

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$ or $mm2$. As grains, to 0.3 mm, or irregular masses; as intergrowths with other sulfides.

Physical Properties: Hardness = n.d. VHN = 190–230 (25 g load). D(meas.) = n.d. D(calc.) = 6.06

Optical Properties: Opaque. *Color:* Pale gray to grayish white in reflected light.

Luster: Metallic. *Anisotropism:* Moderate, from grayish blue to pinkish brown or yellowish brown. *Birefractance:* Very faint; pale gray to white.

R_1 – R_2 : (400) 29.2–30.8, (420) 29.7–30.8, (440) 30.6–31.4, (460) 31.2–32.0, (480) 31.3–32.0, (500) 32.1–32.8, (520) 32.2–32.9, (540) 32.2–33.0, (560) 32.1–33.0, (580) 32.2–33.5, (600) 32.2–33.9, (620) 32.3–34.3, (640) 32.4–34.9, (660) 32.4–35.1, (680) 32.8–35.7, (700) 32.8–35.8

Cell Data: *Space Group:* $Pbmn$, $Pb2m$, or $Pb2_1m$. $a = 10.854(4)$ $b = 11.985(4)$
 $c = 3.871(1)$ $Z = 2$

X-ray Powder Pattern: Mihara mine, Japan.

3.03 (100), 3.00 (70), 1.935 (70), 2.18 (50), 3.25 (30), 3.11 (30), 2.70 (30)

Chemistry:

	(1)	(2)	(3)
Pb	22.72	23.10	22.56
Cu	28.24	27.62	27.67
Fe	6.05	6.05	6.08
Bi	22.75	23.54	22.75
S	20.60	20.66	20.94
Total	100.36	100.97	100.00

(1) Mihara mine, Japan; by electron microprobe, average of six analyses; corresponds to Pb_{1.01}Cu_{4.09}Fe_{1.00}Bi_{1.00}S_{5.91}. (2) Ulsan mine, Korea; by electron microprobe, average of 13 analyses on five grains; corresponds to Pb_{1.03}Cu_{4.00}Fe_{1.00}Bi_{1.04}S_{5.94}. (3) PbCu₄FeBiS₆.

Occurrence: As disseminations in a hedenbergite-garnet-epidote contact metamorphic deposit (Mihara mine, Japan); in a mineralized quartz vein through granite (Imooka mine, Japan); in a bornite vein in copper skarn ore (Ulsan mine, Korea).

Association: Wittichenite, bornite, chalcopyrite, galena.

Distribution: In Japan, in Okayama Prefecture, from the Honpi deposit, Mihara mine [TL], and the Imo-oka mine; in Hyogo Prefecture, in the Akenobe mine. In the Ulsan mine, Kyongsang Province, South Korea. At the Hol Kol Au–Cu mine, about 75 km southeast of Pyongyang, Suan Co., North Korea. From Neves-Corvo, Portugal.

Name: For the type locality at the Mihara mine, Japan.

Type Material: The Institute of Mineralogy, Petrology, and Economic Geology, Faculty of Science, Tohoku University, Sendai, Japan.

References: (1) Sugaki, A., H. Shima, and A. Kitakaze (1980) Miharaite, Cu₄FePbBiS₆, a new mineral from the Mihara mine, Okayama, Japan. *Amer. Mineral.*, 65, 784–788. (2) Choi, S.G. and N. Imai (1983) Miharaite in bornite-rich copper ore from the Ulsan mine, Republic of Korea. *J. Japan. Assoc. Mineral. Petrol. Econ. Geol.*, 78, 350–360 (in English). (3) Petrova, ?? (1988) ??title-str?? *Doklady Acad. Nauk SSSR*, 157??.