

Crystal Data: Orthorhombic. *Point Group:* 2/m 2/m 2/m. As well-formed, stout prismatic to acicular crystals to 0.2 mm; also in radiating aggregates.

Physical Properties: *Cleavage:* Distinct. *Fracture:* Uneven to splintery. *Tenacity:* Brittle. Hardness = ~ 3 D(meas.) = n.d. D(calc.) = 4.512 VHN = 189 (50 g load).

Optical Properties: Translucent. *Color:* Honey-yellow or dark brown (prismatic crystals) to bright yellow (acicular), gray with a bluish tint in reflected light with orange-red or orange-brown internal reflections. *Streak:* Yellow to light brown. *Luster:* Adamantine. *Anisotropism:* Distinct. *Optical Class:* n.d.

R₁-R₂: (470) 14.95-16.3, (546) 13.4-14.85, (589) 12.73-14.16, (650) 12.15-13.5

Cell Data: *Space Group:* Pnma. *a* = 7.6638(1) *b* = 6.8670(1) *c* = 14.5554(2) *Z* = 4

X-ray Powder Pattern: Second Scoria Cone, Tolbachik volcano, Kamchatka Peninsula, Russia. 3.436 (100), 3.301 (99), 3.065 (79), 7.312 (67), 2.506 (66), 2.556 (62), 3.518 (55)

Chemistry:	(1)	(2)	(3)
MoO ₃	54.48	50.3	54.67
SO ₃	0.71	2.16	
V ₂ O ₅	0.28	0.91	
SiO ₂	0.04	0.10	
CuO	43.03	37.8	45.33
FeO	0.08	0.09	
ZnO	0.53	8.48	
Total	99.15	99.87	100.00

(1) Second Scoria Cone, Tolbachik volcano, Russia; average of 7 electron microprobe analyses; corresponding to (Cu_{2.83}Zn_{0.03}Fe_{0.01})_{Σ=2.87}(Mo_{1.98}S_{0.05}V_{0.02})_{Σ=2.05}O₉ (prismatic crystals). (2) Second Scoria Cone, Tolbachik volcano, Russia; average of 7 electron microprobe analyses; corresponding to (Cu_{2.46}Zn_{0.54}Fe_{0.01})_{Σ=3.01}(Mo_{1.81}S_{0.14}V_{0.05})_{Σ=2.00}O₉ (acicular variety). (3) Cu₃O(MoO₄)₂.

Occurrence: A fumarolic mineral formed during post-volcanic degassing.

Association: Piypite, fedotovite, vergasovite, hematite, magnetite, apthitalite, langbeinite, palmierite, As-bearing orthoclase, lammerite, klyuchevskite, alumoklyuchevskite, euchlorine, lyonsite, pseudo-lyonsite, averievite, rutile, gold.

Distribution: From the Yadovitaya (poisonous) fumarole, Second Scoria Cone, Tolbachik volcano, Kamchatka Peninsula, Russia.

Name: For its chemical composition. The name also reflects the stoichiometric relationship with cuprotungstite, Cu₃(OH)₂(WO₄)₂.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (# 4072/1).

References: (1) Zelenski, M.E., N.V. Zubkova, I.V. Pekov, Y.S. Polekhovskiy, and D.Yu. Pushcharovskiy (2012) Cupromolybdate, Cu₃O(MoO₄)₂, a new fumarolic mineral from the Tolbachik volcano, Kamchatka Peninsula, Russia. *European Journal of Mineralogy*, 24(4), 749-757. (2) (2014) *Amer. Mineral.*, 99, 2152-2153 (abs. ref. 1).