

ARGENTITE AND ACANTHITE

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I have read with great interest the paper of Emmons, Stockwell and Jones¹ on the subject named above which forms an important contribution to our knowledge of the sulphides and of many sulphide ore deposits. I desire in what follows to offer a supplement to this paper by drawing attention to articles already published upon the subject which have apparently escaped the attention of the authors. In the first place, both Ramsdell² and at the same time F. Rinne³ have made röntgenographic investigations of argentite and acanthite from Freiberg in Saxony and of artificial silver sulphide. The latter has proved that the röntgenograms of these three substances are alike and show an apparently orthorhombic, not isometric symmetry. I was, however, the first to show, in 1922,⁴ by an optical method, the nonisometric and apparently orthorhombic symmetry of argentite. I was able to show that when examined in reflected polarized light between crossed nicols, polished sections of argentite and acanthite did not remain uniformly dark in all positions. On the contrary the individual grains varied in color as the preparation was turned under the microscope from light gray-blue in the position of illumination to dark gray or dark slate-blue in the position of extinction. *Argentite* and *acanthite*, which behave optically quite alike, are then *optically anisotropic*. It could generally be observed that an individual grain or even what appeared to be a crystal individual was actually not homogeneous but consisted of a large number of lamellae and of feather-like or spindle shaped parts which crossed one another for the most part, at right angles and possessed parallel extinction. Their arrangement was very similar to that of the lamellae which may be seen in leucite or boracite between crossed nicols at normal temperatures. I con-

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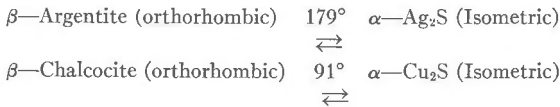
¹ *Amer. Mineral.*, 11, p. 326-328, 1926.

² *Amer. Mineral.*, 10, p. 281, 1925.

³ F. Rinne: Notiz über Silberglanz. *Zeitschr. Krist.*, 60, p. 299-301, 1925.

⁴ H. Schneiderhöhn: Anleitung zur mikroskop. Bestimmung und Untersuchung von Erzen und Aufbereitungsprodukten, besonders im auffallenden Licht. *Berlin*, 1922, p. 206-210.

cluded as early as 1922 from this optical property which may be seen in well-polished preparations of argentite, sufficiently illuminated between crossed nicols, that, in considering the substance Ag_2S , we are dealing with a paramorph, stable at ordinary temperatures as an orthorhombic modification, after an isometric modification, stable only at higher temperatures (above 180°). Rinne, in 1925, in the article cited, confirmed this conclusion and showed further that there was a complete analogy between the inversion forms of argentite and chalcocite:



In natural occurrences of these two ores the temperature of their formation is the control for their inner structure. Both have a lamellar structure and are to be regarded as paramorphs if they have formed above the inversion temperatures, 179° and 91° , respectively. The twin lamellae, may be clearly recognized in argentite in polarized, reflected light, in chalcocite by etching with HNO_3 . I described this lamellar paramorph of β -chalcocite after α -chalcocite minutely in 1920⁵ and named it “*lamellar chalcocite*.” I showed that this “*lamellar chalcocite*” was a “*geological thermometer*” and was characteristic for primary chalcocite, that is for chalcocite that had not been formed by secondary enrichment (“*descendente Zementation*”).⁶ A similar rôle as a “*geological thermometer*” can now be assigned to “*lamellar argentite*” as I would call it. It also has been formed at an elevated temperature, i. e., above 180° , is of primary origin, and cannot be regarded as a product of secondary enrichment.

I desire to propose now that the name “*argentite*” (German: “*Silberglanz*”) shall be employed as the name of the mineral and that the name “*acanthite*” shall be discarded. If by microscopic examination it be established that a paramorph after isometric Ag_2S is present, one can call this product “*lamellar argentite*”, following the analogy of “*chalcocite*” and its paramorph, “*lamellar chalcocite*.”

⁵ *Idem*: Paramorphose von rhomb. Kupferglanz nach regul Senckenbergiana, Frankfurt a. M., 1920, 2, p. 1–15; also Anleitung, 1922, p. 213–215.

⁶ *Idem*: Die Oxydations- und Zementations zone sulfidischer Erzlagerstätten. Fortschritte der Mineralogie. 1924, 2. p. 67–160.