

Triphylite

Li(Fe²⁺, Mn²⁺)PO₄

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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals rare, typically prismatic, with large {011}, {100}, {010}, {021}, {120}, several other forms. Commonly subhedral, to 6.5 m, cleavable, compact, massive.

Physical Properties: *Cleavage:* {100}, perfect; {010}, imperfect; {011}, interrupted. *Fracture:* Uneven to subconchoidal. Hardness = 4–5 D(meas.) = 3.50–3.58 D(calc.) = 3.562

Optical Properties: Transparent to translucent. *Color:* Bluish gray to greenish gray; brownish to black where altered. *Streak:* White to grayish white. *Luster:* Vitreous to subresinous. *Optical Class:* Biaxial (+). *Orientation:* $X = a$ or c ; $Y = c$ or b ; $Z = b$ or a . *Dispersion:* $r < v$, strong. $\alpha = 1.675\text{--}1.694$ $\beta = 1.684\text{--}1.695$ $\gamma = 1.685\text{--}1.700$ $2V(\text{meas.}) = 0^\circ\text{--}55^\circ$

Cell Data: *Space Group:* $Pmnb$. $a = 6.0285(6)$ $b = 10.3586(9)$ $c = 4.7031(3)$ $Z = 4$

X-ray Powder Pattern: Palermo #1 mine, New Hampshire, USA.
3.008 (100), 2.525 (81), 4.277 (76), 3.487 (70), 5.175 (34), 2.781 (34), 3.923 (26)

Chemistry:	(1)	(2)
P ₂ O ₅	44.76	45.11
Fe ₂ O ₃	1.07	
FeO	30.05	22.84
MnO	12.40	22.55
MgO	0.72	
CaO	0.34	
Li ₂ O	8.33	9.50
H ₂ O	0.25	
insol.	1.55	
Total	99.47	100.00

(1) "Central Asia", Russia. (2) Li(Fe, Mn)PO₄ with Mn:Fe = 1:1.

Mineral Group: Forms a series with lithiophilite.

Occurrence: The most abundant primary phosphate in complex zoned granite pegmatites.

Association: Ferrisicklerite, heterosite, alluaudite, many other Fe–Mn phosphates and oxides.

Distribution: Occurs at numerous localities; in Germany, from Hühnerkobel, near Zwiesel, and Hagendorf, Bavaria. At Sukula and Tammela, Finland. From Varuträsk, Norrö, and Skruppetorp, Sweden. In the La Vilate quarry, near Chanteloube, and at Huréaux, Haute-Vienne, France. From Dolni Borí, near Velké Meziříčí, Czech Republic. At the Sapucaia pegmatite mine, about 50 km east-southeast of Governador Valadares, Minas Gerais, Brazil. In the USA, large crystals from the G.E. Smith quarry, Newport, Sullivan Co., the Palermo #1 mine, near North Groton, Grafton Co., and elsewhere in New Hampshire; at Newry, Oxford Co. and other places in Maine; from the Dan Patch, Big Chief, and Hesnard mines, near Keystone, Pennington Co., and at the Bull Moose and Tip Top mines, near Custer, Custer Co., South Dakota; in the White Picacho district, Maricopa and Yavapai Cos., Arizona. At Point de Bois, Manitoba, Canada.

Name: From the Greek for *threefold* and *family*, as it contains three cations.

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