

Trace and minor elements in  
sphalerite: an assessment of  
distributions in metamorphosed  
deposits:

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## **Trace and minor elements in sphalerite**

### **TRACE AND MINOR ELEMENTS IN SPHALERITE: AN ASSESSMENT OF DISTRIBUTIONS IN METAMORPHOSED DEPOSITS:**

#### **ABSTRACT:**

Sphalerite is a common sulphide mineral and occurs in ore deposits of various types. It is the major ore mineral in the majority of Zn-Pb sulphide deposits. The emergence of precise, high-resolution microanalytical methods, such as Laser-Ablation Inductively-Coupled-Plasma Mass-Spectrometry (LA-ICP-MS) has allowed for greater precision in the analysis of the minor and trace elemental characteristics of sulphides, including sphalerite. These methods have evolved to become valuable petrogenetic tools over the past decade. In this study Laser-Ablation Inductively-Coupled-Plasma Mass-Spectrometry (LA-ICP-MS) has been used to analyse 19 sulphide samples from metamorphosed sphalerite-bearing deposits in Norway and Australia. The distributions of Mn, Fe, Co, Cu, Ga, Se, Ag, Cd, In, Sn, Sb, Hg, Tl, Pb and Bi have been investigated with particular attention to how concentrations of these elements vary with metamorphic grade and the extent of sulphide recrystallisation and syn-metamorphic deformation. The study has also attempted to address any possible correlations among the different elements. The results were found to indicate that trace elements which are believed to exist as micro- to nano-scale inclusions in sphalerite (such as Cu, Pb and Bi) are reduced in abundance with increasing metamorphic grade. This is due to recrystallisation resulting in these small scale inclusions being removed from the sphalerite and remobilised to form discrete minerals elsewhere. The distributions of lattice-bound elements (Mn, Fe, Cd, In, Hg) show few trends, suggesting that source and physico-chemical conditions of primary crystallisation are dominant in defining the concentrations of these elements. A moderately strong positive correlation between copper and indium concentrations was also identified, confirming previously published data.

#### **KEY WORDS**

Sphalerite, metamorphism, trace, elements, distribution, mass spectrometry, laser ablation

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