, MnO 1.30, $B_2O_3$ 3.2, $SO_3$ 14.2, $H_2O$ 46.7, sum 101.0 wt%, corresponding (on the basis of Ca = 6) to $Ca_{6.0}\,(Fe^{+3}_{1.5}Al_{0.3}Mn^{+2}_{0.2})_{\Sigma 2.0}$-$(SO_4)_{2.3}(B(OH)_4)_{1.2}(OH)_{12.0}\cdot 25.7H_2O$. This is the $Fe^{+3}$ and B analogue of ettringite, $Ca_6Al_2\,(SO_4)_3\,(OH)_{12}\cdot 26\,H_2O$. The mineral is soluble in cold 3*N* HCl.

X-ray studies show that the mineral is hexagonal, probable space group *P*31*c* (by analogy with ettringite), $a = 11.16(3)$, $c = 21.79(9)$ Å, Z = 2; possesses a pronounced subcell with $a' = a$, and $c' = c/2$ and shows diffraction characteristics compatible with pseudo–space groups $P6_3/mmc$, $P\bar{6}2c$ and $P6_3mc$. These are consistent with sturmanite being isostructural with ettringite. The strongest X-ray powder lines (25 given) are 9.67(100)(100), 5.58(70)(110), 3.89(70)(114), 2.774(50)(304), 2.582(60)(216), 2.215(50)(226,320).

Fresh, unaltered sturmanite is bright yellow, transparent, and occurs as euhedral hexagonal dipyramidal crystals, not exceeding 2 mm in size, that are tabular on {0001} with a width to height ratio of approximately 3:1. The dominant form is $\{10\bar{1}4\}$ with subordinate $\{11\bar{2}4\}$. The mineral has one perfect cleavage, parallel to $\{10\bar{1}0\}$, is brittle, possesses a light yellow streak, a vitreous luster on cleavage surfaces and a vitreous to slightly greasy luster on fracture surfaces. Mohs' hardness = 2½. $D_{meas}$ (heavy liquids and pycnometer) = 1.847, $D_{calc}$ (based on 25 $H_2O$ and the unit-cell parameters) = 1.855. Sturmanite exhibits neither fluorescence nor cathodoluminescence. Optically uniaxial positive, $\omega = 1.500$, $\epsilon = 1.505$, weakly dichroic with $O$ = pale green and $E$ = pale yellowish green. Absorption $E > O$.

Sturmanite occurs at the Black Rock mine, Kuruman district, Republic of South Africa, encrusting hematite and barite. It is named for B. Darko Sturman of the Department of Mineralogy and Geology, Royal Ontario Museum, Toronto, Ontario, Canada. Holotype material is preserved at the Smithsonian Institution (148261). **A.C.R.**

## Tengchongite*

Chen Zhangru, Luo Keding, Tan Falan, Zhang Yi, Gu Xiaofa (1986) Tengchongite, a new mineral of hydrated calcium uranyl molybdate. Kexue Tongbao, 31, 396–401.

Wet-chemical analysis gave $UO_3$ 74.30, $MoO_3$ 11.46, CaO 2.19, $Na_2O$ 0.07, $K_2O$ 0.09, MgO 0.02, MnO 0.02, $Al_2O_3$ 0.66, $Fe_2O_3$ 0.12, $TiO_2$ 0.07, $ThO_2$ 0.12, $SiO_2$ 1.04, $P_2O_5$ 0.28, $H_2O$ 9.00, sum 99.44 wt%; this was recalculated to $UO_3$ 76.64, $MoO_3$ 11.82, CaO 2.26, $H_2O$ 9.28, sum 100.00 wt%, corresponding to an ideal formula $CaO\cdot 6UO_3\cdot 2MoO_3\cdot 12H_2O$. Electron-microprobe X-ray images show the mineral to be homogeneous. Infrared spectroscopy shows the major uranyl band at 920 cm⁻¹, the molybdate band at 780 cm⁻¹, and water bands at 3430 and 1640 cm⁻¹, but fails to show any OH bands.

Single-crystal studies with different methods show the mineral to be orthorhombic, space group $A2_122$, with $a = 15.616(4)$, $b = 13.043(6)$, $c = 17.716(14)$ Å, $V = 3608$ Å³, Z = 4, $D_{calc} = 4.24$, $D_{meas} = 4.25(2)$ g/cm³. The strongest X-ray diffraction lines (26 listed) obtained with a 114.6-mm Gandolfi camera are 8.84(100)(002), 7.66(30)(102), 5.37(50)(013), 4.27(50)(104), 3.65(40)(024,411), 3.38(70)(304,420), 3.17(80)(413), 204-(40)(308).

