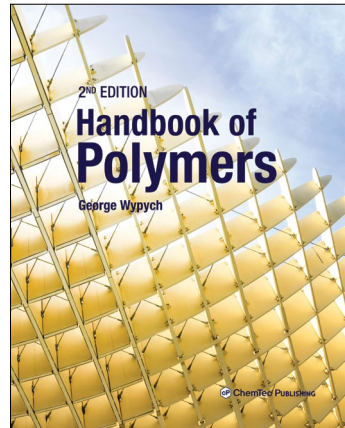
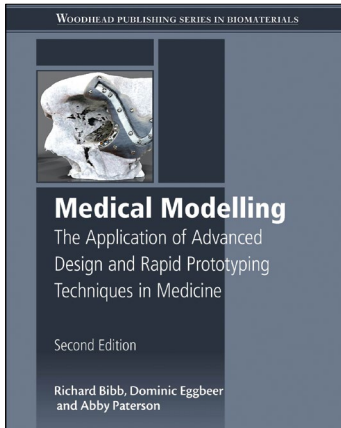
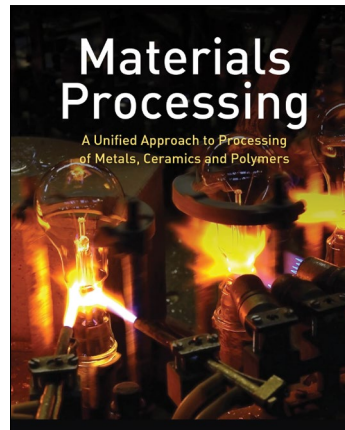




# MATERIALS SCIENCE



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WOODHEAD PUBLISHING SERIES IN BIOMATERIALS



## Extracellular Matrix-derived Implants in Clinical Medicine

Edited by Daniel Mooradian



**ISBN:** 978-0-08-100166-0

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 270

### AUDIENCE

Scientists and engineers working in biomedical engineering, biomaterials and tissue engineering, and regulatory professionals and clinicians

## Extracellular Matrix-derived Implants in Clinical Medicine

Edited by: **Daniel Mooradian** University of Minnesota, Minneapolis, MI, USA



**This fresh perspective on tissue engineering and regenerative medicine focuses on the challenges and economics of their application by highlighting historical data, harvesting and processing information, and the regulatory environment and economics of tissue-based products**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Addresses issues of tissue engineering and regenerative medicine from a biomaterials industry perspective
- Looks at the historical use of human and animal tissues, focusing on the main application areas, including cardiovascular, hard and soft tissue engineering, and neurological
- Examines the challenges in harvesting, processing, and manufacturing of extracellular matrices
- Reviews the international regulatory environment and economics of tissue-based products

### DESCRIPTION

*Extracellular Matrix-Derived Implants in Clinical Medicine* comprehensively covers the emergence of tissue engineering and regenerative medicine over the past few decades, along with discussions of continuous funding and research.

The book provides a state-of-the-art review of this increasingly important technology and how it is translating from bench to bedside. Part One of the book looks at the historical use of human and animal tissues, focusing on the main application areas, including cardiovascular, hard and soft tissue engineering, and neurological, while Part Two examines the challenges in harvesting, processing, and manufacturing of extracellular matrices, with a final section reviewing the international regulatory environment and economics of tissue-based products.

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COVER IMAGE  
FORTHCOMING

## Oxidative Stress and Biomaterials

*Thomas Dziubla* Chemical and Materials Engineering, College of Engineering, University of Kentucky, Lexington, KY  
*D Allan Butterfield* Department of Chemistry, University of Kentucky, Lexington, KY



**This book is an introduction to the fields that provides an expert summary of oxidative stress analysis methods, focusing on the considerations/limitations of each method and reviewing state of the art research into how people are currently using oxidative stress concepts in designing biomaterials**

### KEY FEATURES

- Explores the challenges of designing and using biomaterials in order to minimize oxidative stress, reducing patterns of chronic inflammation and cell death
- Brings together the two fields of biomaterials and the biology of oxidative stress
- Provides approaches for the design of biomaterials with improved biocompatibility

### DESCRIPTION

For biomaterials, oxidative stress poses an especially troubling challenge to their biocompatibility. No material is in all biological settings and situations 100% non-inflammatory, non-toxic, non-teratogenic, non-carcinogenic, non-thrombogenic, and non-immunogenic. At the cellular level, the tissue environment is a harsh landscape of precipitating proteins, infiltrating leukocytes, released oxidants and fluctuations of pH, which even with the slightest shift in stasis can induce a perpetual state of chronic inflammation. While in this embattled terrain, the most we can hope for from the biomaterials we design is a type of “meso-compatibility,” a material which can remain functional and benign for as long as required without succumbing to this cellular onslaught and inducing a local inflammatory reaction.

**ISBN:** 978-0-12-803269-5

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 420

### AUDIENCE

Biomaterials community, Biomedical Engineers, Chemical Engineers

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## Wound Healing Biomaterials

Volume 1

Therapies and Regeneration

Edited by Magnus S. Ågren



**ISBN:** 978-1-78242-455-0

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 360

### AUDIENCE

Researchers in industry, academia and clinics with an interest in wound healing

## Wound Healing Biomaterials - Volume 1

### Therapies and Regeneration

Edited by: *Magnus Ågren* Associate Professor, Department of Surgery, Bispebjerg Hospital, Copenhagen, Denmark



**As an expansive overview of the field of wound healing, this book discusses the types of wounds associated with trauma, illness, or surgery that can sometimes be extremely complex and difficult to heal and the new ways that state-of-the-art emerging therapies, regeneration methods, and biomaterials are being used to create new solutions for patients and practitioners**

### KEY FEATURES

- Provides more systematic and comprehensive coverage of specific therapies and biomaterials for wound healing
- Highlights research that is concerned with new therapies, regeneration methods, and the use of biomaterials to assist in wound healing and healing response
- Presents an organized layout of the material that is carefully arranged with clear titles and comprehensive section headings
- Looks at tissue regeneration strategies, making this an all encompassing book on the topic of wound care

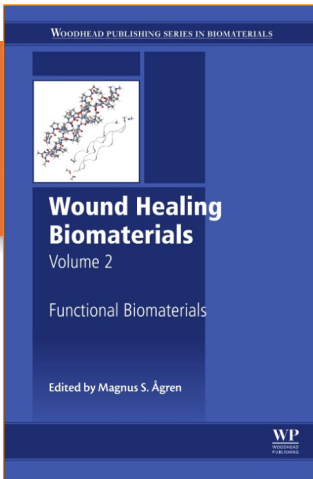
### DESCRIPTION

*Wound Healing Biomaterials: Volume One, Therapies and Regeneration* discusses the types of wounds associated with trauma, illness, or surgery that can sometimes be extremely complex and difficult to heal.

