Manganotapiolite $(Mn^{2+}, Fe^{2+})(Ta, Nb)_2O_6$

Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$. Massive, in a zone, to 100 μ wide, in a poorly developed prismatic ferrotapiolite crystal, 1.5 mm long.

Physical Properties: Hardness = n.d. VHN = 665–752, 711 average (100 g load), probably low due to fractures. D(meas.) = n.d. D(calc.) = 7.72

Optical Properties: Opaque, translucent in very thin fragments. *Color:* Dark brown; gray in reflected light, with strong red-brown internal reflections. *Streak:* Dark brown. *Luster:* Adamantine to submetallic.
Optical Class: Uniaxial. *Pleochroism:* Strong; yellowish brown to reddish brown.
Bireflectance: Weak; light brownish gray to gray.
R_1–R_2: (470) 16.0–15.7, (546) 14.7–14.1, (589) 15.0–14.8, (650) 15.1–14.6

Cell Data: *Space Group:* $P4_2/mnm$. $a = 4.762(5)$ $c = 9.272(5)$ $Z = 2$

X-ray Powder Pattern: Eräjärvi area, Finland.
3.367 (100), 2.592 (90), 1.754 (90), 2.381 (60), 1.682 (60), 4.24 (40), 1.504 (40)

Chemistry:

	(1)
Nb_2O_5	8.5
Ta_2O_5	76.3
SnO_2	1.0
Sb_2O_3	0.1
FeO	3.2
MnO	10.2
MgO	0.0
CaO	0.4
Total	99.7

(1) Eräjärvi area, Finland; by electron microprobe, corresponds to $(Mn_{0.70}Fe_{0.22}Ca_{0.04})_{\Sigma=0.96}(Ta_{1.68}Nb_{0.31}Sn_{0.03})_{\Sigma=2.02}O_6$.

Polymorphism & Series: Dimorphous with manganotantalite; forms a series with ferrotapiolite.

Mineral Group: Ferrotapiolite group.

Occurrence: A rare accessory mineral in a lithium-rich granite pegmatite dike.

Association: Ferrotapiolite, antimony, cassiterite, microlite, albite, schorl, apatite.

Distribution: From the Viitaniemi pegmatite, Eräjärvi area, Orivesi, Finland.

Name: For its dominant MANGANese content and relation to ferroTAPIOLITE.

Type Material: Mineralogical Museum, Geological Survey of Finland, Espoo, Finland.

References: (1) Lahti, S.I., B. Johanson, and M. Virkkunen (1983) Contributions to the chemistry of tapiolite – manganotapiolite, a new mineral. Bull. Geol. Soc. Finland, 55, 101–109. (2) (1985) Amer. Mineral., 70, 217 (abs. ref. 1). (3) Wise, M.A. and P. Černý (1996) The crystal chemistry of the tapiolite series. Can. Mineral., 34, 631–647.