Lehnerite Mn\(^{2+}\)(UO\(_2\))\(_2\)(PO\(_4\))\(_2\)•8H\(_2\)O

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

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

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

Cell Data: Space Group: \(P2_1/\text{n}\). \(a = 7.04(2)\) \(b = 17.16(4)\) \(c = 6.95(2)\). \(\beta = 90^\circ18'\). \(Z = 2\).

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

\(\text{Total = } [100.0] [100.0]\)

(1) Hagendorf, Germany; by electron microprobe, total Fe as FeO, total Mn as MnO, H\(_2\)O by difference; corresponding to \((\text{Mn}_{0.99}\text{Fe}_{0.03})\Sigma = 1.02\text{(UO}_2\text{)}\Sigma = 2.07\text{(PO}_4\text{)}\Sigma = 2.00\cdot7.41\text{H}_2\text{O}\).

(2) Mn(UO\(_2\))\(_2\)(PO\(_4\))\(_2\)•8H\(_2\)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.