Consequently, there is a prominent drive for scientists and clinicians to find methods to heal these types of wounds, with science increasingly turning towards biomaterials to address these challenges. Much research is now concerned with new therapies, regeneration methods, and biomaterials to assist in wound healing and healing response.

This book provides readers with a comprehensive review of the fundamentals and advances in the field of wound healing with regard to therapies and tissue regeneration. Chapters in Part One discuss fundamentals and strategies of wound healing, while Part Two reviews gene, stem cell, and drug delivery therapies for wound healing. Final chapters look at tissue regeneration strategies, making this an all-encompassing book on the topic of wound care and biomaterials.





**ISBN:** 978-1-78242-456-7

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 660

**AUDIENCE**

Researchers in industry, academia and clinics with an interest in wound healing

## Wound Healing Biomaterials - Volume 2

### *Functional Biomaterials*

Edited by: *Magnus Ågren* Associate Professor, Department of Surgery, Bispebjerg Hospital, Copenhagen, Denmark



**This book discusses the latest research on new therapies, regeneration methods, and biomaterials that can assist in wound healing and alter healing responses, including specific sections on the fundamentals of wound healing biomaterials, films and polymer-based dressings for wound healing applications, and more.**

#### KEY FEATURES

- Includes more systematic and comprehensive coverage on the topic of wound care
- Provides thorough coverage of all specific therapies and biomaterials for wound healing
- Contains clear layout and organization that is carefully arranged with clear titles and comprehensive section headings
- Details specific sections on the fundamentals of wound healing biomaterials, films for wound healing applications, polymer-based dressing for wound healing applications, and more

#### DESCRIPTION

*Wound Healing Biomaterials: Volume Two, Functional Biomaterials* discusses the types of wounds associated with trauma, illness, or surgery that can sometimes be extremely complex and difficult to heal. Consequently, there is a prominent drive for scientists and clinicians to find methods to heal wounds opening up a new area of research in biomaterials and the ways they can be applied to the challenges associated with wound care.

Much research is now concerned with new therapies, regeneration methods, and the use of biomaterials that can assist in wound healing and alter healing responses. This book provides readers with a thorough review of the functional biomaterials used for wound healing, with chapters discussing the fundamentals of wound healing biomaterials, films for wound healing applications, polymer-based dressing for wound healing applications, and functional dressings for wound care.

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WOODHEAD PUBLISHING SERIES IN BIOMATERIALS



## Biomaterials and Regenerative Medicine in Ophthalmology

Second Edition

Edited by Traian Chirila and Damien Harkin



## Biomaterials and Regenerative Medicine in Ophthalmology, 2e

*T V Chirila* Queensland Eye Institute, Australia

*Damien Harkin* Faculty of Health, Queensland University of Technology



The second edition of *Biomaterials and Regenerative Medicine in Ophthalmology* provides academics, researchers, and industry professionals working in ophthalmic biomaterials and regenerative medicine with the latest information on new advances that can help alleviate ever increasing instances of eye disease

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Provides an integral and significant exploration of biomaterials and regenerative medicine, presenting crucial advances made in the fields of ophthalmology and optometry, such as the development of intraocular lenses and new applications for contact lens
- Presents a new and updated look at the future direction of biomaterials and regenerative medicine in this field
- Comprehensive coverage in a range of fields, including hydrogels, corneal tissue engineering, and stem cell therapies for the restoration of the ocular surface

### DESCRIPTION

*Biomaterials and Regenerative Medicine in Ophthalmology, Second Edition*, focuses on an aging population and the increasing instances of eye diseases. Biomaterials continue to be used for numerous medical devices for the restoration of eyesight, improving many patients' quality of life. Consequently, biomaterials and regenerative medicine are becoming increasingly important to the advances of ophthalmology and optometry. This book provides readers with an updated and expanded look at the present status and future direction of biomaterials and regenerative medicine in this important field.

**ISBN:** 978-0-08-100147-9

**PREVIOUS EDITION ISBN:**  
9781845694432

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 540

### AUDIENCE

Ophthalmic biomaterials, devices and regenerative medicine researchers in both academia and industry. Chemists and clinicians working in the ophthalmic field.

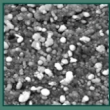
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WOODHEAD PUBLISHING SERIES IN BIOMATERIALS



## Laser Surface Modification of Biomaterials

Edited by Rui Vilar



## Laser Surface Modification of Biomaterials

### *Techniques and Applications*

Edited by: *Rui Vilar* Technical University of Lisbon, Portugal



This useful guide provides a comprehensive review of laser surface modification of biomaterials, covering the most important biomaterials classes and discussing application-specific laser surface modification

#### KEY FEATURES

- Offers a comprehensive review of laser surface modification techniques
- Presents recent developments, fundamentals, and progress in laser surface modification
- Reviews laser surface modification applications across a range of materials
- Emphasizes applications in biomaterials

#### DESCRIPTION

*Laser Surface Modification of Biomaterials: Techniques and Applications* covers this expanding field, which has many potential applications, including biomaterials. Laser surface modification of biomaterials enables the production of hybrid materials with different functionality in the bulk as well as the thin, sub-micrometer surface layer.

This book will provide readers with a comprehensive review of the technology and its applications. Chapters in Part 1 look at the techniques and considerations of laser surface modification, while Part 2 reviews laser surface modification techniques of the most important classes of biomaterials, with a final set of chapters discussing application specific laser surface modification.

**ISBN:** 978-0-08-100883-6

**PUB DATE:** April 2016

**FORMAT:** Hardback

**PAGES:** c. 330

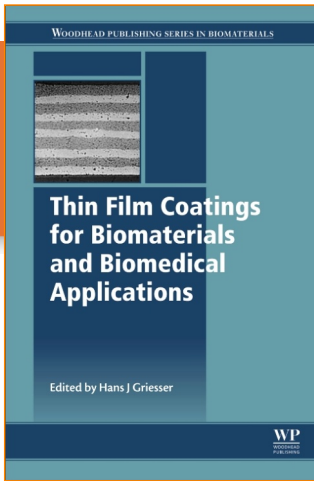
#### AUDIENCE

Engineers, researchers, post-graduate students

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**ISBN:** 978-1-78242-453-6

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 360

**AUDIENCE**

Researchers in industry and academia with a particular interest in improving the design and development of medical implant materials

## Thin Film Coatings for Biomaterials and Biomedical Applications

Edited by: *Hans J Griesser* Mawson Institute, University of South Australia, Australia



As a comprehensive guide to thin film coatings and their application in the biomaterials field, this book discusses the latest information on coatings, including their historic use by scientists who are looking to improve the properties and biological responses of the material-host interface

### KEY FEATURES

- Provides a comprehensive review on the fundamentals, properties, and functions of thin film coatings for biomaterials
- Covers a broad range of applications for implantable biomaterials
- Written by an international team of contributors who carefully tailor the presented information in a way that addresses industry needs

### DESCRIPTION

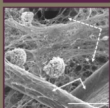
*Thin Film Coatings for Biomaterials and Biomedical Applications* discusses the latest information on coatings, including their historic use by scientists who are looking to improve the properties and biological responses of the material-host interface. Thin films, in particular, are becoming more widely researched and used as an alternative to traditional sprayed coatings because they have a more uniform structure and therefore greater stability.

