

**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3}2/m$ . As very thin foils, to 4 mm across.

**Physical Properties:** *Cleavage:* Perfect on {0001}. *Tenacity:* Flexible. Hardness = 1.5 VHN = 100 (50 g load).  $D(\text{meas.}) > 7.5$   $D(\text{calc.}) = 8.08$

**Optical Properties:** Opaque. *Color:* Silver-white to tin-white. *Streak:* Pale steel-gray. *Luster:* Metallic. *Pleochroism:* Pinkish creamy white to white with creamy tint. *Anisotropism:* Strong, bluish gray to brownish gray to gray. *Bireflectance:* Weak to moderate.  $R_1$ – $R_2$ : (400) 45.8–50.6, (420) 46.6–51.4, (440) 47.7–52.0, (460) 48.7–53.3, (480) 49.6–54.3, (500) 50.3–55.2, (520) 50.9–56.0, (540) 51.4–56.3, (560) 51.7–56.6, (580) 52.0–56.7, (600) 52.2–56.8, (620) 52.3–56.8, (640) 52.3–56.6, (660) 52.2–56.4, (680) 52.1–56.3, (700) 51.9–56.2

**Cell Data:** *Space Group:*  $R\bar{3}m$ .  $a = 4.235$ – $4.240$   $c = 29.59$ – $29.66$   $Z = 3$

**X-ray Powder Pattern:** Kawazu mine, Japan.  
3.12 (100), 2.31 (50), 2.12 (50), 4.92 (40), 3.64 (30), 2.61 (20), 1.757 (20)

Chemistry:	(1)	(2)
Bi	55.4	58.9
Te	31.9	25.9
Se	9.9	12.9
S	0.1	1.9
Total	97.3	99.6

- (1) Kawazu mine, Japan; by electron microprobe, corresponding to  $\text{Bi}_{2.07}(\text{Te}_{1.95}\text{Se}_{0.97}\text{S}_{0.03})_{\Sigma=2.95}$ .  
(2) Suttsu mine, Japan; by electron microprobe, corresponding to  $\text{Bi}_{2.01}(\text{Te}_{1.42}\text{Se}_{1.15}\text{S}_{0.42})_{\Sigma=2.99}$ .

**Mineral Group:** Tetradymite group.

**Occurrence:** Of hydrothermal origin, in a quartz veins (Kawazu and Suttsu mines, Japan); in a breccia pipe cutting dacitic ignimbrites (Mazenod Lake, Canada).

**Association:** Selenian tellurium (Kawazu mine, Japan); tellurobismuthite, uraninite, hematite, yarrowite (Mazenod Lake, Canada); selenian bismuthinite, selenian pavonite, cassiterite, chalcopyrite, pyrite (Suttsu mine, Japan).

**Distribution:** In Japan, from the Kawazu mine, three km north of Shimoda, Izu Peninsula, Shizuoka Prefecture [TL], and at the Suttsu mine, Hokkaido. From the Dianne Cu–U claims, Mazenod Lake, Northwest Territories, Canada. In the USA, at the Lone Pine mine, near Silver City, Grant Co., New Mexico; in the Ward mine, south of Ely, Ward district, White Pine Co., and at Montreal Canyon, Fitting district, Mineral Co., Nevada. From Jilové, Czech Republic. At Ocna de Fier (Morávicza; Vaskő), Romania.

**Name:** For the Kawazu mine, Japan.

**Type Material:** National Science Museum, Tokyo, Japan, M16403; National School of Mines, Paris, France; National Museum of Natural History, Washington, D.C., USA, 121926, 160136.

**References:** (1) Kato, A. (1970) In: Introduction to Japanese minerals. Geol. Sur. Japan, 1970, 87–88. (2) (1972) Amer. Mineral., 57, 1312 (abs. ref. 1). (3) Shimizu, M., S.T. Schmidt, C.J. Stanley, and K. Tsunoda (1995) Kawazulite and unnamed  $\text{Bi}_3(\text{Te, Se, S})_4$  in Ag – Bi – Te – Se – S mineralization from the Suttsu mine, Hokkaido, Japan. Neues Jahrb. Mineral., Abh., 169, 305–308. (4) Nakajima, S. (1963) The crystal structure of  $\text{Bi}_2\text{Te}_{3-x}\text{Se}_x$ . J. Chem. Phys. Solids, 24, 479–485.