

Crystal Data: Triclinic. *Point Group:* $\bar{1}$. As prismatic, tabular or lamellar crystals, to 0.2 mm.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle.
Hardness = ~ 3.5 D(meas.) = n.d. D(calc.) = 5.30

Optical Properties: Transparent. *Color:* Olive-green to dark olive-green, light yellow-green.
Streak: Light olive-green to light yellow-green. *Luster:* Vitreous to greasy.
Optical Class: Biaxial (+). $\alpha = 1.84(1)$ $\beta \approx 1.86$ $\gamma = 1.96(1)$ $2V(\text{meas.}) = 50(20)^\circ$
 $2V(\text{calc.}) = \text{n.d.}$ *Dispersion:* Strong, $r < v$. *Pleochroism:* Distinct; $Z =$ olive-green with a grayish hue, $Y = \text{n.d.}$, $X =$ green. *Absorption:* $X > Z$.

Cell Data: *Space Group:* $P\bar{1}$. $a = 5.1450(3)$ $b = 6.2557(3)$ $c = 6.2766(4)$ $\alpha = 100.064(5)^\circ$
 $\beta = 96.351(5)^\circ$ $\gamma = 95.100(5)^\circ$ $Z = 1$

X-ray Powder Pattern: Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia.
2.927 (100), 2.968 (90), 2.768 (67), 2.462 (67), 2.513 (55), 3.465 (43), 3.715 (36)

| Chemistry: | (1) | (2) |
|--------------------------------|--------|--------|
| CuO | 63.28 | 63.38 |
| ZnO | 0.56 | |
| V ₂ O ₅ | 0.12 | |
| As ₂ O ₅ | 35.80 | 36.62 |
| SO ₃ | 0.27 | |
| Total | 100.03 | 100.00 |

(1) Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia; average of 5 electron microprobe analyses supplemented by Raman spectroscopy; corresponding to $(\text{Cu}_{4.99}\text{Zn}_{0.04})_{\Sigma=5.03}(\text{As}_{1.95}\text{S}_{0.02}\text{V}_{0.01})_{\Sigma=1.98}\text{O}_{10}$.

(2) Cu₅O₂(AsO₄)₂.

Occurrence: Formed as sublimates on basaltic scoria around an active volcanic fumarole.

Association: Ericlaxmanite, kozyrevskite, urusovite, lammerite, lammerite-β, johillerite, bradaczekite, tenorite, hematite, aphthitalite, anhydrite, langbeinite, calciolangbeinite, As-bearing orthoclase, anhydrite, langbeinite, calciolangbeinite, arcanite, wulfite, krashennikovite, steklite, palmierite, tilasite, svabite, alarsite, Cu-gahnite, OH-free fluoborite.

Distribution: From the Arsenatnaya fumarole, Second scoria cone of the Northern Breakthrough of the Great Tolbachik Fissure Eruption, Tolbachik volcano, Kamchatka, Russia.

Name: Honors the Russian mineralogists Vladimir Anatol'evich Popov (b. 1941) and Valentina Ivanovna Popova (b. 1941), Institute of Mineralogy, Urals Branch, Russian Academy of Sciences, Miass, Chelyabinsk Oblast, Russia.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (94135).

References: (1) Pekov, I.V., N.V. Zubkova, V.O. Yapaskurt, D.I. Belakovskiy, M.F. Viganina, E.G. Sidorov, and D.Yu. Pushcharovsky (2015) New arsenate minerals from the Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. III. Popovite, Cu₅O₂(AsO₄)₂. *Mineral. Mag.*, 79(1), 133-143. (2) (2016) *Amer. Mineral.*, 101, 1495 (abs. ref. 1).