*American Mineralogist, Volume 84, pages 990–994, 1999*

# NEW MINERAL NAMES*

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## Blatonite*

R. Vochten, M. Deliens (1998) Blatonite, $UO_2CO_3 \cdot H_2O$, a new uranyl carbonate monohydrate from San Juan County, Utah. Can. Mineral., 36, 1077–1081.

Electron microprobe and thermogravimetric analyses gave $UO_3$ 81.98, $CO_2$ 12.82, $H_2O$ 5.38, sum 100.18 wt%, corresponding to $(UO_2)_{0.99}(CO_3)_{1.00} \cdot 1.03H_2O$. The presence of $CO_3$ groups and $H_2O$ was confirmed by infrared spectroscopy. The mineral occurs as canary-yellow, needle-shaped, subparallel fibers that are in bundles up to 0.1 mm wide and 1 mm long. Silky luster, white streak, translucent, $H$ = 2–3, parting along the fibers, uneven fracture, flexible, $D_{meas} = 4.05(2)$, $D_{calc} = 4.02$ g/cm$^3$ for $Z = 36$, fluoresces strongly greenish yellow at 360 nm, soluble with effervescence in dilute mineral acids and in acetic acid. Optically uniaxial positive, length fast, nonpleochroic, $\omega = 1.588(2)$, $\varepsilon = 1.612(2)$. The Guinier–Hägg X-ray powder pattern ($CuK\alpha_1$ radiation; 14 lines listed) has strongest lines at 7.86(47,110), 6.91(55,103), 6.56(77,201), 4.76(40,114), and 3.056(100,207); calculated $a = 15.79(1)$, $c = 23.93(3)$ Å, hexagonal or trigonal symmetry.

The mineral occurs in seams of gypsum in siltstone within the Triassic Shinarump Conglomerate at the Jomac uranium mine, San Juan Country, Utah. Associated minerals are boltwoodite, coconinoite, metazeunerite, rutherfordine, azurite, malachite, carbonate-cyanotrichite, brochantite, and smithsonite. The new name is for N. Blaton (b. 1945), crystallographer at the University of Leuven, Belgium. Type material is in the Royal Belgian Institute of Natural History, Brussels. **J.L.J.**

## Gerenite-(Y)*

J.L. Jambor, A.C. Roberts, J.D. Grice, T.C. Birkett, L.A. Groat, S. Zajac (1998) Gerenite-(Y), $(Ca,Na)_2(Y,REE)_3Si_6O_{18} \cdot 2H_2O$, a new mineral species, and an associated Y-bearing gadolinite-group mineral, from the Strange Lake peralkaline complex, Quebec–Labrador. Can. Mineral., 36, 793–800.

L.A. Groat (1998) The crystal structure of gerenite-(Y), $(Ca,Na)_2(Y,REE)_3Si_6O_{18} \cdot 2H_2O$, a cyclosilicate mineral. Can. Mineral., 36, 801–808.

One of several electron microprobe analyses listed gave $Na_2O$ 3.1, CaO 7.6, MnO 1.0, $Y_2O_3$ 27.4, $Nd_2O_3$ 0.2, $Sm_2O_3$ 0.2, $Gd_2O_3$ 0.9, $Dy_2O_3$ 4.4, $Er_2O_3$ 3.9, $Yb_2O_3$ 2.7, ($Tb_2O_3$ 0.32, $Ho_2O_3$ 1.15, $Tm_2O_3$ 0.51, $Lu_2O_3$ 0.35 estimated), $SiO_2$ 40.0, $H_2O$ 5.87 by difference, sum 100 wt%, corresponding to $(Ca_{1.21}Na_{0.89}Mn_{0.13})_{\Sigma 2.22}(Y_{2.16}REE_{0.68})_{\Sigma 2.84}Si_{5.98}O_{18} \cdot 2.9H_2O$. The mineral occurs typically in anhedral, heterogeneous masses, 1–2 cm across, of eutectoid-like intergrowths with quartz. White to creamy color, vitreous luster, white streak, brittle, uneven fracture, $H$ = 5, elongate [010], typically in divergent bundles ~100 μm long and 20 μm wide, $D_{calc} = 3.46$ g/cm$^3$ for $Z = 1$. Optically biaxial negative, $\alpha = 1.602(1)$, $\beta = 1.607(2)$, $\gamma = 1.611(1)$, $2V_{meas} = 73(3)°$, $2V_{calc} = 83°$, $X \wedge b = 7°$. Single-crystal X-ray structure study ($R = 0.052$) indicated triclinic symmetry, space group $P\bar{1}$; $a = 9.245(5)$, $b = 9.684(6)$, $c = 5.510(3)$ Å, $\alpha = 97.44(6)$, $\beta = 100.40(6)$, $\gamma = 116.70(6)°$ as refined from a powder pattern (114 mm Gandolfi, $CuK\alpha$ radiation) with strongest lines of 8.44(80,010),3.76(70,$\bar{1}2\bar{1}$,$02\bar{1}$), 2.973(100,$\bar{3}10$,021) and 2,930(60,$\bar{1}3\bar{1}$).