This book provides readers with a comprehensive guide to thin film coatings and their application in the biomaterials field. Part One of the book details the fundamentals of thin films for biomedical application, while Part Two looks at the special properties of thin films, with a final section reviewing functional thin films and their usage in biomedical applications.

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## Nanocomposites for Musculoskeletal Tissue Regeneration

Edited by Huinan Liu



## Nanocomposites for Musculoskeletal Tissue Regeneration

Edited by: *Huinan Liu* University of California, USA



**As a thorough review of biocomposites and their role in musculoskeletal tissue regeneration, this book's comprehensive assessment of nanocomposites and their usage in mimicking the structure of musculoskeletal tissues is ideal for scientists and researchers who are working on new avenues**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Provides a comprehensive discussion on the design and advancements made in the use of nanocomposites for musculoskeletal tissue regeneration
- Presents an In-depth coverage of material properties
- Includes discussions on polymers, ceramics, and glass

### DESCRIPTION

*Nanocomposites for Musculoskeletal Tissue Regeneration* discusses the advanced biomaterials scientists are exploring for use as tools to mimic the structure of musculoskeletal tissues. Bone and other musculoskeletal tissues naturally have a nanocomposite structure, therefore nanocomposites are ideally suited as a material for replacing and regenerating these natural tissues. In addition, biological properties such as biointegration and the ability to tailor and dope the materials make them highly desirable for musculoskeletal tissue regeneration.

**ISBN:** 978-1-78242-452-9

**PUB DATE:** March 2016

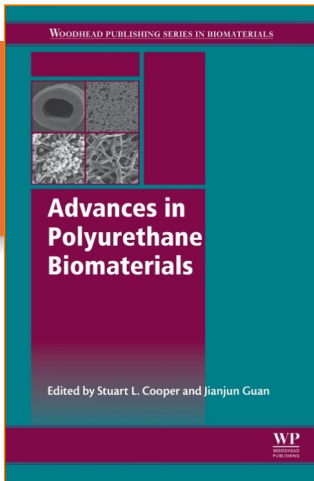
**FORMAT:** Hardback

**PAGES:** c. 450

### AUDIENCE

Researchers in industry and academia with a particular interest in tissue engineering of bone and other hard tissues.





## Advances in Polyurethane Biomaterials

Edited by: *Stuart L. Cooper* Professor, Chemical & Biomolecular Engineering, Ohio State University

*Jianjun Guan* Associate Professor, Materials Science Engineering, Ohio State University



By providing a comprehensive resource on the topic, this book explores the latest advances in properties of polyurethane biomaterials and their biomedical applications, including their tissue engineering and vascular and drug delivery applications

### KEY FEATURES

- Brings together in-depth coverage of an important material, essential for many advanced biomedical applications
- Connects the fundamentals of polyurethanes with state-of-the-art analysis of significant new applications, including tissue engineering and drug delivery
- Written by a team of highly knowledgeable authors with a range of professional and academic experience, overseen by an editor who is a leading expert in the field

### DESCRIPTION

*Advances in Polyurethane Biomaterials* brings together a thorough review of advances in the properties and applications of polyurethanes for biomedical applications. The first set of chapters in the book provides an important overview of the fundamentals of this material with chapters on properties and processing methods for polyurethane. Further sections cover significant uses such as their tissue engineering and vascular and drug delivery applications

Written by an international team of leading authors, the book is a comprehensive and essential reference on this important biomaterial.

**ISBN:** 978-0-08-100614-6

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 692

### AUDIENCE

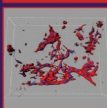
materials scientists, chemists, engineers, R&D managers in industry and academia

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## Biosynthetic Polymers for Medical Applications

Edited by  
L. Poole-Warren, P. Martens and R. Green



## Biosynthetic Polymers for Medical Applications

Edited by: **L. Poole-Warren** University of New South Wales, Australia  
**P. Martens** University of New South Wales, Australia  
**R. Green** University of New South Wales, Australia



**This book provides an exploration of the fundamentals of biosynthetic polymers and the techniques used in their medical applications due to their favorable properties, including degradability and biocompatibility, along with their usage in tissue engineering and the further uses of polymers for other medical applications**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Comprehensively covers all major medical applications of biosynthetic polymers
- Provides an overview of non-degradable and biodegradable biosynthetic polymers and their medical uses
- Presents a specific focus on coatings and surface modifications, biosynthetic hydrogels, particulate systems for gene and drug delivery, and conjugated conducting polymers

### DESCRIPTION

*Biosynthetic Polymers for Medical Applications* provides the latest information on biopolymers, the polymers that have been produced from living organisms and are biodegradable in nature. These advanced materials are becoming increasingly important for medical applications due to their favorable properties, such as degradability and biocompatibility.

This important book provides readers with a thorough review of the fundamentals of biosynthetic polymers and their applications. Part One covers the fundamentals of biosynthetic polymers for medical applications, while Part Two explores biosynthetic polymer coatings and surface modification. Subsequent sections discuss biosynthetic polymers for tissue engineering applications and how to conduct polymers for medical applications.

**ISBN:** 978-1-78242-105-4

**PUB DATE:** November 2015

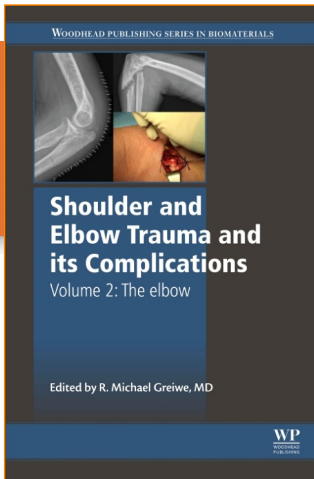
**FORMAT:** Hardback

**PAGES:** c. 342

### AUDIENCE

Biomaterials and chemical scientists in R&D and academia; in addition to polymer scientists, it should appeal to researchers concerned with tissue engineering, drug delivery and conducting materials





**ISBN:** 978-1-78242-450-5

**PUB DATE:** October 2015

**FORMAT:** Hardback

**PAGES:** c. 358

**AUDIENCE**

qualified clinicians and those in training in the orthopaedic field.

## Shoulder and Elbow Trauma and its Complications

### *The Elbow*

Michael Greiwe Commonwealth Orthopedic Centers, Kentucky, USA



**This book provides in-depth coverage of the latest in elbow surgeries and trauma, and is an ideal reference for qualified orthopaedic clinicians and those in training as it contains updated information on all of the major types of elbow trauma.**

A Volume in the Woodhead Publishing Series in Biomaterials.

