

Stacking faults and twin boundaries in sphalerite crystals from the Trepča mines in Kosovo

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ABSTRACT

The structure and chemistry of {111} twin boundaries and stacking faults in Fe-rich sphalerite crystals from the Trepča mines in Kosovo were studied using electron microscopy. The {111} twin boundaries were found to be deficient in S and enriched in O, Mn, Fe, and Cu. The deficiency in S is compensated with O, which is responsible for stabilizing the hexagonal stacking of the fault structures and the formation of {111} twin boundaries in sphalerite. Comparing the intensities of Bijvoet-related reflections we show that there is no inversion of the polar axis across the twin boundaries. In addition to twin boundaries we found two types of stacking faults with $R_{SF1} = 1/3 \cdot [\bar{1}12]$ and $R_{SF2} = 2/3 \cdot [\bar{1}12]$. The excretion of isostructural copper from the sphalerite crystals peaks at the twin boundaries until it precipitates in the form of small chalcopyrite grains, aligned along the {111} twin boundaries.