The mineral occurs in pegmatite-aplite at the Strange Lake complex on the Quebec–Labrador boundary, 250 km northeast of Schefferville, Quebec. Associated minerals are quartz, hematite, kainosite-(Y), gittinsite, leifite, and several others. Also present is a gadolinite-group mineral for which six listed electron microprobe analyses are thought to correspond to the general formula $(Ca,Y)_2Si_2Be_2(O,OH)_{10}$. Type material of gerenite-(Y) is in the Systematic Reference Series at the Geological Survey of Canada, Ottawa. The new mineral name recognizes R. Geren (b. 1917) for his contribution to the discovery of the Strange Lake Y-REE-Nb-Zr-Be deposit. **J.L.J.**

## Graeserite*

M.S. Krzemnicki, E. Reusser (1998) Graeserite, $Fe_4Ti_3AsO_{13}(OH)$, a new mineral species of the derbylite group from the Monte Leone nappe, Binntal region, Western Alps, Switzerland. Can. Mineral., 36, 1083–1088.

P. Berlepsch, T. Armbruster (1998) The crystal structure of $Pb^{2+}$-bearing graeserite, $Pb_{0.14}(Fe,Ti)_7AsO_{12+x}(OH)_{2-x}$, a mineral of the derbylite group. Schweiz. Mineral. Petrogr. Mitt., 78, 1–9.

Electron microprobe analysis gave $TiO_2$ 40.89, $Fe_2O_3$ 33.64, $FeO_{calc}$ 3.94, PbO 5.00, $As_2O_3$ 13.51, $Sb_2O_3$ 1.43, $H_2O$ (calc.) 1.30, sum 99.80 wt%, corresponding to $(Fe^{3+}_{2.91}Fe^{2+}_{0.38}Ti_{0.54}Pb_{0.15})_{\Sigma 3.98}Ti_3(As^{3+}_{0.94}Sb^{3+}_{0.07})_{\Sigma 1.01}O_{13}(OH)$. Occurs as black, opaque, acicular [001] crystals, >10 μm thick and up to 5 mm long, and as radial aggregates. Black streak, metallic luster, ductile, moderate {100} cleavage, conchoidal fracture, possibly twinned along the elongation, $VHN_{25} = 521$ (Mohs 5½), $D_{calc} = 4.56$ g/cm$^3$ for $Z = 2$.

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

0003-004X/99/0506–0990$05.00

Grayish white in reflected light, no pleochroism or bireflectance. Reflectance percentages are given in steps of 20 nm from 400 to 700 nm; representative values for $R_1$ and $R_2$ in air (SiC standard) are 20.1, 20.8 (460), 19.6, 20.3 (480), 18.7, 19.3 (540), 18.2, 18.9 (580), and 17.5, 18.1 (660). Single-crystal X-ray study indicated monoclinic symmetry, space group $A2/m$, $a$ = 7.184(2), $b$ = 14.289(6), $c$ = 5.006(2) Å, β = 105.17(2)°; similar results were obtained in the X-ray structure study ($R$ = 0.0292), but in a $C2/m$ setting. Strongest lines of the powder pattern (Debye–Scherrer, Fe$K\alpha$ radiation) are 3.117(30,220), 2.846(80,131), 2.681(100,231), 2.029(30), and 1.5825(50,351,162).

