

# Amarantite



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**Crystal Data:** Triclinic. *Point Group:*  $\bar{1}$ . Crystals, to 2 cm, elongated along [001], with dominant {100} and {010}, and square cross section; also flattened [100] and striated on {001}; more than 60 forms recorded; typically in radiating or matted aggregates of needles; columnar or bladed.

**Physical Properties:** *Cleavage:* Perfect on {010} and {100}. *Tenacity:* Brittle. Hardness = 2.5 D(meas.) = 2.189–2.286 D(calc.) = 2.14 Decomposes in  $\text{H}_2\text{O}$ , leaving an insoluble residue.

**Optical Properties:** Transparent. *Color:* Amaranth-red to brownish red and red-orange. *Streak:* Lemon-yellow. *Luster:* Vitreous. *Optical Class:* Biaxial (–). *Pleochroism:*  $X$  = colorless;  $Y$  = pale yellow;  $Z$  = reddish brown. *Orientation:*  $X$  ( $82^\circ, 72^\circ$ );  $Y$  ( $178^\circ, 68^\circ$ );  $Z$  ( $-44^\circ, 29^\circ$ ) [with  $c$  ( $0^\circ, 0^\circ$ ) and  $b^*$  ( $0^\circ, 90^\circ$ ) using  $(\phi, \rho)$ ]. *Dispersion:*  $r < v$ , horizontal.  $\alpha = 1.516$   $\beta = 1.598$   $\gamma = 1.621$   $2V(\text{meas.}) = 30^\circ\text{--}36^\circ$

**Cell Data:** *Space Group:*  $P\bar{1}$ .  $a = 8.976(1)$   $b = 11.678(2)$   $c = 6.698(2)$   $\alpha = 95.65(2)^\circ$   $\beta = 90.36(1)^\circ$   $\gamma = 97.20(2)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Sierra Gorda [district], Chile.

11.25 (FFF), 8.69 (FFF), 3.57 (FF), 3.05 (FF), 3.11 (F), 5.16 (mF), 4.98 (mF)

## Chemistry:

	(1)	(2)
$\text{SO}_3$	36.18	35.91
$\text{Fe}_2\text{O}_3$	35.92	35.81
$\text{H}_2\text{O}$	28.13	28.28
Total	100.23	100.00

(1) Paposa, Chile. (2)  $\text{Fe}_2\text{O}(\text{SO}_4)_2 \cdot 7\text{H}_2\text{O}$ .

**Occurrence:** A secondary mineral formed especially in arid climates.

**Association:** Hohmannite, fibroferrite, chalcantinite, copiapite, coquimbite, sideronatrite.

**Distribution:** In Chile, in Antofagasta, from the Union mine, Reventon district, near Paposo, at the Compania mine, east of Sierra Gorda; from Quetena, west of Calama, Alcaparrosa, near Cerritos Bayos, southwest of Calama, and at Chuquicamata; at Tierra Amarilla, southeast of Copiapó, Atacama. In the USA, in the Santa Maria Mountains, Riverside Co., California. At Saghand, Yazd, Iran.

**Name:** From the Greek for *amaranth*, an imaginary purplish red undying flower, for its color.

**Type Material:** BAF, 44700.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 611–613. (2) Cesbron, F. (1964) Contribution à la minéralogie des sulfates de fer hydratés. Bull. Soc. fr. Minéral., 87, 125–143 (in French). (3) Süssé, P. (1968) The crystal structure of amaranthite,  $\text{Fe}_2(\text{SO}_4)_2\text{O} \cdot 7\text{H}_2\text{O}$ . Zeits. Krist., 127, 261–275.