

Crystal Data: Monoclinic. *Point Group:* 2. As prismatic or sometimes lath-like crystals to 0.2 mm, typically slightly split and cavernous; combined in radiating aggregates or crusts.

Physical Properties: *Cleavage:* One imperfect direction (under the microscope). *Tenacity:* Brittle. *Fracture:* Uneven. Hardness = ~3 D(meas.) = n.d. D(calc.) = 4.161

Optical Properties: Transparent. *Color:* Bright sky-blue, turquoise, or light bluish green.

Streak: Light blue. *Luster:* Vitreous.

Optical Class: Biaxial (-). $\alpha = 1.747(5)$ $\beta = 1.774(5)$ $\gamma = 1.792(5)$ $2V(\text{meas.}) = 75(10)^\circ$ $2V(\text{calc.}) = 77^\circ$ *Dispersion:* Weak, $r > v$. *Pleochroism:* Distinct: $Z = \text{blue}$, $Y = \text{pale blue}$, $X = \text{very pale blue}$, almost colorless. *Absorption:* $Z > Y > X$.

Cell Data: *Space Group:* C2. $a = 16.836(3)$ $b = 5.0405(8)$ $c = 9.117(2)$ $\beta = 117.39(1)^\circ$ $Z = 2$

X-Ray Diffraction Pattern: Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. 7.44 (100), 2.591 (96), 3.334 (92), 3.727 (79), 2.914 (73), 2.521(53), 2.765 (50)

Chemistry:	(1)	(2)
CaO	19.22	19.41
CuO	27.37	27.54
As ₂ O ₅	52.54	53.05
SO ₃	0.67	.
Total	99.80	100.00

(1) Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia; average electron microprobe and Raman spectroscopic analyses; corresponds to Ca_{2.96}Cu_{2.97}(As_{3.945}S_{0.07})_{Σ=4.015}O₁₆. (2) Ca₃Cu₃(AsO₄)₄.

Occurrence: A sublimate or, more likely, crystallized by the interaction between fumarolic gas and adjacent basalt scoria.

Association: Anhydrite, svabite, hematite, johillerite, tilasite, fluorophlogopite, sanidine, apthitalite.

Distribution From the Arsenatnaya fumarole, Second scoria cone of the Northern Breakthrough of the Great Tolbachik Fissure Eruption, Tolbachik volcano, Kamchatka peninsula, Far-Eastern Region, Russia.

Name: Honors Russian crystallographer and crystal chemist Natalia Vital'evna Zubkova (b. 1976), Associate Professor of Geology, Moscow State University, a specialist in structural mineralogy and a co-author of the descriptions of 101 new mineral species.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (5185/1; 96202).

References: (1) Pekov, I.V., I.S. Lykova, A.A. Agakhanov, D.I. Belakovskiy, M.F. Vigasina, S.N. Britvin, A.G. Turchkova, E.G. Sidorov, and K.S. Scheidl (2019) New arsenate minerals from the Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. XII. Zubkovaite, Ca₃Cu₃(AsO₄)₄. Mineral. Mag., 83, 879-886.