The mineral is associated with arsenopyrite, anatase, asbecasite, cafarsite, and other rare arsenic oxides in hydrothermal Alpine-type fissures in paragneisses of the Monte Leone nappe in the Binntal region of Switzerland. The new name is for Stefan Graeser (b. 1935) of the Mineralogical–Petrographic Institute, University of Basel, Switzerland. Type material is in the Natural History Museum in Basel. **J.L.J.**

## Kalifersite*

G. Ferraris, A.P. Khomyakov, E. Belluso, S.V. Soboleva (1998) Kalifersite, a new alkaline silicate from Kola Peninsula (Russia) based on a palygorskite-sepiolite polysomatic series. Eur. J. Mineral., 10, 865–874.

The mineral is closely associated with aegirine, fenaksite, and pectolite in a hydrothermally altered pegmatite at the Khibina massif, Mt. Kukisvumchorr, Kola Peninsula, Russia. Occurs as fibrous bundles up to 5 mm, elongate [001], and as aggregates up to 1 cm in cavities. Pink-brownish color, translucent, earthy to silky luster, white streak, $H$ = 2, brittle, [001] fibrous parting, good {100} and {010} cleavages, nonfluorescent, $D_{meas}$= 2.37(2), $D_{calc}$ = 2.28 g/cm$^3$ for $Z$ = 1. Optically biaxial positive, α = 1.523(2), β = 1.525(2), γ = 1.550(2), $2V_{meas}$ = 30(2), $2V_{calc}$ = 32°, dispersion not evident, $X \approx a$, $Y \approx b$, $Z \approx c$; moderately pleochroic, $Z$ = yellow, $Y = X$ slightly pink. Electron microprobe analysis gave $Na_2O$ 1.98, $K_2O$ 7.71, MgO 1.21, MnO 2.38, $Fe_2O_3$ 17.96, $SiO_2$ 55.39, $H_2O$ (Penfield) 13.42, sum 100.40 wt%, corresponding to $(K_{3.58}Na_{1.40})_{\Sigma 4.98}[Fe^{3+}_{4.92}Mn_{0.73}Mg_{0.66}Ca_{0.14}]_{\Sigma 6.45}[Si_{20.16}O_{50}]$ $[(OH)_{3.44}(H_2O)_{14.56}]_{\Sigma 18}$, simplified as $(K, Na)_5Fe^{3+}_7Si_{20}O_{50}$ $(OH)_6 \cdot 12H_2O$. Apparent single crystals are bundles of (100) lamellae, elongate [001]. Electron diffraction patterns indicated triclinic symmetry and structural disorder; the X-ray powder pattern (34 lines; diffractometer, Cu$K\alpha$ radiation) was successfully indexed with $a$ = 14.86(4), $b$ = 20.54(4), $c$ = 5.29(2) Å, α = 95.6(3), β = 92.3(3), γ = 94.4(3)°. Strongest lines of the powder pattern are 12.36(100,$\bar{1}$10), 11.60(40,110), 10.21(14,020), 4.162(5,1$\bar{3}$1,121,$\bar{1}\bar{3}$1), 3.818b(5,0$\bar{4}$1,$\bar{2}\bar{3}$1), 2.196(5, several), and 2.017b(5,631,$\bar{5}$02,$\bar{7}$40,$\bar{5}\bar{1}$2). The new name alludes to the chemical composition (*kali*um, *fer*rum, *si*licium). Type material is in the Fersman Mineralogical Museum, Moscow, Russia, and in the Museo Regionale di Storia Naturale, Torino, Italy. **J.L.J.**

## Oenite*

R.T.M. Dobbe, M.A. Zakrzewski (1998) Oenite, CoSbAs, a new mineral species from the Tunaberg Cu-Co-sulfide skarns, Bergslagen, Sweden. Can. Mineral., 36, 855–860.

