Although the structural crystallography of zinckenite, a sulphantrimonite of lead, has been studied carefully (Vaux & Bannister, 1938; Nuffield, 1946), the quality of the available analyses of this mineral is not high enough to settle the question of cell content. A recent x-ray spectrographic analysis of exceptionally fine zinckenite from Wolfsberg, Harz, Germany, may answer the question.

The symmetry of zinckenite originally was considered to be orthorhombic (pseudo-hexagonal), with twinning on (110), but Vaux & Bannister determined the unit cell as hexagonal, with \( a = 44.06 \), \( c = 8.60 \) Å. The composition of zinckenite was taken formerly as \( \text{PbS}_2\text{S}_3 \), but Vaux & Bannister found that the cell content 12 \( (6\text{PbS}_2\text{S}_3) \) is more likely than 81 \( [\text{PbS}_2\text{S}_3] \). Berry (1943) suggested that zinckenite might still be orthorhombic with very small departure from hexagonal symmetry, and that the cell content might then be 160 \( [\text{PbS}_2\text{S}_3] \). Nuffield (1946) confirmed the cell dimensions of Vaux & Bannister on a fine specimen from Wolfsberg, and measured the specific gravity on a single clean crystal weighing 23 mg, as 5.36. The alternative cell contents appeared to be 81 \( [\text{PbS}_2\text{S}_3] \) (calc. sp. grav. 5.35), 80 \( [\text{PbS}_2\text{S}_3] \) (calc. sp. grav. 5.28), and 12 \( (6\text{PbS}_2\text{S}_3) \) (calc. sp. grav. 5.22). Largely on the basis of the specific gravity determination, Nuffield suggested the composition \( \text{PbS}_2\text{S}_3 \), with either 81 or 80 formula in the unit cell as the mostly likely cell contents for zinckenite.
In the course of a recent study, an opportunity arose to analyze the mineral by x-ray spectrography, using new methods developed for micro-size samples. The samples were selected from two specimens of the same locality, Wolfsberg, Harz, (UT R 63, R 64). Two separate aliquots of 50 and 100 milligrams were fused in potassium pyrosulphate (K$_2$S$_2$O$_7$) at 40:1 dilution. The mineral was analyzed by comparing the net peak intensity ratio of Pb/Sb to that obtained from synthetic samples prepared in an identical fashion from weighed amounts of Pb and Sb.

Results of the analysis of the two fused samples of zinckenite gave identical atomic ratios for Pb/Sb of exactly 6:14. The new x-ray analysis therefore clearly supports 12 [6PbS.7Sb$S_8$] as the most likely cell content for zinckenite.

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References


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NOTE ON THE OCCURRENCE OF EUDIALYTE IN CANADA

Charles Milton

Hicks (1958) reports eudialyte (eucolite) from two Canadian localities; Hollinger, Pontiac County, Quebec, and Seal Lake, Labrador. He concludes "A search of the literature has failed to reveal any published data on Canadian occurrences of eudialyte and eucolite".

\[1\]Publication authorized by the Director, U.S. Geological Survey.