Tengchongite is a calcium uranium molybdate. The only other comparable mineral is calcurmolite, which has a $UO_3$:$MoO_3$ ratio of 1:1, whereas in tengchongite it is 3:1. The mineral occurs in the oxide zone of a uranium mineralization on the contacts between an ocular migmatite and a migmatitic gneiss in Tengchong County, Yunnan Province, China. Tengchongite occurs closely associated with studtite, calcurmolite, and kivuite. The mineral forms irregular grains (size not given), tabular parallel to {001}, with a perfect {001} cleavage.

Tengchongite is transparent to translucent, yellow with a vitreous luster. H = 2–2½. No fluorescence. The mineral is insoluble in 20% KOH, slowly soluble in 0.1*N* HCl, fairly soluble in $HNO_3$ and $H_2SO_4$. In thin section, tengchongite is yellow; no pleochroism observed on the cleavage plane (001). Its optical properties are biaxial negative, $\alpha = 1.663(2)$, $\beta = 1.760(2)$, $\gamma = 1.762(2)$ and $2V_{\text{meas}} = 16°$, $2V_{\text{calc}} = 16°$; $X = c$. DTA data show two endothermic peaks at 83 °C (dehydration) and 853 °C (fusion), and an exothermic peak at 574 °C (formation of $U_3O_8$). On heating to 618 °C, the mineral becomes brown, the luster fades, and the transparency disappears.

The name is for the locality. Type material is at the Uranium Geology Research Institute in Beijing. **E.A.J.B.**

### Tokkoite*

K.A. Lazebnik, L.V. Nikishova, Yu.D. Lazebnik (1986) Tokkoite—A new mineral of charoitites. Mineralog. Zhurnal, 8 (3), 85–89 (in Russian).

Analyses by classical wet-chemical (and in parentheses, average of two microprobe) analyses gave $SiO_2$ 55.65 (54.17), $TiO_2$ 1.42 (1.18), $Fe_2O_3$ 1.58 (1.57), MnO 0.70 (0.54), MgO 0.30 (0.98), CaO 25.10 (24.15), $Na_2O$ 0.60 (0.41), $K_2O$ 11.33 (12.95), $H_2O$ 2.40, F 1.50, sums 99.95, (99.22) wt%, corrected for F ≡ O and corresponding to $(K_{1.85}Na_{0.15})_{\Sigma 2.00}(Ca_{3.45}Mg_{0.06}Mn_{0.08}Fe_{0.15}Ti_{0.13})_{\Sigma 3.87}Si_{7.13}O_{17}(O_{1.63}OH_{2.02}F_{0.61})_{\Sigma 4.26}$ and $(K_{2.09}Na_{0.13})_{\Sigma 2.22}(Ca_{3.32}Mg_{0.19}Mn_{0.06}Fe_{0.15}Ti_{0.11})_{\Sigma 3.83}Si_{6.95}O_{17}(O_{1.39}OH_{2.05}F_{0.61})_{\Sigma 4.05}$ or $K_2Ca_4Si_7O_{17}(O,OH,F)_4$. Spectral analyses gave Sr (to 0.1%); Zr, Nb (0.0*X*%); Be, Cu, V, Ag, Y, and Yb (0.00*X*%); Ba absent. The DTA curve shows an endothermic peak at 920 °C. The infrared spectrum shows a wide absorption band between 1080 and 800 $cm^{-1}$, with maxima at 920, 970, 1020, and 1080 $cm^{-1}$ attributed to $^{IV}$Si–O, and bands at 1595 and 3450 $cm^{-1}$ attributed to hydroxyl.

It is not possible to isolate a single crystal for X-ray study. Electron-diffraction studies suggest that the mineral is triclinic with $c \sin\beta = 7.13$ Å and $a \sin\beta = 1.02$ Å. By indexing the X-ray powder pattern, the following triclinic cell was calculated: $a = 10.37(3)$, $b = 25.39(5)$, $c = 7.27(1)$ Å, $\alpha = 91.67(1)°$, $\beta = 100.66(1)°$, $\gamma = 92.09(1)°$. The strongest lines (56 given) are 3.34(55)($310,0\bar{4}1$), 3.32(85)($\bar{2}60,13\bar{2}$), 3.15(100)($1\bar{4}2,112$), 3.125(85)($\bar{2}61,1\bar{2}2$), 3.075(62)($1\bar{7}1,26\bar{1}$), and 3.044 (broad)(91)($\bar{3}40$).

The mineral occurs in zones a few centimeters thick or in streaky, elongated, nearly monomineralic segregations in the southern part of the Murun alkaline massif (S. W. Yakutiya, between the Charo and Tokko Rivers). The mineral is intimately intergrown with charoite, tinaksite, and miserite, which are present in minor amounts in the segregations, as are aegirine and K-feldspar.

