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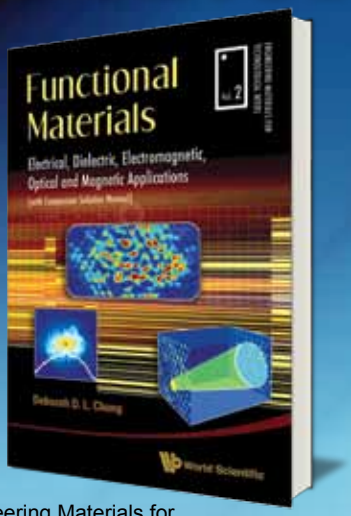
# Materials Engineering Textbooks 2011/12




Engineering Materials for Technological Needs - Vol. 2

## FUNCTIONAL MATERIALS: Electrical, Dielectric, Electromagnetic, Optical and Magnetic Applications (With Companion Solution Manual)

by **Deborah D L Chung** *(State University of New York at Buffalo, USA)*

*Functional Materials* assumes that the readers have had a one-semester introductory undergraduate course on materials science. The coverage on functional materials is much broader and deeper than that of an introductory materials science course. The book features hundreds of illustrations to help explain concepts and provide quantitative information. The style is general towards tutorial. Most chapters include sections on example problems, review questions and supplementary reading.

**Readership:** Undergraduate students, graduate students and professionals in most branches of engineering, specifically materials, electrical, mechanical, aerospace, chemical and civil engineering. Relevant professionals include engineers, scientists, researchers, technicians and technology managers.

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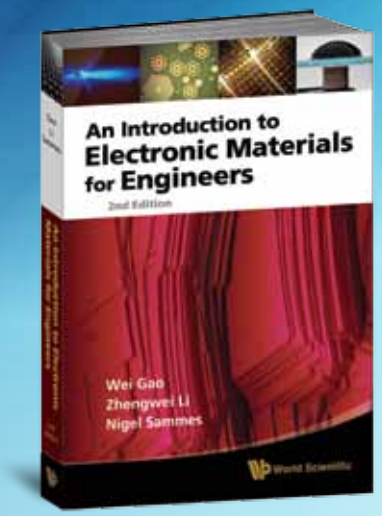
| **364pp** | **Mar 2010** | |
| **978-981-4287-15-9** | **US$85** | **£56** |
| **978-981-4287-16-6(pbk)** | **US$45** | **£30** |




## AN INTRODUCTION TO ELECTRONIC MATERIALS FOR ENGINEERS (2nd Edition)

by **Wei Gao** *(University of Auckland, New Zealand)*, **Zhengwei Li** *(University of Auckland, New Zealand)* & **Nigel Sammes** *(Colorado School of Mines, USA)*

*An Introduction to Electronic Materials* for Engineers aims to give a basic understanding and comprehensive overview of a wide range of materials, such as conducting materials, semiconductors, magnetic materials, optical materials, dielectric materials, superconductors, thermoelectric materials and ionic materials. The new chapters added into this latest edition include thin film electronic materials, organic electronic materials and nanostructured materials. These chapters aim to reflect the new developments made in electronic materials and nanotechnology research towards the design and fabrication of modern equipment and electronic devices.

**Readership:** Students, professionals (engineering), non-experts interested in electronic materials.

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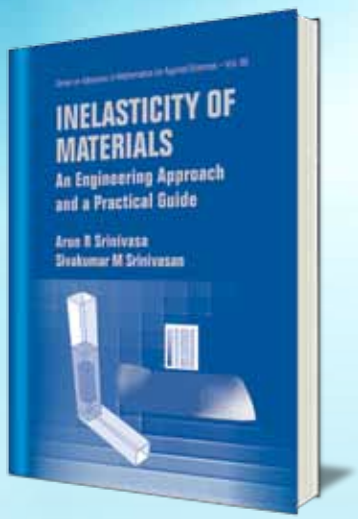
| **450pp** | **Nov 2010** | |
| **978-981-4293-69-3** | **US$68** | **£45** |




Series on Advances in Mathematics for Applied Sciences - Vol. 80

## INELASTICITY OF MATERIALS: An Engineering Approach and a Practical Guide

by **Arun R Srinivasa** *(Texas A&M University, USA)* & **Sivakumar M Srinivasan** *(Indian Institute of Technology, Madras, India)*

This textbook builds upon the existing knowledge of elasticity and thermodynamics, and allows the reader to gain confidence in extending one's skills in understanding and analyzing problems in inelasticity. By reading this textbook and working through the assigned exercises, the reader will gain a level of comfort and competence in developing and using inelasticity models.

