

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3} 2/m$ . As hexagonal plates, commonly rounded, to 5 mm, in irregular aggregates.

**Physical Properties:** *Cleavage:* Perfect on {0001}. *Hardness* = n.d. *VHN* = 51–90 (15 g load). *D*(meas.) = 8.16(5) *D*(calc.) = 8.23

**Optical Properties:** Opaque. *Color:* Silver-white; in polished section, white with a creamy tint. *Streak:* Steel-gray. *Luster:* Metallic. *Pleochroism:* Very weak. *Anisotropism:* Moderate.  $R_1$ – $R_2$ : (400) 61.0–62.2, (420) 61.1–62.3, (440) 61.2–62.4, (460) 61.3–62.7, (480) 61.4–63.1, (500) 61.5–63.4, (520) 61.6–63.8, (540) 61.7–64.2, (560) 61.9–64.6, (580) 62.2–65.0, (600) 62.5–65.4, (620) 62.7–65.7, (640) 63.0–65.9, (660) 63.1–66.0, (680) 63.2–66.1, (700) 63.3–66.2

**Cell Data:** *Space Group:*  $P\bar{3}m1$ . *a* = 4.422(2) *c* = 24.05(2) *Z* = 6

**X-ray Powder Pattern:** Tsumo mine, Japan.

3.23 (vs), 2.36 (s), 2.21 (s), 1.825 (s), 1.487 (s), 2.01 (m), 1.617 (m)

<b>Chemistry:</b>	(1)	(2)
Bi	61.1	62.09
Pb	1.0	
Te	37.6	37.91
Total	99.7	100.00

(1) Tsumo mine, Japan; by electron microprobe, corresponding to  $(\text{Bi}_{0.99}\text{Pb}_{0.02})_{\Sigma=1.01}\text{Te}_{1.00}$ .

(2) BiTe.

**Occurrence:** In massive Ni–Cu–PGE deposits; in Cu–Zn–Pb deposits, with sulfosalts, formed at lower temperatures.

**Association:** Pentlandite, chalcopyrite, pyrrhotite, sperrylite, parkerite, maucherite, michenerite, tetradymite, pilsenite, cosalite, altaite, bismuthinite, galena.

**Distribution:** From Japan, in the Tsumo mine, about 50 km northwest of Hiroshima City, Shimane Prefecture [TL]. At the Dashuigou tellurium deposit, Sichuan Province, China. In the Ban Phuc deposit, northwestern Vietnam. From the Kolar Gold Fields, Karnataka, India. In Russia, at the Tyrnyauz W–Mo deposit, left bank of the Baksan River Valley, northern Caucasus Mountains; in the Alekseevskoye mine, Sutam district, Stanovoi Range, southeast Sakha. From the Ransko massif, about 18 km east-northeast of Havlíčkův Brod, Czech Republic. At Úhorná, Slovakia. From the Bjorkdal gold mine, Vasterbotten, and at Tunaberg, Sweden. From Sylvanite, Hidalgo Co., New Mexico, USA. In the Copper Cliff South mine, Sudbury, Ontario, Canada. A few additional poorly located localities are known.

**Name:** For the Tsumo mine, Japan, where it was first found.

**Type Material:** University Museum, University of Tokyo, Tokyo, Japan.

**References:** (1) Shimazaki, H. and T. Ozawa (1978) Tsumoite, BiTe, a new mineral from the Tsumo mine, Japan. *Amer. Mineral.*, 63, 1162–1165. (2) Vavřín, I. and J. Frýda (1998) Michenerite PdBiTe and froodite PdBi<sub>2</sub> from the Cu–Ni mineralization in the Ransko massif, Czech Republic. *Mineral. Petrol.*, 63, 141–146. str?? (3) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 584.