The mineral forms radiating or columnar aggregates. Color in large masses light brown; in isolated prisms, pale yellow; in transmitted light, colorless; luster vitreous, fracture splintery, cleavages very perfect {010}, perfect {110}. H = 4–5, $D_{\text{meas}} = 2.76(1)$ (hydrostatic suspension), $D_{\text{calc}} = 2.77$ g/cm³ for Z = 4. Optically biaxial positive, $\alpha = 1.570(2)$, $\gamma = 1.577(2)$, $2V = 38°(5)$. Weak dispersion of the optic axes $r < v$. $Z \wedge c = 0°$ to 15°.

The name is for the Tokko River. Type material was given to the mineralogical museum of the Institute of Geology and Geophysics, Siberian Division, Academy of Sciences of the USSR, Novosibirsk.

**Discussion.** Available X-ray and electron-diffraction data are not sufficient to determine unequivocally the cell size and symmetry. The authors note that in the course of approving the mineral, the IMA commission proposed alternative formulae: $K_2Ca_3Si_6O_{15}(OH,F)$, requiring Z = 5, and $K_4Ca_7Si_{14}O_{34}(O,OH,F)_6$ with Z = 2, but the latter gave a calculated density of 2.63, in poor agreement with the measured value, 2.76 g/cm³. Because of the uncertainty in the cell size, the formula proposed by the authors is moot. **E.S.G.**

### Weishanite*

Li Yuheng, Ouyang Shan, Tian Peixue (1984) Weishanite—A new gold-bearing mineral. Acta Mineral. Sinica, 4, 102–105 (in Chinese, English abstract).

Electron-microprobe analysis gave Au 56.91, Hg 39.92, Ag 3.17, sum 100.00 wt%, corresponding to $(Au_{0.289}Ag_{0.029})_{\Sigma 0.318}Hg_{0.199}$, ideally $(Au,Ag)_3Hg_2$. The mineral occurs as pale yellow aggregates, 0.05 to 0.4 mm, in which individual grains vary from several micrometers to a maximum of 30 μm. Au, Ag, and Hg are distributed uniformly. Luster metallic; ductile and malleable; H = 50.5 kg/mm² (Mohs' = 2.4); $D_{\text{calc}} = 18.17$ g/cm³. In reflected light, light yellow with weak reflection pleochroism and anisotropism. Reflectance in air (WC standard): 480(63.75), 534(76.30), 589(81.03), 656(68.6). A hexagonal cell of $a = 2.9265$, $c = 4.8178$ Å was calculated from the X-ray powder pattern (Cu radiation, 57.3-mm camera) by analogy with data for synthetic $Au_3Hg$ (PDF 4-808); space group $P6_3/mmc$, Z = 2. Strongest lines of the X-ray pattern are 2.243(100)(101), 1.4609(60)(110), 1.3593(80)(103), 1.2509(80)(112), 1.2255(60)(201), 0.9954(70)(203), 0.9396(90)(211), 0.9293(60)(114), 0.8235(60)(213).

Weishanite occurs in a silicified zone in the silver-rich part of a gold-silver orebody in biotite granulite in the Poshan mining district, Tongbai, Henan Province, China. Associated minerals include pyrite, galena, sphalerite, pyrrhotite, scheelite, acanthite, native silver, and native gold. Type material is preserved at the National Geological Museum, Beijing, China. **J.L.J.**

### Wülfingite*

K. Schmetzer, G. Schnorrer-Köhler, O. Medenbach (1985) Wülfingite, ε-$Zn(OH)_2$, and simonkolleite, $Zn_5(OH)_8Cl_2 \cdot H_2O$, two new minerals from Richelsdorf, Hesse, F.R.G. Neues Jahrb. Mineral. Mon., 145–154.

Electron-microprobe analysis (for Zn) and thermogravimetric analysis (for $H_2O$) gave ZnO 81.5, $H_2O$ 19.0, sum 100.5 wt%; the results are in agreement with the ideal formula $Zn(OH)_2$.

The strongest X-ray diffraction lines (37 listed) obtained with a 114.6-mm Debye-Scherrer camera are 4.407(100)(110), 4.250(80)(101,200), 3.280(100)(111,210), 3.212(80)(201), 2.727(80)(211), 2.284(80)(021), 2.215(80)(311), 1.5295(80)(203). Synthetic ε-$Zn(OH)_2$ is orthorhombic, space group $P2_12_12_1$. The refined unit-cell dimensions of the natural material are $a = 8.490(1)$, $b = 5.162(1)$, $c = 4.917(1)$ Å, $V = 215.49$ Å³, Z = 4. $D_{\text{calc}} = 3.06$, $D_{\text{meas}} = 3.05(2)$ g/cm³.

