

Crystallization of Water-soluble Inorganic Salts in Microwave Field

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Influence of microwave field on the origin and crystal growth from water solutions was studied. Crystallization by methods of temperature gradient and evaporation of solvent of some inorganic salts (KH_2PO_4 (KDP), NaCl , $\text{Sr}(\text{NO}_3)_2$, KNO_3 , $\text{Ca}(\text{OH})_2$) is investigated. It is established, that growth rates of single crystals in microwave field are much more higher in comparison with growth with the use of other known technologies under the same temperatures and supersaturations. For example growth rate of a prism {100} of KDP crystals reaches 11 mm/day with supersaturations $\sim 1.2\%$, and temperature 70°C . Fine dispersion crystallites of investigated salts were obtained by evaporation of solvent.

Use of microwave field for heating of crystallization water solutions leads to significant increase of crystal faces growth rate.

Microwave field more actively destroys adsorption and diffusion layers on crystal faces in comparison with other methods (mechanic, ultrasonic, etc.) in water solutions, providing more intensive moving of substance in superficial area.

At mass crystallization by evaporation of solvent microwave radiation promotes significant decrease of crystallite size. More distinctly it is shown for hard soluble compounds.

Microwave technique provides uniform heating of the whole crystallization volume with active hashing of the solution and simultaneous origin of a significant amount of crystallites over the whole volume of a crystallizer.

Keywords: crystal growth, microwaves, solutions