#### KEY FEATURES

- All major elbow traumas covered
- Discusses tactics on how to manage complications in surgery
- Provides information based on an aging population and the increase in sports related elbow fractures
- Joint specific information

#### DESCRIPTION

*Shoulder and Elbow Trauma and Its Complications: Volume 2: The Elbow* provides an update on elbow surgery, a type of procedure that is seeing a significant increase in recent years.

Although some of these surgeries are due to an aging population, a large proportion of operations are being performed on younger patients who have damaged their joints through physical activity.

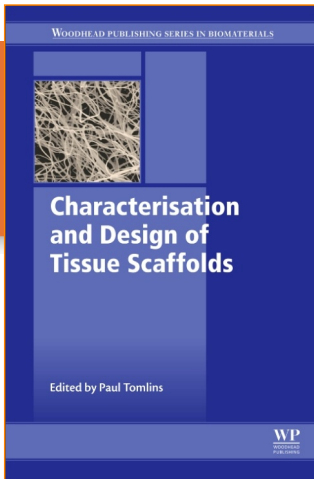
Worldwide, many of the injuries sustained through sport and physical activity are fractures which can be difficult to treat and can cause complications. Chapters in this detailed book will look at the most common types of elbow trauma and how to manage complications in surgery.

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## Characterisation and Design of Tissue Scaffolds

Edited by: *P Tomlins* Independent Consultant, UK



**This book provides an expert overview of the fundamental considerations in the characterization of tissue scaffolds necessary for tissue engineering, discussing both preparation and practical considerations that must be addressed by manufacturers.**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Summarizes concepts and current practice in the characterization and design of tissue scaffolds
- Discusses design and preparation of scaffolds
- Details how to prepare tissue scaffolds, discusses techniques in characterization, and presents practical considerations for manufacturers

### DESCRIPTION

*Characterisation and Design of Tissue Scaffolds* offers scientists a useful guide on the characterization of tissue scaffolds, detailing what needs to be measured and why, how such measurements can be made, and addressing industrially important issues.

Part one provides readers with information on the fundamental considerations in the characterization of tissue scaffolds, while other sections detail how to prepare tissue scaffolds, discuss techniques in characterization, and present practical considerations for manufacturers.

**ISBN:** 978-1-78242-087-3

**PUB DATE:** October 2015

**FORMAT:** Hardback

**PAGES:** c. 276

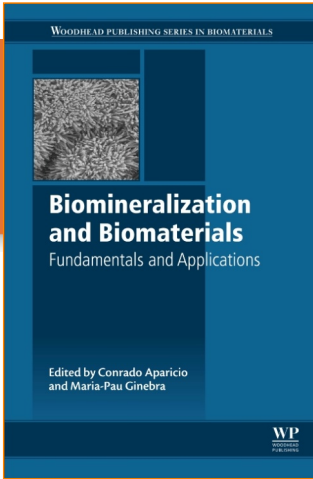
### AUDIENCE

Tissue engineering scientists in industry and academia

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**ISBN:** 978-1-78242-338-6

**PUB DATE:** September 2015

**FORMAT:** Hardback

**PAGES:** c. 462

**AUDIENCE**

Researchers working in Biomaterials and Tissue Engineering; Industry product development professionals; academics and students in biomimetics

## Biomaterialization and Biomaterials

### *Fundamentals and Applications*

*Conrado Aparicio* Associate Professor, University of Minnesota, USA

*Maria Pau Ginebra* Professor, Universitat Politècnica de Catalunya, Spain



**Thorough coverage of all aspects of biomaterialization technology and its applications, including new strategies and technologies that improve the mineralization of biomaterials**

#### KEY FEATURES

- Provides a thorough overview of the biomaterialization process
- Presents the most recent information on the natural process by which crystals in tissues form into inorganic structures such as bone, teeth, and other natural mineralized tissues
- Investigates methods for improving mineralization
- Explores new techniques that will help improve the biomimetic process

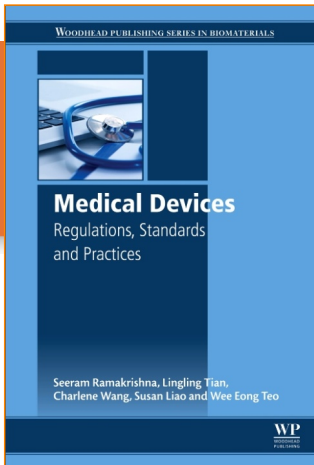
#### DESCRIPTION

Biomaterialization is a natural process by which living organisms form minerals in association with organic biostructures to form hybrid biological materials such as bone, enamel, dentine and nacre among others. Scientists have researched the fundamentals of these processes and the unique structures and properties of the resulting mineralized tissues. Inspired by them, new biomaterials for tissue engineering and regenerative medicine have been developed in recent years. *Biomaterialization and biomaterials: fundamentals and applications* looks at the characteristics of these essential processes and natural materials and describes strategies and technologies to biomimetically design and produce biomaterials with improved biological performance.

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**ISBN:** 978-0-08-100289-6

**PUB DATE:** September 2015

**FORMAT:** Hardback

**PAGES:** c. 240

**AUDIENCE**

regulatory managers, companies that may not employ fulltime regulatory professionals; governmental regulators and manufacturers involved in global biomaterial, biomedical and life science product commercialization; students and graduates in healthcare, business administration and public health

## Medical Devices

### *Regulations, Standards and Practices*

**Seeram Ramakrishna** Director of the Center for Nanofibers & Nanotechnology, National University of Singapore, Singapore;  
**Lingling Tian** Research Fellow, National University of Singapore, Singapore;

**Charlene Wang** Laboratory Technologist, National University of Singapore;

**Susan Liao** Programme manager and Senior Research Fellow, Nanyang

Technological University, Singapore



**A useful step-by-step guide on designing medical devices to ensure regulatory approval**

#### KEY FEATURES

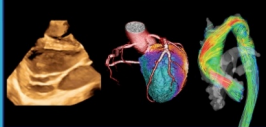
- Provides readers with a global perspective on medical device regulations
- Concise and comprehensive information on how to design medical devices to ensure they meet regulations and standards
- Includes a useful case study demonstrating the design and approval process

#### DESCRIPTION

Medical Devices and Regulations: Standards and Practices will shed light on the importance of regulations and standards among all stakeholders, bioengineering designers, biomaterial scientists and researchers to enable development of future medical devices.

Based on the authors' practical experience, this book provides a concise, practical guide on key issues and processes in developing new medical devices to meet international regulatory requirements and standards.





