Symplesite $Fe_3^{2+}(AsO_4)_2 \cdot 8H_2O$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. Crystals elongated along [001], may be flattened $\{1\overline{1}0\}$, to 2 cm; in fibrous, radially spherical aggregates. *Twinning:* On $\{1\overline{1}0\}$; translation gliding observed.

Physical Properties: *Cleavage:* On {110}, perfect. *Tenacity:* Brittle. Hardness = ∼2.5 D(meas.) = 2.96–3.01 D(calc.) = 3.02

Optical Properties: Transparent, becoming translucent on oxidation. *Color:* Leek-green, pale green; dark green, greenish black to dark Indigo-blue on oxidation. *Streak:* Pale bluish. *Luster:* Vitreous to oily, pearly on cleavages.
Optical Class: Biaxial (–). *Pleochroism:* X = deep blue; Y = nearly colorless; Z = yellowish. *Orientation:* $X \perp \{1\overline{1}0\}$; $Z \wedge c = 31.5°$, increasing to 50° on oxidation. *Dispersion:* $r > v$, strong. $\alpha = 1.635(5)$ $\beta = 1.668(3)$ $\gamma = 1.702(3)$ 2V(meas.) = 86.5°

Cell Data: *Space Group:* $P\overline{1}$. $a = 7.86$–7.86 $b = 9.35$–9.41 $c = 4.72$–4.75 $\alpha = 93.7°-99.9°$ $\beta = 97.4°-98.1°$ $\gamma = 106°-106.5°$ Z = 1

X-ray Powder Pattern: Baia Sprie, Romania; very similar to metaköttigite.
6.785 (100), 7.499 (16), 8.971 (15), 4.007 (8), 3.743 (8), 5.027 (7), 4.069 (7)

Chemistry:

	(1)	(2)
As_2O_5	34.73	38.99
FeO	37.84	36.56
H_2O	[27.43]	24.45
Total	[100.00]	100.00

(1) Hüttenberg, Austria; recalculated after deduction of quartz 7.7%, H_2O by difference.
(2) $Fe_3(AsO_4)_2 \cdot 8H_2O$.

Polymorphism & Series: Dimorphous with parasymplesite.

Occurrence: A rare secondary mineral in the oxidized zone of some arsenic-rich hydrothermal mineral deposits.

Association: Pharmacosiderite, scorodite, erythrite, roselite, annabergite, parasymplesite, "limonite".

Distribution: In Germany, from the Tännig, near Lobenstein, Thuringia, and at Neustädtel-Schneeberg, Saxony. From Baia Sprie (Felsőbánya), Romania. At Pisek, Czech Republic. From Hüttenberg and Lölling, Carinthia, Austria. From Laurium, Greece, in slag. In Italy, at Pizzo Cipolla, near Mandanici, Sicily. In the Wanthwaite mine, St. John's in the Vale, Cumbria, England. At Bou Azzer, Morocco. Large crystals from the Ojuela mine, Mapimí, Durango, Mexico. In the USA, in the Kalkar quarry, Santa Cruz, Santa Cruz Co., California; at the Getchell mine, about 32 km northeast of Golconda, Humboldt Co., Nevada; in the Custer Mountain quarry, Custer, Custer Co., North Dakota. In Australia, from the O'Donoghue Castle copper mine, 10 km west of Wooltana, Flinders Ranges, South Australia, and at the Magnet mine, Dundas, Tasmania.

Name: From the Greek for *with* and *to be associated*, in allusion to the other rare arsenates accompanying it in the original occurrence.

Type Material: Mining Academy, Freiberg, Germany, 21034.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 752–753. (2) Ito, T. and H. Mori (1954) The symplesite problem. Tokyo Univ. Fac. Sci. J., 9(2), 201–204. (3) Schmetzer, K., G. Tremmel, and W. Bartelke (1980) Eine Paragenese seltener Minerale aus Bou-Azzer, Marokko; Parasymplesit, Symplesit, Schneiderhöhnit, Karibibit. Neues Jahrb. Mineral., Abh., 138, 94–108 (in German).