### Oenite

The most Co-rich of 17 electron microprobe analyses listed gave Co 19.9, Fe 0.8, Ni 2.3, Sb 51.0, As 25.9, S 0.5, sum 100.4 wt%, corresponding to $(Co_{0.86}Ni_{0.10}Fe_{0.04})_{\Sigma 1.00}Sb_{1.00}$ $(As_{0.89}Sb_{0.07}S_{0.04})_{\Sigma 1.00}$. Occurs as polycrystalline anhedral aggregates up to 300 μm across in chalcopyrite, typically along contacts with cobaltite. Opaque, silver-white color, metallic luster, brittle, gray streak, uneven fracture, $VHN_{100}$ = 599, $D_{calc}$ = 7.91 g/cm$^3$ for $Z$ = 4. Silver-white in reflected light in air, white with a faint yellowish or creamy tint in oil; nonpleochroic, no bireflectance in air, weakly bireflecting and pleochroic from white to slightly darker creamy white in oil. Weakly to distinctly anistropic, with reddish brown to darker pale violet rotation tints; effects are more intense in oil. Reflectance percentages in air (WC standard) for $R_1$ and $R_2$ are 58.2, 55.5 (470 nm), 56.8, 55.6 (546), 55.8, 55.5 (589), and 55.0, 55.5 (650). Indexing of the X-ray powder pattern (18 lines listed; 114 mm Debye–Scherrer, Fe radiation) gave an orthorhombic cell with $a$ = 3.304(6), $b$ = 6.092(8), $c$ = 10.258(13) Å. Strongest lines of the X-ray powder pattern are 2.63(100,022), 2.53(80,112), 1.942(100,015), and 1.1182(80,137).

The mineral occurs in chalcopyrite that replaced cobaltite and löllingite at the Tunaberg polymetallic sulfide skarns. The new name, pronounced oonite, is for Soen Oen (1928–1986) to recognize his contributions to the geology and mineralogy of ore deposits. Type material is in the Instituut voor Aardwetenschappen, Vrije Universiteit, Amsterdam.

### (Fe,Ni)SbAs

Oenite is variable in composition, with formula Co ranging from 0.86 to 0.21, Ni from 0.06 to 0.34, and four of the listed analyses showing Fe predominant. The most Fe-rich sample gave Co 3.0, Fe 11.7, Ni 8.7, Sb 48.3, As 26.6, S 1.3, sum 99.6 wt%, corresponding to $(Fe_{0.52}Ni_{0.37}Co_{0.13})_{\Sigma 1.02}Sb_{0.99}(As_{0.89}S_{0.10})_{\Sigma 0.99}$. **J.L.J.**

## Okayamalite*

S. Matsubara, R. Miyawaki, A. Kato, K. Yokoyama (1998) Okayamalite, $Ca_2B_2SiO_7$, a new mineral, boron analogue of gehlenite. Mineral. Mag., 62, 703–706.

Electron microprobe analysis gave CaO 46.28, $B_2O_3$ 28.50, $SiO_2$ 24.24, $Al_2O_3$ 0.36, sum 99.38 wt%, corresponding to $Ca_{2.01}B_{2.00}Si_{0.98}Al_{0.02}O_7$, which is the boron analog of gehlenite. Occurs as creamy white, equigranular aggregates, up to a few millimeters across, in which the grains are anhedral and up to 30 μm across. White streak, earthly luster, $H$ = 5½, no cleavage, $D_{calc}$ = 3.30 g/cm$^3$ for $Z$ = 2. Colorless in thin section, uniaxial negative, ω = 1.700(2), ε = 1.696(2). The X-ray powder pattern is in good agreement with that of synthetic $Ca_2B_2SiO_7$, which is tetragonal, space group $P\bar{4}21m$; indexing by analogy gave $a$ = 7.116(2), $c$ = 4.815(1) Å. Strongest lines of the diffractometer pattern are 3.479(40,111), 2.862(55,201), 2.654(100,211), and 1.920(35,212).

The mineral is associated with wollastonite, vesuvianite, calcite, and johnbaumite in a centimeters-wide veinlike skarn within a pentahydroborite-bearing body at the Fuka limestone mine, Bicchu-cho, Okayama Prefecture, Japan. The new name is for the locality. Type material is in the National Science Museum, Tokyo. **J.L.J.**

## Tsugaruite*

M. Shimizu, R. Miyawaki, A. Kato, S. Matsubara, F. Matsuyama, K. Kiyota (1998) Tsugaruite, $Pb_4As_2S_7$, a new mineral species from the Yunosawa mine, Aomori Prefecture, Japan. Mineral. Mag., 62, 793–799.