## Advanced Cardiac Imaging

Edited by Koen Nieman, Oliver Gaemperli,  
Patrizio Lancellotti and Sven Plein



## Advanced Cardiac Imaging

Edited by: *K Nieman* Erasmus University, The Netherlands

*Oliver Gaemperli* University Hospital Zurich, Switzerland

*Patrizio Lancellotti* University of Liège, Belgium

*Sven Plein* Professor of Cardiology, University of Leeds, England, UK



**An all-encompassing look at cardiac imaging technology and its medical applications**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Presents a thorough overview of cardiac imaging technology
- Addresses specific applications for a number of cardiac diseases and how they can improve diagnoses and treatment protocols
- Includes technological developments in cardiac imaging and imaging applications in a clinical setting

### DESCRIPTION

*Advances in Cardiac Imaging* presents the latest information on heart disease and heart failure, major causes of death among western populations. In addition, the text explores the financial burden to public healthcare trusts and the vast amount of research and funding being channeled into programs not only to prevent such diseases, but also to diagnose them in early stages.

This book provides readers with a thorough overview of many advances in cardiac imaging. Chapters include technological developments in cardiac imaging and imaging applications in a clinical setting with regard to detecting various types of heart disease.

**ISBN:** 978-1-78242-282-2

**PUB DATE:** August 2015

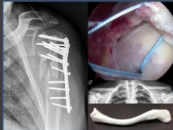
**FORMAT:** Hardback

**PAGES:** c. 782

### AUDIENCE

Cardiologists and radiologists in academia and clinicians in industry. It should also appeal to students studying cardiology.





## Shoulder and Elbow Trauma and its Complications

Volume 1: The Shoulder

Edited by R. Michael Greiwe, MD



## Shoulder and Elbow Trauma and its Complications

### *The Shoulder*

Edited by: *Michael Greiwe* Commonwealth Orthopedic Centers, Kentucky, USA



**A systematic and comprehensive guide to the different types of shoulder trauma and the management of its associated complications**

A Volume in the Woodhead Publishing Series in Biomaterials.

#### KEY FEATURES

- Reviews common types of shoulder trauma
- Addresses the common complications associated with each injury
- Provides a detailed guide to the management of common complications

#### DESCRIPTION

Traumatic injuries to the shoulder remain a problem encountered by young and old alike. Trauma surgeons and shoulder and elbow specialists are called upon daily to improve the quality of life of injured individuals by restoring function, decreasing pain and returning individuals to their previous occupations and places in society. Such treatment provides both humanitarian and economic impact. Only recently have techniques and technology allowed surgeons to restore lives to such a degree following these injuries. Still, shoulder and elbow trauma remains a vexing problem for patients and surgeons alike. Many injuries result in lost work and serious debility including lack of function, post-traumatic arthritis and pain. This important textbook provides a systematic and comprehensive guide to the different types of shoulder trauma and the management of its associated complications.

In Part One, the focus is on the most common types of shoulder trauma, with chapters covering anterior instability, traumatic rotator cuff tears, fractures, joint injuries and the floating shoulder and includes sections on the most common complications befalling each injury. Part II then reviews the management of the most common complications. Chapters include detailed analyses of persistent anterior shoulder instability, several forms of nonunion and malunion, failed acromioclavicular joint reconstruction, post-traumatic arthropathy and traumatic osteonecrosis, and failed arthroplasty for fracture.

**ISBN:** 978-1-78242-449-9

**PUB DATE:** August 2015

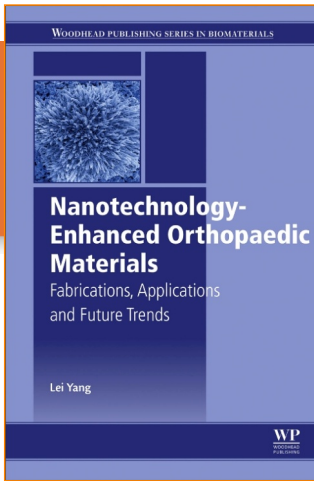
**FORMAT:** Hardback

**PAGES:** c. 486

#### AUDIENCE

Qualified clinicians and those in training in the orthopaedic field.





**ISBN:** 978-0-85709-844-3

**PUB DATE:** July 2015

**FORMAT:** Hardback

**PAGES:** c. 218

**AUDIENCE**

Materials and biomedical engineers or researchers interested in the orthopaedic field, as well as instructors and students interested in the general field of biomaterials and nanotechnology

## Nanotechnology-Enhanced Orthopaedic Materials

### *Fabrications, Applications and Future Trends*

*Lei Yang* Professor, Orthopaedic Institute and the Department of Orthopaedics, the First Affiliated Hospital, Soochow University, China



**Insights into nanotechnology for orthopaedic applications, a comprehensive overview of the field, and an explanation of emerging technologies**

A Volume in the Woodhead Publishing Series in Biomaterials.

#### KEY FEATURES

- Details practical information on the fabrication and modification of new and traditional orthopaedic materials
- Analyzes a wide range of materials, designs, and applications of nanotechnology for orthopaedics
- Investigates future trends in the field, including sections on orthopaedic materials with bacterial-inhibitory properties and novel materials for the control of immune and inflammatory responses

#### DESCRIPTION

*Nanotechnology-Enhanced Orthopaedic Materials* provides the latest information on the emergence and rapid development of nanotechnology and the ways it has impacted almost every aspect of biomedical engineering.

This book provides readers with a comprehensive overview of the field, focusing on the fabrication and applications of these materials, presenting updated, practical, and systematic knowledge on the synthesis, processing, and modification of nanomaterials, along with the rationale and methodology of applying such materials for orthopaedic purposes.

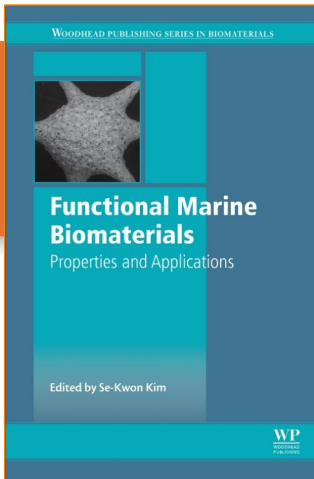
Topics covered include a wide range of orthopaedic material formulations, such as ceramics, metals, polymers, biomolecules, and self-assemblies. Final sections explore applications and future trends in nanotechnology-enhanced orthopaedic materials.

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**ISBN:** 978-1-78242-086-6

**PUB DATE:** June 2015

**FORMAT:** Hardback

**PAGES:** c. 160

**AUDIENCE**

The book should appeal to biomaterials scientists in industry and academia with an interest in tissue engineering and drug delivery.

## Functional Marine Biomaterials

### *Properties and Applications*

Edited by: *S-K Kim* Pukyong National University, Busan, South Korea



**The latest information on the diverse marine environment as a resource for many new substances, including biopolymers, bioceramics, and biominerals**

A Volume in the Woodhead Publishing Series in Biomaterials.

