

**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . Bladed crystals, to 1 cm, are elongate along [001], showing {010}, {304}, and {100}; usually, in compact crystalline crusts.

**Physical Properties:** *Cleavage:* On {010}, good. Hardness = 3  $D(\text{meas.}) = 4.23(8)$   $D(\text{calc.}) = 3.16$

**Optical Properties:** Transparent. *Color:* Cadmium-orange, may be brownish orange or yellowish orange. *Streak:* Cadmium-orange. *Luster:* Greasy.

*Optical Class:* Biaxial (–).  $\alpha = 1.94$   $\beta = 2.04$   $\gamma = 2.05$   $2V(\text{meas.}) = \text{Small}$ .  $2V(\text{calc.}) = 32^\circ$

*Pleochroism:* Moderate;  $Y = \text{orange}$ ,  $X = Z = \text{lemon-yellow}$ . *Orientation:*  $X = a$ ,  $Y = c$ ,  $Z = b$ .

*Dispersion:*  $r > v$ , slight. *Absorption:*  $Y > X = Z$ .

**Cell Data:** *Space Group:*  $C2/m$ .  $a = 8.9575(1)$   $b = 6.4238(1)$   $c = 9.7912(1)$   $\beta = 96.032(1)^\circ$   $Z = 1$

**X-ray Powder Pattern:** U.S. mine, Utah, USA.

9.725 (10), 3.208 (9), 3.047 (5), 4.476 (4), 2.680 (4), 2.153 (4), 1.604 (4)

<b>Chemistry:</b>	(1)
SO <sub>4</sub>	9.7
As <sub>2</sub> O <sub>3</sub>	36.2
Fe <sub>2</sub> O <sub>3</sub>	44.3
H <sub>2</sub> O	9.8
Total	100.0

(1) U.S. mine, Utah, USA; average electron microprobe analysis supplemented by ZANES, total Fe as Fe<sub>2</sub>O<sub>3</sub>, H<sub>2</sub>O by the Penfield method; corresponds to  $\text{Fe}_6[(\text{AsO}_3)_4(\text{SO}_4)]_{\Sigma=5}(\text{OH})_4 \cdot 4\text{H}_2\text{O}$ .

**Occurrence:** An uncommon secondary mineral in the oxidized zone of a replacement orebody in metamorphosed limestone. Formed by bacterial action in acid mine drainage.

**Association:** Jarosite, scorodite, sulfur, kaatialaite, pyrite, arsenopyrite, galena, sphalerite, goethite, gypsum.

**Distribution:** From the U.S. mine, Gold Hill, Tooele Co., Utah, USA. Likely more widespread in contact with acid mine drainage.

**Name:** For its initially noted occurrence in *Tooele* Co., Utah, USA.

**Type Material:** National School of Mines, Paris, France.

**References:** (1) Cesbron, F.P. and S.A. Williams (1992) Tooeleite, a new mineral from the U.S. Mine, Tooele County, Utah. *Mineral. Mag.*, 56, 71-73. (2) (1992) *Amer. Mineral.*, 77, 1306-1307 (abs. ref. 1). (3) Morin, G., G. Rousse, and E. Elkaim (2007) Crystal structure of tooeleite,  $\text{Fe}_6(\text{AsO}_3)_4\text{SO}_4(\text{OH})_4 \cdot 4\text{H}_2\text{O}$ , a new iron arsenite oxyhydroxysulfate mineral relevant to acid mine drainage. *Amer. Mineral.*, 92, 193-197.