

Melt suspension crystallization of pure ice from acetic acid waste water

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In order to produce highly pure crystals from melt-suspension there is the need to create an optimum under-cooling that will drive crystal growth without the inclusion of impurities. Acetic acid waste water (1-5w/w% acetic acid) was cooled under different cooling profiles in a scraped surface crystallizer. The morphology of ice crystals was found to be circular disc to spherical shapes. The growth rate of ice crystals was taken as the increase in the diameter (a-axis) of the crystals with residence time. Ice crystal growth rate was very slow within 10^{-7} to 10^{-8} m/sec. In general the mean ice size in the equipment was quite small; due to breakage and high nucleation rates. In all cooling conditions (slow and fast) spontaneous nucleations was had to avoid due to high metastable zone at regions close enough to the bottom of the crystallizer. Ice crystals grown at slow cooling rate had the slowest growth velocity but with considerable purity as compared to crystals grown at high cooling temperatures and rates.