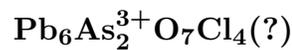


# Heliophyllite



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**Crystal Data:** Orthorhombic, pseudotetragonal. *Point Group:* n.d. As acute pyramidal crystals, horizontally striated, also tabular, radiating. Intergrown with ecdemite; in coarsely foliated or granular aggregates, ball-like, massive.

**Physical Properties:** *Cleavage:* {011}, nearly perfect. *Hardness* = ~2 *VHN* = 96  
*D*(meas.) = 6.89–7.14 *D*(calc.) = 7.33

**Optical Properties:** Translucent. *Color:* Yellow to greenish yellow. *Luster:* Vitreous on cleavages, greasy on fracture surfaces.

*Optical Class:* Biaxial (-); low birefringence. *Dispersion:*  $r < v$ , strong.  $\alpha = \text{n.d.}$   $\beta = \text{n.d.}$   
 $\gamma = \text{n.d.}$   $2V(\text{meas.}) = 35\text{--}40^\circ$

**Cell Data:** *Space Group:* n.d.  $a = 10.794\text{--}10.823$   $b = 10.766\text{--}10.783$   $c = 25.560\text{--}25.580$   
 $Z = 8$

**X-ray Powder Pattern:** Harstigen mine, Sweden. (ICDD 20-471).  
2.84 (100), 2.70 (40), 3.66 (35), 2.06 (25), 1.647 (25b), 1.587 (25), 3.19 (20)

<b>Chemistry:</b>	(1)	(2)	(3)
As <sub>2</sub> O <sub>3</sub>	10.85	12.28	12.01
Sb <sub>2</sub> O <sub>3</sub>	0.56	0.048	
(Fe, Mn)O	0.07		
FeO		0.60	
MnO		0.001	
ZnO		0.01	
PbO	81.03	80.21	81.32
MgO		0.007	
CaO	0.08	0.05	
Cl	8.05	8.05	8.61
P <sub>2</sub> O <sub>5</sub>		0.039	
-O = Cl <sub>2</sub>	1.82	1.85	1.94
Total	98.82	99.45	100.00

(1) Harstigen mine, Sweden. (2) Xitieshan mine, China. (3) Pb<sub>6</sub>As<sub>2</sub>O<sub>7</sub>Cl<sub>4</sub>.

**Occurrence:** From metamorphosed Fe–Mn orebodies (Sweden); in the oxidation zone above a Pb–Zn deposit (Xitieshan mine, China); in metallic slag exposed to seawater (Laurium, Greece).

**Association:** Ecdemite, inesite (Sweden); mimetite, cerussite, calcite (Xitieshan mine, China).

**Distribution:** From the Harstigen mine, near Persberg; at Jakobsberg; and at Långban, Värmland, Sweden. From Laurium, Greece, in slag. At the Xitieshan Pb–Zn mine, Chaidamu, Qinghai Province, China.

**Name:** From the Greek for *sun* and *leaf*, in allusion to its color and habit.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1037–1038. (2) W. Li and G. Chen (1985) The discovery of heliophyllite in China. *Acta Mineralogica Sinica*, 5(3), 216–220 (in Chinese with English abs.). (3) (1987) *Mineral. Abs.*, 38, 347 (abs. ref. 2).