Hydrohetaerolite  \( \text{Zn}_2\text{Mn}_{3+}\text{O}_8 \cdot \text{H}_2\text{O} \)

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Crystal Data:  Tetragonal.  Point Group: 4/m 2/m 2/m.  Crystals are fibrous, elongated || [110]; radiating, in botryoidal crusts, finely granular, massive.

Physical Properties:  Cleavage: Parallel fiber elongation.  Hardness = 5–6  \( D(\text{meas.}) = 4.64 \)  \( D(\text{calc.}) = [5.57] \)


Luster: Submetallic.

Optical Class: Uniaxial (−).  \( \omega = 2.26(2) \)  \( \epsilon = 2.10(2) \)

Cell Data:  Space Group: \( I\text{4}_1/\text{amd} \).  \( a = 5.735(1) \)  \( c = 9.005(1) \)  \( Z = 2 \)

X-ray Powder Pattern:  Wolftone mine, Colorado, USA.

2.47 (10), 2.66 (8), 3.02 (7), 1.508 (7), 1.570 (5), 2.87 (4), 1.434 (4)

Chemistry:

\[
\begin{array}{ccc}
\text{SiO}_2 & 2.69 & 1.71 \\
\text{Fe}_2\text{O}_3 & 0.77 & \\
\text{Mn}_2\text{O}_3 & 56.00 & 60.44 & 63.59 \\
\text{ZnO} & 37.56 & 33.43 & 32.78 \\
\text{H}_2\text{O}^+ & 1.42 & 3.63 & \\
\text{H}_2\text{O}^- & 2.47 & \\
\text{H}_2\text{O} & 4.36 & \\
\hline
\text{Total} & 100.61 & 100.24 & 100.00 \\
\end{array}
\]

(1) Wolftone mine, Colorado, USA; average of two analyses; corresponding to \( \text{Zn}_{2.26} \text{(Mn}_{3.50} \text{Si}_{0.22})_\Sigma=3.77 \text{O}_{7.94} \cdot 1.20\text{H}_2\text{O} \).  (2) Franklin, New Jersey, USA; corresponding to \( \text{Zn}_{2.02} \text{(Mn}_{3.77} \text{Si}_{0.14} \text{Fe}_{0.04})_\Sigma=3.97 \text{O}_{8.03} \cdot 1.06\text{H}_2\text{O} \).  (3) \( \text{Zn}_2\text{Mn}_4\text{O}_8 \cdot \text{H}_2\text{O} \).

Occurrence:  In oxidized manganese-bearing zinc deposits.

Association:  Chalcophanite, hemimorphite, smithsonite (Leadville, Colorado, USA); chalcophanite (Franklin, New Jersey, USA).


Name:  For a HYDROus mineral, and its relation to hetaerolite.

Type Material:  Harvard University, Cambridge, Massachusetts, USA, 112011.