Wülfingite is natural ε-$Zn(OH)_2$. The mineral occurs as a natural weathering product of Zn-bearing slags in an old slag-heap of the Richelsdorf foundry, Hesse, F.R.G. Associated phases are zinc (most probably not of natural origin) and the following natural weathering products: simonkolleite, hydrocerussite, diaboleite, zincite, and hydrozincite. Wülfingite occurs in very fine-grained incrustations of native zinc and zincite, or in small crystals up to 200 μm in size. The mineral is colorless to whitish with a white streak and waxy luster. No cleavage; conchoidal fracture. H = 3. Soluble in dilute acids. In thin section, wülfingite is colorless and transparent. The optical constants were determined with a microrefractometer spindle-stage: at 589 nm $\alpha = 1.5722(3)$ (*not* 1.5277 as printed twice in the paper!), $\beta = 1.5781(3)$,

$\gamma = 1.5801(3)$ and $2V_X = 60°$ (meas. and calc.); $2V_X$ data are also given for nine other wave-lengths from 405 to 680 nm: the dispersion of optical axes ($2V_X$) $r \gg v$ is extreme. Calculations of the Gladstone-Dale relationships lead to a compatibility index $1 - K_P/K_C$ of 0, which shows the superior compatibility of all data.

The name is in honor of Ernst Anton Wülfing (1860–1930), Professor of Mineralogy and Petrography at Heidelberg University from 1908 to 1926. Type material is preserved in the mineralogical collections of the Universities of Göttingen and Heidelberg. **E.A.J.B.**

## Unnamed Au-Pb

S.D. Voznesenskij, N.G. Zolotova (1986) Contemporary mineral-forming processes in a gold placer. Zapiski Vses. Mineralog. Obshch., 115, 301–310 (in Russian).

Microprobe analyses of an intermetallic Au-Pb mineral gave Au 8.2–33.1, Pb 66.5–91.8, which may correspond to $AuPb_2$, $AuPb_3$, or their intergrowths with native gold. Weak peaks on the X-ray powder pattern of impure material, dominated by native gold and lead, correspond to those of $AuPb_2$ or $AuPb_3$.

The mineral occurs in an alluvial gold deposit in the northeastern part of the USSR as segregations up to 12 mm, as a cement among grains of gold, pyrite, ilmenite, etc., or as coatings on gold grains. **J.P.**

## Unnamed solid solutions of Ir-Os-Ru with Fe

A.G. Mochalov, G.G. Dmitrenko, I.V. Zhernovskii, N.S. Rudashevskii (1985) New iridium-osmium-ruthenium type (solid solutions of rare platinum-group elements with iron) of platinum-group mineralization in chromium spinel-group minerals of alpine-type ultramafic rocks of the Koryak Highland. Zapiski Vses. Mineralog. Obshch., 114, 544–554 (in Russian).

Twenty-six analyses by electron microprobe are given for previously unknown native solid solutions of Ir, Os, Ru, Rh, and Pt in Fe, Ni, and Cu. The analyses are grouped into five suggested isomorphous series: Fe-Ru, Ni-Ru, Fe-Os, Fe-Ir, Ni-Ir, and Fe-Rh-Ir. Each of these contains small amounts of several or all of the following: Cu, S, Pt, Pd, Co, As, Mg, Si, Al. Many of the analyses have sums between 80 and 98 wt%, attributed either to unanalyzed light elements or to the presence of abundant microfractures.

The compounds occur in discrete crystals and intergrown masses, measuring 40 to 60 μm, but up to 200 μm in the chromite layers of alpine-type ultramafic massifs in the Koryak Highlands. Associated minerals include laurite, osarsite, awaruite, oregonite, iridosmine, rutheniridosmine, osmiridium, tetraferroplatinum, isoferroplatinum, tulameenite, irarsite, native iridium and native platinum. Crystals of the new compounds are combinations of octahedra, cubes, and pentagonal dodecahedra. In reflected light, the minerals vary from white (in Fe-rich examples) to light-gray and gray (in examples with microcracks). The Fe-Ru and Ni-Ru grains are markedly anisotropic, and the others are weakly anisotropic to isotropic. **D.A.V.**

## Unnamed TiP, unnamed $FeTiSi_2$

E.J. Essene, D.C. Fisher (1986) Lightning strike fusion: Extreme reduction and metal-silicate liquid immiscibility. Science, 234, 189–193.

