Amarantite $Fe_2^{3+}O(SO_4)_2 \cdot 7H_2O$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. 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 H_2O, 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°,72°); Y (178°,68°); Z (–44°,29°) [with c (0°,0°) and b^* (0°,90°) using (ϕ,ρ)]. *Dispersion:* $r < v$, horizontal. $\alpha = 1.516$ $\beta = 1.598$ $\gamma = 1.621$ 2V(meas.) = 30°–36°

Cell Data: *Space Group:* $P\overline{1}$. $a = 8.976(1)$ $b = 11.678(2)$ $c = 6.698(2)$ $\alpha = 95.65(2)°$ $\beta = 90.36(1)°$ $\gamma = 97.20(2)°$ 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)
SO_3	36.18	35.91
Fe_2O_3	35.92	35.81
H_2O	28.13	28.28
Total	100.23	100.00

(1) Paposa, Chile. (2) $Fe_2O(SO_4)_2 \cdot 7H_2O$.

Occurrence: A secondary mineral formed especially in arid climates.

Association: Hohmannite, fibroferrite, chalcanthite, 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) Süsse, P. (1968) The crystal structure of amarantite, $Fe_2(SO_4)_2O \cdot 7H_2O$. Zeits. Krist., 127, 261–275.