

Study of the control of Ammonium sulfate crystallization in semi-batch crystallizations

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Semi-batch crystallization of ammonium sulfate made it possible to understand the nucleation and growth characteristics necessary for the production of target crystal sizes with acceptable morphology. Metastable zone width (MZW) and Supersaturation measurements derived from the variation of the process parameters was essential in this study. The controlling factors depend on the system and the crystallization method. In evaporation crystallization solute concentration, operating temperature and operating vacuum pressure were the main experimental conditions for examining the effect of the crystallization process for seeded and unseeded crystallizations. Seeding however proved to be worthwhile in deriving large particle crystals at lower initial evaporation rates which reduced the effect of secondary nucleation and enhanced the growth of the seed nuclei. Induction time and level control measurements were very useful in drawing conclusive results from the experimental data. Product crystals were characterized by Optical microscopy with image analyzer and Scanning Electron Microscopy (SEM).