

Jahnsite-(CaFeMg)**CaFe²⁺Mg₂Fe³⁺₂(OH)₂(H₂O)₈[PO₄]₄**

Crystal Data: Monoclinic. *Point Group:* 2/m. As blocky to short prismatic crystals to 0.2 mm. *Twinning:* On {001} confirmed by X-ray analysis.

Physical Properties: *Cleavage:* Good on {001}. *Fracture:* Splintery. *Tenacity:* Brittle. Hardness = ~4 D(meas.) = 2.76(4) D(calc.) = 2.772

Optical Properties: Transparent. *Color:* Brownish orange. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Biaxial (-). $\alpha = 1.629(4)$ $\beta = 1.658(4)$ $\gamma = 1.677(4)$ $2V(\text{calc.}) = 76.8^\circ$ *Pleochroism:* Weak; Y = orange-pink, Z = pale orange, X = very pale gray. *Absorption:* Y > Z > X.

Cell Data: *Space Group:* P2/a. $a = 14.975(5)$ $b = 7.1645(14)$ $c = 9.928(2)$ $\beta = 110.65(3)^\circ$ Z = 2

X-ray Powder Pattern: Tom's quarry, Kapunda, South Australia. 9.339 (100), 2.839 (35), 4.923 (20), 3.562 (20), 3.518 (20), 3.453 (20), 2.965 (20)

Chemistry:	(1)
Na ₂ O	0.65
CaO	4.74
MgO	6.47
MnO	5.02
FeO	[9.85]
Fe ₂ O ₃	[20.18]
Al ₂ O ₃	0.06
P ₂ O ₅	34.41
H ₂ O	[19.46]
Total	100.84

(1) Tom's quarry, Kapunda, South Australia; average of 17 electron microprobe analyses supplemented by IR spectroscopy, H₂O calculated from structure, Fe₂O₃ and FeO calculated from crystal-chemical constraints; corresponds to (Ca_{0.70}Na_{0.17}Mn²⁺_{0.16}) $\Sigma=1.03$ Fe²⁺_{1.00}(Mg_{1.33}Mn²⁺_{0.43}Fe³⁺_{0.24}) $\Sigma=2.00$ (Fe³⁺_{1.99}Al_{0.01}) $\Sigma=2.00$ (PO₄)_{4.01}(OH)_{2.10}H₂O_{7.88}.

Mineral Group: Whiteite-jahnsite group.

Occurrence: A secondary mineral in low-grade phosphorites derived by leaching of weakly phosphatic limestones or low-grade primary phosphorites.

Association: Jahnsite-(NaFeMg), goethite, fluorapatite.

Distribution: From Tom's quarry, Koonunga Hill area, 10 km E of Kapunda, South Australia.

Name: For a jahnsite group mineral with dominant Ca in the X site and Fe²⁺ and Mg in the M1 and M2 sites.

Type Material: South Australian Museum, Adelaide, South Australia, Australia (G34045).

References: (1) Elliot, P. (2016) Jahnsite-(CaFeMg), a new mineral from Tom's quarry, South Australia: description and crystal structure. *Eur. J. Mineral.*, 28(6), 991-996. (2) (2017) *Amer. Mineral.*, 102, 1962-1963 (abs. ref. 1).