NEW MINERAL NAMES*

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Deloneite-(Ce)*


Electron microprobe analysis gave Na$_2$O 4.45, K$_2$O 0.07, CaO 14.77, SrO 18.19, BaO 0.10, La$_2$O$_3$ 8.12, CeO$_2$ 13.14, Pr$_2$O$_3$ 1.13, Nd$_2$O$_3$ 3.81, Sm$_2$O$_3$ 0.34, Y$_2$O$_3$ 0.02, ThO$_2$ 0.02, SiO$_2$ 0.74, P$_2$O$_5$ 30.71, F 2.03, H$_2$O (calc) 0.38, O = F 0.85, sum 97.18 wt%, corresponding to (Na$_{0.93}$K$_{0.07}$)$_{2.95}$Ce$_{1.08}$La$_{0.67}$Nd$_{0.30}$Pr$_{0.09}$Sm$_{0.00}$Sr$_{2.17}$P$_{5.81}$Si$_{1.07}$O$_{23.96}$F$_{1.14}$OH$_{0.50}$, ideally NaCa$_2$SrCe(PO$_6$)$_3$F. The mineral occurs as grains, up to 1.5 mm in size, that are intimately intergrown with belovite and an apatite-like mineral rich in Sr and REE. Bright yellow color, transparent, vitreous luster, white streak, brittle, step-like fracture, $H =$ 5, {1010} and {0001} cleavages, $D_{meas} =$ 3.92(5), $D_{calc} =$ 3.95 g/cm$^3$ for $Z =$ 2. Optically uniaxial negative, $\epsilon =$ 1.660(2), $\omega =$ 1.682(2). Readily soluble in 10% HCl or HNO$_3$ at room temperature. Strongest absorption bands in the infrared spectrum are at 1164, 1098, 1047, 1010, and 949 cm$^{-1}$, and weaker bands are at 600, 575, and 547 cm$^{-1}$. Single-crystal X-ray structure study ($R =$ 0.049) indicated trigonal symmetry, space group $P3$, $a =$ 9.51(1), $c =$ 7.01(1) Å. Strongest lines of the X-ray powder pattern (57.3 mm camera, FeK$_\alpha$ radiation) are 3.51(30,002), 3.12(40,210), 2.84(100 broad,211,112), 2.753(40,300), 1.967(30,222), and 1.870(30,213).

The mineral occurs in hyperagpaitic pegmatites at the Khibina alkaline massif, Kola Peninsula, Russia. The new name is for Russian mathematician B.N. Delone (Delaunay), 1890-1980. Type material is in the Fersman Mineralogical Museum, Moscow. The mineral is chemically the Ca analog of belovite, but the two minerals differ structurally. J.L.J.

Orthorhombic lamprophyllite


Electron diffraction patterns of lamprophyllite from the Gardiner complex showed that, in addition to monoclinic (C2/m) lamprophyllite and barytolamprophyllite, an orthorhombic polymorph of lamprophyllite is present. Partial Rietveld analysis of the orthorhombic mineral gave $a =$ 19.356(2), $b =$ 7.1040(2), $c =$ 5.4083(2) Å, space group $Pmmn$. The minerals are designated lamprophyllite-2M, lamprophyllite-2O, and barytolamprophyllite-2M.

Malanite*


The mean and range of five electron microprobe analyses of grains from a mafic Ni-Cu sulfide ore, and six analyses of grains from placer concentrates gave, respectively, S 23.8 (23.2-24.2), 22.6 (21.9-23.3), Fe 0.6 (0.2-0.9), 0.7 (0.3-1.1), Co 2.21 (1.73-2.74), 1.0 (0.7-1.5), Ni 0.3 (0.1-0.5), Cu 10.9 (10.1-11.8), 10.7 (10.2-11.1), Rh 0.7 (0.5-0.9), 1.5 (1.0-2.0), Pd 0.5 (0.3-0.9), 0.0, Ir 23.2 (22.2-24.0), 15.5 (14.3-17.3), Pt 37.0 (36.4-37.8), 47.4 (45.8-48.9), sum 99.2 (99.1-99.7), 99.5 (99.0-99.8) wt%, corresponding to (Cu$_{0.91}$Fe$_{0.09}$)$_{2.09}$Fe$_{0.04}$Ir$_{0.06}$Rh$_{0.04}$Pd$_{0.00}$Co$_{0.02}$Ni$_{0.03}$Sr$_{2.00}$S$_{17.30}$, and (Cu$_{0.93}$Fe$_{0.07}$)$_{2.01}$Pt$_{0.03}$Ir$_{0.04}$Co$_{0.01}$Rh$_{0.08}$S$_{22.01}$S$_{17.97}$, ideally CuPt$_2$S$_4$. Occurs as euhedral octahedral and dodecahedral crystals to 0.2 mm; also as veinlets up to 10 × 200 μm in iridisite. Steel-gray color, metallic luster, opaque, black streak, brittle, H = 5, VHN$_{300} =$ 417, {111} cleavage, nonmagnetic, $D_{calc} =$ 7.57 g/cm$^3$ for $Z =$ 8. White with a greenish tint in reflected light, no bireflectance or pleochroism, isotropic. Reflectance percentages (given in 10-nm steps from 400 to 700 nm; WTIc standard) are 37.3 (470), 37.7 (546), 38.1 (589), and 38.6 (650). Single-crystal X-ray study indicated isometric symmetry, space group $Fd3m$, $a =$ 9.910 Å. Strongest lines of the powder pattern are 2.98(60,311), 2.48(80,400), 1.90(80,333), 1.75(100,440), and 1.001(70,844).

