NEW MINERAL NAMES*

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Georgbokiite*


The average of 13 electron microprobe analyses gave CuO 58.17, ZnO 0.22, SeO3 33.09, Cl 10.96, O = Cl2 1.47, sum 99.97 wt%, corresponding to [Cu5(2)Zn0.02]2(SeO3)2Cl2. Occurs as brown to black-brown, equant to short prismatic crystals, some elongate and striated [101], typically 0.1–0.2 mm and up to 0.3 mm in length. Best developed are {100}, {1–11}, and {001}, [031], {611}, {121} less so. Adamantine luster, yellowish brown streak, weakly brittle or weakly plastic, highly perfect {010} and perfect {100} cleavages, VHN(1) = 215 (190–240), Dcalc = 4.84 g/cm3 for Z = 2 and the empirical formula. In transmitted light, thin grains are transparent and bright brown; optically biaxial negative, α = 2.06(2), β = 2.11(2), γ = 2.15(2). 2Vcalc = 70°, no dispersion, Y = b, X ∩ α = 24°, distinct pleochroism X = yellowish brown, Y = straw yellow, Z = dark brown, Z > X > Y. Single-crystal-X-ray structure study (r = 0.043) indicated monoclinic symmetry, space group P21/c; a = 6.045(2) Å, b = 13.778(2) Å, c = 5.579(3) Å, β = 95.76(4)° as refined from an X-ray powder pattern (diffractometer, CuKα radiation) with strongest lines of 6.88(68.020), 5.511(50.110), 2.990(100.140), 2.963(94.131), 2.566(67.221), and 2.296 (95.060). The results are in good agreement with data for synthetic Cu5Se2O8Cl2.

The mineral is associated with ilinskite and an unidentified selenide in fumarolic incrustations at the southern part of the Great Tolbachik Fissure Eruption, Kamchatka Peninsula, Russia. The new name is for Russian crystal-chemist Georgii Borisovich Bokii. Type material is in the Museum of Mineralogy, Saint Petersburg University, and in the Museum of the Saint Petersburg Mining Institute, Russia. J.P.

Seidite-(Ce)*

Electron microprobe analysis (H2O and F by wet methods) gave Na2O 3.08, K2O 1.20, CaO 1.04, SrO 5.20, BaO 1.56, MnO 0.34, FeO 0.10, La2O3 4.62, Ce2O3 6.52, Pr2O3 0.54, Nd2O3 1.60, Sm2O3 0.16, ThO2 2.96, SiO2 45.62, TiO2 6.54, Nb2O5 0.78, F 1.52, H2O 10.80, O ≡ (H3O) 0.64, sum 99.84 wt%, corresponding to [Na3.19Ca0.19(H3O)0.62]2+[Sr0.53K0.27Ba0.11(FeO1.90Si0.84O21.90O6)22.95(TiO8Nd0.06 Mn0.09Fe2.08)22.95Si6O19.08(F0.84(OH)0.16)5.26H2O, simplified as Na4(Sr,K,Ca,Ba)4(Ce,La,Tb)(Ti,Nb)Si6O22(F,OH)5·H2O. The mineral forms bright yellow, pinkish yellow, or cream-colored spherulites, to 1 cm, in which individual fibers are up to 0.05 mm thick, elongate [010], and flattened [100]. Vitreous to silky luster, resinous or dull in some specimens; translucent, fibrous or splintery fracture, perfect {100} cleavage and less perfect {010}, H = 3–4, Dmeas = 2.76 g/cm3, 2Vmeas = 2.75 g/cm3 for Z = 4, nonfluorescent, readily soluble in 10% HCl or HNO3, reacts with H2O. The DTA curve has a strong endotherm at 180 °C (dehydration) and weak ones at 650, 740, and 840 °C (incongruent melting). Weight loss between 20 and 200 °C is 8.2%, and total loss to 1000 °C is 11.1 wt%. The mineral readily rehydrates after heating to 300 °C, and at that temperature the IR spectrum has not changed. Optically biaxial negative, α = 1.542(2), β = 1.569(2), γ = 1.571(2), 2V = 28(1), 2V = 31°, positive elongation, X = a, Y = c, Z = b. Electron diffraction and X-ray powder patterns indicate monoclinic symmetry, space group C2/c, a = 24.71(1) Å, b = 7.186(3) Å, c = 14.47(2) Å, β = 95.25(10)°; strongest lines of the diffractometer pattern (CuKα radiation) are 12.32(100.200), 3.104(24.420), 3.081(16.800), 3.058(12.642), and 2.705(10.620). The mineral has a miseric-type Si:O ratio of 8:22 and has a structural similarity to b = 7.2 Å pyroxenoids. The substitution Na+ = (H3O)++ is assumed by comparison of natural and artificially hydrated specimens.

