CRYSTALLIZATION OF PARA-XYLENE IN A BATCH COOLING CRYSTALLIZER

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Crystallization of para-xylene in a batch cooling crystallizer was investigated by means of computer simulation. The mathematical model used in this modelling study consists of the population balance equation for crystals completed with the differential equations governing the mass balance of solute and the heat balance of the crystalline suspension. The population balance equation was reduced to a finite set of ordinary differential equations for moments of the crystal size variable using the standard moment method. The resulted finite system of ordinary differential equations was solved in MATLAB environment. The simulation results revealed that both the dynamic trajectories of the crystallizer and the final properties of the crystalline product depend strongly on the cooling profiles. Using the numerical model presented the batch crystallization system can be optimized by choosing the best temperature profile for producing a crystalline product exhibiting the required properties.

Keywords: Para-xylene, Cooling crystallization, Population balance model, Moment method, Optimization, Simulation