The magmatic Ni-Cu sulfide ore, which also contains

* Before publication, minerals marked with an asterisk were approved by the Commission on New Minerals and Mineral Names, International Mineralogical Association.
moncheite, cooperite, and sperrylite, is associated with olivine pyroxenite dikes that occur about 150 km east of Beijing. The chromite placers are near the village of Shuangfeng, about 200 km NNE of Beijing.

**Discussion.** Data for the mineral from the magmatic occurrence were abstracted in *Am. Mineral.*, 61, p. 185 (1976), which introduced several new but unapproved names, including malanite and dagingite (p. 184). Data for malanite were subsequently revised (Am. *Mineral.*, 65, p. 408, 1980), following which dagingite was shown for malanite were subsequently revised (Am. *Mineral.*, 61, p. 185 (1976), following which dagingite was shown for malanite were subsequently revised (Am. *Mineral.*, 65, p. 408, 1980), following which dayingite was shown to be Co-rich malanite (Am. *Mineral.*, 67, 1081-1082, 1982). Malanite has now been approved by the CNMMN (IMA No. 95–003). J.I.L.

**Sn intermetallic compounds**


Complex intergrowths, to 0.5 mm, of native tin and intermetallic compounds occur in the Kubaka Au-quartz-orthoclase (adularia) deposit in the Okhotsk-Chusotka volcanic belt, northeastern Russia. The largest intermetallic inclusions, to 20 µm, are represented by Sn-Sb compounds; inclusions of other compounds are 2-10 µm. All inclusions are white with a yellowish shade, and have a high reflectance and low hardness. Electron microprobe analyses are given for compounds corresponding to Sn,Sn,Sb,Sn,Sb,Cu,Sn,Sn,Pb,Sn,Pb,Fe,Sn, and native tin and stibaite. J.I.L.

\[(Bi,Pb)\text{Te}_3\]


A sample of Au-bearing quartz vein contains mainly pyrite and chalcopyrite, with native gold and tetradymite, pilonsite, aleksite, and mineral A. An electron microprobe analysis (one of three listed) of mineral A gave Bi 56.98, Pb 6.68, Ag 0.04, Cu 0.16, Te 31.18, S 5.16, sum 100.20 wt%, corresponding to \[(Bi,Sn,Sn,Pb,Fe)\text{Te}_3\]. The mineral is light gray in reflected light, weakly anisotropic, and has a high reflectance.

**Discussion.** Data for a mineral with the composition \[(Ca_3,Sr,Na,Ce)\text{Pb}_4\text{Te}_3\] were abstracted in *Am. Mineral.*, 81, p. 519, 1996. J.I.L.

**U**\(^{6+}\) Phosphate


Electron microprobe analyses of two particles gave CaO 0.76, 0.74, P.O, 20.62, 18.70, V.O, 2.20, 2.27, U.O, 71.82, 68.46, H.O (by difference) 4.60, 9.83; after deducting for tyuyamunite impurity (an energy dispersion scan showed only U, P, and a trace of Fe), the analyses correspond to, respectively, \[\text{U}_{0.96}\text{Ca}_{0.04}\text{(P.O)}_{1.96}\text{(OH)}_{0.42}\text{~}~\cdot\text{H.O}\], ideally \[\text{U}_{0.96}\text{(P.O)}_{1.96}\text{(OH)}_{0.42}\text{~}~\cdot\text{H.O}\], and to \[\text{U}_{0.96}\text{(P.O)}_{1.96}\text{(OH)}_{0.42}\text{~}~\cdot\text{H.O}\] ideal. \[\text{U}_{0.96}\text{(P.O)}_{1.96}\text{(OH)}_{0.42}\text{~}~\cdot\text{H.O}\]. The O/U ratio is 2.15 in an ore sample consisting predominantly of phosphate, indicating that U is probably quadvalent in the mineral. Aggregates of the mineral from Uzbekistan are very small, compact, and dark green (size of particles not given). Average \(n = 1.735\). Least-squares refinement of electron diffraction data (63 reflections) showed the mineral to be monoclinic, space group \(C2/m\), \(a = 14.09(5), b = 13.19(3), c = 15.02(15)\), \(\alpha = 94.6(6)\). No powder X-ray data could be obtained. The mineral was first found in the Kanzhusen exogenic deposit in the Chu-Sarysuyskaya depression, Kazakhstan, and later in the oxidized zone of the Koscheka and Dzhantuar deposits, Uzbekistan. At the latter localities the mineral has settled out mostly on unspecified “uran-micas” (auitumite, torbernite, etc.) and less commonly on coconinite. The mineral formed repeatedly during a complex hydrogene process.

