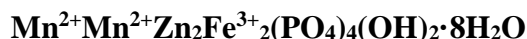


Jahnsite-(MnMnZn)

Crystal Data: Monoclinic. *Point Group:* 2/m. As sub-parallel bundles of prisms or thick blades to 0.3 mm elongated along [001] with shallow pyramidal terminations. *Twining:* Presumably by reflection on {001}.

Physical Properties: *Cleavage:* Good on {001}. *Tenacity:* Brittle. *Fracture:* Irregular, splintery. Hardness = ~4 D(meas.) = 2.89(2) D(calc.) = 2.898 Rapidly soluble in dilute HCl.

Optical Properties: Transparent. *Color:* Light golden brown. *Streak:* White.

Luster: Vitreous to silky.

Optical Class: Biaxial (+). $\alpha = 1.655(2)$ $\beta = 1.662(2)$ $\gamma = 1.673(2)$ $2V(\text{calc.}) = 78(1)^\circ$

Orientation: n.d. *Pleochroism:* X = nearly colorless, Y = Z = beige. *Dispersion:* n.d.

Absorption: X < Y ≈ Z.

Cell Data: *Space Group:* P2/a. $a = 15.222(6)$ $b = 7.187(6)$ $c = 10.028(5)$ $\beta = 111.746(16)^\circ$ Z = 2

X-ray Powder Pattern: Herdade dos Pendões mine, 5 km north of Odemira, Beja district, Portugal. 2.842 (100), 9.25 (63), 3.509 (41), 5.00 (40), 1.9984 (37), 4.648 (33), 1.5853 (33)

Chemistry:	(1)	(2)
Na ₂ O	0.54	
CaO	0.63	
MgO	0.47	
MnO	19.15	15.58
ZnO	9.25	17.88
Fe ₂ O ₃	[18.39]	17.54
FeO	[1.70]	
Al ₂ O ₃	0.03	
P ₂ O ₅	32.72	31.18
H ₂ O	[18.49]	17.81
Total	101.37	100.00

(1) Herdade dos Pendões mine, Beja district, Portugal; average electron microprobe analysis supplemented by Raman spectroscopy, H₂O by stoichiometry, total iron apportioned to Fe₂O₃ and FeO for charge balance; corresponds to $(\text{Mn}^{2+}_{0.71}\text{Na}_{0.15}\text{Ca}_{0.10})_{\Sigma=0.96}\text{Mn}^{2+}_{1.00}(\text{Zn}_{1.00}\text{Mn}^{2+}_{0.66}\text{Fe}^{2+}_{0.21}\text{Mg}_{0.10}\text{Fe}^{3+}_{0.03})_{\Sigma=2.00}(\text{Fe}^{3+}_{1.99}\text{Al}_{0.01})_{\Sigma=2.00}(\text{P}_{1.01}\text{O}_4)_4(\text{OH})_2 \cdot 8\text{H}_2\text{O}$. (2) $\text{MnMnZn}_2\text{Fe}^{3+}_2(\text{PO}_4)_4(\text{OH})_2 \cdot 8\text{H}_2\text{O}$.

Mineral Group: Jahnsite group, jahnsite subgroup; Fe³⁺ > Al in the M(3) structural site.

Occurrence: In highly altered (leached and silicified) gossan of an iron-manganese deposit.

Association: Zn-bearing libethenite, quartz, rhodochrosite, santabarbaraite.

Distribution: At the Herdade dos Pendões manganese and iron mine, 5 km north of Odemira, Beja district, Portugal.

Name: Root name, *jahnsite*, indicates a member of the group with M(3) = Fe³⁺; the suffix indicates sequentially the dominant atom in the X, M(1), and M(2) structural positions.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (67277).

References: (1) Kampf, A.R., P. Alves, A. Kasatkin, and R. Škoda (2019) Jahnsite-(MnMnZn), a new jahnsite-group mineral, and formal approval of the jahnsite group. *Eur. J. Mineral.*, 31(1), 167-172. (2) (2021) *Amer. Mineral.*, 106, 1364 (abs. ref. 1).