

Metaköttigite



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Crystal Data: Triclinic. *Point Group:* 1 or $\bar{1}$. Tabular crystals, very small, intergrown with köttigite. *Twinning:* Universal on $\{1\bar{1}0\}$.

Physical Properties: *Cleavage:* $\{1\bar{1}0\}$, perfect. Hardness = n.d. D(meas.) = n.d. D(calc.) = 3.03

Optical Properties: Semitransparent. *Color:* Bluish gray.

Optical Class: Biaxial (-). *Pleochroism:* Strong; X = deep blue; Y = yellow; Z = light yellow. $\alpha = 1.648(3)$ $\beta = 1.680(1)$ $\gamma = 1.716(2)$ $2V(\text{meas.}) = 94(1)^\circ$

Cell Data: *Space Group:* P1 or $P\bar{1}$. $a = 7.96(2)$ $b = 9.44(2)$ $c = 4.72(1)$ $\alpha = 95.6(2)^\circ$ $\beta = 97.0(2)^\circ$ $\gamma = 107.8(2)^\circ$ Z = 1

X-ray Powder Pattern: Ojuela mine, Mexico; very similar to symplecite.

6.91 (100), 8.90 (40), 3.93 (30), 3.00 (30), 3.11 (25), 2.83 (25), 4.99 (20)

Chemistry:

	(1)
As ₂ O ₅	37.36
FeO	14.70
CoO	0.09
ZnO	22.50
H ₂ O	[25.35]
Total	[100.00]

(1) Ojuela mine, Mexico; by electron microprobe, average of two analyses, total Fe as FeO, H₂O by difference; corresponds to $(\text{Zn}_{1.72}\text{Fe}_{1.27}\text{Co}_{0.01})_{\Sigma=3.00}(\text{AsO}_4)_{2.02} \cdot 8[\text{H}_2\text{O, (OH)}]$.

Polymorphism & Series: Dimorphous with köttigite.

Occurrence: A rare secondary mineral from the oxide zone of an arsenic-rich polymetallic mineral deposit, formed by oxidation and concomitant dehydrogenization of ferroan köttigite.

Association: Köttigite, smithsonite, adamite, goethite.

Distribution: In the Ojuela mine, Mapimí, Durango, Mexico.

Name: For its dimorphous relation to köttigite, and by analogy to *metavivianite*.

Type Material: National Museum of Natural History, Washington, D.C., USA, 160541.

References: (1) Schmetzer, K., G. Amthauer, V. Stähle, and O. Medenbach (1982) Metaköttigite, $(\text{Zn, Fe}^{3+})(\text{Zn, Fe}^{3+}, \text{Fe}^{2+})_2(\text{AsO}_4)_2 \cdot 8(\text{H}_2\text{O, OH})$, ein neues Mineral aus Mapimi, Mexiko. Neues Jahrb. Mineral., Monatsh., 506-518 (in German with English abs.). (2) (1983) Amer. Mineral., 68, 1039 (abs. ref. 1).