The phases occur with native metals and other intermetallic compounds in spheroidal globules (with a diameter up to 100 μm) that unmixed from silicate glass in fulgurite masses 20 km north of Ann Arbor near Winans Lake, Livingston County, Michigan, U.S.A. Temperatures in excess of 2000 K and reducing conditions approaching those of the $SiO_2$-Si buffer were needed to form the coexisting metallic and silicate liquids. The authors stress that earlier reports of similar compounds should not be rejected a priori as requiring impossible geological conditions.

### Unnamed TiP

Electron-microprobe analysis gave nearly stoichiometric TiP. The phase occurs as long laths intergrown with $Fe_3Si_7$, FeSi and $FeTiSi_2$, or in intergrowths with FeSi and $Fe_3Si_7$ encasing skeletal Si and <1-μm-sized blebs of Au.

### Unnamed $FeTiSi_2$

Electron-microprobe analysis gave Si 31.4, P 6.4, Ti 29.8, Fe 33.3, Mn 0.4, sum 101.3 wt%, corresponding to $(Fe_{24.2}Mn_{0.3})$-$Ti_{25.3}(Si_{45.4}P_{4.7})$, or idealized $FeTiSi_2$. The phase occurs as long laths intergrown with $Fe_3Si_7$, FeSi, and TiP.

**Discussion.** Further studies are certainly needed. It is regrettable that previously contested phases and similar new phases are described with so few data (not even optical properties). **E.A.J.B.**

## Unnamed analogue of thalenite

A.V. Voloshin, Ya.A. Pakhomovsky, F.N. Tyusheva (1985) Keiviite-(Y)—A new yttrian diorthosiliate, and thalenite from amazonite pegmatites of the Kola Peninsula. Diortho- and triorthosilicates of yttrium. Mineralog. Zhurnal, 7 (6), 79–94 (in Russian).

Microprobe analysis gave $Y_2O_3$ 57.92, $Yb_2O_3$ 1.24 $Er_2O_3$ 2.42, $Dy_2O_3$ 1.86, $Lu_2O_3$ 0.06, $Gd_2O_3$ 0.78, $Tm_2O_3$ 0.34, $Ho_2O_3$ 0.70, $Tb_2O_3$ 0.00, $Sm_2O_3$ 0.47, CaO 0.27, $SiO_2$ 33.03, sum 99.10 wt%. The X-ray pattern of the mineral differs slightly from that of thalenite: a diffraction line at 4.45 Å cannot be indexed with thalenite parameters, and the strong line at 2.248 Å, characteristic of thalenite, is not present. The mineral occurs between crystals of keiviite-(Y) in amazonitic pegmatites of the Kola Peninsula. **J.P.**

## Unnamed layer silicate

K. Wada, Y. Kakuto (1983) A new intergradient vermiculite-kaolin mineral in 2:1 to 1:1 mineral transformation. Mém. Sci. Géol. (Strasbourg, France), 73, 123–131.

A phyllosilicate with a $d_{001}$ of 14 Å, previously called a "chloritized vermiculite," was studied by X-ray diffraction and infrared spectroscopy in combination with dissolution by hot 0.33*M* sodium citrate and heating at 350 to 550 °C. The results indicate that the vermiculite does not contain aluminum hydroxide, but that there is a partial transformation of layers in the vermiculite structure into double kaolinite layers (which explains the presence of 14-Å reflections). If this transformation occurs in most layers of the vermiculite structure, it results in the formation of a new intergradient vermiculite-kaolinite mineral, which represents an intermediate stage of the 2:1 to 1:1 mineral transformation in layer silicates.

The phase has been observed in several temperate red and yellow soils (ultisols and alfisols), and in soils derived from different parent materials. In this study the samples were taken from soils in Korea.

**Discussion.** A study by electron microscope is needed. **E.A.J.B.**

## New Data

### Calomel

V.I. Vasilev, Yu.G. Lavrentev, N.A. Palchik (1985) Bromine calomel—A new variety of natural $Hg_2Cl_2$. Geologiya i Geofizika, 26 (11), 56–61 (in Russian; English translation available).

Calomel grains from the Kadyrel mercury ore deposit (Tuva ASSR, southern Siberia) contain up to 14.5 wt% Br so that the formula proportion of Cl:Br = 1:1. Calomel and kuzminite (see accompanying abstract) form a solid-solution series $Hg_2Cl_2$-$Hg_2Br_2$, with Cl > Br in calomel, and Cl < Br in kuzminite. The name Br-calomel is proposed for the mineral of composition $Hg_2(Cl,Br)_2$, Cl > Br.

**Discussion.** The new name Br-calomel is unnecessary for a variety of calomel. **J.P.**

### Charoite

L.V. Nikishova, K.A. Lazebnik, Yu.D. Lazebnik (1985) Crystal chemical formula of charoite. Kristallokhim. Strukt. Tipomorfizm Mineral., 1985, 100–104.

