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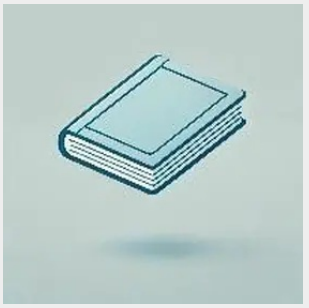
Mechanical Processes in Solid-Phase Transformations

The Role of Stresses and Relaxation Processes in the Kinetics of Polymorphic Transformations and Chemical Reactions



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Mechanical Processes in Solid-Phase Transformations: The Role of Stresses and Relaxation Processes in the Kinetics of Polymorphic Transformations and Chemical Reactions provides a systematic treatment of the role of mechanical feedback through several different real-world examples covering the major types of solid-state transformations. It provides a novel, comprehensive and in-depth analysis of the role of mechanical stresses and relaxation processes induced by solid-state chemical reactions. This topic has previously been addressed in a very fragmented manner, with a primary focus on superficial phenomenological levels and qualitative conclusions. The chapters feature experimental results and quantitative models of the kinetics of various types of solid-state transformations (polymorphic phase transitions, topochemical reactions, photochemical reactions in crystals) accompanied by stress, plastic deformation, fracture, and macroscopic changes in the shape of crystals. Clear examples are given of controlling transformation kinetics and product morphology by influencing mechanical properties and conditions. Mechanical Processes in Solid-Phase Transformations will help to improve understanding in the growing field of solid-state mechanochemical transformations and polymorph control. It is written for academics both in research and advanced graduate/postdoc level teaching, as well as their students, who are interested in solid-state chemistry, materials science, solid-state physics, or applications of solid-state reactivity to industry. It will also be relevant to this in the areas of nanotechnology, chemical engineering, catalysis and also pharmaceutical technologies.

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