Hillite  

\[ \text{Ca}_2(\text{Zn}, \text{Mg})(\text{PO}_4)_2 \cdot 2\text{H}_2\text{O} \]

**Crystal Data:** Monoclinic, pseudo-orthorhombic.  
*Point Group:* 2/m. As delicate needles, to several mm long.

**Physical Properties:** Hardness = n.d.  
\[ \text{D(meas.)} = 1.43 \quad \text{D(calc.)} = 1.467 \]

**Optical Properties:** Semitransparent.  
*Color:* Yellow, yellowish green.  
*Optical Class:* [Biaxial (+).]  
*Orientation:* \(\alpha \parallel \text{elongation}\).  
\[ \alpha = \sim 1.75 \quad \beta = \sim 1.75 \quad \gamma = \sim 2.0 \]

\[ 2\text{V(meas.)} = \text{n.d.} \]

**Cell Data:** *Space Group:* \( P2_1/a \).  
\[ a = 15.81 \quad b = 3.967 \quad c = 7.876 \quad \beta = 102.67^\circ \quad Z = 2 \]

**X-ray Powder Pattern:** Synthetic. (ICDD 28-2002).  
\[ 3.52 (100), 7.69 (95), 3.36 (80), 6.16 (50), 3.84 (35), 3.14 (14), 3.79 (10) \]

**Chemistry:** (1) Modern identification would depend on coincidence of X-ray powder diffraction pattern with that of synthetic material (anthraquinone).

**Occurrence:** Very rare, in crusts around the surface vents of a burning coal deposit.

**Association:** Sal ammoniac, sulfur.

**Distribution:** On Mt. Pyramide, Spitsbergen, Norway.

**Name:** Honors Adolf Hoel (1879–1964), leader of the discovery expedition to Spitsbergen during which the mineral was found.

**Type Material:** Mineralogical-Geological Museum, University of Oslo, Oslo, Norway, 21981.

**References:**  
(2) (1923) Mineral. Abs., 2, 10 (abs. ref. 1).