The mean of seven electron microprobe analyses listed is Pb 68.70, Tl 0.13, As 12.45, S 18.64, sum 99.92 wt%, corresponding to $Pb_{3.99}Tl_{0.01}As_{2.00}S_{7.00}$, ideally $Pb_4As_2S_7$. The mineral occurs as opaque, silvery lead-gray, radiating groups of tabular crystals, elongate [001] and tabular on {010}, up to 2 mm long and 0.04 mm wide. Metallic luster, lead-gray streak, brittle, uneven fracture, no cleavage, $VHN_{25}$ = 75.4–94.9 (mean 86.7), $D_{calc}$ = 6.83 g/cm$^3$ for $Z$ = 16. In reflected light, weakly bireflectant and weakly pleochroic from white with a greenish tint to gray-white with a greenish tint. No internal reflection. Weakly to moderately anisotropic, with rotation tints of dark brownish gray at near-extinction, to dark yellowish gray, and to dark greenish gray. Reflectance percentages (SiC standard) for $R_{min}$ and $R_{max}$ in air and in oil, respectively, are 33.8, 34.0; 19.2, 19.4 (470 nm), 31.8, 31.9; 18.2, 19.6 (546 nm), 31.2, 31.3; 17.4, 19.3 (589 nm), and 30.4, 30.4; 16.3, 18.4 (650 nm). Single-crystal X-ray study indicated orthorhombic symmetry, space group *Pnn*2 or *Pnnm*; $a$ = 15.179(1), $b$ = 38.195(1), $c = 2c'$ = 8.0745(5) Å as refined from a diffractometer pattern (Cu$K\alpha$ radiation) with strongest lines of 3.705(34,1.10.0), 3.395(100,450), 2.870(34,192), 2.819(53,550), and 2.739(48,2.13.0, 560).

The mineral coexists with jordanite, wurtzite, marcasite, and galena in a centimeters-wide hydrothermal barite veinlet at the Yunosawa mine in the Minami-Tsugara-gun provincial unit of Aomori Prefecture in northern Japan. The new name refers to the locality. Type material is in the University Museum of the University of Tokyo, and in the National Science Museum, Tokyo. **J.L.J.**

## Zinccopperite

Yanfu Xiao, Yan Sun, Yan Lu, Chunqi Wen, Jiangzhen Wang (1998) Zinccopperite—a new variety of zinc-copper intermetallic compounds discovered in a porphyry-copper deposit. Acta Geol. Sinica, 72(3), 308–313.

An electron microprobe analysis, and the range for the five listed, gave Cu 62.55 (59.80–62.55), Zn 36.79 (36.32–39.85), Fe 0.33 (0.21–0.59), Ag 0.10 (0.02–0.13), Co 0.03 (0–0.03), Ni 0.04 (0–0.05), S 0.10 (0–0.40), sum 99.94 (99.12–99.94) wt%, corresponding to $Cu_{7.0}Zn_4$. SEM images indicated a homogeneous distribution of Cu and Zn. The grains occur as individuals and as aggregates up to 50 μm across. Golden color, metallic luster, anhedral, $VHN_{10}$ = 190, bright golden color in reflected light, isotropic; reflectance percentages range from 58.2 at 420 nm, to 83.7 at 700 nm. The grains are present at depths of 100–160 m below surface, occurring interstitially to the main rock-forming minerals in the potassic zone of a porphyry Cu deposit within a stock of quartz monzonite porphyry. The stock is in the Xifanping area, Yanyuan County, Sichuan Province, China.

**Discussion.** Zinccopperite is referred to as "tentatively named." That species rather than varietal status is intended is indicated by references to danbaite ($CuZn_2$) and zhanghengite (CuZn) as other varieties in the Zn-Cu alloy series. No X-ray data are given. See *Am. Mineral.*, 78, 1318–1319, 1993, for another report on apparently the same mineral. **J.L.J.**

## Tantalum

V.V. Seredin, M.E. Generalov, T. L. Evstigneeva (1998) New discovery of native tantalum. Doklady Akad. Nauk, 360(6), 791–795 (in Russian).

