

**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . As well-formed prismatic crystals to 0.06 mm, with complex oblique terminations, typically in open-work incrustations.

**Physical Properties:** *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = n.d.  $D(\text{meas.}) = \text{n.d.}$   $D(\text{calc.}) = 4.409$

**Optical Properties:** Transparent. *Color:* Bright green, in some cases with a distinct golden hue.

*Streak:* Light green. *Luster:* Vitreous.

*Optical Class:* Biaxial (-).  $\alpha = 1.816(5)$   $\beta = 1.870(5)$   $\gamma = 1.897(5)$   $2V(\text{meas.}) = 30(15)^\circ$   $2V(\text{calc.}) = 69^\circ$  (Difference between measured and calculated  $2V$  ascribed to low quality crystals.)

*Pleochroism:* Weak,  $X = \text{yellowish-green}$ ,  $Y = Z = \text{emerald green}$ . *Dispersion:* Weak,  $r > v$ .

**Cell Data:** *Space Group:*  $P2_1/n$ .  $a = 8.1131(4)$   $b = 9.9182(4)$   $c = 11.0225(5)$   $\beta = 110.855(2)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Arsenatnaya fumarole, Kamchatka Peninsula, Far-Eastern Region, Russia. 5.260 (100), 5.99 (70), 2.556 (50), 4.642 (46), 7.13 (41), 2.784 (38), 2.821 (35)

Chemistry:	(1)	(2)
CuO	64.03	64.74
ZnO	0.79	
Fe <sub>2</sub> O <sub>3</sub>	0.25	
P <sub>2</sub> O <sub>5</sub>	0.05	
As <sub>2</sub> O <sub>5</sub>	20.83	20.78
SO <sub>3</sub>	14.92	14.48
Total	100.87	100.00

(1) Arsenatnaya fumarole, Kamchatka Peninsula, Far-Eastern Region, Russia; average of 5 electron microprobe analyses supplemented by Raman spectroscopy; corresponding to

$(\text{Cu}_{8.78}\text{Zn}_{0.11}\text{Fe}^{3+}_{0.03})_{\Sigma=8.92}\text{As}_{1.98}\text{P}_{0.01}\text{S}_{2.03}\text{O}_{20}$ . (2)  $\text{Cu}_9\text{O}_4(\text{AsO}_4)_2(\text{SO}_4)_2$ .

**Occurrence:** A volcanic sublimate on basaltic scoria in the walls of a fumarole at temperatures higher than 380 °C.

**Association:** Tenorite, lammerite, lammerite- $\beta$ , stranskiite, langbeinite, dolerophanite, hematite, As-bearing sanidine, Cu-bearing gahnite (specimen 1); johillerite, urusovite, ericlxmanite, kozyrevskite, popovite, tilasite, svabite, bradaczekite, aphthitalite, metathénardite, belomarinaite, krashennikovite, anhydrite, euchlorine, wulfite, alumoklyuchevskite, cryptochalcite, fluorborite, sylvite, halite (specimen 2).

**Distribution:** From Arsenatnaya fumarole, on the apex of the Second scoria cone of the Northern Breakthrough, Great Tolbachik Fissure Eruption of 1975-1976, 18 km south of the Ploskiy Tolbachik volcano, central Kamchatka Peninsula, Far-Eastern Region, Russia.

**Name:** Honors Russian mineralogist, geologist, and chemist Vasilij Mikhailovich *Severgin* (1765-1826), Academician of the Russian Academy of Sciences. His books on geology and mineralogy were the first in Russia and presented the first chemical nomenclature in Russian. Severgin was one of the founders of the Russian Mineralogical Society in 1817.

**Type Material:** A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (95280).

**References:** (1) Pekov, I.V., S.N. Britvin, S.V. Krivovichev, V.O. Yapaskurt, M.F. Vigasina, A.G. Turchkova, and E.G. Sidorov (2021) Vasilseverginite,  $\text{Cu}_9\text{O}_4(\text{AsO}_4)_2(\text{SO}_4)_2$ , a new fumarolic mineral with a hybrid structure containing novel anion-centered tetrahedral structural units. *Amer. Mineral.*, 106, 633-640.