

**Crystal Data:** Monoclinic, pseudo-orthorhombic. *Point Group:*  $2/m$ . Primary crystals are rare, prismatic to long prismatic, elongated along [001], to 2.5 cm, may be tubular; massive. Commonly paramorphic after the cubic high-temperature phase (“argentite”), of original cubic or octahedral habit, to 8 cm. *Twinning:* Polysynthetic on  $\{\bar{1}11\}$ , may be very complex due to inversion; contact on  $\{\bar{1}01\}$ .

**Physical Properties:** *Cleavage:* Indistinct. *Fracture:* Uneven. *Tenacity:* Sectile. Hardness = 2.0–2.5 VHN = 21–25 (50 g load). D(meas.) = 7.20–7.22 D(calc.) = 7.24 Photosensitive.

**Optical Properties:** Opaque. *Color:* Iron-black. *Streak:* Black. *Luster:* Metallic. *Anisotropism:* Weak.

R: (400) 32.8, (420) 32.9, (440) 33.0, (460) 33.1, (480) 33.0, (500) 32.7, (520) 32.0, (540) 31.2, (560) 30.5, (580) 29.9, (600) 29.2, (620) 28.7, (640) 28.2, (660) 27.6, (680) 27.0, (700) 26.4

**Cell Data:** *Space Group:*  $P2_1/n$ .  $a = 4.229$   $b = 6.931$   $c = 7.862$   $\beta = 99.61^\circ$   $Z = 4$

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

2.606 (100), 2.440 (80), 2.383 (75), 2.836 (70), 2.583 (70), 2.456 (70), 3.080 (60)

Chemistry:	(1)	(2)	(3)
Ag	86.4	87.2	87.06
Cu		0.1	
Se	1.6		
S	12.0	12.6	12.94
Total	100.0	99.9	100.00

(1) Guanajuato, Mexico; by electron microprobe. (2) Santa Lucia mine, La Luz, Guanajuato, Mexico; by electron microprobe. (3) Ag<sub>2</sub>S.

**Polymorphism & Series:** The high-temperature cubic form (“argentite”) inverts to acanthite at about 173 °C; below this temperature acanthite is the stable phase and forms directly.

**Occurrence:** A common silver species in moderately low-temperature hydrothermal sulfide veins, and in zones of secondary enrichment.

**Association:** Silver, pyrargyrite, proustite, polybasite, stephanite, aguilarite, galena, chalcopryite, sphalerite, calcite, quartz.

**Distribution:** Widespread in silver deposits. Localities for fine primary and paramorphic crystals include: from Jáchymov (Joachimsthal), Czech Republic [TL]. In Germany, at Freiberg, Schneeberg, Annaberg, and Marienberg, Saxony; and from St. Andreasberg, Harz Mountains. In Mexico, large paramorphs from Arizpe, Sonora; in the Rayas and other mines at Guanajuato; and from many mines in Zacatecas, Chihuahua, etc. In the USA, at Butte, Silver Bow Co., Montana; Tonopah, Nye Co., and the Comstock Lode, Virginia City, Storey Co., Nevada. From various mines at Cobalt, Ontario, Canada. At Chañarcillo, south of Copiapó, Atacama, Chile.

**Name:** From the Greek for *thorn*, in allusion to the shape of the crystals.

**Type Material:** Emperor’s collection, Vienna, Austria, 2592.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1944) Dana’s system of mineralogy, (7th edition), v. I, 191–192 (acanthite), 176–178 (“argentite”). (2) Frueh, A.J., Jr. (1958) The crystallography of silver sulfide, Ag<sub>2</sub>S. *Zeits. Krist.*, 110, 136–144. (3) Sadanaga, R. and S. Sueno (1967) X-ray study on the  $\alpha$ – $\beta$  transition of Ag<sub>2</sub>S. *Mineral. J. (Japan)*, 5, 124–143. (4) Petruk, W., D.R. Owens, J.M. Stewart, and E.J. Murray (1974) Observations on acanthite, aguilarite and naumannite. *Can. Mineral.*, 12, 365–369. (5) (1960) NBS Circ. 539, 10, 51. (6) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 1.

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