#### KEY FEATURES

- Provides readers with the latest information on the diverse marine environment as a resource for many new substances, including biopolymers, bioceramics, and biominerals
- Presents a comprehensive review of these materials and their functional applications in the biomedical field
- Discusses the properties of the main classes of functional marine biomaterials, applications of marine products in tissue engineering, applications in drug delivery systems, and the role of marine derived materials in medical devices

#### DESCRIPTION

*Functional Marine Biomaterials: Properties and Applications* provides readers with the latest information on the diverse marine environment as a resource for many new substances, including biopolymers, bioceramics, and biominerals.

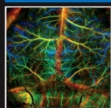
As recent advances and funding has enabled scientists to begin harnessing many of these materials for biomedical applications from drug delivery to bone tissue engineering and biosensors, this important new text provides readers with a comprehensive review of these materials and their functional applications in the biomedical field.

Chapters discuss the properties of the main classes of functional marine biomaterials, applications of marine products in tissue engineering, applications in drug delivery systems, and the role of marine derived materials in medical devices.

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## Biophotonics for Medical Applications

Edited by Igor Meglinski



**ISBN:** 978-0-85709-662-3

**PUB DATE:** June 2015

**FORMAT:** Hardback

**PAGES:** c. 392

### AUDIENCE

Scientists, researchers and academics concerned with medical imaging and physics, as well as clinicians who require a strong understanding of the field

## Biophotonics for Medical Applications

Edited by: *I Meglinski* University of Otago, New Zealand



### Information on the interface between laser optics and cell biology/medicine

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Presents information on the interface between laser optics and cell biology/medicine
- Discusses the development and application of photonic techniques which aid the diagnosis and therapeutics of biological tissues in both healthy and diseased states
- Presents the fundamental technologies used in biophotonics and a wide range of therapeutic and diagnostic applications

### DESCRIPTION

*Biophotonics for Medical Applications* presents information on the interface between laser optics and cell biology/medicine.

The book discusses the development and application of photonic techniques that aid the diagnosis and therapeutics of biological tissues in both healthy and diseased states. Chapters cover the fundamental technologies used in biophotonics and a wide range of therapeutic and diagnostic applications.





## Regenerative Engineering of Musculoskeletal Tissues and Interfaces

Edited by Syam P. Nukavarapu, Joseph W. Freeman and Cato T. Laurencin



## Regenerative Engineering of Musculoskeletal Tissues and Interfaces

Edited by: **Syam Nukavarapu** University of Connecticut Health Center, Farmington, CT, USA

**Joseph Freeman** Rutgers University, School of Engineering, New Brunswick, NJ, USA

**Cato Laurencin** University of Connecticut Health Center, Farmington, CT, USA



**Comprehensive coverage of the issues related to the repair and regeneration of musculoskeletal tissues and interfaces**

### KEY FEATURES

- Comprehensive review of the repair and regeneration of musculoskeletal individual tissues and tissue interfaces
- Presents recent developments, fundamentals and progress in the field of engineering tissues
- Reviews progress and advances in tissue vascularization and innervation

### DESCRIPTION

Repair and regeneration of musculoskeletal tissues is generating substantial interest within the biomedical community. Consequently, these are the most researched tissues from the regeneration point of view. *Regenerative Engineering of Musculoskeletal Tissues and Interfaces* presents information on the fundamentals, progress and recent developments related to the repair and regeneration of musculoskeletal tissues and interfaces. This comprehensive review looks at individual tissues as well as tissue interfaces. Early chapters cover various fundamentals of biomaterials and scaffolds, types of cells, growth factors, and mechanical forces, moving on to discuss tissue-engineering strategies for bone, tendon, ligament, cartilage, meniscus, and muscle, as well as progress and advances in tissue vascularization and nerve innervation of the individual tissues. Final chapters present information on musculoskeletal tissue interfaces.

**ISBN:** 978-1-78242-301-0

**PUB DATE:** April 2015

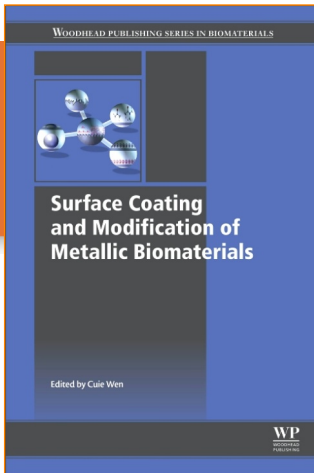
**FORMAT:** Hardback

**PAGES:** c. 440

### AUDIENCE

Researchers, clinicians who deal with soft and hard tissue repair and regeneration, teachers, students and industry professionals who are in the broad field of Tissue Engineering and focused on musculoskeletal tissues.





## Surface Coating and Modification of Metallic Biomaterials

Edited by: *Cuie Wen* Professor of Surface Engineering, School of Engineering, Industrial Research Institute Swinburne, Australia



The fundamentals and techniques of surface modification of metals for biomaterial are covered in this comprehensive volume

### KEY FEATURES

- An expansive overview of surface modification techniques for biomedical use
- In-depth exploration of issues arising from metal biomaterial use
- Includes examples of applications in a clinical setting

### DESCRIPTION

Despite advances in alternative materials, metals are still the biomaterial of choice for a number of clinical applications such as dental, orthopedic and cardiac implants. However, there are a number of intrinsic problems associated with implanting metal in the biological environment, such as wear, corrosion, biocompatibility and toxicity, which must be addressed. Modern technology has enabled scientists to modify metal surfaces or apply special coatings to metals to improve their performance safety. *Surface Coating and Modification of Metallic Biomaterials* will discuss the most important modification techniques and coatings for metals, first covering the fundamentals of metals as a biomaterial and then exploring surface modification techniques and coatings.

**ISBN:** 978-1-78242-303-4

**PUB DATE:** April 2015

**FORMAT:** Hardback

**PAGES:** c. 432

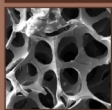
### AUDIENCE

Materials/metals scientists and R&D companies concerned with metallic medical implants in fields such as dentistry, orthopaedics and cardiology.

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## Shape Memory Polymers for Biomedical Applications

Edited by L'Hocine Yahia



**ISBN:** 978-0-85709-698-2

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 312

### AUDIENCE

Materials researchers and scientists in the biomaterials industry and academia as well as chemists

## Shape Memory Polymers for Biomedical Applications

Edited by: *L. Yahia* École Polytechnique de Montréal, Canada



**A comprehensive review of shape memory polymers with a focus on properties, behaviour, fabrication and characterisation**

A Volume in the Woodhead Publishing Series in Biomaterials.

