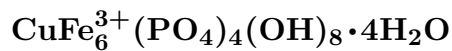


Chalcosiderite

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Crystal Data: Triclinic. *Point Group:* $\bar{1}$. Crystals short prismatic, with a number of forms noted, typically in sheafs, to 3 mm; in crusts.

Physical Properties: *Cleavage:* One, perfect; another, less perfect. *Hardness* = 4.5
D(meas.) = 3.22 D(calc.) = [3.28]

Optical Properties: Transparent. *Color:* Pale siskin-green to dark green. *Streak:* White to greenish, pale green. *Luster:* Vitreous.

Optical Class: Biaxial (-). *Pleochroism:* Weak; *X* = colorless; *Z* = pale green. *Orientation:* *X* ($107^\circ, 57^\circ$); *Y* ($-143^\circ, 68^\circ$); *Z* ($-32^\circ, 40^\circ$) using (ϕ, ρ) . *Dispersion:* $r > v$, very strong, crossed. $\alpha = 1.775$ $\beta = 1.840$ $\gamma = 1.844$ $2V(\text{meas.}) = 22(2)^\circ$

Cell Data: *Space Group:* $P\bar{1}$. $a = 7.653(4)$ $b = 7.873(4)$ $c = 10.190(4)$ $\alpha = 67.57(2)^\circ$
 $\beta = 69.17(2)^\circ$ $\gamma = 64.93(2)^\circ$ $Z = 1$

X-ray Powder Pattern: Cornwall, England.

3.77 (100), 3.39 (70), 3.02 (60), 3.56 (40), 2.96 (40), 2.14 (40), 2.07 (40)

Chemistry:

	(1)	(2)
P ₂ O ₅	29.93	28.77
As ₂ O ₅	0.61	
Al ₂ O ₃	4.45	
Fe ₂ O ₃	42.81	48.56
CuO	8.15	8.06
H ₂ O	15.00	14.61
Total	100.95	100.00

(1) West Phoenix mine, Cornwall, England. (2) CuFe₆(PO₄)₄(OH)₈•4H₂O.

Polymorphism & Series: Forms a series with turquoise.

Mineral Group: Turquoise group.

Occurrence: A rare mineral in the oxidized zone of some hydrothermal mineral deposits.

Association: Dufrénite, goethite (West Phoenix mine, Cornwall, England); dufrénite, cyrilovite, leucophosphite (Gunheath china clay pit, Cornwall, England); sampleite, libethenite, crandallite, cyrilovite, pseudomalachite, saléeite, torbernite, ulrichite (Lake Boga quarry, Australia).

Distribution: In England, from the West Phoenix United mines, Linkinhorne, and the Gunheath china clay pit, St. Austell, Cornwall. In Germany, at Schneckenstein, and in the Tannenberg mine, Mühlleithen, Saxony; from Hagendorf, Bavaria. From the Miguel Vacas mine, Estremoz, Portugal. At Les Montmins, Auvergne, France. In the USA, from the Cole and Shattuck mines, Bisbee, Cochise Co., Arizona; in the Tyrone mine, Santa Rita, Grant Co., New Mexico; at the Mohawk mine, Clark Mountains, San Bernardino Co., California; from the King turquoise mine, Conejos Co., Colorado. In Australia, in the Lake Boga granite quarry, near Swan Hill, Victoria, and the Spring Creek mine, near Wilmington, South Australia.

Name: From the Greek for *copper* and *iron*, for those elements in the mineral's composition.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 946–951. (2) Giuseppetti, G., F. Mazzi, and C. Tadini (1989) The crystal structure of chalcosiderite, CuFe₆³⁺(PO₄)₄(OH)₈•4H₂O. Neues Jahrb. Mineral., Monatsh., 227–239. (3) Graham, R. (1948) X-ray study of chalcosiderite and turquoise. Univ. Toronto Studies, Geol. Series, 52, 39–53.

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