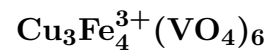


Lyonsite



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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As euhedral crystals, lathlike, flattened on {010}, to 230 μm .

Physical Properties: *Cleavage:* Good on {001}. *Tenacity:* Brittle. *Hardness* = n.d. D(meas.) = n.d. D(calc.) = 4.215

Optical Properties: Opaque. *Color:* Black; in reflected light, creamy white. *Streak:* Dark gray. *Luster:* Metallic.

Optical Class: [Biaxial.] *Anisotropism:* Weak.

R_1 – R_2 : (481) 17.5–23.1, (547) 16.6–22.3, (591) 14.7–20.7, (644) 14.4–18.8

Cell Data: *Space Group:* $Pm\bar{c}n$. $a = 10.296(1)$ $b = 17.207(2)$ $c = 4.910(1)$ $Z = 2$

X-ray Powder Pattern: Izalco volcano, El Salvador.

3.279 (100b), 2.526 (60), 4.423 (40), 2.779 (40), 2.722 (40), 1.591 (40), 1.550 (40)

Chemistry:

	(1)	(2)
V_2O_5	47.74	49.44
TiO_2	2.27	
Fe_2O_3	24.83	28.94
Mn_2O_3	3.41	
CuO	21.99	21.62
Total	100.24	100.00

(1) Izalco volcano, El Salvador; by electron microprobe, average of three analyses, total Fe as Fe_2O_3 , total Mn as Mn_2O_3 ; corresponds to $\text{Cu}_{3.04}(\text{Fe}_{3.43}\text{Mn}_{0.48}\text{Ti}_{0.32})_{\Sigma=4.23}(\text{V}_{0.96}\text{O}_4)_6$.

(2) $\text{Cu}_3\text{Fe}_4(\text{VO}_4)_6$.

Occurrence: In summit crater fumaroles, as a sublimate formed at ≤ 800 °C.

Association: Thenardite, howardevansite.

Distribution: On the Izalco volcano, El Salvador.

Name: To honor Dr. John Bartholomew Lyons (1916–), Professor of Mineralogy, Dartmouth College, Hanover, New Hampshire, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 164470.

References: (1) Hughes, J.M., S.J. Starkey, M.L. Malinconico, and L.L. Malinconico (1987) Lyonsite, $\text{Cu}_3^{2+}\text{Fe}_4^{3+}(\text{VO}_4)_6^{3-}$, a new fumarolic sublimate from Izalco volcano, El Salvador: descriptive mineralogy and crystal structure. *Amer. Mineral.*, 72, 1000–1005.