Transport Processes in Porous Media

The subject of this book is to study the porous media and the transport processes occur there. As a first step, the authors discuss several techniques for artificial representation of porous. Afterwards, they describe the single and multi phase flows in simplistic and complex porous structures in terms of macroscopic and microscopic equations as well as of their analytical and numerical solutions. Furthermore, macroscopic quantities such as permeability are introduced and reviewed. The book also discusses with mass transport processes in the porous media which are further strengthened by experimental validation and specific technological applications.

Features
- Discusses all the topics related to transport in porous media
- Uses of state-of-the-art techniques for the modeling of transport processes
- Considers of realistic sorption mechanisms
- Encounters a variety of scientific and engineering disciplines

Contents

Fields of interest
Characterization and Evaluation of Materials; Engineering Thermodynamics, Heat and Mass Transfer; Soft and Granular Matter; Complex Fluids and Microfluidics

Target groups
Research

Discount group
Professional Non-Medical

Available
2012. XII, 236 p. 129 illus. (Advanced Structured Materials, Volume 20) Hardcover
➤ $129.00
ISBN 978-3-642-27909-6

Biomateriomics

Biomateriomics is the holistic study of biological material systems. While such systems are undoubtedly complex, we frequently encounter similar components -- universal building blocks and hierarchical structure motifs -- which result in a diverse set of functionalities. Similar to the way music or language arises from a limited set of musical notes and words, we exploit the relationships between form and function in a meaningful way by recognizing the similarities between Beethoven and bone, or Shakespeare and silk.

Features
- Introduces a holistic approach to the study of biological and bioinspired materials and systems
- Makes current and new experimental and computational techniques available to a wider community of engineers and scientists
- Discusses the development of integrated mechanical models and experiments for hierarchical biomaterials
- Covers recent advances in understanding of multiscale deformation and failure of biomaterials
- Endorses interdisciplinary methods of research

Contents

Fields of interest
Biomaterials; Biophysics and Biological Physics; Biomedical Engineering

Target groups
Research

Discount group
Professional Non-Medical

Available
2012. XVI, 448 p. 159 illus., 20 in color. (Springer Series in Materials Science, Volume 165) Hardcover
➤ $179.00
ISBN 978-94-007-1610-0

Mathematical Modeling in Mechanics of Granular Materials

Organized by: H. Altenbach, Otto-von-Guericke-Universität Magdeburg, Germany

This monograph contains original results in the field of mathematical and numerical modeling of mechanical behavior of granular materials and materials with different strengths. It proposes new models helping to define zones of the strain localization. The book shows how to analyze processes of the propagation of elastic and elastic-plastic waves in loosened materials, and constructs models of mixed type, describing the flow of granular materials in the presence of quasi-static deformation zones.

Features
- Contains original results in the field of mathematical and numerical modeling
- Includes a very new rheological theory
- Studies a numerical realization of the models on multiprocessor computer systems

Contents

Fields of interest
Characterization and Evaluation of Materials; Continuum Mechanics and Mechanics of Materials; Soft and Granular Matter; Complex Fluids and Microfluidics

Target groups
Research

Discount group
Professional Non-Medical

Available
➤ $179.00
ISBN 978-3-642-29052-7