Jahnsite-(CaMnMn)  \[\text{CaMn}^{2+}\text{Mn}^{2+}\text{Fe}^{3+}_2(\text{PO}_4)_4(\text{OH})_2\cdot8\text{H}_2\text{O}\]

Crystal Data: Monoclinic. \textit{Point Group}: 2/m or \textit{m}. As equant crystals flattened on \{001\},
to 0.5 mm. \textit{Twinning}: Common on \{001\}.

Physical Properties: \textit{Cleavage}: Poor on \{001\}, a parting. \textit{Fracture}: Splintery.
\textit{Tenacity}: Brittle. \textit{Hardness} = \sim 4 \text{ D(meas.)} = 2.78(8) \text{ D(calc.)} = 2.798

\textit{Optical Class}: Biaxial (–). \textit{Pleochroism}: Slight; \textit{X} = pale yellow-green; \textit{Y} = brown-green;
\textit{Z} = yellow-green. \textit{Orientation}: \textit{Z} = \textit{b}; \textit{X} \wedge \textit{c} = 20°. \textit{Absorption}: \textit{Y} \textit{> Z > X}. \textit{α} = 1.643(1)
\textit{β} = 1.659(1) \textit{γ} = 1.671(1) \textit{2V(meas.)} = 80(2)° \textit{2V(calc.)} = 81°

Cell Data: \textit{Space Group}: \textit{P2}/\textit{a} or \textit{Pa}. \textit{a} = 14.877(8) \textit{b} = 7.152(7) \textit{c} = 9.966(6)
\textit{β} = 109.77(5)° \textit{Z} = 2

X-ray Powder Pattern: Mangular pegmatite, Portugal.
9.40 (10), 2.870 (8), 4.704 (3), 5.74 (2), 5.02 (2), 4.971 (2), 3.532 (2)

Chemistry:
\begin{align*}
\text{P}_2\text{O}_5 & \text{ 34.3} \\
\text{Al}_2\text{O}_3 & \text{ 0.7} \\
\text{Fe}_2\text{O}_3 & \text{ 21.5} \\
\text{MnO} & \text{ 20.2} \\
\text{MgO} & \text{ 0.5} \\
\text{CaO} & \text{ 5.8} \\
\text{H}_2\text{O} & \text{ 18.5} \\
\hline
\text{Total} & \text{ 101.5}
\end{align*}

(1) Mangular pegmatite, Portugal; by electron microprobe, total Fe as Fe$_2$O$_3$, total Mn as MnO,
H$_2$O by TGA-EGA; corresponding to Ca$_{0.86}$Mn$_{2+}$$_{0.86}$($\text{Mn}^{2+}_{1.56}\text{Fe}^{2+}_{0.34}\text{Mg}_{0.10})\Sigma=2.00(\text{Fe}^{3+}_{1.89}\text{Al}_{0.11})\Sigma=2.00$
(PO$_4$)$_4$(OH)$_{1.66}\cdot7.67\text{H}_2\text{O}$.

Mineral Group: Whiteite group; Fe$^{3+}$ > Al in the M(3) structural site.

Occurrence: A late stage hydrothermal decomposition product of primary phosphate minerals
in complex granite pegmatites.

Association: Phosphosiderite, zodacite, varulite, microcline (Mangular pegmatite, Portugal).

Distribution: From the Mangular pegmatite, near Mesquitela, Portugal. In the Bell pit,
Newry, and on Mt. Mica, near Paris, Oxford Co., Maine, USA.

Name: By analogy to jahnsite-(CaMnMg); the suffix indicates sequentially the dominant atom
in the X, M(1), and M(2) structural positions.

Type Material: Canadian Museum of Nature, Ottawa, Canada, 53784; National Museum of
Natural History, Washington, D.C., USA, 149953.

References: (1) Grice, J.D., P.J. Dunn, and R.A. Ramik (1990) Jahnsite-(CaMnMn), a new