**Readership:** Mechanical, aeronautical, civil and metallurgical engineers; material scientists; biomechanists and engineers interested in inelastic/nonlinear systems.

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| **572pp** | **Jul 2009** | |
| **978-981-283-749-3** | **US$96** | **£66** |

## HIGHLIGHTS

### DISLOCATION BASED FRACTURE MECHANICS

by **Johannes Weertman** *(Northwestern University)*

Pg 2


### POLYMER MEMBRANES IN BIOTECHNOLOGY: Preparation, Functionalization and Application

by **Seeram Ramakrishna** *(National University of Singapore)*, **Zuwei Ma** *(National University of Singapore)* & **Takeshi Matsuura** *(University of Ottawa, Canada)*

Pg 2

### TUNDISH TECHNOLOGY FOR CLEAN STEEL PRODUCTION

by **Yogeshwar Sahai** *(The Ohio State University, USA)* & **Toshihiko Emi** *(Institute of Research of Iron & Steel, Jiangsu/Sha-Steel, China)*

Pg 3

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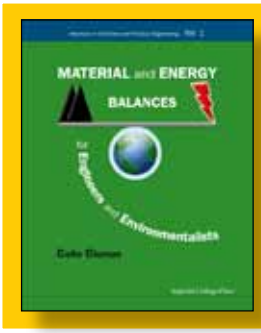

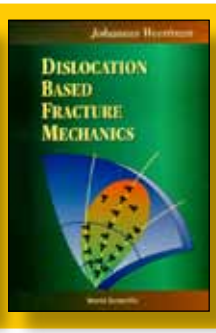

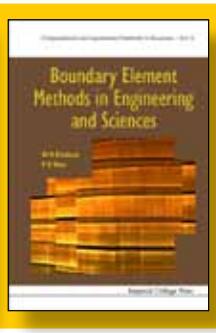

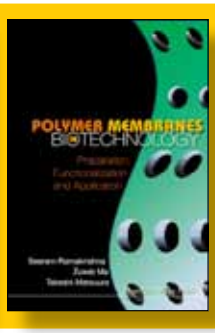

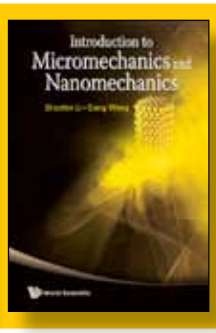

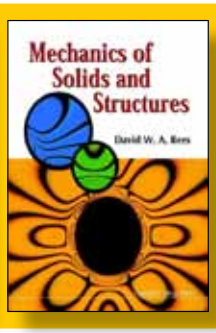


Advances in Chemical and Process Engineering - Vol. 1

## MATERIAL AND ENERGY BALANCES FOR ENGINEERS AND ENVIRONMENTALISTS

by **Colin Oloman** *(University of British Columbia, Canada)*

Following a review of the basic science and economics, the text focuses on material and energy accounting in batch and continuous operations, with emphasis on generic process units, flow sheets, stream tables and spreadsheet calculations. There is a unified approach to reactive and non-reactive energy balance calculations, plus chapters dedicated to the general balance equation and simultaneous material and energy balances. Seventy worked examples show the elements of process balances and connect them with the material and energy concerns of the 21st century.

**Readership:** Undergraduates in engineering and industrial chemistry (and science); graduates in engineering (and science) for review of core material; professional engineers (and scientists) for review of core material; other professionals, such as those in economics, geography and the environmental or social sciences, for guidance on quantitative methods for assessing the "triple bottom line" of the industrial economy.

