## Finnemanite $Pb_5(As^{3+}O_3)_3Cl$



**Crystal Data:** Hexagonal. *Point Group:* $6/m$. As small distorted crystals, elongated ‖ [0001], showing $\{10\bar{1}0\}$, $\{10\bar{1}1\}$, and $\{0001\}$, in crystalline crusts.

**Physical Properties:** *Cleavage:* $\{10\bar{1}1\}$, distinct. Hardness = 2.5 D(meas.) = 7.265 D(calc.) = [7.35]

**Optical Properties:** Translucent to opaque. *Color:* Gray to black; pale olive-green in transmitted light. *Luster:* Subadamantine.
*Optical Class:* Uniaxial (–). $\omega = 2.2949$ $\epsilon = 2.2847$

**Cell Data:** *Space Group:* $P6_3/m$. $a = 10.322(7)$ $c = 7.055(6)$ $Z = 2$

**X-ray Powder Pattern:** Långban, Sweden.
3.03 (10), 2.88 (9), 3.35 (6), 2.07 (6), 1.957 (5), 1.924 (5), 1.352 (5)

**Chemistry:**

| | (1) | (2) |
|---|---|---|
| $As_2O_3$ | 20.54 | 20.61 |
| $Sb_2O_3$ | trace | |
| FeO | trace | |
| PbO | 76.83 | 77.49 |
| CaO | 0.39 | |
| $Na_2O$ | 0.24 | |
| $K_2O$ | 0.44 | |
| Cl | 2.42 | 2.46 |
| $-O = Cl_2$ | 0.55 | 0.56 |
| Total | 100.31 | 100.00 |

(1) Långban, Sweden. (2) $Pb_5(AsO_3)_3Cl$.

**Occurrence:** In crevices in hematite in a metamorphosed Fe–Mn orebody (Långban, Sweden).

**Association:** Hematite, rouseite, trigonite (Långban, Sweden).

**Distribution:** From Långban, Värmland, Sweden. In the Puttapa zinc mine, near Beltana, South Australia.

**Name:** For K.J. Finneman, of Långban, Sweden, who found the first specimen.

**Type Material:** Swedish Museum of Natural History, Stockholm, Sweden.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1038–1039. (2) Effenberger, H. and F. Pertlik (1979) Die Kristallstruktur des Finnemanits, $Pb_5Cl(AsO_3)_3$, mit einem Vergleich zum Strukturtyp des Chlorapatits, $Ca_5Cl(PO_4)_3$. Tschermaks Mineral. Petrog. Mitt., 26, 95–107 (in German with English abs.). (3) Traill, R.J. and A.P. Sabina (1960) Catalogue of X-ray diffraction patterns and specimen mounts on file at the Geological Survey of Canada. Geol. Sur. of Canada, Paper 60-4, 37.