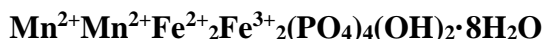


**Jahnsite-(MnMnFe)**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. Prismatic crystals to 0.2 mm are elongated along [100], slightly flattened on (010). *Twinning:* By reflection on (001).

**Physical Properties:** *Cleavage:* Perfect on {001}. *Tenacity:* Brittle. *Fracture:* Irregular. Hardness = ~4 D(calc.) = 2.654

**Optical Properties:** Translucent. *Color:* Dark orange-brown. *Streak:* Pale greenish brown.

*Luster:* Vitreous.

*Optical Class:* Biaxial (-).  $\alpha = 1.673(3)$   $\beta = 1.685$   $\gamma = 1.689$   $2V(\text{calc.}) = 60^\circ$  *Orientation:*  $X = b$ ,  $Y \sim c$ ,  $Z = a$ . *Dispersion:* Moderate,  $r < v$ . *Pleochroism:*  $X = \text{dark brown}$ ,  $Y = \text{brownish orange}$ ,  $Z = \text{yellow}$ .

**Cell Data:** *Space Group:* P2/a.  $a = 15.1559(6)$   $b = 7.1478(2)$   $c = 10.0209(4)$   $\beta = 112.059(4)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Malpensata pegmatite mine, near Olgiasca, Lecco province, Italy. 2.590 (100), 9.221 (89), 2.840 (82), 4.932 (78), 4.651 (78), 3.971 (71), 3.504 (64)

Chemistry:	(1)	(2)
Na <sub>2</sub> O	0.17	
CaO	1.69	
MgO	0.68	
MnO	15.40	15.92
ZnO	0.33	
Fe <sub>2</sub> O <sub>3</sub>	[18.88]	17.92
FeO	[11.88]	16.12
Al <sub>2</sub> O <sub>3</sub>	0.04	
P <sub>2</sub> O <sub>5</sub>	33.68	31.85
H <sub>2</sub> O	[18.54]	18.19
Total	101.30	100.00

(1) Malpensata pegmatite mine, near Olgiasca, Lecco province, Italy; average electron microprobe analysis, H<sub>2</sub>O by stoichiometry and charge balance, total iron apportioned from structure analysis; corresponds to  $(\text{Mn}_{0.40}\text{Ca}_{0.25}\text{Na}_{0.05})_{\Sigma=0.70}\text{Mn}(\text{Fe}^{2+}_{1.39}\text{Mn}_{0.43}\text{Mg}_{0.14}\text{Zn}_{0.03})_{\Sigma=2.00}(\text{Fe}^{3+}_{1.99}\text{Al}_{0.01})_{\Sigma=2.00}(\text{PO}_4)_4(\text{OH})_{1.35} \cdot 8\text{H}_2\text{O}$ . (2)  $\text{Mn}^{2+}\text{Mn}^{2+}\text{Fe}^{2+}_2\text{Fe}^{3+}_2(\text{PO}_4)_4(\text{OH})_2 \cdot 8\text{H}_2\text{O}$ .

**Mineral Group:** Jahnsite group, jahnsite subgroup;  $\text{Fe}^{3+} > \text{Al}$  in the M(3) structural site.

**Occurrence:** A low temperature, secondary mineral formed by alteration of primary phosphates in zoned granitic pegmatite.

**Association:** Rockbridgeite, mitridatite.

**Distribution:** In the dumps of the Malpensata pegmatite mine, near Olgiasca, Colico municipality, Lecco province, Italy.

**Name:** Root name, *Jahnsite*, indicates a member of the group with  $M(3) = \text{Fe}^{3+}$ ; the suffix indicates sequentially the dominant atom in the X, M(1), and M(2) structural positions.

**Type Material:** Mineralogical Collection, Laboratory of Mineralogy, University of Liège, Belgium (21168).

**References:** (1) Vignola, P., F. Hatert, N. Rotiroti, F. Nestola, A. Risplendente, and F. Vanini (2019) Jahnsite-(MnMnFe),  $\text{Mn}^{2+}\text{Mn}^{2+}\text{Fe}^{2+}_2\text{Fe}^{3+}_2(\text{PO}_4)_4(\text{OH})_2 \cdot 8\text{H}_2\text{O}$ , a new phosphate mineral from the Malpensata Pegmatite, Olgiasca, Colico Municipality, Lecco Province, Italy. *Can. Mineral.*, 57(2), 225-233. (2) (2021) *Amer. Mineral.*, 106, 1363 (abs. ref. 1).