

Crystal Data: Hexagonal. *Point Group:* $6/m$. Crystals, may be crudely hexagonal, acicular along [0001], typically in compact concentric spherical to radial aggregates, to 8 mm; in bundles, randomly fibrous; as coatings or an intergranular cement.

Physical Properties: Hardness = 3–4 $D(\text{meas.}) = 2.2\text{--}2.6$ $D(\text{calc.}) = 2.217$

Optical Properties: Semitransparent. *Color:* Yellow to brownish yellow or reddish orange, golden yellow, deep orange, rarely greenish; yellow in transmitted light. *Luster:* Silky.

Optical Class: Uniaxial (+). *Pleochroism:* $O = \text{pale yellow}$; $E = \text{canary-yellow to yellow-orange}$. $\omega = 1.575\text{--}1.585$ $\epsilon = 1.635\text{--}1.656$

Cell Data: *Space Group:* $P6_3/m$. $a = 27.559(1)$ $c = 10.550(1)$ $Z = 2$

X-ray Powder Pattern: Avant claim, Arkansas, USA.

11.94 (10), 22.0 (8), 3.3452 (5), 4.897 (4), 6.921 (3), 9.065 (2), 2.7868 (2)

Chemistry:

	(1)	(2)	(3)
P_2O_5	25.71	26.18	26.04
Al_2O_3		2.89	1.10
Fe_2O_3	41.46	40.37	41.36
H_2O	32.81	30.59	31.50
insol.		0.14	
Total	99.98	100.17	100.00

(1) Svatá Dobrotivá (St. Benigna), Czech Republic. (2) Eleonore mine, Germany. (3) $\text{Fe}_{24}\text{AlO}_6(\text{PO}_4)_{17}(\text{OH})_{12}\cdot 75\text{H}_2\text{O}$.

Occurrence: A common accessory mineral in oxidized magnetite and “limonite” iron ores; in Fe,Mn-bearing novaculites; a rare constituent of iron-rich sediments and soils.

Association: Dufrenóite, rockbridgeite, beraunite, strengite, wavellite, magnetite, “limonite”.

Distribution: Widespread in small amounts. In the Czech Republic, from the Hrbek mine, Svatá Dobrotivá (St. Benigna); at Třenice; from Zbirov; and at Cerhovice. In Germany, from the Eleonore and Rotläufchen mines, near Giessen, Hesse, and at Hühnerkobel, near Zwiesel, Bavaria. In France, at Rochefort-en-Terre, Morbihan. From Shanagolden, Co. Limerick, Ireland. At Kiruna, Sweden. In the USA, from the Palermo #1 mine, near North Groton, Grafton Co., New Hampshire; from Pennsylvania, at Hellertown, Northampton Co., Moore’s Mill, Cumberland Co., and Noble’s mine, Lancaster Co. On Indian Mountain, Cherokee Co., Alabama, groups large for the species; in the Wilson Springs (Potash Sulphur Springs) mine, Garland Co., from the Avant claim, about three km southwest of Shady, and at Three Oak Gap, Polk Co., Arkansas; in the Vanleer mine, Iron City, Lawrence Co., Tennessee; from the Palmetto mine, southwest of Bartow, Polk Co., Florida.

Name: From the Greek for a *bad guest*, for the phosphorus content that degrades the quality of iron made from the host ores.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana’s system of mineralogy, (7th edition), v. II, 997–999. (2) Fisher, D.J. (1966) Cacoxenite from Arkansas. *Amer. Mineral.*, 51, 1811–1814. (3) Moore, P.B. and J. Shen (1983) X-ray structural study of cacoxenite, a mineral phosphate. *Nature*, 306, 356–358.