Laueite $Mn^{2+}Fe^{3+}_2(PO_4)_2(OH)_2 \cdot 8H_2O$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. As tabular prismatic crystals, composed of {100}, {010}, {001}, {110}, {1$\overline{1}$0}, {0$\overline{1}$1}, {011}, to 3 mm.

Physical Properties: *Cleavage:* Perfect on {010}. *Tenacity:* Very brittle. Hardness = 3 D(meas.) = 2.44–2.49 D(calc.) = 2.56

Optical Properties: Transparent to translucent. *Color:* Honey-brown, amber, yellow, dark yellow, yellow-orange, reddish orange. *Luster:* Vitreous.
Optical Class: Biaxial (–). *Dispersion:* $r < v$, strong. α = 1.588–1.603 β = 1.654–1.659 γ = 1.680–1.682 2V(meas.) = 63°–66° 2V(calc.) = 62°–63°

Cell Data: *Space Group:* $P\overline{1}$. a = 5.28 b = 10.66 c = 7.14 α = 107°55′ β = 110°59′ γ = 71°07′ Z = 1

X-ray Powder Pattern: Hagendorf, Germany; close to ushkovite.
9.91 (100), 3.28 (9), 4.95 (8), 6.57 (7), 2.88 (6), 4.02 (5), 3.93 (5)

Chemistry:

	(1)	(2)		(1)	(2)
P_2O_5	26.47	26.55	MnO	11.06	13.27
Al_2O_3	1.76		MgO	0.52	
Fe_2O_3	27.54	29.86	CaO	0.23	
FeO	1.34		H_2O	30.84	30.22
			Total	99.76	100.00

(1) Hagendorf, Germany. (2) $Mn^{2+}Fe^{3+}_2(PO_4)_2(OH)_2 \cdot 8H_2O$.

Polymorphism & Series: Trimorphous with pseudolaueite and stewartite.

Mineral Group: Paravauxite group.

Occurrence: A common late-stage hydrothermal mineral in oxidized triphylite-bearing complex granite pegmatites.

Association: Rockbridgeite (Hagendorf, Germany); rockbridgeite, strunzite, stewartite, pseudolaueite, siderite, ludlamite (Palermo #1 mine, New Hampshire, USA).

Distribution: Well-crystallized from Hagendorf, Bavaria, Germany. At the Mangualde pegmatite, near Mesquitela, and in the Bendada pegmatite, near Guarda, Portugal. In the Norrö pegmatite, on Rånö Island, Sweden. On Mt. Vasin-Myl'k, Voron'i massif, Kola Peninsula, Russia. In the USA, at the Palermo #1 and Fletcher mines, near North Groton, Grafton Co., and the Fitzgibbon mine, Alstead, Cheshire Co., New Hampshire; in the Emmons quarry, Greenwood, Oxford Co., Maine; in South Dakota, from the White Elephant and Etta mines, near Keystone, Pennington Co., at the Big Chief mine, near Glendale, and the Linwood, Hesnard, and Tip Top mines, near Custer, Custer Co.; at the Foote mine, Kings Mountain, Cleveland Co., North Carolina. From the Énio pegmatite mine, northeast of Galiléia, and the Sapucaia pegmatite mine, about 50 km east-southeast of Governador Valadares, Minas Gerais, Brazil. In the Wiperaminga Hill West quarry, near Olary, South Australia. From the Tsaobismund pegmatite, 60 km south of Karibib, Namibia. Other minor occurrences are known.

Name: Honors Max Theodor Felix von Laue (1879–1960), German physicist, University of Munich, Munich, Germany, awarded the Nobel prize for his discovery of X-ray diffraction.

Type Material: Harvard University, Cambridge, Massachusetts, USA, 119478.

References: (1) Strunz, H. (1954) Laueit, $MnFe_2^{\bullet\bullet\bullet}[OH|PO_4]_2 \cdot 8H_2O$, ein neues Mineral. Naturwissenschaften, 41, 256 (in German). (2) (1954) Amer. Mineral., 39, 1038 (abs. ref. 1). (3) Moore, P.B. (1965) The crystal structure of laueite, $Mn^{2+}Fe^{3+}_2(OH)_2(PO_4)_2(H_2O)_6 \cdot 2H_2O$. Amer. Mineral., 50, 1884–1892. (4) Plieth, K., G. Ruban, and H.-G. Smolczyk (1965) Zur Kristallstruktur des Laueits, $Fe_2Mn[PO_4/OH]_2 \cdot 8H_2O$. Acta Cryst., 19, 485 (in German). (5) Pitman, L.C. (1989) Laueite from Hagendorf-Süd and the Palermo mine. Mineral. Record, 20, 363–364. (6) Hurlbut, C.S., Jr. and R. Honea (1962) Sigloite, a new mineral from Llallagua, Bolivia. Amer. Mineral., 47, 1–8.