

## New Mineral Names\*

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### IN THIS ISSUE

This New Mineral Names has two entries: galuskinite and gunterite, and one unnamed mineral.

#### GALUSKINITE\*

B. Lazic, T. Armbruster, V.B. Savelyeva, A.E. Zadov, N.N. Pertsev, and P. Dzierżanowski (2011) Galuskinite, Ca<sub>7</sub>(SiO<sub>4</sub>)<sub>3</sub>(CO<sub>3</sub>), a new skarn mineral from the Birkhin gabbro massif, Eastern Siberia, Russia. *Mineral. Mag.*, 75(5), 2631–2648.

Galuskinite (IMA 2010-057), ideally Ca<sub>7</sub>(SiO<sub>4</sub>)<sub>3</sub>(CO<sub>3</sub>) is a new mineral belonging to the CaO-SiO<sub>2</sub>-CO<sub>3</sub> system. A synthetic analogue of galuskinite has neither been found in the process of cement production nor produced experimentally. It is found in contact-metamorphosed silicate carbonate xenoliths intruded gabbroid rocks of the Birkhin complex (Baikal area, Eastern Siberia, Russia) and is associated with pavlovskyite (IMA2010-63) in thin veins cutting calico-olivine skarn with relict larnite, with sporadic grains of bredigite, gehlenite, cuspidine, and hydroxyllellastadite. It is interpreted as a retrograde product of skarn alteration; it replaces dellaite and is subsequently replaced by spurrite. The mineral name honors Russian mineralogists Irina Olegovna Galuskina (born 1961) and Evgeny Vadimovich Galuskin (born 1960), who work at the Faculty of Earth Sciences, University of Silesia, Poland. It forms aggregates of highly fractured grains showing polysynthetic twin on (001). Crystals are transparent and colorless-white to pale gray in color, with white streak. No fluorescence was observed under either short-wave or long-wave ultraviolet radiation. The tenacity is brittle and the fracture is uneven. Cleavage is imperfect on (001), (100), and (010). Parting is perfect on (001). Mohs hardness is ~5 (VHN load 20 g, 440 kg/mm<sup>2</sup>). The calculated density is 3.096 g/cm<sup>3</sup>. Galuskinite is not pleocroic. It has  $\alpha = 1.660(3)$ ,  $\beta = 1.669(3)$ ,  $\gamma = 1.676(3)$  ( $\lambda = 589$  nm).  $2V_{\text{obs}} = 60(5)^\circ$  and  $2V_{\text{calc}} = 82.4^\circ$ . Optical orientation was difficult to determine due to undulatory extinction  $\alpha \parallel \mathbf{b}$ ,  $\gamma \wedge \mathbf{a} \approx 25^\circ$ ,  $\beta \wedge \mathbf{c} \approx 25^\circ$  or  $\alpha \parallel \mathbf{b}$ ,  $\gamma \wedge \mathbf{c} \approx 25^\circ$ ,  $\beta \wedge \mathbf{a} \approx 25^\circ$ . Electron microprobe analyses (wavelength-dispersive mode, CAMECA SX100) yielded the average composition (in wt%) Na<sub>2</sub>O 0.43, CaO 62.61, SiO<sub>2</sub> 28.85, P<sub>2</sub>O<sub>5</sub> 0.20, SO<sub>3</sub> 0.05, CO<sub>2</sub> 7.08 (by stoichiometry from crystal-structure

analysis), total is 99.22 wt%. The empirical formula (based on 15 O atoms) is (Ca<sub>6.936</sub>Na<sub>0.086</sub>)<sub>Σ7.022</sub>(Si<sub>2.983</sub>P<sub>0.018</sub>S<sub>0.004</sub>)<sub>Σ3.005</sub>O<sub>12</sub>(CO<sub>3</sub>). Raman spectroscopy confirmed the presence of CO<sub>3</sub><sup>2-</sup> in galuskinite, while no bands characteristic of OH were found. The 10 strongest calculated X-ray powder diffraction lines are [*d* in Å (*I*<sub>obs</sub>%; *hkl*)]: 18.7854 (56; 100), 3.0323 (59; 502), 2.7338 (98; 420), 2.7141 (78; 222), 2.7032 (100; 602), 2.7030 (85; 222), 2.6706 (100; 602), 2.6166 (82; 004), 2.1777 (52; 13 $\bar{1}$ ) and 1.9251 (53; 820). The crystal structure of galuskinite was solved by direct methods on the basis of single-crystal X-ray diffraction data (Bruker APEX II SMART diffractometer with MoK $\alpha$  radiation) in the space group *P*2<sub>1</sub>/*c* [*a* = 18.7872(5), *b* = 6.7244(2), *c* = 10.4673(2) Å,  $\beta = 90.788(1)^\circ$ , *V* = 1322.24(6) Å<sup>3</sup>, *Z* = 4], and refined to *R*<sub>1</sub> = 3.10% for 3287 reflections with *I* > 2 $\sigma$ (*I*). The crystal structure of galuskinite has a modular character. It can be described by as a polysomatic series built from regular alternating 1:1 spurrite and larnite modules parallel to (100). Holotype samples of galuskinite are deposited in the collections of the A.E. Fersman Mineralogical Museum of the Russian Academy of Sciences, catalogue number 93506, and in the collections of the Natural History Museum, Bern, catalog number NMBE-40811. **F.C. and G.D.G.**

