Jahnsite-(CaFeMg)  
\[ \text{CaFe}^{2+}\text{Mg}_2\text{Fe}^{3+}_2\text{(OH)}_2\text{(H}_2\text{O})_8\text{[PO}_4\text{]}_4 \]

**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.  
*Luster:* Vitreous.  
*Optical Class:* Biaxial (−).  
\(\alpha = 1.629(4)\)  
\(\beta = 1.658(4)\)  
\(\gamma = 1.677(4)\)  
2V(calc.) = 76.8°

**Cell Data:**  
*Space Group:* P2_1/a.  
\(a = 14.975(5)\)  
\(b = 7.1645(14)\)  
\(c = 9.928(2)\)  
\(\beta = 110.65(3)°\)  
\(Z = 2\)

**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)

\[
\begin{align*}
\text{Na}_2\text{O} & \quad 0.65 \\
\text{CaO} & \quad 4.74 \\
\text{MgO} & \quad 6.47 \\
\text{MnO} & \quad 5.02 \\
\text{FeO} & \quad [9.85] \\
\text{Fe}_2\text{O}_3 & \quad [20.18] \\
\text{Al}_2\text{O}_3 & \quad 0.06 \\
\text{P}_2\text{O}_5 & \quad 34.41 \\
\text{H}_2\text{O} & \quad [19.46] \\
\text{Total} & \quad 100.84
\end{align*}
\]

(1) Tom’s quarry, Kapunda, South Australia; average of 17 electron microprobe analyses supplemented by IR spectroscopy, \(\text{H}_2\text{O}\) calculated from structure, \(\text{Fe}_2\text{O}_3\) and \(\text{FeO}\) calculated from crystal-chemical constraints; corresponds to \((\text{Ca}_{0.70}\text{Na}_{0.17}\text{Mn}^{2+}_{0.16})\text{Fe}^{2+}_{1.00}\text{Fe}^{3+}_{1.00}(\text{Mg}_{1.33}\text{Mn}^{2+}_{0.43}\text{Fe}^{3+}_{0.24})\text{Fe}^{3+}_{1.99}\text{Al}_{0.01})\text{Fe}^{2+}_{2.00}(\text{PO}_4)_{4.01}(\text{OH})_{2.00}\text{H}_2\text{O}_{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 \(\text{Fe}^{2+}\) and \(\text{Mg}\) in the \(M1\) and \(M2\) sites.

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

**References:**  