

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

Twinning: Pseudo-merohedry by twin law $[\bar{1} 0\bar{1} / 010 / 001]$ confirmed by structure analysis.

Physical Properties: *Cleavage:* On {100}, good; on {110}, probable. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = ~ 2.5 D(meas.) = ~ 5.1 D(calc.) = 5.74 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 (+). $\alpha = 1.898(5)$ $\beta = 1.915(5)$ $\gamma = \text{n.d.}$ $2V(\text{meas.}) = \text{Small}$ [red] to large [blue]; $0^\circ\text{-}25^\circ$. *Pleochroism:* Moderately strong; $X = \text{yellow}$; $Y = \text{yellow with orange tint}$; $Z = \text{colorless to pale yellow}$. *Orientation:* $Y = c$. *Dispersion:* $r \ll v$; extreme, showing anomalous interference colors and incomplete extinction.

Cell Data: *Space Group:* $P2_1/m$. $a = 31.066(3)$ $b = 17.303(2)$ $c = 7.043(1)$ $\beta = 96.492(2)^\circ$ $Z = 8$

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, and As are the main components, H_2O determined as 5.3%; structure analysis confirms the composition (no analysis given) and this species to be the arsenate analog of dumontite.

Mineral Group: Phosphuranylite group.

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: 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.). (4) Locock, A.J. and P.C. Burns (2003) The structure of hügelite, an arsenate of the phosphuranylite group, and its relationship to dumontite. *Mineral. Mag.*, 67(5), 1109-1120. (5) (2004) *Amer. Mineral.*, 89, 897 (abs. ref. 4).