Acanthite  \( \text{Ag}_2\text{S} \)

**Crystal Data:** Monoclinic, pseudo-orthorhombic.  \textit{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.  \textit{Twinning:} Polysynthetic on \( \{111\} \), may be very complex due to inversion; contact on \( \{101\} \).

**Physical Properties:**  \textit{Cleavage:} Indistinct.  \textit{Fracture:} Uneven.  \textit{Tenacity:} Sectile.  

**Hardness = 2.0–2.5**  \( \text{VHN} = 21–25 \) (50 g load).  \( \text{D(meas.)} = 7.20–7.22 \)  \( \text{D(calc.)} = 7.24 \)  

**Photosensitive.***


**Anisotropism:** Weak.  

**Cell Data:**  \textit{Space Group:} \( P2_1/n \).  

\[
a = 4.229 \qquad b = 6.931 \qquad c = 7.862 \qquad \beta = 99.61^\circ \quad Z = 4
\]

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

\[
\begin{align*}
2.606 & \quad (100) \quad 2.440 & \quad (80) \quad 2.383 & \quad (75) \quad 2.836 & \quad (70) \quad 2.583 & \quad (70) \quad 2.456 & \quad (70) \quad 3.080 & \quad (60)
\end{align*}
\]

**Chemistry:**

\[
\begin{array}{ccc}
\text{Ag} & 86.4 & 87.2 \\
\text{Cu} & 0.1 & \\
\text{Se} & 1.6 & \\
\text{S} & 12.0 & 12.6 & 12.94 \\
\hline
\text{Total} & 100.0 & 99.9 & 100.00
\end{array}
\]

(1) Guanajuato, Mexico; by electron microprobe.  (2) Santa Lucia mine, La Luz, Guanajuato, Mexico; by electron microprobe.  (3) \( \text{Ag}_2\text{S} \).

**Polymorphism & Series:** The high-temperature cubic form (“argentite”) inverts to acanthite at about 173 \( ^\circ \text{C} \); 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, chalcopryrite, 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:**  
5. (1960) NBS Circ. 539, 10, 51.  

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