**Discussion.** The data reported are for material from Uzbekistan, but which locality is not specified. E.S.G.

\[\text{Ca}_{0.3}(\text{Sr},\text{Na,Ce})\text{Pb}_4\text{F}\]


Electron microprobe analysis (results not listed) gave the formula \[(Ca_{0.3},Sr_{0.7}Te_{0.3})\text{Pb}_4\text{F}\]

Discussion. The data reported are for material from Uzbekistan, but which locality is not specified. E.S.G.

\[\text{Pb-Al sulfosilicate}\]


Six electron microprobe analyses gave a mean and range of MnO 0.40 (0.34–0.46), PbO 83.75 (83.16–84.33), Al.O, 1.04 (0.95–1.11), Si.O, 9.35 (8.65–9.86), SO, 1.83 (1.67–1.93), H.O (by difference) 3.63, sum 100 wt%, corresponding to \[\text{Pb}_{27}(\text{Al}_{16}\text{Mn}_{99})\text{Si}_{60}\text{O}_{180}\text{O}_{30}\]
pirssonite, rasvumite, and thermonatrite, and crystallized between cancrinite crystals; it is associated with villiaumite, Mountain, Khibina massif, Kola Peninsula, Russia, which cuts nepheline syenite at the Kirov mine, Kukisvumchorr pattern is very close to that of type material, but no lines are listed). Powder X-ray data gave a: 9.84(1), c = 13.09(1) Å (the mineral has symmetry 42m. Goniometric measurements dipyramid {101} and tetragonal tetrahedron {112}, so the prism {110} and pinacoid {001}; less common are the position and intensity to the corresponding ones in natro-

bands at 722, 707, 671, 627, and 514 cm⁻¹, attributed to calcite, cf. Am. Mineral., 48, p. 433, 1963) are 3.11(70,021), 2.81(70,012), 2.02(100,211), 1.905(50,131), and 1.757(40,203). Because the powder pattern closely resembles that of synthetic CaB₂O₄·0.5H₂O, the same formula is proposed for korzhinskite, originally given as CaB₂O₄·H₂O. Under the electron microscope, the crystals of the mineral are characteristically platy.

**Discussion.** There is no information on the structural position of the hydrogen. E.S.G.

**Kalborsite**


Electron microprobe analyses at seven points gave an average of SiO₂ 37.81, B₂O₃ 4.13, Al₂O₃ 22.10, SrO 0.02, K₂O 28.45, Na₂O 0.13, Cl 3.84, F 0.05, calculated H₂O 3.81, O = (Cl,F) 0.89, sum 99.45 wt%. The corresponding formula for (Si,Al)₉O₂₃ is (K₅(six)Na₃Sr₀.02)₂₃₋₄⁷ \[Al₄₋₅Si₅₋₆O₂₀₋₂₃\] [B₁₋₂(OH)₂₋₃F₇₋₉]Cl₂₋₃, in good agreement with the ideal formula K₅[Al₅Si₆O₂₃]B(OH)₉Cl and with analysis of the type material. The infrared spectrum has absorption bands at 3350 cm⁻¹ (retained after heating to 104 °C, thus suggesting structural water), and at 1551, 1040, 985, 880, 863, 835, 822, 695, 620, 570, and 480 cm⁻¹. In addition, bands at 722, 707, 677, 627, and 574 cm⁻¹, attributed to the aluminosilicate framework, are virtually identical in position and intensity to the corresponding ones in natro-