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| **296pp** | **May 2009** | |
| **978-1-84816-368-3** | **US$80** | **£60** |
| **978-1-84816-369-0(pbk)** | **US$55** | **£41** |

## DISLOCATION BASED FRACTURE MECHANICS

by **Johannes Weertman** *(Northwestern University)*

*"This reviewer wholeheartedly recommends 'Dislocation Based Fracture Mechanics' for purchase by students, researchers, scholars, scientists, geologists, geophysicists, glaciologists, and engineers particularly in the areas of civil, structural, foundation, transportation, mechanical, electrical, metallurgical, agricultural, and aeronautical engineering, who need a good understanding of the subject of fracture mechanics in order to solve practical field problems associated with crack initiation, propagation, and prevention. Every library should also purchase copies of this superb book."* **Applied Mechanics Reviews**

**Readership:** Researchers and graduate students in materials science and theoretical & applied mechanics; and undergraduate and graduate students in geophysics.

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| **548pp** | **Feb 1996** | |
| **978-981-02-2620-6** | **US$86** | **£59** |

Computational and Experimental Methods in Structures - Vol. 4

## BOUNDARY ELEMENT METHODS IN ENGINEERING AND SCIENCES

by **M H Aliabadi** *(Imperial College, UK)* & **P Wen** *(Queen Mary University of London, UK)*

The boundary element method (BEM), also known as the boundary integral equation method (BIEM), is a modern numerical technique which has enjoyed increasing popularity over the past two decades. It is now an established alternative to traditional computational methods of engineering analysis. The main advantage of the BEM is its unique ability to provide a complete solution in terms of boundary values only, with substantial savings in modeling effort. This book is designed to provide readers with a comprehensive and up-to-date account of the method and its application to problems in engineering and science. Each chapter provides a brief description of historical development, followed by basic theory, derivation and examples.

**Readership:** Graduate students, academics and researchers in engineering mechanics, materials engineering, mechanical engineering, and software engineering/programming.

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| **450pp** | **Oct 2010** | |
| **978-1-84816-579-3** | **US$124** | **£86** |
| **978-1-84816-580-9(ebook)** | **US$161** | |

## POLYMER MEMBRANES IN BIOTECHNOLOGY: Preparation, Functionalization and Application

by **Seeram Ramakrishna** *(National University of Singapore)*, **Zuwei Ma** *(National University of Singapore)* & **Takeshi Matsuura** *(University of Ottawa, Canada)*

This book provides a concise and comprehensive introduction of polymer membranes' preparation, functionalization and applications in biotechniques including affinity membrane chromatography, membrane-based biosensor and membrane-based bioreactor. It provides a concept of membrane separation, preparation of polymeric membranes, membrane surface activation, ligand immobilization techniques and the organic chemistries, application of affinity membrane chromatography, membranes used in biosensors and gas sensors, enzymatic membranes used as biosensor, and finally, membrane biosensor for waste water treatment. A novel filter medium, i.e. nonwoven nanofiber membrane, and its preparation method, i.e. electrospinning technique, are also introduced in this book.

**Readership:** Undergraduates, graduates and researchers in membrane science, polymer membrane preparation, affinity membrane chromatography and theories, polymer surface modification and enzyme functionalized membrane.

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| **300pp** | **Aug 2010** | |
| **978-1-84816-379-9** | **US$75** | **£50** |
| **978-1-84816-380-5(pbk)** | **US$45** | **£30** |

## INTRODUCTION TO MICROMECHANICS AND NANOMECHANICS

by **Shaofan Li** *(University of California at Berkeley, USA)* & **Gang Wang** *(Hong Kong University of Science and Technology, China)*

*"This new book furnishes a most comprehensive and self-contained introduction to the state-of-the-art knowledge of micromechanics and nanomechanics. In addition, the way that the book is organized is very logical, and the presentation is quite clear, and the examples and excises included are excellent. These make the book very suitable and competitive as an excellent textbook." Xin-Lin Gao, Texas A&M University*

**Readership:** Researchers and educators in academics, first year graduate students in engineering mechanics, materials science, nanotechnology, mechanical engineering, civil engineering, and applied mechanics.