#### GUNTERITE\*

A.R. Kampf, J.M. Hughes, J. Marty, and B. Nash (2011) Gunterite, Na<sub>4</sub>(H<sub>2</sub>O)<sub>16</sub>(H<sub>2</sub>V<sub>10</sub>O<sub>28</sub>)·6H<sub>2</sub>O, a new mineral species with a doubly-protonated decavanadate polyanion: crystal structure and descriptive mineralogy. *Can. Mineral.*, 49, 1243–1251.

Gunterite (IMA 2011-001), ideally Na<sub>4</sub>(H<sub>2</sub>O)<sub>16</sub>(H<sub>2</sub>V<sub>10</sub>O<sub>28</sub>)·6H<sub>2</sub>O is a new mineral found in West Sunday mine, Slick Rock district, San Miguel County, Colorado, U.S.A., where it occurs in efflorescences on the sandstone walls of the mine workings and in fractures in the sandstone. It is interpreted it forms from the oxidation of montroseite–corvusite assemblages. The mineral name honors Mickey Eugene Gunter (born 1953), Professor of Mineralogy at the University of Idaho, well known for his studies in optical mineralogy and the mineralogy of asbestos minerals. The crystals are tabular on {001} and generally stacked into elongate curved multiple crystals (up to 500  $\mu$ m in maximum dimension). They are transparent to translucent

\* All minerals marked with an asterisk have been approved by the IMA CNMMC.

† In memoriam. Passed away June 1, 2013.

‡ For a complete listing of all IMA-validated unnamed minerals and their codes, see <http://pubsites.uws.edu.au/ima-cnmmc/>.

