

**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . As irregular prismatic grains, to 0.15 mm, with striations parallel to elongation.

**Physical Properties:** *Cleavage:* None observed. *Fracture:* n.d. *Tenacity:* Brittle.  
Hardness = n.d. D(meas.) = n.d. D(calc.) = 5.06

**Optical Properties:** Transparent. *Color:* Light to dark green. *Streak:* n.d.  
*Luster:* Vitreous.

*Optical Class:* Biaxial (+).  $\alpha = 1.887(5)$   $\beta = 1.936(5)$   $\gamma = 2.01(1)$   $2V(\text{calc}) = 81^\circ$   
*Dispersion:*  $r < v$ , strong. *Pleochroism:* None observed.

**Cell Data:** *Space Group:*  $P2_1/c$ .  $a = 6.306(1)$   $b = 8.643(1)$   $c = 11.310(1)$   $\beta = 92.26(1)^\circ$   
 $Z = 4$

**X-ray Powder Pattern:** Great fissure Tolbachik eruption, Kamchatka peninsula, Russia.  
2.83 (100), 6.50 (10), 5.65 (10), 4.32 (10), 4.03 (5), 2.90 (5), 2.86 (5)

<b>Chemistry:</b>	(1)
CuO	51.30
ZnO	0.32
<u>As<sub>2</sub>O<sub>3</sub></u>	<u>49.12</u>
Total	100.74

(1) Great fissure Tolbachik eruption, Kamchatka peninsula, Russia; average of 5 electron microprobe analyses; corresponding to  $\text{Cu}_{3.00}\text{Zn}_{0.02}\text{As}_{1.99}\text{O}_8$ .

**Polymorphism & Series:** The polymorph of lammerite.

**Occurrence:** The product of post-eruption fumarolic reactions (400–650 °C) in an active volcano.

**Association:** Euchlorine, piypite, alumokluchevskite, alarsite, lammerite.

**Distribution:** Second Scoria cone of the Northern Branch of the Great fissure Tolbachik eruption (1975–1976), Kamchatka peninsula, Russia.

**Name:** Signifies the monoclinic polymorph of *lammerite*, named to honor Franz Lammer, mineral collector of Leoben, Austria, who provided the first specimen.

**Type Material:** Mineralogical Museum, Saint Petersburg University, Saint Petersburg, Russia.

**References:** (1) Starova, G.L., L.P. Vergasova, S.K. Filatov, S.N. Britvin, and V.V. Ananyev (2011) Lammerite- $\beta$ ,  $\text{Cu}_3(\text{AsO}_4)_2$  - a new mineral from fumaroles of the Great fissure Tolbachik eruption (Kamchatka, Russia). *Zap. Ross. Mineral. Obshch.*, 140(5), 46–51 (in Russian, English abstract). (2) (2013) *Amer. Mineral.*, 98, 1080 (abs. ref. 1).