

Triplite

(Mn²⁺, Fe²⁺, Mg, Ca)₂(PO₄)(F, OH)

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Crystal Data: Monoclinic. *Point Group:* 2/*m*. Crystals are typically very rough, but may have many indistinct forms, to 4 m; usually nodular, massive.

Physical Properties: *Cleavage:* On {001}, good; on {010}, fair; on {100}, poor.
Fracture: Uneven to subconchoidal. Hardness = 5–5.5 D(meas.) = 3.5–3.9 D(calc.) = 3.85–3.94

Optical Properties: Translucent to opaque. *Color:* Chestnut-brown, reddish brown, flesh-red, salmon-pink; brownish black to black if altered; in transmitted light, pale brownish yellow to dark reddish brown. *Streak:* White to brown. *Luster:* Vitreous to resinous.

Optical Class: Biaxial (+). *Pleochroism:* Distinct; yellow-brown to reddish brown. *Orientation:* Y = b; Z ∧ c = –41°. *Dispersion:* r > v, , moderate to strong. *Absorption:* X > Z = Y. α = 1.643–1.684 β = 1.647–1.693 γ = 1.668–1.703 2V(meas.) = 25°–76°

Cell Data: *Space Group:* I2/a. a = 12.065–12.134 b = 6.454–6.546 c = 9.937–9.939 β = 106.08°–107.09° Z = 8

X-ray Powder Pattern: Palermo #1 mine, New Hampshire, USA; close to zwieselite. (ICDD 40-1499).

3.008 (100), 2.525 (81), 4.277 (76), 3.487 (70), 5.175 (34), 3.923 (26), 2.462 (25)

Chemistry:

	(1)	(2)	(3)
P ₂ O ₅	31.84	31.9	31.58
FeO	1.68	14.2	31.97
MnO	57.63	46.8	31.56
MgO	1.21	2.2	
CaO	2.86	0.7	
F	7.77	10.0	8.45
–O = F ₂	3.27	4.2	3.56
Total	99.72	101.6	100.00

(1) Aurum, Reagan district, White Pine Co., Nevada, USA. (2) East Kemptville, Canada; by electron microprobe, total Fe as FeO, total Mn as MnO, corresponds to (Mn_{1.43}Fe_{0.43}Mg_{0.12}Ca_{0.03})_{Σ=2.01}P_{0.97}O_{3.86}F_{1.14}. (3) (Mn, Fe)₂(PO₄)F with Mn:Fe = 1:1.

Polymorphism & Series: Forms a series with zwieselite.

Occurrence: A principal primary phosphate, or replacing earlier species, commonly lithiophilite, in complex zoned granite pegmatites; in hydrothermal tin veins.

Association: Triploidite–wolfeite, triphylite–lithiophilite, phosphosiderite, vivianite, apatite, tourmaline, sphalerite, pyrite, quartz.

Distribution: Many localities; some prominent occurrences follow: from Limoges and in the La Vilate quarry, near Chanteloube, Haute-Vienne, France. In Germany, from Hagendorf, and on the Kreuzberg, Pleystein, Bavaria. At Horní Slavkov (Schlaggenwald), Czech Republic. From the Mangualde pegmatite, near Mesquitela, Portugal. At Lemnäs, Finland. In the Varuträsk pegmatite, 15 km northwest of Skellefteå, Västerbotten, Sweden. At the East Kemptville tin mine, Nova Scotia, Canada. In the USA, at the Mica Lode, Fremont Co., Colorado; in the White Picacho district, Maricopa and Yavapai Cos., Arizona; from Lord Hill, Stoneham, Oxford Co., Maine; at the Elk Ridge pegmatite, Custer, Custer Co., South Dakota. From the El Criollo pegmatite, Cerro Blanco, Tanti district, 45 km west of Córdoba, Córdoba Province, Argentina, large nodules.

Name: From the Greek for *threefold*, probably for its cleavages.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 849–852. (2) Waldrop, L. (1969) The crystal structure of triplite, (Mn, Fe)₂FPO₄. Zeits. Krist., 130, 1–14. (3) Mandarino, J.A., J.M.G. Richardson, P.J. Dunn, and E.T.C. Spooner (1984) Triplite from East Kemptville, Nova Scotia. Mineral. Mag., 48, 142–143.

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