Zincobotryogen (Zn, Mg, Mn\(^{2+}\))Fe\(^{3+}\)(SO\(_4\))\(_2\)(OH)\(\cdot\)7H\(_2\)O

Crystal Data: Monoclinic. Point Group: 2/m. Prismatic crystals, to a few mm, showing \{010\}, \{\overline{1}01\}, \{120\}, \{110\}, minor \{\overline{1}11\}, \{101\}, singly and in conical radiating aggregates.

Physical Properties: Hardness = ~2.5  D(meas.) = 2.19–2.20  D(calc.) = [2.24]


Cell Data: Space Group: \(P2_1/n\). \(a = 10.488–10.51\)  \(b = 17.819–17.85\)  \(c = 7.14–7.185\)  \(\beta = 100°00′–100°50′\)  \(Z = 4\)

X-ray Powder Pattern: Synthetic. 8.963 (100), 5.163 (75), 3.027 (61), 6.354 (58), 4.095 (53), 2.762 (52), 3.219 (51)

Chemistry:

\[
\begin{array}{lcc}
\text{SO}_3 & \text{(1)} & \text{(2)} \\
\text{Al}_2\text{O}_3 & 0.01 & \\
\text{Fe}_2\text{O}_3 & 18.34 & 18.4 \\
\text{FeO} & 0.85 & 1.2 \\
\text{MnO} & 1.75 & 3.6 \\
\text{ZnO} & 11.77 & 7.7 \\
\text{MgO} & 2.50 & 1.6 \\
\text{Na}_2\text{O} & 0.05 & \\
\text{K}_2\text{O} & 0.00 & \\
\text{H}_2\text{O}^+ & 29.13 & 30.9 \\
\text{H}_2\text{O}^- & 0.22 & \\
\hline
\text{Total} & 100.65 & 99.5
\end{array}
\]

(1) Xitieshan mine, China; corresponds to \((\text{Zn}_{0.64}\text{Mg}_{0.27}\text{Mn}_{0.11}\text{Fe}_{2+0.05})\Sigma=1.00\text{Fe}_{3+1.96}(\text{SO}_4)_{1.96}\text{(OH)}_{1.06}\cdot\text{6.61H}_2\text{O}\). (2) Rammelsberg mine, Germany; corresponds to \((\text{Zn}_{0.47}\text{Mn}_{2+0.25}\text{Mg}_{0.20}\text{Fe}_{2+0.08}\Sigma=1.00\text{Fe}_{3+1.00}(\text{SO}_4)_{2\cdot1.00}\text{(OH)}\cdot\text{7H}_2\text{O}\).

Occurrence: A rare secondary mineral formed in the oxidation zone, typically in an arid climate.

Association: Pickeringite, chaidaminite, coquimbite, copiapite, butlerite, pyrite (Xitieshan mine, China); zincian melanterite (Rammelsberg mine, Germany).

Distribution: From an undisclosed Pb–Zn deposit [Xitieshan mine, south of Mt. Qilianshan, Chaidamu], Qinghai Province, China. At the Rammelsberg mine, near Goslar, Harz Mountains, Germany. In the USA, from Bisbee, Cochise Co., Arizona; in Colorado, from the Prompt Pay and Running Lode mines, Central City district, Gilpin Co., in the Summitville mine, Rio Grande Co., and at the Bonanza mine, Bonanza district, Saguache Co.

Name: For its dominant content of zinc and relation to botryogen.

Type Material: n.d.


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