## Manganarsite $Mn_3^{2+}As_2^{3+}O_4(OH)_4$



**Crystal Data:** Hexagonal or pseudohexagonal. *Point Group:* $\overline{3}$ $2/m$, $3m$, or 32. As platy hexagonal crystals, imperfect, to 1 mm; fine-grained, massive. *Twinning:* Lamellar, two sets at ~60°, observed optically.

**Physical Properties:** *Cleavage:* {0001}, perfect. Hardness = ~3 D(meas.) = 3.64 D(calc.) = 3.60

**Optical Properties:** Semitransparent. *Color:* Pale pinkish brown. *Streak:* Pale pink. *Luster:* Vitreous.
*Optical Class:* Biaxial (–). *Orientation:* $X \perp$ {0001} cleavage. *Dispersion:* $r > v$. $\alpha = 1.78$ $\beta = 1.81$ $\gamma = 1.81$ 2V(meas.) = 28°–43°

**Cell Data:** *Space Group:* $P\overline{3}1m$, $P31m$, $P3m1$, or $P312$. $a = 11.451(6)$ $c = 7.252(6)$ Z = 4

**X-ray Powder Pattern:** Långban, Sweden.
2.662 (100), 1.845 (70), 1.652 (60), 3.62 (50), 1.531 (40), 5.74 (30), 4.49 (30)

**Chemistry:**

| | (1) | (2) |
|---|---|---|
| $As_2O_3$ | 44.3 | 44.29 |
| $Sb_2O_3$ | 1.3 | |
| FeO | 1.8 | |
| MnO | 43.1 | 47.64 |
| MgO | 1.7 | |
| $H_2O$ | 7.7 | 8.07 |
| Total | 99.9 | 100.00 |

(1) Långban, Sweden; by electron microprobe, $Fe^{2+}$ determined by microchemical tests, $H_2O$ by TGA; corresponding to $(Mn_{2.74}Mg_{0.19}Fe_{0.11})_{\Sigma=3.04}(As_{2.02}Sb_{0.04})_{\Sigma=2.06}O_{4.21}(OH)_{3.85}$.
(2) $Mn_3As_2O_4(OH)_4$.

**Occurrence:** Coating armangite, and filling fractures, in a museum specimen from a metamorphosed Fe–Mn deposit.

**Association:** Calcite, barite, hematite, fluorite, armangite.

**Distribution:** From Långban, Värmland, Sweden.

**Name:** For MANGANese and ARSenic in the composition.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, R5795.

**References:** (1) Peacor, D.R., P.J. Dunn, W.B. Simmons, and F.J. Wicks (1986) Arsenites related to layer silicates: manganarsite, the arsenite analogue of manganpyrosmalite, and unnamed analogues of friedelite and schallerite from Långban, Sweden. Amer. Mineral., 71, 1517–1521.