The chemical formula of charoite is given as $(K,Na)_5(Ca,Ba,Sr)_8(Si_{12}O_{30})(Si_6O_{16})(OH,F)\cdot nH_2O$ with the unit-cell parameters $a = 10.7$, $b = 32.0$, $c = 7.25$ Å, $\beta = 113°$; a structural similarity to miserite is suggested. **F.C.H.**

### Ferrithorite

G.N. Nechelyustov, T.N. Shuriga (1986) "Ferrithorite" from subalkalic rare-metal metasomatites of eastern Siberia. Mineralog. Zhurnal, 8 (1), 88–94 (in Russian).

Ferrithorite from eastern Siberia was studied optically, chemically (by electron microprobe), and crystallographically (X-ray powder diffraction) to determine how Fe is incorporated. Chemical analyses show that the Si/(Th + U + Pb) ratio in ferrithorites remains close to unity whatever the Fe content. In one variety of the Siberian material, the Fe is enriched in submicroscopic veinlets and inclusions. The Fe is interpreted to be in the form of iron hydroxides, finely dispersed in thorite, with no evidence of isomorphic Fe for Th substitution. The absence of extra lines on X-ray powder patterns is attributed to the poor quality of patterns obtained on iron hydroxides in general. Thus, the eastern Siberian ferrithorite is a mechanical mixture of thorite and iron hydroxide formed by secondary alteration of thorite. **E.S.G.**

### Furongite

M. Deliens, P. Piret (1985) The uranium and aluminum phosphates from Kobokobo: VIII. Furongite. Schweiz. Mineral. Petrogr. Mitt., 65, 1–7 (in French).

Kobokobo, Kivu, Zaire, is the second world occurrence of furongite. Chemical, thermogravimetric, and crystallographic data are given. Electron-microprobe and TGA analysis gave $Al_2O_3$ 9.38, $UO_3$ 49.61, $P_2O_5$ 18.56, $H_2O$ 22.45, total 100.00 wt%, corresponding to $Al_{13}(UO_2)_7(PO_4)_{13}(OH)_{14}\cdot 58H_2O$ or approximately $Al_2(UO_2)(PO_4)_2(OH)_2\cdot 8H_2O$, which differs from the original description. X-ray diffraction studies show the mineral to be triclinic, $P1$ or $P\bar{1}$ with $a = 19.271(6)$, $b = 14.173(4)$, $c = 12.136(7)$ Å, $\alpha = 67.62(3)$, $\beta = 115.45(3)$, $\gamma = 94.58(3)°$ and $V = 2754(2)$ Å$^3$. A new cell orientation has been chosen with $\beta$ and $\gamma$ obtuse. **J.D.G.**

### Glushinskite*

P. Bayliss (1987) Mineral nomenclature: Glushinskite. Mineral. Mag., 51, 327–328.

Glushinskite, $Mg(C_2O_4)\cdot 2H_2O$, originally described inadequately in 1960, is now known to occur at three localities and has been approved as a mineral name. **J.L.J.**

### Imogolite*

P. Bayliss (1987) Mineral nomenclature: Imogolite. Mineral. Mag., 51, 327.

Imogolite has the ideal formula $Al_2SiO_3(OH)_4$, and a two-dimensional tabular structure with $b = 5.1$, $c = 8.4$ Å. The X-ray powder pattern has strongest lines at 16(100,vb), 7.9(70), 5.6(35), 3.7(20), 3.3(65,vb), and 2.25 Å (25,vb). The mineral now has been accepted as distinct from allophane, the latter being almost amorphous and having the composition $Al_2O_3\cdot(SiO_2)_{1.3-2.0}\cdot(H_2O)_{2.5-3.0}$. **J.L.J.**

### Redledgeite

J.D. Scott, G.R. Peatfield (1986) Mannardite $[Ba\cdot H_2O](Ti_6V_2^{3+})O_{16}$, a new species, and new data on redledgeite. Can. Mineral., 24, 55–66.

