## Hemloite $(As^{3+}, Sb^{3+})_2(Ti, Fe^{3+}, V^{3+}, Fe^{2+})_{12}O_{23}(OH)$



**Crystal Data:** Triclinic. *Point Group:* $\overline{1}$. As subhedral to anhedral grains, to 600 $\mu$m.

**Physical Properties:** *Fracture:* Curved to irregular. Hardness = 6.5–7 VHN = 858–967, 913 average (100 g load). D(meas.) = n.d. D(calc.) = 4.613

**Optical Properties:** Opaque. *Color:* Black; gray in reflected light. *Streak:* Black.
*Luster:* Metallic to submetallic.
*Optical Class:* Biaxial. *Dispersion:* Weak. *Anisotropism:* Very weak; dark gray to dark brown.
$R_1$–$R_2$: (400) 18.9–20.5, (420) 18.6–19.8, (440) 18.2–19.1, (460) 17.8–18.7, (480) 17.6–18.4, (500) 17.4–18.2, (520) 17.2–18.0, (540) 17.1–17.8, (560) 17.0–17.7, (580) 17.0–17.6, (600) 16.9–17.5, (620) 16.9–17.4, (640) 16.8–17.4, (660) 16.8–17.3, (680) 16.8–17.3, (700) 16.8–17.2

**Cell Data:** *Space Group:* $P\overline{1}$. $a = 7.158(1)$ $b = 7.552(1)$ $c = 16.014(3)$ $\alpha = 89.06(1)°$ $\beta = 104.32(2)°$ $\gamma = 84.97(1)°$ $Z = 2$

**X-ray Powder Pattern:** Hemlo deposit, Canada.
2.924 (100), 2.722 (90), 2.665 (90), 2.799 (80), 3.045 (70), 2.498 (70), 1.774 (60)

**Chemistry:**

| | (1) |
|---|---|
| $TiO_2$ | 39.0 |
| $Al_2O_3$ | 1.3 |
| $Fe_2O_3$ | 27.0 |
| $V_2O_3$ | 12.7 |
| $As_2O_3$ | 12.0 |
| $Sb_2O_3$ | 5.7 |
| Total | 97.7 |

(1) Hemlo deposit, Canada; by electron microprobe, $Fe^{2+}$:$Fe^{3+}$ and OH calculated from charge balance; corresponds to $(As^{3+}_{1.42}Sb^{3+}_{0.46})_{\Sigma=1.88}(Ti_{5.74}Fe^{3+}_{3.60}V^{3+}_{2.00}Fe^{2+}_{0.38}Al_{0.30})_{\Sigma=12.02}O_{23}(OH)$.

**Occurrence:** In a hydrothermal gold deposit.

**Association:** Quartz, barian microcline, pyrite, molybdenite, sphalerite, arsenopyrite, vanadian muscovite, rutile, titanite.

**Distribution:** From the Hemlo gold deposit, in the Page-Williams mine, three km east of Hemlo, Thunder Bay district, Ontario, Canada.

**Name:** For the Hemlo deposit, Ontario, Canada, where it occurs.

**Type Material:** The Natural History Museum, London, England, 1986,512 and E.1210; Canadian Geological Survey, Ottawa, Canada, 65544.

**References:** (1) Harris, D.C., B.F. Hoskins, I.E. Grey, A.J. Criddle, and C.J. Stanley (1989) Hemloite $(As, Sb)_2(Ti, V, Fe, Al)_{12}O_{23}OH$: a new mineral from the Hemlo gold deposit, Hemlo, Ontario, and its crystal structure. Can. Mineral., 27, 427–440. (2) (1990) Amer. Mineral., 75, 1432–1433 (abs. ref. 1).