

Crystal Data: Orthorhombic. *Point Group:* 2/m 2/m 2/m. Rough crystals and flakes, rhomboidal, flattened on {010}, to 0.3 mm; in radial spherical aggregates.

Physical Properties: *Cleavage:* On {010}, perfect. *Tenacity:* Brittle. Hardness = 4.25
VHN = 180-345, 247 average (10 g load). D(meas.) = 4.81 (thought low due to admixtures).
D(calc.) = 4.97

Optical Properties: Opaque, transparent in very thin grains. *Color:* Bright red, golden red in transmitted light. *Streak:* Red-orange. *Luster:* Vitreous.
Optical Class: Biaxial (-). *Orientation:* X = b, Y = a, Z = c. $\alpha = \text{n.d.}$ $\beta = 2.29(1)$ $\gamma = 2.35(1)$
2V(meas.) = Large.

Cell Data: *Space Group:* Ibam. $a = 9.005(7)$ $b = 11.046(9)$ $c = 9.349(7)$ $Z = 4$

X-ray Powder Pattern: Tolbachik volcano, Russia.
3.418 (100), 2.763 (95), 2.358 (73), 2.548 (66), 3.242 (62), 5.545 (49), 1.847 (49)

Chemistry:	(1)	(2)
As ₂ O ₅	0.49	
V ₂ O ₅	26.22	26.03
CuO	32.84	34.16
ZnO	0.32	
PbO	32.13	31.95
Cl	9.60	10.15
- O = Cl ₂	2.17	2.29
Total	99.43	100.00

(1) Tolbachik volcano, Russia; by electron microprobe, average of ten analyses on five grains; corresponds to Pb_{1.01}(Cu_{2.89}Zn_{0.05})_{Σ=2.94}[(V_{1.01}As_{0.01})_{Σ=1.02}O₄]₂(Cl_{1.90}O_{0.10})_{Σ=2.00}. (2) PbCu₃(VO₄)₂Cl₂.

Occurrence: In volcanic fumaroles, deposited at about 140° C.

Association: Tolbachite, lammerite, anglesite, hematite.

Distribution: At the Tolbachik fissure volcano, Kamchatka Peninsula, Russia.

Name: For the city of *Leningrad* (once and again St. Petersburg), in the Universities of which this and related minerals have been studied.

Type Material: Mining Institute, St. Petersburg, Russia, 2003/1.

References: (1) Vergasova, L.P., S.K. Filatov, T.F. Semenova, and V.V. Anan'ev (1990) Leningradite PbCu₃(VO₄)₂Cl₂, a new mineral from volcanic exhalations. Doklady Acad. Nauk SSSR, 310, 1434-1437 (in Russian). (2) (1991) Amer. Mineral., 76, 1434-1435 (abs. ref. 1). (3) Sidra, O.I., S.V. Krivovichev, T. Armbruster, S.K. Filatov, and I.V. Pekov (2007) The crystal structure of leningradite, PbCu₃(VO₄)₂Cl₂. Can. Mineral, 45, 445-449.