GROWTH BEHAVIOR AND KINETICS OF SINGLE AND POLY- CRYSTALS OF SOLDIUM CHLORIDE

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Summary

The growth behavior and kinetics were measured and observed for single crystals of sodium chloride placed in supersaturated solutions in an agitated vessel. The seed crystal was mounted at the tip of a Pt wire and its growth was continuously observed by means of a TV camera fitted with a microscopic lenz. The experimental variables were supersaturation of the solution in terms of supercooling, crystallization temperature, agitation speed of the impeller and the existence or absence of microcrystalline particles in the solution.
The average linear growth rate defined as the displacement of the observed crystal edges devided by the growth period was found to be proportional to the square root of the solution supersaturation at any crystallization temperatures, which seems abnormal hence the tendency was discussed.
It was also pointed out that the average linear growth rate was always higher when microcrystals existed in the solution than those without the microcrystals. This fact was further investigated by analyzing the instantaneous growth rate, indicating that the initial growth rate was 20 times as fast as that eventually obtained after one hour or that forthe case without microcrystals. From these facts it was suggested that the microcrystals in the solution played an important role in the growth process of soldium chloride crystals either as growth units or parts to be incorpolated in the mother crystal body.
From the results, although further studies are required to provide final conclusions, the growth mechanism of sodium chloride crystals in practical crystallizers has become clearer.