**Sibirskite**


Electron diffraction patterns gave the space group as P2₁m. The cell parameters a = 3.67, b = 4.89, c = 19.30 Å, β = 62° were calculated to give the optimal correspondence between measured and calculated d values for X-ray powder data on material from the type locality, the Yuliya Svinsovoi deposit, Khakassia, Siberia, Russia. The original powder X-ray data could be indexed; strongest lines in the pattern (17 lines given, plus two lines attributed to calcite, cf. Am. Mineral., 48, p. 433, 1963) are 3.74(40,013), 3.29(60,100), 2.93(100,112), 2.58(100,102), 2.20(40,023), 2.05(40,122), 1.93(40,120), and 1.878(60,203). Similarly, previously published d values based on electron diffraction patterns of material from the Solongo deposit, Buratiya, and the Novofrolovskoye deposit, northern Urals, Russia, are optimally matched with the following cell parameters, respectively, a = 3.68, b = 4.89, c = 19.32 Å, β = 63°, and a = 3.67, b = 4.89, c = 19.30 Å, β = 62°. On the basis of similarities between the X-ray patterns of sibirskite and synthetic hydrated calcium borates, and given that the amount of water in sibirskite cannot be determined, the preferred formula is Ca₅B₄O₉·nH₂O, where 1 < n < 2, rather than the CaHBO₃ formulation proposed originally. Review of
Russian occurrences, all of which are B-bearing skarn deposits, indicates that, at Yuliya Svintsova and Solongo, sibirskite formed with chlorite, calcite, and szaibelyite from breakdown of sakhaite and harkerite, whereas at Novoroloskovskoye, sibirskite formed nearly coevally with calciborite.

**Discussion.** There is no information on the structural position of the hydrogen. A request for a redefinition has not been submitted to the CNMMN. E.S.G.

### Villamaninite


Single-crystal X-ray structure study of two grains of villamaninite, (Cu,Ni,Co,Fe)(S,Se)$_2$, from the type locality showed that the mineral is monoclinic, space group $P_{2_1}^1$, with $a = 5.709(2)$, $b = 5.707(2)$, $c = 5.708(2)$ Å, $\beta = 90.01(1)^\circ$, $R = 0.051$, and $a = 5.704(3)$, $b = 5.703(3)$, $c = 5.704(3)$ Å, $\beta = 89.99(2)^\circ$, $R = 0.034$. Both grains are optically anisotropic.

**Discussion.** A request for a redefinition has not been submitted to the CNMMN. J.L.J.

### Volkonskoite


Four electron microprobe analyses of massive material that replaced fossilized wood at the Samosadka deposit gave SiO$_2$ 51.530–53.796, Al$_2$O$_3$ 4.894–5.364, Cr$_2$O$_3$ 19.795–20.690, Fe$_2$O$_3$ 1.616–1.696, CaO 2.144–2.444, NiO 0–0.04, sum 80.845–83.074 wt%. Where it has replaced the central parts of fossil trunks, the mineral in hand specimen is dark green, massive, with a conchoidal fracture. Generally fibrous or acicular under the SEM; distinctive spongy texture if recrystallized from a gel. Polarization weak, extinction straight, $n = 1.550–1.560$, $\Delta = 0.15–0.20$. Some is pleochroic from light green to green with a blue hue. A diffractogram of natural material in a preparation with strong preferred orientation has the following lines (in Å): 15.1 (sss), 5.32 (www), 5.06 (www), 4.49 (w), 3.34 (ww), 3.017 (ww), 2.60 (ww), 2.56 (ww) (strong, weak for relative intensities estimated from published diffractogram), a pattern typical of smectites. The mineral occurs in Upper Permian deposits exposed in the Pikhhotovski River, and in the Samosadka and Bosh’yanovskaya deposits, Kama River region west of the Ural Mountains, Russia. The mineral in economic concentrations is closely related to silicified and carbonatized fossil wood, dominantly *Araucarites* sp., in sandstone, wherein the mineral has formed veinlets, nests, inclusions, and has completely pseudomorphosed the woody remains. Less commonly, the mineral cements grains in sandstone. Some massive material developed by recrystallization of a gel.

**Discussion.** Compared to analyses of the neotype and cotype specimens, also from the Perm Basin (Am. Mineral., 73, p. 934, 1988), the mineral analyzed here has higher SiO$_2$ and lower Fe$_2$O$_3$; Cr$_2$O$_3$ contents are comparable. See also Clays Clay Minerals, 36(6), 540–541, 1988 for discussions of volkonskoite nomenclature. E.S.G.

### Discredited Mineral

**Ferrazite**


Electron microprobe analyses and X-ray powder patterns of ferrazite, including the type specimen, have shown the mineral to be gorceixite. The discreditation of ferrazite has been approved by the CNMMN. J.L.J.

**Erratum**

In the abstract of *mereiterite* (Am. Mineral., 81, p. 251, 1996), the angle for the monoclinic unit cell (β = 94.87°) was inadvertently omitted. J.L.J.