The mineral occurs sparingly in cavernous natrolite in the Yubileynaya ultragaugitic pegmatite vein at the Lovozero alkaline massif, Kola Peninsula, Russia. Associated minerals are belovite, vitusite, sashinite-(Ce), steenstrupine, manganunepinite, serandite, leucosphenite, and pale yellow sphalerite. The new name is for the locality, the Seidozer massif. Type material is in the Museum of the Saint Petersburg Mining Institute, Russia. J.P.
Shibkovite*
K(Ca,Mn,Na)(K\textsubscript{2-x},\textsubscript{x})Zn\textsubscript{1-x}Si\textsubscript{12}O\textsubscript{30} — a new mineral of the milarite group. Zapiski Vseross. Mineral. Obshch., 127(4), 89–94 (in Russian, English abs.).

The average of four electron microprobe analyses gave SiO\textsubscript{2} 61.33, Al\textsubscript{2}O\textsubscript{3} 0.04, FeO 0.04, MnO 2.43, ZnO 20.80, CaO 6.00, K\textsubscript{2}O 8.83, Na\textsubscript{2}O 1.03, sum 100.50 wt%, corresponding to K\textsubscript{1.00}(Ca\textsubscript{1.26}Mn\textsubscript{0.40}Na\textsubscript{0.84}Fe\textsubscript{0.01})\textsubscript{2.00}(Zn\textsubscript{2.00}Si\textsubscript{0.98})\textsubscript{2.00} simplified as K\textsubscript{2-x}(Ca,Mn,Na)\textsubscript{2}K\textsubscript{x}Zn\textsubscript{1-x}Si\textsubscript{12}O\textsubscript{30}. Occurs as white to colorless equant grains, to 0.5 mm, resembling quartz. Vitreous luster, white streak, no cleavage, brittle, \(H = 5\frac{1}{2} – 6\), \(VHN\textsubscript{90} = 609\), \(D_{meas} = 2.89(2)\), \(D_{calc} = 2.90(5)\) \(g/cm^3\) for \(Z = 2\), insoluble in water and 1:1 HCl, bright red fluorescence in short-wave ultraviolet light. The IR spectrum has bands at 495, 530, 575, 700, 920, 940, 1000, 1048, and 1105 cm\textsuperscript{-1}. Colorless in transmitted light, uniaxial or weakly biaxial positive, \(\alpha = 1.561(2), \varepsilon = 1.563(2)\). Single-crystal X-ray structure study (R = 0.0245) indicated hexagonal symmetry, space group \(P6/mcc\); \(a = 10.505(1)\), \(c = 14.185(3)\) \(\AA\) as refined from the powder pattern, for which the strongest lines are 7.11(35002), 3.830(100022), 3.345(60121), 3.304(40014), 2.940(50114), 2.795(85024), and 2.627(35220).

The mineral is associated with reedmergnerite, aegirine, polythionite, sodgianite, albite, pyrochlore, pectolite, eudialyte-group minerals, and turkestanite that occur in coarse-grained microcline-quartz rocks in the moraine deposits of the Praborna Mn deposit, about 5 km south of the village of Saint-Marcel, northwestern Italy. The new name alludes to the composition and the color, the latter from the Greek melas, -anos, black. Type material is in the Geological Museum of Lausanne, Switzerland, and in the Laboratoire et Galerie de Minéralogie, Muséum National d’Histoire Naturelle, Paris, France. J.L.J.

Zn-Cu-Fe-In sulfide

Among the polymetallic sulfides that occur in fracture-fill veins near the town of Kamikawa, central Hokkaido, is a mineral for which electron microprobe analysis gave Cu 13.06, Ag 0.33, Fe 6.98, Zn 28.59, Sn 3.70, In 16.30, S 30.12, summary 99.08 wt%, corresponding to \((Zn\textsubscript{1.86}Cu\textsubscript{0.14}Fe\textsubscript{0.56}Ag\textsubscript{0.01})\textsubscript{2.27}In\textsubscript{0.60}Sn\textsubscript{0.13}S\textsubscript{7.73}S\textsubscript{1.86} \). For 8 atoms. The grains, about 10 \(\mu\)m across, occur with chalcopyrite in sphalerite, and also in sharp contact with kesterite-sakuraiite solid solution.

Discussion. As is noted by the authors, the composition is similar to that of an unidentified mineral reported previously (Am. Mineral., 80, p. 407, 1995). J.L.J.