One of six electron microprobe analyses listed gave Ta 96.25, Nb 2.20 (max. Nb reported), Sc 0.30, sum 99.45 wt%. Occurs as irregular, metallic grains and aggregates 50–80 × 100–200 μm; some have a facet-like appearance, and others are flattened and stacked. X-ray powder diffraction patterns (3 listed; 57 mm Gandolfi) are in good agreement with data for synthetic Ta; $a$ = 3.308–3.375 Å as calculated from the powder data.

More than 20 grains have been found with other native metals, including native niobium, tungsten, nickel, aluminum, and silicon, in eluvial sediments overlying kaolinitized Lower Cambrian schists on a hill between the Osimovka and Abramovka rivers, southern Primor'e, Russia. The schist was intruded by hydrothermally altered basic dikes, thought to be Pliocene–Quaternary, that may have generated or activated saline hydrothermal fluids during intrusion and the accompanying extrusion of basalts.

**Discussion.** Native tantalum has been independently reported to occur as inclusions in diamond (see abstract on Tl chloride). **J.L.J.**

## $Fe^{2+}$-Ti wodginite

A.G. Tindle, F.W. Breaks (1998) Oxide minerals of the Separation Rapids rare-element pegmatite group, northwestern Ontario. Can. Mineral., 36, 609–635.

A.G Tindle, F.W. Breaks, P.C. Webb (1998) Wodginite-group minerals from the Separation Rapids rare-element pegmatite group, northwestern Ontario. Can. Mineral., 36, 637–658.

One of two electron microprobe analyses listed gave FeO 10.66, MnO 2.80, PbO 0.07, $TiO_2$ 8.13, $SnO_2$ 8.13, $Sc_2O_3$ 0.06, $Sb_2O_3$ 0.09, $UO_2$ 0.12, $Nb_2O_5$ 12.82, $Ta_2O_5$ 56.27, $WO_3$ 0.05, sum 99.20 wt%, which after recalculation corresponds to $(Fe^{2+}_{3.17}Mn^{2+}_{0.82}Pb_{0.01})_{\Sigma 4.00}(Ti_{2.35}Sn_{1.25}Ta_{0.11}Mn_{0.09}Sc_{0.02}Sb_{0.01}U_{0.01})_{\Sigma 4.09}(Ta_{5.77}Nb_{2.23}W_{0.01})_{\Sigma 8.01}O_{32}$. The mineral occurs as euhedral to anhedral zoned inclusions in cassiterite crystals, and as a 2 mm crystal whose composition varies to that of wodginite at the core. The mineral occurs in cassiterite-beryl-petalite pegmatite.

An electron microprobe analysis of W-dominant wodginite from a beryl-columbite pegmatite gave FeO 2.32, MnO 16.54, PbO 0.14, $TiO_2$ 0.06, $SnO_2$ 8.10, $Sc_2O_3$ 0.02, $Sb_2O_3$ 0.02, $Bi_2O_3$ 0.26, $ThO_2$ 0.01, $Nb_2O_5$ 4.00, $Ta_2O_5$ 34.67, $WO_3$ 34.63, sum 100.77 wt%, which after recalculation corresponds to $(Mn_{3.99}Pb_{0.02})_{\Sigma 4.01}(Mn_{1.71}Sn_{1.31}Fe^{3+}_{0.79}Ta_{0.22}Bi_{0.03}Ti_{0.02}Sc_{0.01})_{\Sigma 4.09}(W_{3.65}Ta_{3.61}Nb_{0.74})_{\Sigma 8.00}O_{32}$. Four other listed analyses have 7.69–17.36 wt% $WO_3$. **J.L.J.**

### Thallium chloride

A.I. Gorshkov, S.F. Vinokurov, D.I. Solodov, L.V. Bershov, A.V. Mokhov, Yu.P. Solodova, A.V. Sivtsov (1998) Polycrystalline diamond from the Udachnaya pipe, Yakutia: Mineralogical, geochemical, and genetic characteristics. Lithology and Mineral Resources, 33(6), 525–538.

