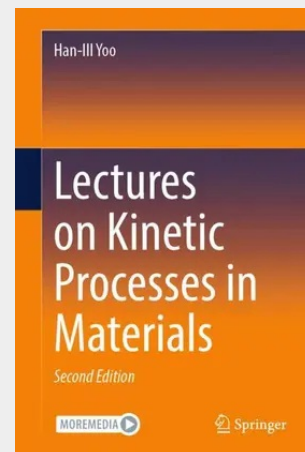


## Lectures on Kinetic Processes in Materials

This updated, second edition features a new section how to document and measure all the mass and charge transport properties of a material and a comprehensive solution manual for end-of-chapter exercise problems, that is designed to help readers themselves grasp and apply the fundamental knowledge of kinetics. It remains an essential primer for beginning graduate or senior undergraduate students in materials discipline, presenting fundamental and quantitative ideas on kinetic processes in materials. Kinetics is concerned with the rate of change of the state of existence of a material system under thermodynamic driving forces. Typically, kinetic processes in materials involve chemical reactions and diffusion either in parallel or in tandem. Thus, mathematics of diffusion in continuum is first dealt with in some depth, followed by the atomic theory of diffusion and a brief review of chemical reaction kinetics. As applications, then follow chemical diffusion in multi-component materials ( e.g., metallic alloys and mixed ionic electronic conductors), the kinetics of phase transformations, and the kinetics of gas-solid reactions. Through this course of learning and practice, a student will become able to predict quantitatively how fast a kinetic process takes place, to understand the inner workings of the process, and to design an optimal process for state changes in materials used in processing applications.

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