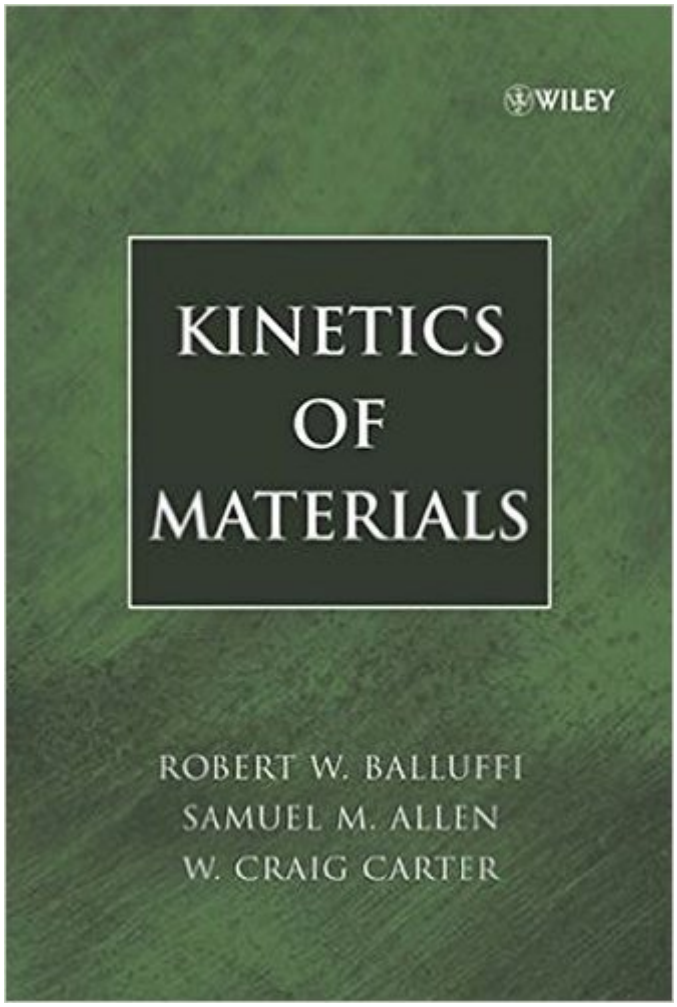
Kinetics Of Materials



Synopsis

A classroom-tested textbook providing a fundamental understanding of basic kinetic processes in materials This textbook, reflecting the hands-on teaching experience of its three authors, evolved from Massachusetts Institute of Technology's first-year graduate curriculum in the Department of Materials Science and Engineering. It discusses key topics collectively representing the basic kinetic processes that cause changes in the size, shape, composition, and atomistic structure of materials. Readers gain a deeper understanding of these kinetic processes and of the properties and applications of materials. Topics are introduced in a logical order, enabling students to develop a solid foundation before advancing to more sophisticated topics. Kinetics of Materials begins with diffusion, offering a description of the elementary manner in which atoms and molecules move around in solids and liquids. Next, the more complex motion of dislocations and interfaces is addressed. Finally, still more complex kinetic phenomena, such as morphological evolution and phase transformations, are treated. Throughout the textbook, readers are instilled with an appreciation of the subject's analytic foundations and, in many cases, the approximations commonly used in the field. The authors offer many extensive derivations of important results to help illuminate their origins. While the principal focus is on kinetic phenomena in crystalline materials, select phenomena in noncrystalline materials are also discussed. In many cases, the principles involved apply to all materials. Exercises with accompanying solutions are provided throughout Kinetics of Materials, enabling readers to put their newfound knowledge into practice. In addition, bibliographies are offered with each chapter, helping readers to investigate specialized topics in greater detail. Several appendices presenting important background material are also included. With its unique range of topics, progressive structure, and extensive exercises, this classroom-tested textbook provides an enriching learning experience for first-year graduate students.

Book Information

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Customer Reviews

This is an excellent book. I have used it three times to teach a course with the same title. The students like the book even though they find it challenging. The solved problems at the end of each chapter are an integral part of this book and the students and I have found it beneficial to work through all the details of the solutions that are provided. The introduction to diffusion through Onsager's irreversible thermodynamic treatment is basic to the subject and is the only book I am aware of in the field of materials science and engineering that commences with this treatment. The authors provide an introduction to irreversible thermodynamics that is very readable. Many of the chapters have excellent tables that summarize the main results.David N. SeidmanWalter P. Murphy ProfessorMaterials Science and EngineeringNorthwestern University

THis book provides a very comprehensive introduction to the topic. Would have been nicer if it had ventured further into some of the topics especially the thermodynamics aspects of it, but is generally a brilliant book.

Good book for engineers. Even though it is really deep sometimes and hard to get (for me at least), it still covers the essential stuff in depth. And the problems have the solution.

The problems in the back of each section are partially worked out and are pretty important in making the concepts concrete.

Reaction Dynamics (Dover Books on Chemistry) Principles of Chemical Kinetics Kinetics of Aggregation and Gelation Physical Kinetics: Volume 10 (Course of Theoretical Physics S) Materials North American Edition w/Online Testing: Materials - North American Edition, Second Edition: engineering, science, processing and design Engineering Materials 2, Fourth Edition: An Introduction to Microstructures and Processing (International Series on Materials Science and Technology) Ceramics: Mechanical Properties, Failure Behaviour, Materials Selection (Springer Series in Materials Science) ISO 12215-3:2002, Small craft - Hull construction and scantlings - Part 3: Materials: Steel, aluminium alloys, wood, other materials Phillips' Science of Dental Materials, 11e (Anusavice Phillip's Science of Dental Materials) Craig's Restorative Dental Materials, 12e (Dental Materials: Properties & Manipulation (Craig))