Energy dispersive analyses of inclusions in polycrystalline diamond revealed the presence of Cr spinel, native iron, native chromium, native copper, native tantalum, and thallium chloride. The last occurs as equant grains 1–12 µm in diameter. EDS detected Tl and Cl, with O absent. **J.L.J.**

### Fe analog of werdingite

E.S. Grew, M.G. Yates, J.P.P. Huijsmans, J.J. McGee, C.K. Shearer, M. Wiedenbeck, R.C. Rouse (1998) Werdingite, a borosilicate new to granitic pegmatites. Can. Mineral., 36, 399–414.

Electron microprobe and SIMS analyses (three listed) gave $SiO_2$ 18.83, $B_2O_3$ 10.65, $Al_2O_3$ 60.41, $Fe_2O_3$ 0.48, FeO 7.57, MgO 1.46, BeO 0.20, sum 99.60 wt%, corresponding to $Fe^{2+}_{1.29}Mg_{0.44}Al_{14.51}Fe^{3+}_{0.007}Si_{3.84}B_{0.10}$ to 24 cations; the general formula is $(Fe,Mg,Al)_2Al_{12}(Al,Fe)_2(Si,Al)_4B_2(B,Al,Be,Si)_2O_{37}$. The mineral, which is the Fe analog of werdingite, occurs as bundles, typically 2–3 mm long, of subparallel or somewhat radiating prisms; also occurs as open clusters of prisms, and as intergrowths with grandidierite. These minerals are associated with dumortierite, sillimanite, potassium feldspar, boralsilite, plagioclase, quartz, and tourmaline in pegmatite at Almgjotheii, Norway. Analyses of werdingite and its Fe analog are also given for an occurrence in granitic pegmatite at Cap Andrahomana, southeastern Madagascar. **J.L.J.**

## New Data

### Boltwoodite

P.C. Burns (1998) The structure of boltwoodite and implications of solid solution toward sodium boltwoodite. Can. Mineral., 36, 1069–1075.

Electron microprobe analyses of boltwoodite from near Rössing, Namibia, gave $Na_2O$ 2.59, 2.74, $K_2O$ 5.69, 5.14, CaO 0.06, 0.18, $SiO_2$ 14.48, 14.46, $UO_3$ 68.85, 68.22, $H_2O$ (calc.) 8.25, 8.17, sum 99.92, 98.91 wt%, corresponding to $K_{0.53}Na_{0.37}Ca_{0.01}U_{1.05}Si_{1.05}(H_2O)_2$ and $K_{0.48}Na_{0.39}Ca_{0.01}Si_{1.06}U_{1.05}(H_2O)_2$ for cations = 3. Single-crystal X-ray structure study ($R$ = 0.032) gave monoclinic symmetry, space group $P2_1/m$, $a$ = 7.0772(8), $b$ = 7.0597(8), $c$ = 6.6479(7) Å, β = 104.982(2)°, $D_{calc}$ = 4.144 g/cm$^3$ for $Z$ = 2. The structure determination gave the new formula $(K_{0.56}Na_{0.42})[(UO_2)(SiO_3OH)](H_2O)_{1.5}$. **J.L.J.**

### Compreignacite

P.C. Burns (1998) The structure of compreignacite, $K_2[(UO_2)_3O_2(OH)_3]_2(H_2O)_7$. Can. Mineral., 36, 1061–1067.

Single-crystal X-ray structure study ($R$ = 0.032) of compreignacite from Compreignac, France, confirmed the previously determined orthorhombic unit cell and space group *Pnnm*, but the new structural formula contains $7H_2O$ rather than $8H_2O$; $D_{calc}$ = 5.088 g/cm$^3$ for $Z$ = 2. **J.L.J.**

### Dugganite

A.E. Lam, L.A. Groat, T.S. Ercit (1998) The crystal structure of dugganite, $Pb_3Zn_3Te^{6+}As_2O_{14}$. Can. Mineral., 36, 823–830.

Single-crystal X-ray structure study ($R$ = 0.027) of microprobe-analyzed dugganite from the Empire mine, Tombstone, Arizona, gave hexagonal symmetry, $a$ = 8.460(2), $c$ = 5.206(2) Å, and identified the space group as $P321$. The microprobe- and structure-derived new formulas are similar, and correspond to anhydrous $Pb_3Zn_3TeAs_2O_{14}$. **J.L.J.**

### Kupletskite

C.C. Christiansen, O. Johnsen, K. Ståhl (1998) Crystal structure of kupletskite from the Kangerdlugssuaq intrusion, East Greenland. Neues Jahrb. Mineral. Mon., 253–264.

