



Topics in Crystal Shape Dynamics

By Christian Borchert

Shaker Verlag Dez 2012, 2012. Buch. Book Condition: Neu. Neuware - The topic of this work is the dynamic modeling and observation of polyhedral, growing crystals. This is motivated by the fact that besides size, shape is an important product property for particulate materials in various industries. Due to the underlying anisotropic molecular crystal structure, growth proceeds at different rates in different directions. Therefore, crystals assume a non-spherical, polyhedral, though, under ideal conditions also a symmetric shape. The work at hand is essentially divided into three major parts. At first, a system-theoretic framework is introduced and applied to describe the evolution of single crystals and of crystal populations. In the second part the extraction of shape information from suspension images is discussed. This data is finally used to determine growth kinetics enabling the description of the conducted experiments with the developed models. It is shown that models describing the development of a single crystal exhibit hybrid dynamics if the number of faces changes. In order to transfer this property to the population level, the class of systems that can be captured with population balances is widened to hybrid systems. Such systems are capable of performing switches in their velocity field...



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