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| **516pp** | **Jul 2008** | |
| **978-981-281-413-5** | **US$107** | **£56** |
| **978-981-281-414-2(pbk)** | **US$65** | **£33** |

## MECHANICS OF SOLIDS AND STRUCTURES

edited by **David W A Rees** *(Brunel University, UK)*

*"… the book is a welcome addition to the existing teaching literature on solid mechanics. It will also be useful to mechanical, civil and aeronautical engineers."* **Mathematics Abstracts**

**Readership:** Undergraduate and graduate students in mechanical, aeronautical, civil and materials engineering.

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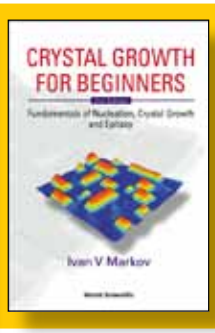
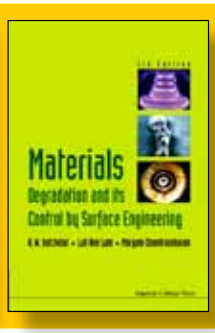
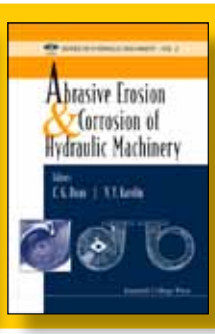
| **752pp** | **Apr 2000** | |
| **978-1-86094-217-4** | **US$133** | **£92** |
| **978-1-86094-218-1(pbk)** | **US$77** | **£53** |
| **978-1-86094-306-5(ebook)** | **US$173** | |








Series on Industrial and Systems Engineering - Vol. 1

## ENGINEERING SAFETY: Fundamentals, Techniques, and Applications

by **B S Dhillon** *(University of Ottawa, Canada)*

Safety has become very important because each year a vast number of people die due to workplace and other accidents. For example, in the United States for the year 1996 as per the National Safety Council, there were 93,400 deaths and 20,700,000 disabling injuries due to workplace accidents, with a total loss of $121 billion. Today there are a large number of books available on safety, but to the best of the author's knowledge none covers both general and systems safety (i.e., at a significant depth) and application or specialized areas such as software safety, robot safety, health care safety, and maintenance safety. This book has been written to satisfy that vital need.

**Readership:** Senior level undergraduates and graduate students in safety/industrial engineering; safety professionals and researchers; company safety officers; engineering designers.

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| **240pp** | **Mar 2003** | |
| **978-981-238-221-4** | **US$60** | **£41** |
| **978-981-238-328-0(pbk)** | **US$36** | **£25** |

## TUNDISH TECHNOLOGY FOR CLEAN STEEL PRODUCTION

by **Yogeshwar Sahai** *(The Ohio State University, USA)* & **Toshihiko Emi** *(Institute of Research of Iron & Steel, Jiangsu/Sha-Steel, China)*

This pioneering book is the first of its kind to cover all aspects of tundish technology, ranging from fundamental aspects and theory necessary for understanding the basic concepts of tundish operations to operational aspects of the tundish. Written by internationally recognized experts in continuous casting technology in general and tundish technology in particular, this book is sufficiently fundamental to serve as a graduate-level textbook on process metallurgy or as an important reference for metallurgical researchers and is comprehensive enough to contribute to the understanding of scientists and engineers engaged in research and development in the steel industry.

**Readership:** Undergraduate and graduate students in process metallurgy as well as researchers in steel and metallurgical production.

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| **328pp** | **Dec 2007** | |
| **978-981-270-621-8** | **US$111** | **£76** |
| **978-981-279-076-7(ebook)** | **US$144** | |

## SMART TECHNOLOGIES

edited by **K Worden** *(University of Sheffield, UK)*, **W A Bullough** *(University of Sheffield, UK)* & **J Haywood** *(University of Sheffield, UK)*

*"All contributions are presented in a simple and non-mathematical approach. This book is particularly suited to scientists who are already involved in one sector of smart technologies and would like to broaden their knowledge or are willing to expand their activities to another field. Also, because of the simple approach used to introduce the various topics and the large number of examples presented it could be of great help for Masters or PhD students who are beginning their projects in their field."* ***Journal of Sound and Vibration***

**Readership:** Undergraduates and researchers in materials science and engineering, electrical & electronic engineering, systems engineering and aerospace engineering.

