Orthopinakiolite $(Mg, Mn^{2+})_2Mn^{3+}BO_5$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As acicular crystals.

Physical Properties: Hardness = 6 D(meas.) = 3.935–4.03 D(calc.) = 4.06

Optical Properties: Opaque. *Color:* Black. *Luster:* Metallic.
Optical Class: Biaxial. α = n.d. β = n.d. γ = n.d. 2V(meas.) = n.d.
R_1–R_2: n.d.

Cell Data: *Space Group: Pnnm.* $a = 18.357(4)$ $b = 12.591(2)$ $c = 6.068(1)$ Z = 16

X-ray Powder Pattern: Långban, Sweden.
2.59 (10), 5.17 (9), 2.52 (9), 2.03 (9), 2.20 (8), 1.523 (8), 3.01 (7)

Chemistry:

	(1)
SiO_2	0.78
B_2O_3	13.92
Fe_2O_3	10.52
Mn_2O_3	34.04
MnO	16.36
PbO	1.22
MgO	22.36
CaO	1.35
Total	100.55

(1) Långban, Sweden. (2) Do.; by electron microprobe, Mg 16.7%, Fe 5.8%, Mn 34.4%, stated to correspond to $(Mg_{1.42}Mn^{2+}_{0.43})_{\Sigma=1.85}Mn^{3+}_{0.88}Fe^{3+}_{0.22}BO_5$.

Occurrence: A very rare species formed in veinlets in granular dolomite in a metamorphosed Fe–Mn orebody.

Association: Hausmannite, manganophyllite, dolomite, calcite.

Distribution: From Långban, Värmland, Sweden.

Name: As an ORTHOrhombic mineral related to *pinakiolite*.

Type Material: Swedish Museum of Natural History, Stockholm, Sweden, 420106.

References: (1) Randmets, R. (1960) Orthopinakiolite, a new modification of $Mg_3Mn^{2+}Mn^{3+}_2B_2O_{10}$ from Långban, Sweden. Arkiv Mineral. Geol., 2(42), 551–555. (2) (1961) Amer. Mineral., 46, 768 (abs. ref. 1). (3) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 324–325 [pinakiolite]. (3) Takéuchi, Y., N. Haga, T. Kato, and Y. Miura (1978) Orthopinakiolite, $Me_{2.95}O_2[BO_3]$: its crystal structure and relation to pinakiolite, $Me_{2.90}O_2[BO_3]$. Can. Mineral., 16, 475–485.