Single-crystal X-ray structure study ($R$ = 0.047) of kupletskite of composition $(K_{1.74}Na_{1.04}Ca_{0.36})_{\Sigma 3.14}(Mn_{3.67}Fe_{2.29}Mg_{0.70})_{\Sigma 6.66}(Ti_{1.82}Zr_{0.17}Nb_{0.06}Ta_{0.01})_{\Sigma 2.06}(Si_{7.78}Al_{0.27})_{\Sigma 8.05}O_{26}(OH_{4.17}F_{0.83})_{\Sigma 5}$ showed that the mineral has triclinic symmetry, space group $P\bar{1}$, $a$ = 5.4035(1), $b$ = 11.958(2), $c$ = 11.724(2) Å, α = 113.14(3), β = 94.74(3), γ = 103.10(3)°, $D_{calc}$ = 3.219 g/cm$^3$ for $Z$ = 1. Kupletskite is isostructural with astrophyllite, and the ideal formula is $(K,Na)_3(Mn,Fe)_7Ti_2Si_8O_{26}(OH)_4F$. **J.L.J.**

### Perraultite

N.A. Yamnova, Yu.K. Egorov-Tismenko, I.V. Pekov (1998) Crystal structure of perraultite from the coastal region of the Sea of Azov. Crystallogr. Reports, 43, 401–410.

Electron microprobe analysis gave $Na_2O$ 2.76, $K_2O$ 1.67, CaO 1.48, SrO 0.05, BaO 10.64, MgO 0.04, MnO 19.28, FeO 12.06, $Fe_2O_3$ 0.75, $Al_2O_3$ 0.03, $SiO_2$ 27.72, $TiO_2$ 17.83, $ZrO_2$ 1.09, $Nb_2O_5$ 1.24, $Ta_2O_5$ 0.11, $H_2O$ 1.79, F 2.18, O ≡ F 0.92, sum 99.80 wt% ($H_2O$ and $Fe^{2+}/Fe^{3+}$ by wet chemistry), corresponding to $Na_{1.54}K_{0.61}Ca_{0.46}Sr_{0.01}Ba_{1.20}Mg_{0.02}Mn_{4.70}Al_{0.01}Ti_{3.86}Zr_{0.15}Nb_{0.17}Ta_{0.01}Si_8O_{32.28}(OH)_{3.44}F_{1.99}$, idealized as $(Na,Ca)_2(Ba,K)_2(Mn,Fe)_8(Ti,Nb)_4Si_8O_{32}(OH,F,O)_6$, which is slightly different from the original formula (*Am. Mineral.*, 76, p. 2023, 1991). Single-crystal X-ray structure study ($R$ = 0.062) gave monoclinic symmetry and established the space group as $C2$; $a$ = 10.731(2), $b$ = 13.841(4), $c$ = 24.272(6) Å, β = 121.19(2)° for the new orientation. $D_{calc}$ = 3.67 g/cm$^3$ for $Z$ = 4. **J.L.J.**

## Tadzhikite-(Ce)

F.C. Hawthorne, M.A. Cooper, M.C. Taylor (1998) Refinement of the crystal structure of tadzhikite. Can. Mineral., 36, 817–822.

Single-crystal X-ray structure study ($R = 0.049$) of microprobe-analyzed tadzhikite from Dara-i-Pioz, Tadzhikistan, gave monoclinic symmetry, space group $P2/a$, $a = 19.058(4)$, $b = 4.729(1)$, $c = 10.321(2)$ Å, $\beta = 111.39(1)°$. The structure is of the hellandite type, contains essential H, and the new formula is simplified as $Ca_2(Ca,Y)_2(Ti^{4+},Fe^{3+})(REE, \square)[B_4Si_4O_{16}(O,OH)_6](OH)_2$. The formula ratio of Y:Ce in the analyzed sample is 0.894:0.679, but Y occurs at the Ca(2) site and is subordinate to Ca. **J.L.J.**