A reinvestigation of holotype redledgeite shows the correct formula to be $[Ba_{1.07}(H_2O)_{0.93}](Ti_6Cr^{3+}_{1.83}V^{3+}_{0.05}Fe^{3+}_{0.11})O_{16}$. Revised unit-cell parameters are $a = 14.320(2)$, $c = 5.893(1)$ Å, space group $I4_1/a$. Redledgeite seems to be isostructural with mannardite; however, additional, weak diffraction-maxima in the precession photographs of redledgeite suggest additional Ba-$H_2O$ order in this mineral. **T.S.E.**

### Rozenite*

P. Bayliss (1987) Mineral nomenclature: Rozenite. Mineral. Mag., 51, 176.

Rozenite, $FeSO_4\cdot 4H_2O$ has been approved as a mineral distinct from siderotil, $FeSO_4\cdot 5H_2O$. **J.L.J.**

### Scapolite*

P. Bayliss (1987) Mineral nomenclature: Scapolite. Mineral. Mag., 51, 176.

Scapolite is retained as a group name encompassing the marialite ($Na_4Al_3Si_9O_{24}Cl$)–meionite ($Ca_4Al_6Si_6O_{24}CO_3$) series. Dipyre and mizzonite are regarded as varietal names; wernerite is synonymous with scapolite and is abolished. **J.L.J.**

### Schmiederite

H. Effenberger (1987) Crystal structure and chemical formula of schmiederite, $Pb_2Cu_2(OH)_4(SeO_3)(SeO_4)$, with a comparison to linarite, $PbCu(OH)_2(SO_4)$. Mineralogy and Petrology, 36, 3–12.

The crystal structure of schmiederite, $a = 9.922(3)$, $b = 5.712(2)$, $c = 9.396(3)$ Å, $\beta = 101.96(3)°$, $P2_1/m$, Z = 2 was refined to an $R$ index of 5.8% for 1131 reflections. The chemical formula proved to be $Pb_2Cu_2(OH)_4(SeO_3)(SeO_4)$, a mixed selenite-selenate mineral, rather than $PbCu(OH)_2(SeO_4)$ as had been suggested in previous studies. **F.C.H.**

### Shakhovite

N.A. Pal'chik, M.Yu. Antipin, V.I. Vasil'ev, K.A. Potekhin, Yu.T. Struchkov (1984) Crystal structure of shakhovite $Hg_4SbO_6$. Doklady Akad. Nauk SSSR, 278, 108–112 (in Russian).

The crystal structure of shakhovite was solved and refined to $R$ = 6.0% for 1160 observed reflections. A revised chemical formula has resulted: $Hg_4SbO_6$. The unit cell has been reset to one-half the volume of the previously proposed setting: $a = 4.855(1)$, $b = 5.415(2)$, $c = 8.249(2)$ Å, $\alpha = 106.42(2)$, $\beta = 104.18(2)$, $\gamma = 98.75(2)°$, giving Z = 1 and $D_{calc} = 8.64$ g/cm³. **T.S.E.**

### Sjögrenite

O.K. Ivanov, Yu.V. Mozzherin, V.I. Vilisov (1986) New data on sjögrenite. Izvestiya Akad. Nauk Kazakh. SSR, Geol. Ser. 1, 40–45 (in Russian).

Colorless sjögrenite occurs with pokrovskite and magnesite in a vein cutting serpentinitized dunite in the Zlatogor layered intrusion (northern Kazakhstan), reported to be the second documented locality. Microprobe analyses of five individuals from this locality yield Fe 16.97–18.54, Mn 0.0–0.30, and Mg 21.66–25.88 wt%. Loss on ignition in a capillary was 40.61% and a semiquantitative combustion method gave about 1% C. Based on a review of hydroxides, carbonates, and hydrocarbonates, in which $Fe^{3+}$ is reported to lend brown colors, whereas $Fe^{2+}$ does not contribute to color, the authors have proposed that the Fe in sjögrenite is ferrous. Thus the formula should be $Mg_6Fe_2^{2+}(CO_3)(OH)_{14}\cdot 5H_2O$, not $Mg_6Fe_2^{3+}(CO_3)(OH)_{16}\cdot 4H_2O$, the formula proposed for the type material. **E.S.G.**

### Tugarinovite

V.G. Kruglova, G.A. Sidorenko, Ye.G. Ryabeva, A.A. Poteryaykina, L.S. Dubakina (1984) New data on tugarinovite. Doklady Akad. Nauk SSSR, Earth Sciences Section, 264, 149–152 (English translation of original, 264, 689–693).

Further study of tugarinovite, monoclinic $MoO_2$, showed that it is typically polysynthetically twinned, and bireflectance and anisotropism color effects are conspicuous. Detailed optical data based on measurements from 260 to 700 nm are given. Partial to complete pseudomorphism by wulfenite occurs in oxidized material. **J.L.J.**

### Waylandite

A.M. Clark, A.G. Couper, P.G. Embrey, E.E. Fejer (1986) Waylandite: New data, from an occurrence in Cornwall, with a note on "agnesite." Mineral. Mag., 50, 731–733.

