Lehnerite  
\[\text{Mn}^{2+}(\text{UO}_2)_{2}(\text{PO}_4)_{2} \cdot 8\text{H}_2\text{O}\]

(c)2001-2005 Mineral Data Publishing, version 1

Crystal Data: Monoclinic, pseudotetragonal. Point Group: \(2/m\). As thin pseudotetragonal crystals, tabular on \{010\} and modified by \{101\}, \{001\}, \{100\}, to 1 mm; as aggregates of parallel crystals stacked along [010].

Physical Properties: Cleavage: Perfect on \{010\}; good on \{101\}; less good on \{100\}; poor on \{001\}. Hardness = 2–3 D (meas.) = > 3.50 D (calc.) = 3.674 Radioactive.

Optical Properties: Transparent to translucent. Color: Bronze-yellow, yellow, ocher-yellow. Streak: Pale yellow. Luster: Vitreous to resinous. Optical Class: Biaxial (-), some parts uniaxial. Pleochroism: \(X = Y = \) light yellow; \(Z = \) yellow. Orientation: \(X = b\); \(Y \wedge a \simeq 8^\circ\); \(Z \wedge c = \approx 8^\circ\). Dispersion: \(r \gg v\). \(\alpha = 1.599(2)\) \(\beta = 1.607(2)\) \(\gamma = 1.607(2)\) \(2V(\text{meas.}) = 45^\circ\).

Cell Data: Space Group: \(P2_1/n\). \(a = 7.04(2)\) \(b = 17.16(4)\) \(c = 6.95(2)\) \(\beta = 90^\circ 18'\) \(Z = 2\)

X-ray Powder Pattern: Hagendorf, Germany.
8.56 (10), 3.50 (8b), 2.23 (7), 4.96 (6), 1.375 (4b), 2.48 (3), 2.17 (3)

Chemistry:

<table>
<thead>
<tr>
<th>Compounds</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{UO}_3)</td>
<td>63.0</td>
<td>61.58</td>
</tr>
<tr>
<td>(\text{P}_2\text{O}_5)</td>
<td>15.1</td>
<td>15.28</td>
</tr>
<tr>
<td>(\text{FeO})</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>(\text{MnO})</td>
<td>7.5</td>
<td>7.63</td>
</tr>
<tr>
<td>(\text{H}_2\text{O})</td>
<td>[14.2]</td>
<td>15.51</td>
</tr>
<tr>
<td>Total</td>
<td>[100.0]</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Hagendorf, Germany; by electron microprobe, total Fe as FeO, total Mn as MnO, H\(_2\)O by difference; corresponding to (Mn\(_{0.99}\)Fe\(_{0.03}\)\Sigma = 1.02\((\text{UO}_2)_{2.07}(\text{PO}_4)_{2.00} \cdot 7.41\text{H}_2\text{O}\).

(2) Mn\((\text{UO}_2)_{2}(\text{PO}_4)_{2} \cdot 8\text{H}_2\text{O}\).

Mineral Group: Meta-autunite group.

Occurrence: A rare secondary mineral in the oxidized zone of a complex granite pegmatite.

Association: Zwieselite, rockbridgeite.

Distribution: From Hagendorf, Bavaria, Germany.

Name: Honors Ferdinand Lehner (1868–1943), Pleystein, Germany, an early collector of Hagendorf minerals.

Type Material: n.d.

References: (1) M"ücke, A. (1988) Lehnerit Mn[\text{UO}_2]\text{PO}_4\text{]_2 8\text{H}_2\text{O}, ein neues Mineral aus dem Pegmatit von Hagendorf/Oberpfalz. Aufschluss, 39, 209–217 (in German with English abs.).
(2) (1990) Amer. Mineral., 75, 1433 (abs. ref. 1).