

**Crystal Data:** Tetragonal. *Point Group:*  $4/m\ 2/m\ 2/m$ . Very rare in platy crystals, to 0.5 mm; typically radially fibrous to spheroidal, in crusts and earthy to dense massive aggregates.

**Physical Properties:** *Cleavage:* On {001}, probable. Hardness = 2.5–3.5  
D(meas.) = 6.1–7.7; 8.11 D(calc.) = 8.25

**Optical Properties:** Opaque to transparent in small grains. *Color:* Straw-brown, brown, brownish yellow, pale yellow, pale green, greenish gray, gray, may be dark gray to black in dense pseudomorphs; colorless to pale yellow or pale green in transmitted light. *Streak:* Gray. *Luster:* Vitreous, waxy, may be dull to earthy. *Optical Class:* Uniaxial; moderate birefringence. *Orientation:* Positive elongation, parallel extinction.  $n = 2.12\text{--}2.30$

**Cell Data:** *Space Group:*  $I4/mmm$ .  $a = 3.867\text{--}3.870$   $c = 13.686\text{--}13.697$   $Z = 2$

**X-ray Powder Pattern:** Marropino mine, Zambezia, Mozambique.  
2.953 (100), 2.737 (41), 3.724 (30), 1.6184 (30b), 2.137 (25), 1.7502 (22b), 1.9354 (20)

Chemistry:	(1)	(2)
CO <sub>2</sub>	8.29	8.63
Bi <sub>2</sub> O <sub>3</sub>	91.68	91.37
H <sub>2</sub> O	trace	
Total	99.97	100.00

(1) Guanajuato, Mexico. (2) Bi<sub>2</sub>O<sub>2</sub>(CO<sub>3</sub>).

**Occurrence:** A relatively common alteration product of other bismuth-bearing minerals in hydrothermal mineral deposits and granite pegmatites.

**Association:** Bismuth, bismuthinite, tetradymite, many other bismuth-bearing minerals.

**Distribution:** Some well-confirmed occurrences include: in Germany, from Ullersreuth, Thuringia; at Schneeberg, Johanngeorgenstadt, and elsewhere in Saxony. At Meymac, Corrèze, France. In England, from Wheal Owles, Wheal Coates, the South Crofty mine, the Penberthy Croft mine, and others in Cornwall, and at Caldbeck Fells, Cumbria. From Beresovsk, near Yekaterinburg (Sverdlovsk), Middle Ural Mountains, Russia. At Tazna and many other places in Bolivia. In the USA, at the Harding mine, Dixon, Taos Co., New Mexico; in the Trout Creek Pass pegmatites, Chaffee Co., Colorado; from the Comstock mine, Dos Cabezas Mountains, Cochise Co., Arizona; at the Mammoth mine, Tintic district, Juab Co., Utah. From Kingsgate, New South Wales, Australia. At many other minor localities.

**Name:** In allusion to *bismuth* in the composition.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 259–262. (2) Lagerkrantz, A. and G. Sillén (1948) On the crystal structure of Bi<sub>2</sub>O<sub>2</sub>CO<sub>3</sub> (bismutite) and CaBi<sub>2</sub>O<sub>2</sub>(CO<sub>3</sub>)<sub>2</sub> (beyerite). *Arkiv Kemi*, 25(20), 21 p. (3) Sahama, T.G. and M. Lehtinen (1968) Bismutite of the granite pegmatites of Zambezia, Mozambique. *Bull. Geol. Soc. Finland*, 40, 145–150.