Pharmazincite $KZnAsO_4$

Crystal Data: Hexagonal. *Point Group*: 6. As imperfect prismatic to acicular crystals, to 1 mm, elongated and with coarse striation along [001], typically skeletal, with a gear-like cross section. Crystals display {110}, {101}, {100} and {001} with crude terminations, sometimes roundish, and/or "fringed" with epitactic overgrowths of tiny crystals of the same mineral. As open-work radial aggregates to 2 mm.

Physical Properties: *Cleavage*: Perfect on {001}. *Tenacity*: Brittle. *Fracture*: Stepped. Hardness = n.d. D(meas.) = n.d. D(calc.) = 4.748

Optical Properties: Transparent. *Color*: Colorless, white (aggregates). *Streak*: n.d. *Luster*: Vitreous.
Optical Class: Uniaxial (–). ω = 1.649(2) ε = 1.642(2)

Cell Data: *Space Group*: $P6_3$. a = 18.501(4) c = 8.7114(9) Z = 24

X-ray Powder Pattern: Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia.
3.179 (100), 2.676 (77), 4.35 (48), 4.64 (45), 3.260 (36), 6.36 (28), 2.770 (26)

Chemistry:	(1)	(2)
K_2O	18.98	19.35
CaO	0.14	
MgO	1.20	
CuO	4.41	
ZnO	27.58	33.43
Fe_2O_3	0.15	
P_2O_5	0.50	
As_2O_5	46.67	47.22
Total	99.63	100.00

(1) Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia; average of 7 electron microprobe analyses supplemented by Raman spectroscopy; corresponds to $(K_{0.97}Ca_{0.01})_{\Sigma=0.98}(Zn_{0.82}Cu_{0.13}Mg_{0.07}Fe^{3+}_{0.01})_{\Sigma=1.03}(As_{0.98}P_{0.02})_{\Sigma=1.00}O_4$. (2) $KZnAsO_4$.

Occurrence: A minor constituent of sublimate incrustations (360-380° C) near a volcanic fumarole.

Association: Shchurovskyite, dmisokolovite, bradaczekite, arsmirandite, tilasite, johillerite, tenorite, hematite, aphthitalite, As-bearing orthoclase.

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

Name: An acronym for its essential chemical composition, arsenic (from the Greek *φαρμακον*, for *poison*) and *zinc*.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (94378).

References: (1) Pekov, I.V., V.O. Yapaskurt, D.I. Belakovskiy, M.F. Vigasina, N.V. Zubkova, and E.G. Sidorov (2017) New arsenate minerals from the Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. VII. Pharmazincite, $KZnAsO_4$. Mineral. Mag., 81(4), 1001-1008. (2) (2018) Amer. Mineral., 103, 335 (abs. ref. 1).