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POTASSIUM-COBALT SULPHATE CRYSTAL GROWTH ASSISTED BY LOW FREQUENCY VIBRATIONS

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Abstract

Single crystals of $K_2Co(SO_4)_2 \cdot 6H_2O$ were grown from solution using the temperature reduction method enhanced by the axial low frequency vibration control technique (AVC-technique). Physical modeling of heat-mass transfer in solution under the AVC action was performed. The growth rate of the AVC grown crystal was found to be twice that of the crystal grown under natural convection conditions. Analysis of spectral characteristics (absorption and Raman spectra) as well as structural properties (dislocation density and microhardness) of the grown crystals showed the significant superiority of the AVC technique for the growth of $K_2Co(SO_4)_2 \cdot 6H_2O$ crystals.

Key words:

A1. Crystal morphology

A1. Convection

A1. Mass transfer

A2. Growth from solutions

B1. Inorganic compounds

1. Introduction

Continuous development of industry leads to an increase in the requirements for such characteristics of single crystals as homogeneity, structural and functional perfection. Hence, there is a need for new materials and improving the economics of technology, as well as in improving their growing processes. In laboratory conditions and industry, among the most economical methods are various solution growth techniques. The undeniable advantages of solution growth techniques are their high energy efficiency, simplicity of the growth system, and possibility to grow many crystals, which cannot be obtained by other methods.

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