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| **284pp** | **Apr 2003** | |
| **978-981-02-4776-8** | **US$113** | **£78** |
| **978-981-270-531-0(ebook)** | **US$147** | |

## CRYSTAL GROWTH FOR BEGINNERS: Fundamentals of Nucleation, Crystal Growth and Epitaxy (2nd Edition)

by **Ivan V Markov** *(Bulgarian Academy of Sciences, Bulgaria)*

This is the first-ever textbook on the fundamentals of nucleation, crystal growth and epitaxy. The reader is required to possess some basic knowledge of mathematics and physics. All formulae and equations are accompanied by examples that are of technological importance. The second revised edition includes two separate chapters dealing with the effect of the Ehrlich-Schwoebel barrier for down-step diffusion, as well as the effect of surface active species, on the morphology of the growing surfaces. In addition, many other chapters are updated accordingly.

**Readership:** Graduate students, academics and researchers in materials engineering, microelectronics, new materials, semiconductors and related areas.

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| **564pp** | **Aug 2003** | |
| **978-981-238-245-0** | **US$135** | **£93** |

## MATERIALS DEGRADATION AND ITS CONTROL BY SURFACE ENGINEERING (3rd Edition)

by **Andrew Batchelor** *(Aramco, Saudi Arabia)*, **Margam Chandrasekaran** *(Bio-Scaffold International Pte Ltd, Singapore)* & **Nee Lam Loh** *(Nanyang Technological University, Singapore)*

This book provides a general holistic view of materials degradation without undue emphasis on aqueous corrosion with the neglect of other important topics such as liquid metal corrosion. Discussion of materials degradation is balanced by detailed description and evaluation of surface engineering as a means of managing materials degradation. The control or management of materials degradation is not only discussed in scientific terms, but the economics or financial aspects of materials degradation and surface engineering is also discussed in detail with the help of analytical models.

**Readership:** Engineers and scientists in materials engineering, surface science, materials science (general), materials chemistry and surface and interface chemistry.

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| **450pp** | **Jan 2011** | |
| **978-1-84816-501-4** | **US$138** | **£91** |
| **978-1-84816-502-1(ebook)** | **US$179** | |

Series on Hydraulic Machinery - Vol. 2

## ABRASIVE EROSION AND CORROSION OF HYDRAULIC MACHINERY

edited by **C G Duan** *(International Research Center on Hydraulic Machinery, Beijing, China)* & **V Y Karelin** *(Moscow State University of Civil Engineering, Russia)*

This book gives a systematic exposition of abrasive erosion and corrosion of hydraulic machinery in both theory and engineering practice, and is the first comprehensive volume to cover this area in depth.

**Readership:** Upper level undergraduates, graduate students, researchers, academics and industrialists in mechanical, civil and electrical & electronic engineering.

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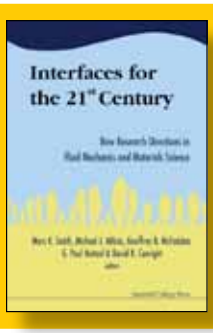
| **424pp** | **Jan 2003** | |
| **978-1-86094-335-5** | **US$184** | **£127** |
| **978-1-84816-002-6(ebook)** | **US$239** | |

## Titles of Interest







### EXPLOSIVE PULSED POWER

by **Larry L Altgilbers** *(US Army Space and Missile Defense Command, USA)*, **Jason Baird** *(Missouri University of Science and Technology, USA)*, **Bruce L Freeman** *(KTECH Corporation, USA)*, **Christopher S Lynch** *(University of California, Los Angeles, USA)* & **Sergey I Shkuratov** *(Loki Incorporated, USA)*

The objective of this book is to acquaint the reader with the principles of operation of explosive generators and to provide details on how to design, build, and test three types of generators: flux compression, ferroelectric, and ferromagnetic generators, which are the most developed and the most near term for practical applications. Containing a considerable amount of new experimental data that has been collected by the authors, this is the first book that treats all three types of explosive pulsed power generators.

