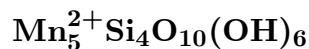


Bementite



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Crystal Data: Orthorhombic. *Point Group:* 222. Radiated or stellate with minute foliated structure; compact, hornlike forms; massive granular; in intricate intergrowths with other minerals.

Physical Properties: *Cleavage:* Perfect on {100}, {010}, {001}. *Fracture:* Conchoidal. Hardness = 4.5–6 D(meas.) = 2.98–3.02 D(calc.) = [3.07]

Optical Properties: Translucent. *Color:* Pale yellow to yellowish brown. *Luster:* Waxy, pearly on perfect cleavage.

Optical Class: Biaxial (–). *Pleochroism:* Weak, in yellows. *Orientation:* $X \perp \{001\}$. $\alpha = 1.624$ $\beta = 1.650$ $\gamma = 1.650$ $2V(\text{meas.}) = \sim 0^\circ$

Cell Data: *Space Group:* $P2_12_12_1$. $a = 14.5$ $b = 17.5$ $c = 29.1$ $Z = [16]$

X-ray Powder Pattern: Franklin, New Jersey, USA.

3.66 (100), 7.25 (90), 3.58 (90), 2.436 (14), 3.43 (9), 3.30 (6), 3.09 (5)

Chemistry:

	(1)	(2)	(3)
SiO ₂	39.00	38.36	37.03
Al ₂ O ₃		0.96	
Fe ₂ O ₃		0.71	
FeO	[3.75]	4.94	
MnO	42.12	39.22	54.64
ZnO	2.86	2.93	
MgO	3.83	3.35	
CaO	trace	0.62	
H ₂ O ⁺	8.44	8.01	8.33
H ₂ O [–]		0.60	
Total	[100.00]	99.70	100.00

(1) Franklin, New Jersey, USA; FeO lost, estimated by difference. (2) Do. (3) $\text{Mn}_5\text{Si}_4\text{O}_{10}(\text{OH})_6$.

Occurrence: Layered parallel to the walls of secondary veins of calcite in a metamorphosed stratiform zinc orebody (Franklin, New Jersey, USA); intimately intergrown with other manganese minerals (Olympic Peninsula, Washington, USA).

Association: Calcite, willemite (Franklin, New Jersey, USA); hausmannite, jacobsonite, braunite, alleghanyite, barite, grossular, johannsenite, calcite (Olympic Peninsula, Washington, USA); hausmannite, rhodochrosite, inesite (Hale Creek, California, USA).

Distribution: In the USA, at Franklin, Sussex Co., New Jersey; in Washington, on the Olympic Peninsula, an ore mineral at a number of small deposits in Clallan, Jefferson, and Mason Cos.; from Ray, Pinal Co., Arizona; at Hale Creek, Trinity Co., California; and from the Black Diablo mine, Black Diablo district, Pershing Co., Nevada. In the Treburland mine, Altarnun, Cornwall, and near Chillaten, Devon, England. From Langbåsen, Värmland, Sweden. In Russia, at a number of poorly-defined localities. In the Tokuzawa mine, Fukushima Prefecture; the Ichinomata mine, Kumamoto Prefecture; and at Kunimiyama, Kochi Prefecture, Japan. In the Wessels mine, near Kuruman, Cape Province, South Africa.

Name: For Clarence Sweet Bement (1843–1923), American mineral collector of Philadelphia, Pennsylvania, USA.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 704. (2) Palache, C. (1935) The minerals of Franklin and Sterling Hill, Sussex County, New Jersey. U.S. Geol. Sur. Prof. Paper 180, 117–118. (3) Kato, T. (1963) New data on the so-called bementite. J. Min. Soc. Japan, 6, 93–103 (in Japanese). (4) (1964) Amer. Mineral., 49, 446–447 (abs. ref. 3).

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