Matildite $AgBiS_2$

Crystal Data: Hexagonal. *Point Group:* $\overline{3}\ 2/m$. Subhedral prismatic crystals rare; massive, granular; characteristically in intimate intergrowth with galena, which may form Widmanstättenlike textures.

Physical Properties: *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 2.5 VHN = 72–85 (100 g load). D(meas.) = 6.9 D(calc.) = 6.99

Optical Properties: Opaque. *Color:* Iron-black to gray; white in polished section. *Streak:* Pale gray. *Luster:* Metallic. *Pleochroism:* Weak. *Anisotropism:* Weak. R_1–R_2: (400) 41.4–47.2, (420) 41.9–47.8, (440) 42.2–48.3, (460) 43.1–48.8, (480) 43.4–49.3, (500) 43.4–49.3, (520) 43.0–49.0, (540) 42.8–48.4, (560) 42.5–47.8, (580) 42.2–47.3, (600) 41.7–46.9, (620) 41.3–46.7, (640) 40.8–46.7, (660) 40.3–46.7, (680) 39.9–46.3, (700) 39.3–46.1

Cell Data: *Space Group:* $P\overline{3}m1$. $a = 4.0662(21)$ $c = 18.5958(17)$ $Z = 3$

X-ray Powder Pattern: Camsell River area, Canada.
2.827 (100), 3.302 (80), 1.966 (60), 2.029 (50), 6.311 (30), 1.709 (30), 3.453 (20)

Chemistry:

	(1)	(2)	(3)
Ag	28.76	27.3	28.33
Bi	54.50	56.0	54.84
S	17.24	16.9	16.83
Total	100.50	100.2	100.00

(1) Morococha, Peru; average of three analyses, after deduction of galena; corresponds to $Ag_{0.99}Bi_{0.97}S_{2.00}$. (2) Camsell River area, Canada; by electron microprobe, corresponds to $Ag_{0.96}Bi_{1.02}S_{2.00}$. (3) $AgBiS_2$.

Occurrence: Formed in hydrothermal deposits at medium to high temperatures and in pegmatites.

Association: Galena, pavonite, aikinite, bismuthinite, hessite, tetradymite, pyrite, chalcopyrite, sphalerite, arsenopyrite, tetrahedrite.

Distribution: From the Matilda mine, near Morococha, Peru [TL]. At Cerro Rico, Potosí, Bolivia. From the Pirquitas deposit, Riconada Department, Jujuy Province, Argentina. In the USA, at the Mayflower mine, Boise basin area, Ada Co., Idaho; in the Darwin mine, Inyo Co., California; in Colorado, near Lake City, Hinsdale Co., in the Revell #1 mine, north of Silver Cliff, Custer Co., at Leadville, Lake Co., and elsewhere; from the Campbell mine, Bisbee, Cochise Co., Arizona; at the Outlaw mine, Round Mountain district, Nye Co., Nevada. In Canada, in the O'Brien and other mines, Cobalt, Ontario; at Glacier Gulch, British Columbia; and along the Camsell River, about six km south of Great Bear Lake, Northwest Territories. In Germany, from Schapbach, Black Forest. At Baia Borşa, Baia Mare (Nagybánya), Romania. From Bustarviejo, near Madrid, Spain. At Panasqueira and in the Vale das Gatas tungsten mine, near Vila Real, Portugal. In southwestern Greenland, from the Ivigtut cryolite deposit. In the Kenya mine, Imtali, Zimbabwe. Also known from a few other occurrences with less-well-defined locality information.

Name: For its occurrence in the Matilda mine, Peru.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 429–430. (2) Harris, D.C. and R.I. Thorpe (1969) New observations on matildite. Can. Mineral., 9, 655–662. (3) Geller, S. and J.H. Wernick (1959) Ternary semiconducting compounds with sodium chloride-like structure: $AgSbSe_2$, $AgSbTe_2$, $AgBiS_2$, $AgBiSe_2$. Acta Cryst., 12, 46–54. (4) Bayliss, P. (1991) Crystal chemistry and crystallography of some minerals in the tetradymite group. Amer. Mineral., 76, 257–265. (5) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 358.