**INTRODUCTION**

Melt inclusions (MIs) are volume enclosed bubbles of melts trapped in a solid matrix that can be used to study the evolution of magmas. The trapping of MIs by crystals during crystallization is a complex process that is influenced by several factors, including the crystal growth rate, the diffusion coefficients of elements, and the partition coefficients between the melt and the crystal.

**THE BOUNDARY LAYER PROBLEM**

The boundary layer problem is a critical aspect of the trapping mechanism of MIs. It involves the concentration gradients that develop across the boundary layer between the crystal and the melt. The thickness and composition of this layer can significantly impact the composition of MIs. Several factors, including the crystal growth rate, the diffusion coefficient of the element, and the partition coefficient between the melt and the crystal, influence the thickness and composition of the boundary layer.

**SAMPLES AND ANALYTICAL TECHNIQUES**

Melt inclusions are studied using a variety of techniques, including electron microprobe analysis, X-ray fluorescence, and laser ablation ICP-MS. These techniques allow for the determination of the concentration of trace elements in MIs and the measurement of the boundary layer thickness. The use of these techniques has led to a better understanding of the trapping mechanism of MIs.

**RESULTS**

The results of the study show that the trapping of MIs by crystals is influenced by the thickness and composition of the boundary layer. The concentration of trace elements in MIs is influenced by the diffusion of elements across the boundary layer. The thickness and composition of the boundary layer are influenced by the crystal growth rate and the diffusion coefficients of elements.

**FINAL REMARKS**

The results of this study provide new insights into the trapping mechanism of MIs. Further research is needed to better understand the factors that influence the trapping of MIs and to develop more accurate models for predicting the composition of MIs.