

470c Crystallization in Monodisperse Emulsions

Richard D. Dombrowski, James D. Litster, Norman J. Wagner, and Yinghe He

Crystallization from surfactant-free, monodisperse emulsions was investigated as a method for controlling the crystal size distribution (CSD) of lactose crystals. Microfluidic T-junctions were used to produce water-in-oil emulsion drops with diameters in the range of 165 to 300 micron with a coefficient of variation of drop sizes less than 3%. Lactose was crystallized in drops formed from the microfluidic T-junction using a plug flow crystallizer. The fraction of drops containing single crystals first increases as the initial lactose supersaturation is increased then decreases due to a higher nucleation rate at high supersaturation. The narrowest CSD is obtained when the fraction of drops containing single crystals is highest. The CV of the size of crystals produced by emulsion crystallization was as low as 14%, compared with 40% for seeded bulk crystallization.