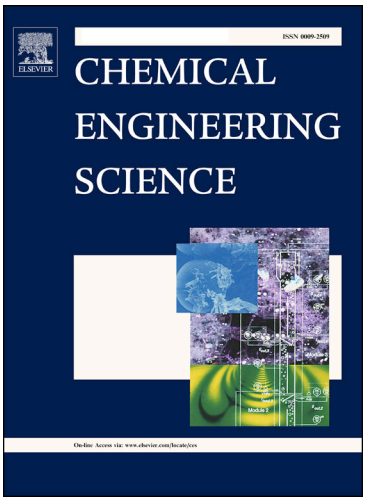

A Model-Based Approach for Controlling Particle Size Distribution in Combined Cooling-Antisolvent Crystallization Processes

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A MODEL-BASED APPROACH FOR CONTROLLING PARTICLE SIZE DISTRIBUTION IN COMBINED COOLING-ANTISOLVENT CRYSTALLIZATION PROCESSES

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Abstract:

This article focuses on the design and implementation of model-based control strategies for real time control of crystal size distribution (CSD) in semi batch crystallization processes. The objective of the feedback controller is to reach a desired particle mean size while the standard deviation is controlled in a feedforward fashion. Alternative model-based control strategies are formulated and implemented for a target mean size. An image processing technique based on wavelet-fractal and energy signature analysis is employed to determine online CSD status for controller corrective actions. To validate the proposed model-based control strategies, unseeded crystallization of sodium chloride in water using ethanol as antisolvent is performed in an experimental bench-scale semi-batch crystallizer.

Keywords: Crystallization, Image analysis, Fokker-Planck Equation, Particle Size Distribution, Model-based Control