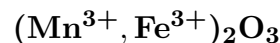


Bixbyite

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Crystal Data: Cubic. *Point Group:* $2/m\bar{3}$. As cubes, rarely modified by {112} or {111}, commonly striated, to 6 cm; massive. *Twinning:* On {111}, as penetration twins.

Physical Properties: *Cleavage:* {111}, in traces. *Fracture:* Irregular. Hardness = 6–6.5 VHN = 946–1402 (100 g load). $D(\text{meas.}) = 4.945$ $D(\text{calc.}) = 5.031$

Optical Properties: Opaque. *Color:* Black. *Streak:* Black. *Luster:* Metallic.

Optical Class: Isotropic.

R: (400) 24.7, (420) 24.1, (440) 23.5, (460) 23.0, (480) 22.8, (500) 22.9, (520) 23.3, (540) 23.6, (560) 23.5, (580) 23.2, (600) 22.9, (620) 22.7, (640) 22.4, (660) 22.2, (680) 22.2, (700) 22.1

Cell Data: *Space Group:* $Ia\bar{3}$. $a = 9.411$ $Z = 16$

X-ray Powder Pattern: Synthetic Mn_2O_3 .

2.72 (100), 1.664 (30), 3.84 (25), 2.01 (14), 1.845 (14), 1.4191 (14), 2.35 (12)

Chemistry:	(1)	(2)	(3)
SiO_2	1.21	0.00	
TiO_2	1.70		
Al_2O_3	2.53	2.02	
Fe_2O_3	47.98	14.86	50.29
Mn_2O_3		82.56	49.71
MnO	42.05		
MgO	0.10	0.07	
O	4.38		
Total	99.95	99.51	100.00

(1) Thomas Range, Utah, USA; average of two analyses. (2) Postmasburg, South Africa; by electron microprobe. (3) $(\text{Mn}, \text{Fe})_2\text{O}_3$ with Mn:Fe = 1:1.

Occurrence: In lithophysal cavities in rhyolite; in metamorphosed manganese ores.

Association: Topaz, spessartine, beryl, quartz, sanidine, pseudobrookite, hematite (rhyolites); braunite (manganese ores).

Distribution: In the USA, from the Thomas Range, Juab Co., Utah; at a number of places in the Black Range, Sierra and Catron Cos., New Mexico; and near Saddle Mountain, Pinal Co., Arizona. In Mexico, at Cerro de Mercado, Durango; the Barranca del Cobre, Chihuahua; and Tepetate, San Luis Potosi. From Ribes, Girona Province, Spain. At the Bellerberg volcano, two km north of Mayen, Eifel district, Germany. At Långban, Värmland, near Murjek, and at Sörhårås, Ultevis, Sweden. From Sitapár, Chindwara district, Central Provinces, and the Kajlidongri mine, Jhabua district, Madhya Pradesh, India. At Cobatla, near Postmasburg, Transvaal; a major ore in the Kuruman district, Cape Province, South Africa. In the Lomagundi district, Zimbabwe. Large crystals from the Otjiwarango district, Namibia. A few additional localities are known.

Name: For Maynard Bixby, mineral dealer of Salt Lake City, Utah, USA, who provided the first specimens.

Type Material: Yale University, New Haven, Connecticut, USA, 1.6369.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 550–551. (2) Montgomery, A. (1934) A recent find of bixbyite and associated minerals in the Thomas Range, Utah. *Amer. Mineral.*, 19, 82–87. (3) Geller, S. (1971) Structures of $\alpha\text{-Mn}_2\text{O}_3$, $(\text{Mn}_{0.983}\text{Fe}_{0.017})_2\text{O}_3$ and $(\text{Mn}_{0.37}\text{Fe}_{0.63})_2\text{O}_3$ and relation to magnetic ordering. *Acta Cryst.*, 27, 821–828. (4) Moore, P.B. and T. Araki (1976) Braunite: its structure and relationship to bixbyite, and some insights on the genealogy of fluorite derivative structures. *Amer. Mineral.*, 61, 1226–1240. (5) de Villiers, J.P. and P.R. Buseck (1989) Stacking variations and nonstoichiometry in the bixbyite-braunite polysomatic mineral group. *Amer. Mineral.*, 74, 1325–1336. (6) (1959) NBS Circ. 539, 9, 37.

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