

# Bindheimite

# Pb<sub>2</sub>Sb<sub>2</sub>O<sub>6</sub>(O, OH)

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**Crystal Data:** Cubic. *Point Group:*  $4/m\bar{3}2/m$ . Fibrous, perhaps due to pseudomorphism; as dense to earthy cryptocrystalline masses and incrustations; rarely opaline.

**Physical Properties:** *Fracture:* Earthy, conchoidal. Hardness = 4–4.5 D(meas.) = 4.6–8.4 D(calc.) = [6.78–6.88]

**Optical Properties:** Translucent to opaque. *Color:* Yellow, yellow-brown, brown, white, gray, greenish; colorless to yellow and brown in transmitted light. *Streak:* White, yellowish white.

*Luster:* Resinous, dull, earthy.

*Optical Class:* Isotropic.  $n = 1.84\text{--}1.87$

**Cell Data:** *Space Group:*  $Fd\bar{3}m$ .  $a = 10.37\text{--}10.42$   $Z = 8$

**X-ray Powder Pattern:** Unknown locality.

3.03 (100), 1.85 (80), 1.58 (80), 2.62 (60), 0.884 (50), 1.20 (40), 1.17 (40)

<b>Chemistry:</b>	(1)	(2)	(3)		(1)	(2)	(3)
As <sub>2</sub> O <sub>5</sub>		0.1		CaO		1.0	
Sb <sub>2</sub> O <sub>5</sub>	40.35	30.0	41.06	Na <sub>2</sub> O		0.2	
Fe <sub>2</sub> O <sub>3</sub>	5.22	3.0		H <sub>2</sub> O	5.31		2.29
Bi <sub>2</sub> O <sub>3</sub>		9.7		LOI		4.5	
PbO	44.12	41.1	56.65	insol.	3.63	8.0	
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				Total	98.63	97.6	100.00

(1) Wamsley mine, Mineral Co., Nevada, USA. (2) Otjimboyo East, Namibia; remnant is SiO<sub>2</sub> 6.4%, insoluble 1.6%. (3) Pb<sub>2</sub>Sb<sub>2</sub>O<sub>7</sub>•H<sub>2</sub>O.

**Mineral Group:** Stibiconite group.

**Occurrence:** Common in the oxidized portions of antimony-bearing lead deposits.

**Association:** Galena, pyrite, chalcopyrite, tetrahedrite, jamesonite, bournonite, zinkenite, cerussite, plumbojarosite, argentojarosite, minium, massicot, quartz, barite, calcite, dolomite.

**Distribution:** A widely distributed mineral, but rarely in large amounts. From Nerchinsk, Siberia, Russia. In Austria, at Oberzeiring, Styria, and Hüttenberg, Carinthia. In Italy, at Camerata Cornello, Val Brembana, and at Gorno, Val Seriana, Lombardy. In the Bodannon mine and Wheal Boys, St. Endellion, and elsewhere in Cornwall, and at Caldbeck Fells, Cumbria, England. From Otjimboyo East, Karibib, Namibia. At Hamman N'bail, Qacentina (Constantine), Algeria. From Broken Hill, New South Wales, Australia. In the Chichibu mine, Saitama Prefecture, Japan. At Machacamaraca, Potosi, Bolivia. From the Ojuela mine, Mapimí, Durango, Mexico. In the USA, at the Montezuma and other mines, Arabia district, Pershing Co., Nevada; from the Coeur d'Alene district, Shoshone Co., Idaho; in several mines in the Tintic district, Juab Co., and the Horn Silver mine, San Francisco district, Beaver Co., Utah; at Cerro Gordo, Inyo Co., and elsewhere in California.

**Name:** For Johann Jacob Bindheim (1750–1825), German chemist who made the first chemical analysis of the mineral.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1018–1020. (2) Mason, B. and C.J. Vitaliano (1953) The mineralogy of the antimony oxides and antimonates. *Mineral. Mag.*, 30, 100–112. (3) Bothwell, D.I., R.J. Davis, and A.A. Moss (1960) A bismuth-bearing variety of bindheimite. *Mineral. Mag.*, 32, 664–666.