

# Simulation and analysis of crystallization of high aspect ratio crystals with fragmentation

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## Abstract

A two-dimensional population balance model of continuous cooling crystallization, involving nucleation, growth of the two characteristic crystal facets and random binary breakage along the length of high aspect ratio crystals is developed. The randomness of breakage is described by beta distribution of the broken fractions. The population balance model is reduced into a closed moment equation model for the joint moments of the two size variables of crystals by means of which the influence of parameters of breakage on the dynamic and steady state behavior of crystallizer is analyzed. It is shown that the mean value of width of crystals increases as the intensity of breakage along the crystal length resulted in increasing number of crystals, increases.

## Keywords

Crystallization; High aspect ratio crystals; Breakage; Population balance; Model reduction