Lehnerite $Mn^{2+}(UO_2)_2(PO_4)_2 \cdot 8H_2O$

Crystal Data: Monoclinic, pseudotetragonal. *Point Group:* $2/m$. As thin pseudotetragonal crystals, tabular on {010} and modified by {101}, {$\bar{1}$01}, {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 {$\bar{1}$01}; poor on {100}. 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:* $X = b$; $Y \wedge a \simeq 8°$; $Z \wedge c = \approx 8°$. *Dispersion:* $r \gg v$. $\alpha = 1.599(2)$ $\beta = 1.607(2)$ $\gamma = 1.607(2)$ 2V(meas.) = 45°

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

	(1)	(2)
UO_3	63.0	61.58
P_2O_5	15.1	15.28
FeO	0.2	
MnO	7.5	7.63
H_2O	[14.2]	15.51
Total	[100.0]	100.00

(1) Hagendorf, Germany; by electron microprobe, total Fe as FeO, total Mn as MnO, H_2O by difference; corresponding to $(Mn_{0.99}Fe_{0.03})_{\Sigma=1.02}(UO_2)_{2.07}(PO_4)_{2.00} \cdot 7.41H_2O$.
(2) $Mn(UO_2)_2(PO_4)_2 \cdot 8H_2O$.

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) Mücke, A. (1988) Lehnerit $Mn[UO_2|PO_4]_2$ $8H_2O$, 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).