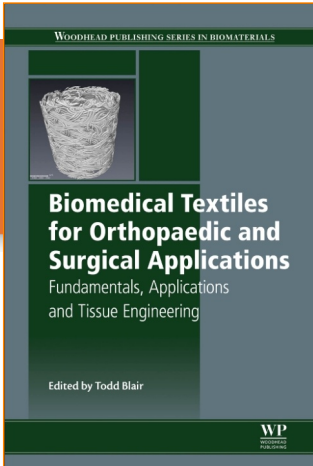
### KEY FEATURES

- Reviews the fundamentals of shape memory polymers with chapters focussing on the basic principles of the materials
- Comprehensive coverage of design and mechanical aspects of SMPs
- Expert analysis of the range of technologies and materials available for scientific manipulation

### DESCRIPTION

Shape memory polymers (SMPs) are an emerging class of smart polymers which give scientists the ability to process the material into a permanent state and predefine a second temporary state which can be triggered by different stimuli. The changing chemistries of SMPs allows scientists to tailor important properties such as strength, stiffness, elasticity and expansion rate. Consequently SMPs are being increasingly used and developed for minimally invasive applications where the material can expand and develop post insertion. This book will provide readers with a comprehensive review of shape memory polymer technologies. Part 1 will discuss the fundamentals and mechanical aspects of SMPs. Chapters in part 2 will look at the range of technologies and materials available for scientific manipulation whilst the final set of chapters will review applications.





# Biomedical Textiles for Orthopaedic and Surgical Applications

*Fundamentals, Applications and Tissue Engineering*

Edited by: *T Blair* Biomedical Structures Ltd, USA



**A comprehensive overview of the role biomedical textiles can play in orthopaedics, covering such topics as embroidery technology for hard tissue scaffolds, nonwoven scaffolds for bone regeneration, ACL prostheses using biotextiles, and more**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Provides a comprehensive overview of the role biomedical textiles can play in the orthopaedic field

### DESCRIPTION

Recent concerns over the possible effects of metal-on-metal orthopaedic implants and the evolution of more natural structures made from fibre have made medical device manufacturers consider the potential of fibre. Textiles offer the potential to replace traditional materials with novel fibres which are more suitable for many load bearing applications. Orthopaedics, in particular, is embracing textile technology for repairing, replacing, and regenerating integral pieces of the skeletal system and its associated components. This important new book will provide readers with a comprehensive overview of the role biomedical textiles can play in the orthopaedic field. Chapters in part one will discuss the fundamentals of textiles for orthopaedic applications. Part two will cover textiles for implantable orthopaedic applications whilst the final set of chapters will discuss the role of textiles in orthopaedic tissue engineering.

**ISBN:** 978-1-78242-017-0

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 196

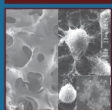
### AUDIENCE

R&D managers in the biomaterials and biomedical textile industry; postgraduate students and academic researchers in biomaterials, particularly those concerned with orthopaedic and tendon and ligament tissue engineering.

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## Hydroxyapatite (HAp) for Biomedical Applications

Edited by Michael Mucalo



**ISBN:** 978-1-78242-033-0

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 384

### AUDIENCE

Researchers and developers in industry and academia who are interested in biomaterials, tissue engineering, drug delivery and coating applications.

## Hydroxyapatite (HAp) for Biomedical Applications

Edited by: *M R Mucalo* University of Waikato, New Zealand



**A systematic review of recent research into--and developments in the use of--hydroxyapatite in medicine**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Reviews the important properties of hydroxyapatite as a biomaterial
- Considers a range of specific forms of the material and their advantages
- Reviews a range of specific medical applications for this important material

### DESCRIPTION

Hydroxyapatite in the form of hydroxycarbonate apatite is the principal mineral component of bone tissue in mammals. In Bioceramics, it is classed as a bioactive material, which means bone tissue grows directly on it when placed in apposition without intervening fibrous tissue. Hydroxyapatite is hence commonly used as bone grafts, fillers and as coatings for metal implants. This important book provides an overview of the most recent research and developments involving hydroxyapatite as a key material in medicine and its application.





## Implantable Neuroprostheses for Restoring Function

Edited by Kevin Kilgore



## Implantable Neuroprostheses for Restoring Function

Edited by: *K Kilgore* Associate Director of Technology at the Cleveland FES Center, USA



**This important new book provides readers with a complete examination of neuroprostheses, the developments in the field and application of these technologies.**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Systematic and comprehensive coverage of neuroprostheses
- Covers the fundamentals of neuroprostheses, their application in restoring sensory and motor function and an analysis of the future trends
- Keen focus on industry needs in the field of biomaterials

### DESCRIPTION

Research and developments in neuroprostheses are providing scientists with the potential to greatly improve the lives of individuals who have lost some function. Neuroprostheses can help restore or substitute motor and sensory functions which may have been damaged as a result of injury or disease. However, these minute implantable sensors also provide scientists with challenges. This important new book provides readers with a comprehensive review of neuroprostheses. Chapters in part one are concerned with the fundamentals of these devices. Part two looks at neuroprostheses for restoring sensory function whilst part three addresses neuroprostheses for restoring motor function. The final set of chapters discusses significant considerations concerning these sensors.

**ISBN:** 978-1-78242-101-6

**PUB DATE:** February 2015

**FORMAT:** Hardback

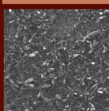
**PAGES:** c. 438

### AUDIENCE

Scientists, clinicians and researchers in medical device companies, and academic researchers with an interest in this field.







## Surface Modification of Magnesium and its Alloys for Biomedical Applications

Volume 2: Modification and Coating Techniques

Edited by T.S.N. Sankara Narayanan, Il-Song Park and Min-Ho Lee



## Surface Modification of Magnesium and its Alloys for Biomedical Applications

### Modification and Coating Techniques

Edited by: *T S N S Narayanan* Chonbuk National University, Republic of Korea

*I S Park* Chonbuk National University, Republic of Korea

*M H Lee* Chonbuk National University, Republic of Korea



The second volume of this essential two-part series explores chemical, biomimetic and physical modifications as well as duplex, hybrid and functionally gradient surface modifications of magnesium and its alloys for biomedical applications

A Volume in the Woodhead Publishing Series in Biomaterials.

#### KEY FEATURES

- Includes expert analysis on chemical solution deposition of hydroxyapatite (HAp) and octacalcium (OCP) phosphate coatings for magnesium
- Comprehensive coverage of biomimetic modifications, surface functionalization of biomolecules, natural, conducting and biodegradable polymeric coatings
- Lucid dissection of chemical, physical, mechanical and electromechanical modifications of magnesium and its alloys for biomedical applications

#### DESCRIPTION

The development of biodegradable implants which can remain in the human body to fix a problem and subsequently dissolve, or be absorbed, consumed or excreted, without warranting a secondary surgery, is very appealing to scientists. Due to their excellent biocompatibility and biodegradability, magnesium implants provide a viable option many problems associated with permanent metallic implants such as, restenosis, thrombosis, permanent physical irritation, and inability to adapt to growth and changes in human body. Volume 2 of this important new book explores practical issues of magnesium and magnesium alloys, physical and mechanical modification and coatings to enhance this material for biomedical applications.

**ISBN:** 978-1-78242-078-1

**PUB DATE:** February 2015

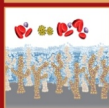
**FORMAT:** Hardback

**PAGES:** c. 442

#### AUDIENCE

Materials/metals scientists and R&D companies concerned with metallic medical implants in fields such as dentistry, orthopaedics and cardiology.