Cu\textsubscript{6}(Fe,Cu,Zn)Sn\textsubscript{3}S\textsubscript{10}

Among the various assemblages occurring in the Shin-Ohhtoyo Cu-Au deposit, which is 20 km west of Sapporo, is a Sn-bearing suite consisting mainly of tetrahedrite, disseminated pyrite, colusite-series minerals, empletite, and stannoidite in silicified volcanic rocks containing abundant kaolinite. Electron microprobe analyses (n = 27) of an associated unidentified sulfide gave Cu 35.88, Fe 2.03, Zn 1.51, Sb 0.36, Bi 0.35, Sn 31.72, S 28.23, Se 0.18, summary 99.80 wt%, corresponding to \(Cu\textsubscript{6}Fe\textsubscript{4/3}Zn\textsubscript{6/3}S\textsubscript{10}\) simplified as \(Cu\textsubscript{6}(Fe,Cu,Zn)Sn\textsubscript{3}S\textsubscript{10} \). In reflected light the mineral is gray, isotropic, and has a reflectance lower than that of tetrahedrite. The X-ray powder pattern, after deletion of lines assigned to impurities, has \(d\) values of 3.347, 3.136, 1.919, 1.551, 1.242, and 1.230 \(\AA\). The mineral is distinct from kumite and mohite. J.L.J.

Pb\textsubscript{3}Ag\textsubscript{2}Bi\textsubscript{2}S\textsubscript{7}

Mineralogical data, including reflectances and electron microprobe analyses, are given for heyrovskyite, Ag-rich xilingolite, bursaite, cannizzarite, ustarasite, schirmerite, kobellite, and an unidentified sulfosalt which occur at the Pangushan deposit, Huang sha mining region. For the unidentified sulfosalt, which is present in grains up to 0.05 × 0.10 mm, the average of four listed electron microprobe analyses is Pb 42.32, Ag 15.83, Cu 0.25, Fe 0.14, Bi 26.18, Sb 0.20, S 15.14, sum 100.06 wt%, corresponding to Pb 3.02 (Ag 2.19 Cu 0.05 Fe 0.04 )Σ2.28 (Bi 1.85 Sb 0.02 )Σ1.87 S 7 . Lead gray color, metallic luster, slightly malleable, VHN10 = 57.2 – 59.9. In reflected light, grayish white with a bluish tint, anisotropic with polarization colors from grayish yellow to grayish black. Maximum and minimum reflectance percentages are given in 10 nm steps from 410 to 700 nm; representative values are 42.25, 35.75 (470), 38.08, 36.52 (540), 38.29, 36.51 (590), and 38.22, 35.95 (650). No X-ray data are given. The mineral is associated with chalcopyrite, sphalerite, and a Pb-Ag-Bi sulfosalt in the sulfide-rich part of the quartz-W vein.


New Data

Tourmaline group, aenigmatite group


An unofficial, i.e., not CNMMN-approved, classification of the tourmaline group is proposed on the basis of the general formula \( XY_3 [(Z_6)_T O_{18} (BO_3)_3 V_3 W] \). The 13 approved species fall into three groups, as in the accompanying table wherein the end-member formulas of olentine, liddicoaitite, and foitite have been modified from those suggested originally, and “hydroxy-feruvite” is a modification of feruvite. Also tabulated in the paper are the formulas of hypothetical end-member species, and it is noted that some published compositions correspond to these species. The recommendation is that, as for the amphibole group, new root names not be used to designate a new member whose distinguishing feature is homovalent substitution within a root species; such a member can be named by use of an appropriate prefix.

The aenigmatite group is reviewed in terms of the general formula \( [X_2][Y_6(Z_6)O_{20}] \), where \( X = \text{Na or Ca} \). Although the group contains only eight approved minerals, the theoretical number of end-members is immense because \( [Y] \) contains six-fold-coordinated \( \text{Mg}^{2+}, \text{Fe}^{2+}, \text{Fe}^{3+}, \text{Ti}^{4+}, \text{Al}^{3+}, \text{Mn}^{2+}, \text{Cr}^{3+}, \text{Ti}^{3+}, \text{Ca}^{2+}, \text{Sb}^{5+}, \text{Nb}^{5+}, \) and \( \text{As}^{5+} \), and \( [Z] \) has fourfold-coordinated \( \text{Si}^{4+}, \text{Al}^{3+}, \text{Fe}^{3+}, \text{Be}^{2+}, \) and \( \text{B}^{3+} \). The proposed nomenclature system would require several rededications.

Choloalite


Single-crystal X-ray structure study \( (R = 0.053) \) of choloalite from the type locality established the space group as \( P4_1 3 2 \), and confirmed the anhydrous ideal formula \( \text{CuPbFe}^{2+} \text{O}_6 \) that had been obtained from synthetic material (Am. Mineral., 80, p. 634, 1995).

