Simulation of ammonium sulfate crystallization using CFD-PBE model

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The crystallization of ammonium sulfate in the continuous Taylor-Couette Reactor(TCR) is simulated using CFD program. CFD model is based on the Eulerian multi-phase model to describe the liquid-solid two phase flow and the PBE model is based on the discrete method including nucleation and growth kinetics. Although there are minor deviations due to numerical diffusion brought by relative coarse grid, the PBE model is in good agreement with the results by Q.Hu.
When the TCR operated in the continuous system, there are great mixing effect by the Taylor vortices and it looks like a CSTR in series. The particles are affeced by the gravity force, buoyancy, drag force and centrifugal force. The gravity force, buoyancy, drag force are canclled out at the appropriate flow condition and the centrifugal force classify the particles by size.