

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3}$ . 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}, {11 $\bar{2}$ 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.

**Optical Properties:** Transparent to opaque. *Color:* Colorless to white, gray, flesh-red, dark brown, honey-yellow, apple-green, blue; colorless in thin section. *Streak:* White.

*Luster:* Vitreous to resinous.

*Optical Class:* Uniaxial (+).  $\omega = 1.691\text{--}1.694$   $\epsilon = 1.719\text{--}1.725$

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

**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:**

	(1)	(2)	(3)
SiO <sub>2</sub>	26.55	26.56	26.96
Al <sub>2</sub> O <sub>3</sub>	1.00		
Fe <sub>2</sub> O <sub>3</sub>		0.23	
FeO	0.08	0.81	
MnO	0.12	8.96	
ZnO	72.11	61.38	73.04
PbO		0.005	
MgO	0.13	1.05	
CaO		0.75	
Total	99.99	99.74	100.00

(1–2) Franklin, New Jersey, USA. (3) Zn<sub>2</sub>SiO<sub>4</sub>.

**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, mimetite, 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).

**References:** (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 460–461. (2) Palache, C. (1935) The minerals of Franklin and Sterling Hill, Sussex County, New Jersey. U.S. Geol. Sur. Prof. Paper 180, 82–88. (3) Klaska, K.-H., J.C. Eck, and D. Pohl (1978) New investigations of willemite. Acta Cryst., 34, 3324–3325. (4) (1957) NBS Circ. 539, 7, 62.

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