Phyllotungstite $HCaFe_3^{3+}(WO_4)_6 \cdot 10H_2O$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$, $mm2$, or 222. Crystals are flattened on {001}, to 0.25 mm, showing {100}, {010}, {110}, {001}, in radial aggregates and scaly crusts. *Twinning:* On {110}.

Physical Properties: *Cleavage:* On {001}, perfect. *Fracture:* Irregular. Hardness = ∼2
D(meas.) = > 4.03 D(calc.) = 5.26

Optical Properties: Translucent. *Color:* Yellow to yellow-brown. *Streak:* Pale yellow. *Luster:* Pearly.
Optical Class: Biaxial (–), may be uniaxial (–). *Orientation:* $Z = c$. *Dispersion:* $r \gg v$.
$\alpha = 2.10(1)$ β = n.d. $\gamma = 2.185(1)$ 2V(meas.) = 18°

Cell Data: *Space Group:* $Pmmm$, $Pmm2$, or $P222$. $a = 7.29$ $b = 12.59$ $c = 19.55$
Z = 3

X-ray Powder Pattern: Clara mine, Germany.
3.13 (10), 3.25 (8), 1.822 (8), 6.33 (7), 2.92 (7), 2.45 (7), 6.01 (6)

Chemistry:

	(1)	(2)
WO_3	72.7	74.16
Fe_2O_3	13.3	12.77
PbO	2.1	
CaO	1.8	2.99
H_2O	[10.1]	10.08
Total	[100.0]	100.00

(1) Clara mine, Germany; H_2O by difference, corresponds to $H(Ca_{0.61}Pb_{0.18})_{\Sigma=0.79}Fe_{3.15}(WO_4)_{5.93} \cdot 10.2H_2O$. (2) $HCaFe_3(WO_4)_6 \cdot 10H_2O$.

Occurrence: A rare secondary mineral in the oxidized zone of a hydrothermal polymetallic barite–fluorite deposit.

Association: Ferritungstite, scheelite, pyrite, fluorite, hematite, quartz.

Distribution: From the Clara mine, near Oberwolfach, Black Forest, Germany.

Name: From the Greek for *leaf*, reflecting its crystal habit, and *tungsten* in its composition.

Type Material: University of Stuttgart, Stuttgart, Germany; National Museum of Natural History, Washington, D.C., USA, 161199.

References: (1) Walenta, K. (1984) Phyllotungstit, ein neues sekundäres Wolframmineral aus der Grube Clara im mittleren Schwarzwald. Neues Jahrb. Mineral., Monatsh., 529–535 (in German with English abs.). (2) (1986) Amer. Mineral., 71, 846 (abs. ref. 1).