

The secondary nucleation of L-ornithine-L-aspartate in a drowning out crystallization

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Crystallization of L-ornithine-L-aspartate (LOLA) by drowning out was conducted using methanol as an antisolvent in a semibatch crystallizer. The relationship between nucleation and induction period allows us to characterize the crystallization of LOLA. The induction period was measured at different levels of supersaturation using the conductivity measurement. Nucleation mechanism in this process were quite complex because generation and redissolution of initial precipitates in solution occurred simultaneously in early feeding stage of aqueous LOLA solution into the antisolvent. Supersaturation for nucleation was generated by fast dissolution of precipitates. At lower feed concentration, it was found that initial precipitates dissolve again and the LOLA crystals are formed by primary nucleation. However, at higher feed concentration, it was found that some precipitates remain and act as seeds, and thus they affect the induction period. This phenomenon is similar to catastrophic secondary nucleation. Therefore, the induction period will be estimated theoretically using a cluster coagulation model which is a suitable model to interpret the catastrophic secondary nucleation.