Armangite

\[ \text{Mn}^{2+}_{26} \text{As}^{3+}_{18} \text{O}_{50} (\text{CO}_3)(\text{OH})_4 \]

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Crystal Data: Hexagonal. Point Group: \( \overline{3} \). As tiny short hexagonal prisms, terminated by a trigonal pyramid. Twinning: On \{11\overline{2}0\}.

Physical Properties: Cleavage: \( \{0001\} \), fair to poor. Hardness = \( \sim 4 \) D(meas. = \([4.43]\) (calculated from material with 12% admixed carbonate). D(calc.) = 4.406

Optical Properties: Opaque, transparent in thin fragments. Color: Black to pale brown; yellow to brown in transmitted light. Streak: Brown. Optical Class: Uniaxial (-). \( \omega = 2.01 \quad \epsilon = 1.99 \)

Cell Data: Space Group: \( P\overline{3} \). \( a = 13.491(2) \quad c = 8.855(1) \quad Z = 1 \)

2.762 (100), 2.94 (70), 2.428 (70), 1.759 (60), 3.92 (50), 1.676 (50), 1.459 (50)

Chemistry:

\[
\begin{array}{llll}
\text{As}_2\text{O}_3 & 42.92 & 48.82 & 48.06 \\
\text{Sb}_2\text{O}_3 & 0.40 & 0.46 & \\
\text{FeO} & 2.19 & 2.49 & \\
\text{MnO} & 45.06 & 47.06 & 49.78 \\
\text{PbO} & 0.32 & 0.36 & \\
\text{MgO} & 0.49 & & \\
\text{CaO} & 2.83 & & \\
\text{H}_2\text{O} & 0.71 & 0.81 & 0.97 \\
\text{CO}_2 & 5.08 & 1.19 & \\
\text{insol.} & 0.20 & & \\
\hline
\text{Total} & 100.20 & [100.00] & 100.00
\end{array}
\]

(1) Långban, Sweden; average of three analyses. (2) Do.; recalculated to 100% after deduction of insoluble and \((\text{Ca}, \text{Mn}, \text{Mg})\text{CO}_3\) 3.69%; essential \text{CO}_3 however was found by crystal-structure analysis and confirmed qualitatively by electron microprobe. (3) \( \text{Mn}^{2+}_{26} \text{As}^{3+}_{18} \text{O}_{50} (\text{CO}_3)(\text{OH})_4 \).

Occurrence: On a museum specimen collected from a metamorphosed Fe-Mn deposit.

Association: Calcite, dolomite, barite, hematite, fluorite, manganarsite, hausmannite.


Name: For ARsenic and MANGanese in the composition.


References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana’s system of mineralogy, (7th edition), v. II, 1031–1032. (2) Moore, P.B. and T. Araki (1979) Armangite, \( \text{Mn}^{2+}_{26} [\text{As}^{3+}_{6} (\text{OH})_4 \text{O}_{14}] [\text{As}^{3+}_{6} \text{O}_{18}]_2 [\text{CO}_3] \), a fluorite derivative structure. Amer. Mineral., 64, 748–757.