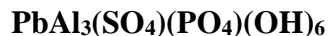


**Hinsdalite**

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . As rhombohedra {10 $\bar{1}$  1}, hexagonal plates, tabular on {0001}, or pseudocubic crystals, to 2 cm; massive or granular.

**Physical Properties:** *Cleavage:* Perfect on {0001}. Hardness = 4.5 D(meas.) = 3.65  
D(calc.) = 4.030

**Optical Properties:** Translucent. *Color:* Colorless, pale green, pearly white. *Luster:* Vitreous to greasy.

*Optical Class:* Uniaxial (+); may exhibit biaxial sectors.  $\omega = 1.671$   $\varepsilon = 1.689$

**Cell Data:** *Space Group:*  $R\bar{3} m$ .  $a = 7.029(4)$   $c = 16.789(4)$   $Z = 3$

**X-ray Powder Pattern:** Golden Fleece mine, Colorado, USA.

2.78 (100), 2.96 (80), 5.59 (65), 5.70 (50), 2.222 (50), 3.50 (40), 1.896 (25)

<b>Chemistry:</b>	(1)	(2)
SO <sub>3</sub>	14.13	15.36
P <sub>2</sub> O <sub>5</sub>	14.50	13.61
Al <sub>2</sub> O <sub>3</sub>	26.47	29.33
PbO	31.75	21.40
SrO	3.11	9.94
H <sub>2</sub> O	10.25	10.36
Total	100.21	100.00

(1) Golden Fleece mine, Colorado, USA. (2) (Pb, Sr)Al<sub>3</sub>(PO<sub>4</sub>)(SO<sub>4</sub>)(OH)<sub>6</sub> with Pb:Sr = 1:1.

**Mineral Group:** Beudantite group.

**Occurrence:** A rare secondary mineral in the oxidized zone of polymetallic sulfide deposits.

**Association:** Barite, pyrite, galena, tetrahedrite, rhodochrosite (Golden Fleece mine, USA).

**Distribution:** In the USA, large crystals from the Golden Fleece mine, near Lake City, Hinsdale Co., Colorado; in the Mineral Park mine, Mohave Co., Arizona; and at the Daisy Creek prospect, 25 km north of Thompson Falls, Sanders Co., Montana. In the Sylvester mine, Zeehan, and the Comet mine, Dundas, Tasmania; from Broken Hill, New South Wales, Australia. At Penkiln Burn, 13 km north-northeast of Newton Stewart, Kirkcudbrightshire, Scotland. In the Colettes massif, about 45 km southeast of Montluçon, Allier, France. From Bad Ems, Rhineland-Palatinate, and the Schoene Aussicht mine, near Dernbach, Westerwald area, Germany.

**Name:** For *Hinsdale* County, Colorado, USA, source of the first specimens.

**Type Material:** Harvard University, Cambridge, Massachusetts, 101680, 101682, 101683; National Museum of Natural History, Washington, D.C., USA, 86987, 92971.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1004. (2) Stanley, C.R. (1987) Hinsdalite and other products of oxidation at the Daisy Creek stratabound copper-silver prospect, northwestern Montana. *Can. Mineral.*, 25, 213-220. (3) Nicolas, J. and A. De Rosen (1963) Phosphates hydrothermaux de basse température et kaolinisation: la gorceixite du massif des Colettes (Allier) et les minéraux associés (hinsdalite). *Bull. Minéral.*, 86, 379-385 (in French). (4) Kolitsch, U., E.R.T. Tiekink, P.G. Slade, M.R. Taylor, and A. Pring (1999) Hinsdalite and plumbogummite, their atomic arrangements and disordered lead sites. *Eur. J. Mineral.*, 11, 513-520.