

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . Crystals, to 12 cm, but indistinct, commonly in parallel groupings, or hopped; reticulated, arborescent, foliated, granular. *Twining:* Polysynthetic, common.

**Physical Properties:** *Cleavage:* Perfect on {0001}, good on {10 $\bar{1}$ 1}, poor on {10 $\bar{1}$ 4}. *Tenacity:* Sectile, brittle. *Hardness* = 2–2.5 *VHN* = 16–18 (100 g load). *D*(meas.) = 9.70–9.83 *D*(calc.) = 9.81

**Optical Properties:** Opaque. *Color:* Silver-white, with reddish hue, tarnishes iridescent; in polished section, brilliant creamy white, tarnishing yellow. *Streak:* Pale silver. *Luster:* Metallic. *Pleochroism:* Feeble. *Anisotropism:* Distinct.

*R*<sub>1</sub>–*R*<sub>2</sub>: (400) 47.0–58.2, (420) 49.3–58.8, (440) 51.4–59.7, (460) 52.9–60.9, (480) 54.4–62.4, (500) 56.2–63.9, (520) 57.8–65.3, (540) 59.3–66.6, (560) 60.4–67.8, (580) 61.4–69.0, (600) 62.4–69.9, (620) 63.1–70.7, (640) 63.6–71.5, (660) 63.9–72.2, (680) 64.0–72.8, (700) 64.1–73.2

**Cell Data:** *Space Group:*  $R\bar{3}m$ . *a* = 4.546 *c* = 11.860 *Z* = 6

**X-ray Powder Pattern:** Synthetic.

3.28 (100), 2.273 (41), 2.37 (40), 1.868 (23), 1.443 (16), 1.491 (11), 1.330 (11)

**Chemistry:**

	(1)
Bi	98.77
Sb	0.5
As	0.19
S	0.2
Total	99.66

(1) Durango, Mexico.

**Mineral Group:** Arsenic group.

**Occurrence:** In hydrothermal veins with ores of Co, Ni, Ag, and Sn; in pegmatites and topaz-bearing Sn–W quartz veins.

**Association:** Chalcopyrite, arsenopyrite, pyrrhotite, pyrite, cobaltite, nickeline, breithauptite, skutterudite, safflorite, löllingite, bismuthinite, silver, cubanite, molybdenite, sphalerite, galena, scheelite, wolframite, calcite, barite, quartz.

**Distribution:** From numerous localities, but typically as a minor accessory mineral. From Altenberg, Schneeberg, and Annaberg, Saxony, Germany. At Jáchymov (Joachimsthal), Czech Republic. From near Villanueva de Córdoba, Córdoba Province, Spain. In the Dolcoath and other mines, Cornwall, England. From Uncia, Chorolque, Llallagua, and Tazna, Potosí, Bolivia, economically important. An 11 kg nugget found at Velaque, La Paz, Bolivia. In the Mt. Arthur mine, Queensland, and from Kingsgate, New South Wales, Australia. At Natsukidani, Oita Prefecture, Japan, large crystals. From Cobalt, Ontario, Canada.

**Name:** From the German *weisse masse*, later *wismuth*, *white mass*.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 134–135. (2) (1954) NBS Circ. 539, 3, 20. (3) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 47.