**Readership:** Graduate students and researchers working in the field of pulsed power and electrical engineering.

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| **640pp** | **Aug 2010** | |
| **978-1-84816-322-5** | **US$135** | **£84** |
| **978-1-84816-323-2(ebook)** | **US$176** | |

Materials for Engineering - Vol. 1

### CRYSTALLINE MATERIALS FOR ACTINIDE IMMOBILISATION

by **Boris E Burakov** *(V G Khlopin Radium Institute, Russia)*, **Michael I Ojovan** *(University of Sheffield, UK)* & **William (Bill) E Lee** *(Imperial College, UK)*

This book summarises approaches and current practices in actinide immobilisation using chemically-durable crystalline materials such as ceramics and monocrystals. As a result of the increasing worldwide growth of the nuclear industry, long-lived α-emitting actinides such as Pu, Np, Am and Cm are fast becoming a serious environmental concern — actinide-bearing wastes have accumulated in different countries due to nuclear weapons production. On the other hand, as actinides are chemical elements with unique properties they could be beneficially used for humankind in areas such as medicine and technology. Durable actinide-containing materials are attractive for various applications.

**Readership:** Undergraduates, post-graduates, researchers and specialists studying physics, chemistry, geology and environmental engineering with an interest in the welfare of planet.

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| **216pp** | **Jul 2010** | |
| **978-1-84816-418-5** | **US$66** | **£41** |
| **978-1-84816-419-2(ebook)** | **US$86** | |

### INTERFACES FOR THE 21ST CENTURY: NEW RESEARCH DIRECTIONS IN FLUID MECHANICS AND MATERIALS SCIENCE

edited by **Marc K Smith** *(Georgia Institute of Technology, USA)*, **Michael J Miksis** *(Northwestern University, USA)*, **Geoffrey B McFadden** *(National Institute of Standards and Technology, USA)*, **G Paul Neitzel** *(Georgia Institute of Technology, USA)* & **David R Canright** *(Naval Postgraduate School, USA)*

This book highlights some recent advances in interfacial research in the fields of fluid mechanics and materials science at the beginning of the twenty-first century.

**Readership:** Researchers and graduate students in fluid mechanics and materials science.

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| **332pp** | **May 2002** | |
| **978-1-86094-319-5** | **US$94** | **£65** |
| **978-1-86094-960-9(ebook)** | **US$122** | |

### ULTRASONIC AND ADVANCED METHODS FOR NONDESTRUCTIVE TESTING AND MATERIAL CHARACTERIZATION

edited by **C H Chen** *(University of Massachusetts Dartmouth, USA)*

This book deals with both industrial ultrasound and medical ultrasound. The advantages of ultrasound include flexibility, low cost, in-line operation, and providing data in both signal and image formats for further analysis. The book devotes 11 chapters to ultrasonic methods and 14 chapters catering to other or advanced methods for nondestructive testing or material characterization.

**Readership:** Academics, practitioners, researchers, physicists, engineers and computer scientists.

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| **684pp** | **May 2007** | |
| **978-981-270-409-2** | **US$231** | **£159** |
| **978-981-277-094-3(ebook)** | **US$300** | |

Biomaterials Engineering and Processing Series - Vol. 1

### ENGINEERING MATERIALS FOR BIOMEDICAL APPLICATIONS

edited by **Teoh Swee Hin** *(National University of Singapore)*

The aim of this book is to provide a basic understanding on the engineering and processing aspects of biomaterials used in medical applications. Of paramount importance is the tripartite relationship between material properties, processing methods and design.

**Readership:** Undergraduates and postgraduates (in bioengineering, materials science and engineering, mechanical engineering, dental and orthopaedic departments), engineers, researchers, academics/lecturers and industrialists.

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| **352pp** | **Oct 2004** | |
| **978-981-256-061-2** | **US$164** | **£113** |
| **978-981-256-222-7(ebook)** | **US$213** | |

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