

Hügelite

$\text{Pb}_2(\text{UO}_2)_3\text{O}_2(\text{AsO}_4)_2 \cdot 5\text{H}_2\text{O}$

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Crystal Data: Monoclinic. *Point Group:* $2/m$ or 2 . Prismatic crystals, flattened on $\{100\}$, elongated and striated along $[001]$, showing $\{001\}$, $\{100\}$, $\{011\}$, $\{110\}$, to 3 mm.

Physical Properties: *Cleavage:* On $\{100\}$, good; on $\{110\}$, probable. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = ~ 2.5 D(meas.) = ~ 5.1 D(calc.) = 5.80 Radioactive.

Optical Properties: Transparent to translucent. *Color:* Yellow-orange to yellowish brown, brown. *Streak:* Pale yellow. *Luster:* Greasy to adamantine. *Optical Class:* Biaxial (+) to uniaxial (+). *Pleochroism:* Moderately strong; X = yellow; Y = yellow with orange tint; Z = colorless to pale yellow. *Orientation:* $Y = c$. *Dispersion:* $r \ll v$; extreme, showing anomalous interference colors and incomplete extinction. $\alpha = 1.898(5)$
 $\beta = 1.915(5)$ $\gamma = \text{n.d.}$ $2V(\text{meas.}) = \text{Small [red] to large [blue]; } 0^\circ\text{--}25^\circ$.

Cell Data: *Space Group:* $P2_1/m$ or $P2_1$. $a = 8.13(20)$ $b = 17.27(20)$ $c = 7.01(20)$
 $\beta = 109.0^\circ$ $Z = 2$

X-ray Powder Pattern: Michael mine, Germany.
3.73 (10b), 3.06 (9), 3.00 (7), 2.89 (7), 1.833 (7), 4.33 (6b), 2.70 (6)

Chemistry: (1) Michael mine, Germany; microchemical tests show Pb, U, As as the main components, H_2O determined as 5.3%; from X-ray data, presumed to be the arsenate analog of dumontite.

Occurrence: A rare secondary mineral in cavities in hornstone breccia.

Association: Hallimondite, widenmannite, zeunerite, mimetite, cerussite.

Distribution: From the Michael mine, Weiler, near Lahr, Black Forest, Germany.

Name: To honor Baron Friedrich von Hügel (1852–1925), Austrian-British theologian.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 815. (2) Walenta, K. (1979) Über den Hügelite. *Tschermaks Mineral. Petrog. Mitt.*, 26, 11–19 (in German with English abs.). (3) Piret, P. and J. Piret-Meunier (1988) Nouvelle détermination de la structure cristalline de la dumontite $\text{Pb}_2[(\text{UO}_2)_3\text{O}_2(\text{PO}_4)_2] \cdot 5\text{H}_2\text{O}$. *Bull. Minéral.*, 111, 439–442 (in French with English abs.).