Willemite

\( \text{Zn}_2 \text{SiO}_4 \)

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Crystal Data: Hexagonal. Point Group: \( \overline{3} \). Crystals prismatic, both stout and slender, terminated by rhombohedra and \{0001\}, to 10 cm. Coarse to fine granular, disseminated; in fibrous aggregates, botryoidal, and massive.

Physical Properties: Cleavage: Indistinct on \{0001\}, \{1\overline{1}2\overline{0}\}. Fracture: Irregular to conchoidal. Tenacity: Brittle. Hardness = 5.5 D(meas.) = 3.89–4.19 D(calc.) = 4.224 Typically strongly fluorescent in yellow-green to yellow-orange under SW and LW UV; may be phosphorescent.


Cell Data: Space Group: \( R\overline{3} \) (synthetic). \( a = 13.948(2) \quad c = 9.315(2) \quad Z = 18 \)

X-ray Powder Pattern: Synthetic.

2.634 (100), 2.834 (95), 3.486 (80), 2.318 (45), 4.026 (35), 1.8592 (35), 1.4205 (30)

Chemistry:

\[
\begin{array}{cccc}
\text{SiO}_2 & 26.55 & 26.56 & 26.96 \\
\text{Al}_2\text{O}_3 & 1.00 & & \\
\text{Fe}_2\text{O}_3 & 0.23 & & \\
\text{FeO} & 0.08 & 0.81 & \\
\text{MnO} & 0.12 & 8.96 & \\
\text{ZnO} & 72.11 & 61.38 & 73.04 \\
\text{PbO} & 0.005 & & \\
\text{MgO} & 0.13 & 1.05 & \\
\text{CaO} & 0.75 & & \\
\hline
\text{Total} & 99.99 & 99.74 & 100.00 \\
\end{array}
\]

(1–2) Franklin, New Jersey, USA. (3) \( \text{Zn}_2 \text{SiO}_4 \).

Occurrence: Of secondary origin, especially in zinc deposits developed in limestones; while uncommon, locally an important ore of zinc.

Association: Nasonite, glaucochroite, leucophoenicite (Franklin, New Jersey, USA); malachite, minnetite, rosasite, duftite, cerussite (Tsumeb, Namibia).

Distribution: In Belgium, from Altenberg, near Moresnet. At Tsumeb and Guchab, Namibia. From Kabwe (Broken Hill), Zambia. In the USA, large crystals at Franklin and Sterling Hill, Ogdensburg, Sussex Co., New Jersey; from Balmat, St. Lawrence Co., New York; in Arizona, from the Mammoth-St. Anthony mine, Tiger, Pinal Co., at the Red Cloud mine, La Paz Co., and other minor localities; in California, at the Ygnacis and Cerro Gordo mines, Inyo Co.; in the Tres Hermanas district, Luna Co., New Mexico. From Mont Saint-Hilaire, Quebec, Canada. In a large deposit at the Puttapa zinc mine, near Beltana, South Australia. There are many other minor localities.

Name: For William I (1772–1843), King of the Netherlands (1815–1840).


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