Waylandite, a member of the crandallite group, is uniaxial positive, $\omega = 1.748$, $\epsilon = 1.774$, mostly twinned, some cyclically. Four electron-microprobe analyses gave $Al_2O_3$ 25.29–28.1, $SiO_2$ 0.06–0.18, $P_2O_5$ 20.96–23.96, CaO 0.63–1.40, FeO 0.15–0.81, CuO 0.81–1.06, BaO 0.77–1.01, $Bi_2O_3$ 32.27–37.32, $H_2O$ (calc. by difference) 11.15–14.32 wt%. The idealized formula is $BiAl_3(PO_4)_2(OH)_6$. X-ray powder data yield a cell with $a = 6.9834(3)$, $c = 16.175(1)$ Å; Z = 3, $D_{calc} = 4.08$ g/cm³. The optical results, chemical analyses, and simplified formula are new. **J.L.J.**

## Discredited Minerals

### Cuprocassiterite (= mushistonite)

P.J. Dunn, W.L. Roberts (1986) Cuprocassiterite discredited as mushistonite. Mineral. Record, 17, 383.

Cuprocassiterite was originally described by Ulke (1893) from the Etta mine, near Keystone, Pennington County, South Dakota. Microprobe studies on source material have shown the "mineral" to be very inhomogeneous, although predominantly composed of Cu and Sn, and examination of the X-ray powder pattern has shown that the cuprocassiterite is in fact mushistonite. Discrediting of the name was approved by the IMA Commission. **R.A.S.**

### Kusuite (= Plomboan wakefieldite-(Ce)*)

M. Deliens, P. Piret (1986) Kusuite becomes known as plomboan wakefieldite-(Ce). Bull. Minéral., 109, 305 (in French).

The name kusuite has been changed to plomboan wakefieldite-(Ce) in accordance with the nomenclature proposed by Levinson and accepted by IMA. The adjectival modifier, plomboan, emphasizes the partial substitution of Ce by Pb. **J.D.G.**

# ERRATA

The following are errata for "Procedures involving the IMA Commission on New Minerals and Mineral Names and guidelines on mineral nomenclature" by E. H. Nickel and J. A. Mandarino [*American Mineralogist,* v. 72 (1987), p. 1031–1042].

Page 1034, column 2, line 8 from bottom: *change* elements Y or Sc *to* element Y.
Page 1037, column 5, line 31 from bottom: *change* Eucolite *to* Eudialyte.
Page 1037, column 5, line 23 from bottom: *change* feitknechite *to* feitknechtite.
Page 1038, column 2, line 23 in Table: *change* Gotzenite *to* Götzenite.
Page 1038, column 2, line 10 from bottom: *change* Tanteuxenite *to* Tanteuxenite-(Y).
Page 1038, column 5, line 13 from bottom: *change* Crocidolite *to* Asbestiform riebeckite.
Page 1039, column 2, line 12 from bottom: *change* Karnasurtite *to* Karnasurtite-(Ce).
Page 1039, column 2, line 11 from bottom: *change* Crocidolite *to* Asbestiform riebeckite.
Page 1039, column 2, line 10 from bottom: *change* Crocidolite *to* Asbestiform riebeckite.
Page 1039, column 5, line 41 in Table: *change* Psilomelane *to* Romanechite.
Page 1039, column 5, line 59 in Table: *delete* Beta-lomonosovite.
Page 1040, column 2, line 8 in Table: *change* Yttropyrochlore *to* Yttropyrochlore-(Y).
Page 1040, column 2, line 3 from bottom: *change* Churchite *to* Churchite-(Y).
Page 1040, column 2, last line: *change* Alpha-quartz *to* Quartz.
Page 1040, column 4, line 24 in Table: *after* Simpsonite *add* (of Wade and Prider).
Page 1040, column 4, line 51 in Table: *after* Stibiomicrolite *add* (of Quensel and Berggren).
Page 1040, column 4, line 65 in Table: *after* Sundiusite *add* (of Phillips and Layton).
Page 1042, column 1, line 2 in Appendix 2: *insert* Aeschynite-(Y) *below* Aeschynite-(Nd).
Page 1042, columns 1 and 2, line 31 from bottom: *delete* Ewaldite *and* Ewaldite-(Y).
Page 1042, columns 1 and 2, line 5 from bottom: *change* Keivyite *to* Keiviite *and* Keivyite-(Yb) *to* Keiviite-(Yb).
Page 1042, column 1, line 5 from bottom: *insert* Keiviite-(Y) *below* Keivyite.
Page 1042, column 1, line 3 from bottom: *insert* Kuliokite-(Y) *below* Kobeite.
Page 1042, columns 1 and 2, line 2 from bottom: *delete* Kusuïte *and* Kusuïte-(Ce).
Page 1042, column 3, line 9 from bottom: *insert* Xinganite-(Y) *below* Xenotime.

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