

Treatment of Wastewater Containing Acetic Acid by Ice Layer Crystallization

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Layer melt crystallization of organic materials from the melt is also a separation technique enabling the purification of chemicals at the cost of relatively low energy consumption compared to conventional separation techniques like evaporation. The use of melt crystallization for separation of soluble solutions has increased rapidly in the chemical industry over the past few years. In this paper, layer melt crystallization and sweating operations were carried out for acetic acid–water mixtures, which is a simple eutectic system. The impurity distribution inside crystalline layers obtained in layer melt crystallization was explored experimentally for a binary eutectic mixture of acetic acid and water. The growth rates and sweating operations of crystalline layers were obtained under the conditions of the cooling temperature at 269, 268, and 267 K, the impurity contents of 0.5, 1.0, and 5.0 wt% acetic acid and the cooling rates of 0.1, 0.5, and 1.0 K/min. The effect of sweating on the distribution coefficient for different growth conditions was investigated. The crystalline layer formed in higher growth rate is purified more easily by sweating operations.