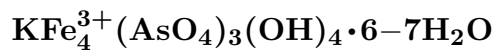


## Pharmacosiderite



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**Crystal Data:** Cubic. *Point Group:*  $\bar{4}3m$ . Commonly in good crystals, dominantly cubic, striated diagonally, with minor {111},  $\{\bar{1}11\}$ , {011}, {122}, to 2 cm. May be granular or earthy. *Twinning:* Lamellar, visible optically; rarely as twinned tetrahedra.

**Physical Properties:** *Cleavage:* On {001}, good to imperfect. *Fracture:* Uneven. *Tenacity:* Somewhat sectile. Hardness = 2.5 D(meas.) = 2.797 D(calc.) = 2.90 Weakly piezoelectric and pyroelectric.

**Optical Properties:** Transparent to translucent. *Color:* Olive-green, grass-green, emerald-green, honey-yellow, yellowish brown, dark brown; less commonly hyacinth-red, brownish red; in transmitted light, green, yellow, pale brown, biaxially sector. *Luster:* Adamantine to greasy.

*Optical Class:* Isotropic; commonly anomalously biaxial (+) or biaxial (−), with weak birefringence, perhaps showing six biaxial sectors. *Dispersion:*  $r > v$  or  $r < v$ , strong.  $n = 1.687-1.704$   $\alpha = 1.660-1.697$   $\beta = 1.661-1.700$   $\gamma = 1.663-1.704$  2V(meas.) = Large.

**Cell Data:** *Space Group:*  $P\bar{4}3m$ .  $a = 7.93-7.98$   $Z = 1$

**X-ray Powder Pattern:** Pednandrea mine, Cornwall, England. (ICDD 34-155). 4.61 (100), 8.0 (90), 2.408 (80), 3.259 (70), 2.822 (65), 1.7844 (65), 1.5959 (60)

Chemistry:	(1)	(2)
P <sub>2</sub> O <sub>5</sub>	1.20	
As <sub>2</sub> O <sub>5</sub>	37.16	39.88
Fe <sub>2</sub> O <sub>3</sub>	37.58	36.95
K <sub>2</sub> O	4.54	5.45
H <sub>2</sub> O	18.85	17.72
Total	99.33	100.00

(1) Cornwall, England; K is exchangeable for H, Ba, Na, etc. (2)  $\text{KFe}_4(\text{AsO}_4)_3(\text{OH})_4 \cdot 6.5\text{H}_2\text{O}$

**Occurrence:** An oxidation product of arsenic-bearing sulfides.

**Association:** Scorodite, beudantite, carminite, arseniosiderite, symplectite, jarosite, “limonite”.

**Distribution:** Many localities, in small amounts. In England, in Cornwall, from the Carharrack and Tincroft mines and Wheals Gorland and Unity, Gwennap, and a number of other localities; at many mines in Caldbeck Fells, Cumbria. From Vaulry, Haute-Vienne, and at the Cap Garonne mine, near le Pradet, Var, France. In Germany, from Dernbach and Horhausen, Rhineland-Palatinate; at the Clara mine, near Oberwolfach, and elsewhere in the Black Forest; from Schneeberg, Saxony, Germany. From Nova Bana, near Baňská Štiavnica (Schemnitz), Slovakia. In the USA, in the Mammoth mine, Tintic district, Juab Co., Utah; from the Northumberland mine, Nye Co., and as large crystals at the Majuba Hill mine, Antelope district, Pershing Co., Nevada. From Tsumeb, Namibia. At Broken Hill, New South Wales, Australia.

**Name:** From the Greek for *poison*, for the arsenic content, and *iron* in the composition.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 995–997. (2) Buerger, M.J., W.A. Dollase, and I. Garaycochea-Wittke (1967) The structure and composition of the mineral pharmacosiderite. *Zeits. Krist.*, 125, 92–108. (3) Greis, O., G. Mutter, and W. Eysel (1981) Pulverröntgenographische Untersuchungen an verschiedenen Pharmakosideriten  $\text{A}[\text{Fe}_4(\text{OH})_4(\text{AsO}_4)_3] \cdot (5-7)\text{H}_2\text{O}$ . *Zeits. Krist.*, 156, 48–49 (in German). (4) Mutter, G., W. Eysel, O. Greis, and K. Schmetzer (1984) Crystal chemistry of natural and ion-exchanged pharmacosiderites. *Neues Jahrb. Mineral., Monatsh.*, 183–192.

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