

# Hardystonite

# Ca<sub>2</sub>ZnSi<sub>2</sub>O<sub>7</sub>

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**Crystal Data:** Tetragonal. *Point Group:*  $\bar{4}2m$ . In coarse, columnar masses; granular and as isolated grains.

**Physical Properties:** *Cleavage:* {001}, good; {100} and {110}, poor. *Tenacity:* Brittle. Hardness = 3–4 D(meas.) = 3.396–3.443 D(calc.) = 3.42 A dull violet fluorescence can be observed in some samples under UV.

**Optical Properties:** Translucent. *Color:* White, pinkish, light brown; colorless in thin section. *Luster:* Vitreous.

*Optical Class:* Uniaxial (-).  $\omega = 1.669$   $\epsilon = 1.657$

**Cell Data:** *Space Group:*  $P\bar{4}2_1m$ .  $a = 7.8287(16)$   $c = 5.0140(4)$   $Z = 2$

**X-ray Powder Pattern:** Franklin, New Jersey, USA. (ICDD 12-453). 2.868 (100), 3.085 (60), 3.711 (50), 5.018 (35), 1.761 (35), 2.473 (30), 2.037 (18)

Chemistry:	(1)	(2)	(3)
SiO <sub>2</sub>	38.10	36.80	38.31
Al <sub>2</sub> O <sub>3</sub>		0.94	
Fe <sub>2</sub> O <sub>3</sub>	0.57	0.20	
MnO	1.50	0.76	
ZnO	24.30	25.56	25.94
PbO		0.56	
MgO	1.62	0.39	
CaO	33.85	34.61	35.75
Na <sub>2</sub> O		0.29	
LOI	0.52		
Total	100.46	100.11	100.00

(1) Franklin, New Jersey, USA. (2) Do.; by electron microprobe. (3) Ca<sub>2</sub>ZnSi<sub>2</sub>O<sub>7</sub>.

**Mineral Group:** Melilite group.

**Occurrence:** In granular ore in a metamorphosed stratiform zinc deposit.

**Association:** Vesuvianite, apatite, franklinite, willemite, rhodonite, calcite, dolomite.

**Distribution:** From Franklin, Sussex Co., New Jersey, USA.

**Name:** For Hardyston Township in which Franklin is situated.

**Type Material:** Harvard University, Cambridge, Massachusetts, USA, 113594, 113608.

**References:** (1) Dana, E.S. (1899) Dana's system of mineralogy, (6th edition), app. I, 32–33. (2) Palache, C. (1935) The minerals of Franklin and Sterling Hill, Sussex County, New Jersey. U.S. Geol. Sur. Prof. Paper 180, 93–94. (3) Louisnathan, S.J. (1969) Refinement of the crystal structure of hardystonite, Ca<sub>2</sub>ZnSi<sub>2</sub>O<sub>7</sub>. Zeits. Krist., 130, 427–437.