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Geochemical Kinetics



Synopsis

This book offers a comprehensive exploration of geochemical kinetics--the application of chemical kinetics to geological problems, both theoretical and practical. Geochemical Kinetics balances the basic theories of chemical kinetics with a thorough examination of advanced theories developed by geochemists, such as nonisothermal kinetics and inverse theories, including geochronology (isotopic dating), thermochronology (temperature-time history), and geospeedometry (cooling rates). The first chapter provides an introduction and overview of the whole field at an elementary level, and the subsequent chapters develop theories and applications for homogeneous reactions, mass and heat transfer, heterogeneous reactions, and inverse problems. Most of the book's examples are from high-temperature geochemistry, with a few from astronomy and environmental sciences. Appendixes, homework problems for each major section, and a lengthy reference list are also provided. Readers should have knowledge of basic differential equations, some linear algebra, and thermodynamics at the level of an undergraduate physical chemistry course. Geochemical Kinetics is a valuable resource for anyone interested in the mathematical treatment of geochemical questions.

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One of Choice's Outstanding Academic Titles for 2009"This is the most comprehensive, authoritative account of geochemical kinetics published to date. Writing in a remarkably accessible style, considering the complexity of the subject, Zhang, one of the leading experts in the field, covers every conceivable area of geochemical kinetics."--B. Ransom, Choice"[T]his is a very good

textbook, which I would recommend to anyone wanting to be informed about the kinetic aspects of geochemistry. The book is well organized and well written--Professor Zhang's English style makes it easy to read. Interesting sets of carefully thought-out problems at the end of each chapter contribute to making this an excellent introductory text, one that may be used in teaching. The book is remarkably free of errors, which is impressive given the extensive mathematical formulation throughout. The publisher is also to be commended for the easy-to-read font size and the clarity and simplicity of the figures. This book has a nice 'feel' about it."--Terry M. Seward, Elements

"There are not many books available that present multiple solutions for each problem, as Zhang elegantly does here. I discovered new points, examples, and mathematical treatments not found in the low-temperature geochemistry literature or related textbooks. It was a real pleasure to read this book."--Martial Tallefert, Georgia Institute of Technology

"The contents of Geochemical Kinetics are well-balanced among various topics important to a broad spectrum of geochemists. Theoreticians, experimentalists, and field researchers will all find this book useful."--James Kubicki, Pennsylvania State University

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