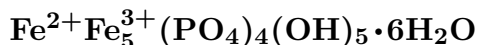


Beraunite

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Crystal Data: Monoclinic. *Point Group:* $2/m$. Commonly as crystals, tabular on {100}, elongated along [010], to 1 cm; striated on {100} || [010]. In coarse radially fibrous aggregates, globular or discoidal, and in crusts. *Twinning:* On {100}, may be interpenetrant.

Physical Properties: *Cleavage:* On {100}, good. Hardness = 3–4 D(meas.) = 2.8–3.08 D(calc.) = 2.894 (greenish black); 2.970 (orange).

Optical Properties: Translucent. *Color:* Dull greenish to greenish brown when fresh, may be color banded; reddish brown to hyacinth-red, blood-red on exposure. *Streak:* Olive-drab when fresh; yellow, brownish yellow on exposure. *Luster:* Vitreous, pearly on cleavages, resinous on fractures.

Optical Class: Biaxial (+), may be biaxial (-). *Pleochroism:* X = pale flesh-pink, yellow, blue-green; Y = pale flesh-pink, yellow, pale olive-green; Z = carnelian-red, reddish brown, olive-green. *Orientation:* Z = b; Y \wedge c = 1.5°–5°. *Dispersion:* r > v, marked, may be r < v. $\alpha = 1.707\text{--}1.775$ $\beta = 1.735\text{--}1.786$ $\gamma = 1.738\text{--}1.820$ 2V(meas.) = Moderate to large.

Cell Data: *Space Group:* C2/c (greenish black) with a = 20.953(5) b = 5.171(1) c = 19.266(4) $\beta = 93.34(2)^\circ$ Z = 4, or *Space Group:* C2/c (orange) with a = 20.646(5) b = 5.129(7) c = 19.213(5) $\beta = 93.67(7)^\circ$ Z = 4

X-ray Powder Pattern: Palermo #1 mine, New Hampshire, USA. 10.37 (10), 4.825 (6), 3.082 (6), 9.58 (5), 7.229 (5), 4.418 (5), 3.187 (4), 3.747 (3)

Chemistry:

	(1)	(2)
P ₂ O ₅	30.17	31.26
Al ₂ O ₃	0.02	
Fe ₂ O ₃	54.41	43.97
FeO	1.92	7.91
H ₂ O	13.45	16.86
Total	99.97	100.00

(1) Middletown, New Jersey, USA; partially oxidized. (2) Fe²⁺Fe₅³⁺(PO₄)₄(OH)₅ · 6H₂O.

Occurrence: A component of bog iron ores; a cement in clays, sands, and bone material; an alteration product of triphylite in granite pegmatites.

Association: Vivianite, dufrénite, rockbridgeite, cacoxenite, wavellite, ferrostrunzite, ferristrunzite, frondelite, huréaulite, mitridatite, stewartite, laeuite, leucophosphite, triphylite, “limonite”.

Distribution: Many localities are known; some with well-studied material include: in the Hrbek mine, at St. Benigna, near Beroun, Czech Republic. In Germany, from the Eleonore and Rotläufchen iron mines, near Giessen, Hesse; and at Hühnerkobel, near Zwiesel, from Hagedorf, and on the Kreuzberg, Pleystein, Bavaria. From the Gravel Hill mine, Perranzabuloe, Cornwall, England. In the Mangualde pegmatite, near Mesquitela, Portugal. From the Leveäniemi mine, Svappavaara, near Kiruna, Sweden. In the USA, from the Palermo #1 and Fletcher mines, near North Groton, Grafton Co., New Hampshire; at Raccoon Creek, Mullica Hill, Gloucester Co., New Jersey; in the Hesnard mine, three km southwest of Keystone, and the Big Chief mine, one km south of Glendale, Pennington Co., South Dakota; from the Foote mine, near Kings Mountain, Cleveland Co., North Carolina. In the Moculta phosphate quarry, northeast of Angaston, South Australia.

Name: For its occurrence near Beroun (formerly Beraun), Czech Republic.

Type Material: Mining Academy, Freiberg, Germany, 21359.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 959–961. (2) Fanfani, L. and P.F. Zanazzi (1967) The crystal structure of beraunite. Acta Cryst., 22, 173–181. (3) Moore, P.B. (1970) Crystal chemistry of the basic iron phosphates. Amer. Mineral., 55, 135–169. (4) Moore, P.B. and A.R. Kampf (1992) Beraunite: refinement, comparative crystal chemistry, and selected bond valences. Zeits. Krist., 201, 263–281.

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