Fullerite


Aggregations, up to 120 × 120 µm, of microspheres and microcrystals of fullerite, \( \text{C}_{60} \), occur on graphite in a xenolith of peridotite in the Tuvish basaltoid pipe at South Gissar, Tajikistan. Among the 19 X-ray diffraction lines \( (57 \text{ mm camera, Fe} K\alpha \text{ radiation}) \) stated to be characteristic of fullerite, the

Formulas of end-member species in the tourmaline group

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<th>(X)</th>
<th>(Y_3)</th>
<th>(Z_6)</th>
<th>T_6O_{18}</th>
<th>(BO_3)_3</th>
<th>V_3</th>
<th>W</th>
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<td>Al_3</td>
<td>SiO_{18}</td>
<td>(BO_3)_3</td>
<td>(OH)_3</td>
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<tr>
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<td>Mg_3</td>
<td>Cr_6</td>
<td>SiO_{18}</td>
<td>(BO_3)_3</td>
<td>(OH)_3</td>
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<tr>
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<td>Fe_3Al_3</td>
<td>Al_3</td>
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<td>(BO_3)_3</td>
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<tr>
<td>oleneite</td>
<td>Na</td>
<td>Al_3</td>
<td>Al_3</td>
<td>SiO_{18}</td>
<td>(BO_3)_3</td>
<td>O_3</td>
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<tr>
<td>bugerite</td>
<td>Na</td>
<td>Fe_3</td>
<td>Al_3</td>
<td>SiO_{18}</td>
<td>(BO_3)_3</td>
<td>O_3</td>
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<tr>
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<td>Fe_3</td>
<td>Fe_3^3 Mg_2</td>
<td>SiO_{18}</td>
<td>(BO_3)_3</td>
<td>O_3</td>
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<td>“hydroxy-feruvite”</td>
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<tr>
<td>uvite</td>
<td>Ca</td>
<td>Mg_3</td>
<td>Al,Mg</td>
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<td>(BO_3)_3</td>
<td>(OH)_3</td>
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<tr>
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<td>Ca</td>
<td>Fe_3Al_3</td>
<td>Al_3</td>
<td>SiO_{18}</td>
<td>(BO_3)_3</td>
<td>(OH)_3</td>
</tr>
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</table>

| calcic tourmaline |
| rossmanite | LiAl_2 | Al_3 | SiO_{18} | (BO_3)_3 | (OH)_3 | (OH) |
| foitite | Fe_3Al_3 | SiO_{18} | (BO_3)_3 | (OH)_3 | (OH) |
| magnesiofoitite* | MgAl | Al_3 | SiO_{18} | (BO_3)_3 | (OH)_3 | (OH) |

X-site-vacant tourmaline

IMA No. 98–037, approved.

J.L.J.
strongest ones not overlapping with the patterns for graphite are 4.74(70.030), 4.24(90.131), 3.76(90.132), 2.56(70.234), 2.46(70.252), 2.29(70.352,161), 2.25(70.006), and 1.819 Å (70.560). The indexing gave a pseudocubic, tetragonal cell with \( a = 14.22, c = 13.56, c/a = 0.95, D_{\text{calc}} = 1.745 \text{ g/cm}^3 \) for \( Z = 4 \).

**Discussion.** See *Am. Mineral.*, 84, p. 1686 (1999) for discussion of the use of the unapproved name. The symmetry therein is given as cubic. **J.L.J.**

**Garronite**


High-resolution synchrotron powder diffractometry and Rietveld refinement of garronite of composition \( K_{0.05}Na_{0.10}Ca_{2.71}Al_{5.87}Si_{10.20}O_{32} \cdot 14.12H_2O \), from Goble, Oregon, showed the mineral to be monoclinic, space group \( I2/a \), pseudotetragonal, \( a = 9.8799(6), b = 10.2801(2), c = 9.8764(6) \AA, \beta = 90.113(6)^\circ \). **J.L.J.**

**Discredited Mineral**

**Arsenobismite**


Reexamination of type specimens of arsenobismite from the Mammoth mine, Juab County, Utah, showed them to be quartz-rich and to consist mainly of preisingerite accompanied by minor amounts of atelestitite and beudantite–segnitite, and by lesser amounts of mixite, conichalcite, and an X-ray amorphous, brownish red Fe phase. The original analysis, which gave a formula approximating \( \text{Bi}_2(\text{AsO}_4)(\text{OH})_3 \), is concluded to have been derived by analysis of a preisingerite-rich concentrate of the above minerals, including some quartz. The discreditation has been approved by the CNMMN. **J.L.J.**