and orange-yellow color; the streak is yellow and the luster subadamantine. No fluorescence was observed under either short-wave or long-wave ultraviolet radiation. The tenacity is brittle and the fracture is irregular. Mohs hardness is about 1. The calculated density from the empirical formula using the single-crystal cell data is 2.398 g/cm<sup>3</sup>. Gunterite is biaxial (+) with  $\alpha = 1.735(5)$ ,  $\beta = 1.770(5)$  (white light).  $2V_{\text{obs}} = 77(6)^\circ$  (Bloss spindle stage and the program EXCALBRW). It was not possible to measure directly  $\gamma$  (slow decomposition in liquids with  $n > 1.8$ ). Value calculated with  $2V = 78^\circ$  yields  $\gamma = 1.825(5)$ . Dispersion is  $v < r$ .  $X = \mathbf{b}$ ,  $Y \approx \mathbf{c}$ ; pleochroism is  $X$  yellow,  $Y$  orange,  $Z$  yellow;  $Y > X > Z$ . Gunterite dehydrates rapidly under vacuum and under the electron beam of the microprobe. Electron microprobe analyses (wavelength-dispersive mode, CAMECA SX50) yielded the average composition (in wt%) for dehydrated gunterite: Na<sub>2</sub>O 8.76, K<sub>2</sub>O 0.07, CaO 4.32, Al<sub>2</sub>O<sub>3</sub> 0.02, V<sub>2</sub>O<sub>5</sub> 80.4, H<sub>2</sub>O 6.44 (by difference). Normalization using the H<sub>2</sub>O derived from the crystal-structure analysis yields: Na<sub>2</sub>O 6.77, K<sub>2</sub>O 0.05, CaO 3.34, Al<sub>2</sub>O<sub>3</sub> 0.02, V<sub>2</sub>O<sub>5</sub> 62.1, H<sub>2</sub>O 27.32, corresponding to the empirical formula (Na<sub>3.20</sub>K<sub>0.02</sub>Ca<sub>0.87</sub>)<sub>Σ4.09</sub>[H<sub>1.06</sub>(V<sub>9.99</sub>Al<sub>0.01</sub>)<sub>Σ10</sub>O<sub>28</sub>]·22H<sub>2</sub>O calculated on the basis of 10 [V + Al] apfu. The four strongest observed X-ray powder diffraction lines are [ $d$  in Å ( $I_{\text{obs}}$ %;  $hkl$ ): 10.01 (100;  $\bar{2}01,001$ ), 8.44 (72; 110), 8.09 (46;  $\bar{1}10$ ), and 2.997(29;  $\bar{3}31,401$ ) (Rigaku R-Axis Rapid II curved imaging plate microdiffractometer using MoK $\alpha$  radiation). The crystal structure of gunterite was solved by direct methods on the basis of single-crystal X-ray diffraction data (Rigaku R-Axis Rapid II diffractometer with MoK $\alpha$  radiation) in the space group  $C2/m$  [ $a = 19.848(2)$ ,  $b = 10.1889(11)$ ,  $c = 13.1184(15)$  Å,  $\beta = 130.187(9)^\circ$ ,  $V = 2026.7(4)$  Å<sup>3</sup>,  $Z = 2$ , and refined to  $R_1 = 6.32\%$  for 929 reflections with  $F_o > 4\sigma(F_o)$ ]. The crystal structure of gunterite contains a doubly protonated decavanadate polyanion {H<sub>2</sub>[V<sub>10</sub>O<sub>28</sub>]}, linked by interstitial solvated Na polyhedra [NaO<sub>5</sub>(H<sub>2</sub>O)<sub>2</sub> and (Na,Ca)O<sub>2</sub>(H<sub>2</sub>O)<sub>6</sub> groups]. There are two additional (H<sub>2</sub>O) groups not connected to cations. Some interstitial (H<sub>2</sub>O) groups are disordered. The

two cotype specimens used in the description of the mineral are housed in the mineral collection of the Natural History Museum of Los Angeles County under catalog numbers 63506 and 63507. **F.C. and G.D.G.**

**Unnamed thallium-copper-iron sulfide: UM2011-13-S:CuTl $\ddagger$**

S. Karup-Møller and E. Makovicky (2011) Mineral X, a new thalcosite homologue from the Ilímaussaq complex, South Greenland. *Bull. Geol. Soc. Denmark* 59, 13–22.

“Mineral X” is considered to be a new member of the thalcosite homologous series with the structural formula TlCu<sub>2n</sub>S<sub>2n+1</sub> ( $n = 1.5$ ). It was found in loose ussingite-analcime boulders on the Taseq slope towards the Narsaq Elv in the northern part of the Ilímaussaq complex of South Greenland, in association with chalcocite, cuprostibite, galena, sphalerite, bornite, antimonian silver and seinäjokite. A total of 26 microprobe analyses on three grains from two different polished sections gave (wt% = mean, range): Ag 0.09, 0.09–0.10; Cu 29.6, 28.82–30.63; Fe 10.79, 10.48–11.39; Sb 0.23, 0.12–0.43; Tl 39.33, 38.05–40.74; K 0.32, 0–0.97; S 18.84, 18.46–19.30; Total 99.17, 97.2–100.34, leading to a mean empirical formula: (Tl<sub>1.632</sub>K<sub>0.150</sub>)<sub>Σ1.782</sub>(Cu<sub>3.949</sub>Fe<sub>1.638</sub>Ag<sub>0.007</sub>)<sub>Σ5.595</sub>(S<sub>4.984</sub>Sb<sub>0.015</sub>)<sub>Σ5.000</sub>. This differs somewhat from the authors’ tabulated formula (their Table 1) of Tl<sub>2</sub>(Cu,Fe)<sub>6</sub>S<sub>5</sub>. In reflected light, “mineral X” cannot be distinguished from chalcocite (creamy white to pale gray, with a brownish creamy tint), but in backscattered electron images it is slightly darker than the associated chalcocite. The mineral forms lamellar grains with one pronounced cleavage and occurs either in aggregates with random orientation or in parallel intergrowths with chalcocite. It appears to be chemically quite homogeneous and does not contain inclusions of other minerals. It may be assumed that in hand specimen the mineral is opaque with a metallic luster. **D.G.W.S.**