Pseudolyonsite $Cu_3(VO_4)_2$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As needles to 0.5 mm or in sprays or openwork clusters to 1 mm.

Physical Properties: *Cleavage*: None. *Fracture*: Conchoidal. *Tenacity*: Brittle, needles flexible and elastic. Hardness = 2-3 D(meas.) = n.d. D(calc.) = 4.749

Optical Properties: Translucent to opaque. *Color*: Dark red with brownish tint; gray with a weak bluish tint in reflected light, with strong red internal reflections. *Streak*: Reddish brown.
Luster: Adamantine to semi-metallic. *Anistropism*: Distinct.
Optical Class: n.d.
R_1-R_2: (470) 17.05-19.6, (546) 16.1-18.15, (589) 15.85-17.7, (650) 15.55-17.4

Cell Data: *Space Group*: $P2_1/c$. a = 6.2695(4) b = 8.0195(3) c = 6.3620(3) β = 111.96(1)°
Z = 2

X-ray Powder Pattern: Tolbachik volcano, Kamchatka Peninsula, Russia.
2.761 (100), 3.22 (87), 3.30 (79), 2.894 (74), 2.419 (67), 4.70 (60), 2.479 (59)

Chemistry:

	(1)	(2)
V_2O_5	40.37	43.25
CuO	48.83	56.75
ZnO	7.6	
MoO_3	1.89	
SiO_2	0.14	.
Total	98.83	100.00

(1) Tolbachik volcano, Kamchatka Peninsula, Russia; average of 4 electron microprobe analyses; corresponding to $(Cu_{2.58}Zn_{0.44})_{\Sigma=3.02}(V_{1.88}Mo_{0.06}Si_{0.02})_{\Sigma=1.96}O_8$. (2) $Cu_3(VO_4)_2$.

Polymorphism & Series: Dimorphous with mcbirneyite and the natural analogue of synthetic monoclinic $Cu_3(VO_4)_2$.

Occurrence: Formed by late post-eruptive degassing in cavities from several centimeters to 1.5 m in size under the surface crust of volcanic cinder - typically as overgrowths on acicular piypite.

Association: Piypite, palmierite, lyonsite, hematite.

Distribution: From the Yadovitaya (''Poisonous'') fumarole, Second cone, Tolbachik volcano, Kamchatka Peninsula, Far East Asia, Russia.

Name: For its close visual (color, luster, habit) similarity to *lyonsite*.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (# 3879/1).

References: (1) Zelenski, M.E., N.V. Zubkova, I.V. Pekov, M. M. Boldyreva, D.Yu. Pushcharovsky, and A.N. Nekrasov (2011) Pseudolyonsite, $Cu_3(VO_4)_2$, a new mineral species from the Tolbachik volcano, Kamchatka Peninsula, Russia. Eur. J. Mineral., 23, 475-481. (2) (2012) Amer. Mineral., 97, 760-761 (abs. ref. 1).