Lindbergite

\[
\text{Mn(C}_2\text{O}_4)\cdot 2\text{H}_2\text{O}
\]

Crystal Data: Monoclinic.  \textit{Point Group:} 2/m.  Prismatic to 0.3 mm as pseudomorphs after orthorhombic trihydrate, display \{100\}, \{hk0\}, \{010\}, and \{0kl\}, rounded edges, and twinning on \{010\}; and as aggregates in 0.1 mm crusts of interlocking irregularly contoured platelets to 0.03 mm.

Hardness = 2.5  \(D\text{(meas.)} = 2.10(3)\)  \(D\text{(calc.)} = 2.251\)

Luster: Vitreous.
Optical Class: Biaxial (-).  \(\alpha = 1.424(3)\)  \(\beta = 1.550(3)\)  \(\gamma = 1.65(1)\)  \(2V\text{(meas.)} = 80(2)^\circ\)

\(2V\text{(calc.)} = 77^\circ\)  Dispersion: \(r > v\), very weak.
Orientation: \(Y \wedge c = 20^\circ\).

Cell Data: Space Group: \(C_2/c\).  \(a = 11.995(5)\)  \(b = 5.632(2)\)  \(c = 9.967(7)\)  \(\beta = 128.34(4)^\circ\)  \(Z = 4\)

X-ray Powder Pattern: Boca Rica mine, Sapucaia do Norte, Galiléia Co., Minas Gerais, Brazil.  4.803 (100), 4.699 (84), 2.996 (58), 4.855 (26), 3.907 (23), 3.622 (22), 2.679 (14)

Chemistry:

\begin{tabular}{lcc}
 & (1) & (2) \\
MnO & 39.99 & 39.63 \\
Al\(_2\)O\(_3\) & 0.24 & \\
Na\(_2\)O & 0.21 & \\
C\(_2\)O\(_3\) & 34.90 & 40.24 \\
H\(_2\)O & 19.62 & 20.13 \\
Total & 94.96 & 100.00 \\
\end{tabular}

(1) Boca Rica mine, Sapucaia do Norte, Galiléia Co., Minas Gerais, Brazil; EDS and CHN analyses; corresponds to \((\text{Mn}_{1.11}\text{Na}_{0.01}\text{Al}_{0.01})\Sigma=1.13(\text{C}_{1.94}\text{O}_4)\cdot 2.15\text{H}_2\text{O}\).  (2) \text{Mn(C}_2\text{O}_4)\cdot 2\text{H}_2\text{O}.

Occurrence: A secondary mineral in granite pegmatites.

Association: Triphylite, phosphosiderite, frondelite, strengite, cyrilovite, bermanite, rockbridgeite, huréaulite, tavorite, reddingite, heterosite, laueite.

Distribution: From the Boca Rica mine, Sapucaia do Norte, Galiléia Co., Minas Gerais, Brazil [TL], from Parsettens, Grisons, Switzerland, the Lecht Mines, Banffshire, Scotland, and the Morefield Pegmatite, Amelia, Virginia, USA.  In the Black Forest, Germany, at the Clara Mine, Oberwolbach, Wolfach Valley, Baden-Württemberg; at Ortenberg near Offenburg; and at Gremmelsbach near Triberg.

Name: Honors Marie Louise Lindberg (-Smith) (b. 1918), from the US Geological Survey, who described several new minerals from the nearby Sapucaia quarry (frondelite, facheyite, moraesite, barbosalite, and tavorite).

Type Material: Geosciences Museum, Institute of Geosciences, University of São Paulo, Brazil (DR542).