## Switchable and Responsive Surfaces and Materials for Biomedical Applications

Edited by Zheng Zhang



**ISBN:** 978-0-85709-713-2

**PUB DATE:** January 2015

**FORMAT:** Hardback

**PAGES:** c. 306

### AUDIENCE

Researchers and developers in industry and academia who are concerned with the surface science of biomaterials, particularly biomaterials scientists working on biosensors, drug delivery and tissue engineering

## Switchable and Responsive Surfaces and Materials for Biomedical Applications

Edited by: *Johnathan Zhang* Principal Scientist, Semprus BioSciences, USA



**A comprehensive scientific overview of the issues and methods involved with effective surface engineering of biomaterials to enhance their compatibility with the human body**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

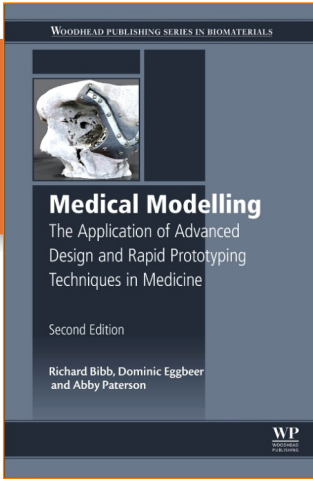
- A comprehensive overview of switchable and responsive materials and surfaces
- Includes in depth analysis of thermo-responsive polymers, photonic sensitive materials and peptide-based surfaces
- Detailed exploration of biological interactions of responsive and switchable surfaces, covering stimuli-sensitive polymers for drug delivery, surfaces with proteins/cells and application of polymers in medical devices

### DESCRIPTION

Surface modification of biomaterials can ultimately determine whether a material is accepted or rejected from the human body, and a responsive surface can further make the material "smart" and "intelligent". *Switchable and Responsive Surfaces and Materials for Biomedical Applications* outlines synthetic and biological materials that are responsive under different stimuli, their surface design and modification techniques, and applicability in regenerative medicine/tissue engineering, drug delivery, medical devices, and biomedical diagnostics.

Part one provides a detailed overview of switchable and responsive materials and surfaces, exploring thermo-responsive polymers, environmentally responsive polyelectrolytes and zwitterionic polymers, as well as peptide-based and photonic sensitive switchable materials. Further chapters include a detailed overview of the preparation and analysis of switchable polymer brushes and copolymers for biomedical application. Part two explores the biological interactions and biomedical applications of switchable surfaces, where expert analysis is provided on the interaction of switchable surfaces with proteins and cells. The interaction of stimuli-sensitive polymers for tissue engineering and drug delivery with biosurfaces is critiqued, whilst the editor provides a skillful study into the application of responsive polymers in implantable medical devices and biosensors.





**ISBN:** 978-1-78242-300-3

**PREVIOUS EDITION ISBN:**  
978-1-84569-138-7

**PUB DATE:** January 2015

**FORMAT:** Hardback

**PAGES:** c. 500

**AUDIENCE**

Designers, engineers, technicians, clinicians, doctors, surgeons and professionals involved in this multi-disciplinary, and highly collaborative field.

## Medical Modelling, 2e

*The Application of Advanced Design and Rapid Prototyping Techniques in Medicine*

**Richard Bibb** Reader in Medical Applications of Design at the Loughborough University Design School, UK

**Dominic Eggbeer** Research Officer and Head of Medical Applications at Cardiff Metropolitan University, UK

**Abby Paterson** Lecturer in Industrial Design and Technology at Loughborough University, UK



**This second edition expands and revises the original work, including adding key information on innovative imaging techniques, rapid prototyping technologies and case studies.**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Covers the steps towards rapid prototyping, from conception (modelling) to manufacture (manufacture)
- Includes a comprehensive case studies section on the practical application of computer-aided design (CAD) and rapid prototyping (RP)
- Provides an insight into medical imaging for rapid prototyping and working with medical scan data

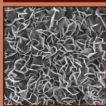
### DESCRIPTION

Medical modelling and the principles of medical imaging, Computer Aided Design (CAD) and Rapid Prototyping (also known as Additive Manufacturing and 3D Printing) are important techniques relating to various disciplines - from biomaterials engineering to surgery. Building on the success of the first edition, *Medical Modelling: The application of Advanced Design and Rapid Prototyping techniques in medicine* provides readers with a revised edition of the original text, along with key information on innovative imaging techniques, Rapid Prototyping technologies and case studies. Following an overview of medical imaging for Rapid Prototyping, the book goes on to discuss working with medical scan data and techniques for Rapid Prototyping. In this second edition there is an extensive section of peer-reviewed case studies, describing the practical applications of advanced design technologies in surgical, prosthetic, orthotic, dental and research applications.

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## Surface Modification of Magnesium and its Alloys for Biomedical Applications

Volume 1: Biological Interactions, Mechanical Properties and Testing

Edited by T.S.N. Sankara Narayanan, Il-Song Park and Min-Ho Lee



**ISBN:** 978-1-78242-077-4

**PUB DATE:** January 2015

**FORMAT:** Hardback

**PAGES:** c. 364

### AUDIENCE

This book will be of interest to Materials/metals scientists and R&D companies concerned with metallic medical implants in fields such as dentistry, orthopaedics and cardiology.

## Surface Modification of Magnesium and its Alloys for Biomedical Applications

### *Biological Interactions, Mechanical Properties and Testing*

Edited by: *T S N S Narayanan* Chonbuk National University, Republic of Korea

*I S Park* Chonbuk National University, Republic of Korea

*M H Lee* Chonbuk National University, Republic of Korea



**An authoritative guide to biological interactions, mechanical properties and testing in the surface modification of magnesium and its alloys for biomedical applications**

A Volume in the Woodhead Publishing Series in Biomaterials.

### KEY FEATURES

- Expert analysis of the fundamentals in surface modification of magnesium and its alloys for biomedical applications
- Includes biological interactions and mechanical properties
- Focuses on testing and characterisation, as well as biocompatibility

### DESCRIPTION

*Surface modification of magnesium and its alloys for biomedical applications: Biological interactions, mechanical properties and testing*, the first of two volumes, is an essential guide on the use of magnesium as a degradable implant material. Due to their excellent biocompatibility and biodegradability, magnesium based degradable implants provide a viable option for the permanent metallic implants. This volume focuses on the fundamental concepts of surface modification of magnesium, its biological interactions, mechanical properties and, *in vitro* and *in vivo* testing. The contents of volume 1 is organized and presented in three parts.

Part 1 reviews the fundamental aspects of surface modification of magnesium, including surface design, opportunities, challenges and its role in revolutionizing biodegradable biomaterials.

Part 2 addresses the biological and mechanical properties covering an *in vivo* approach to the bioabsorbable behavior of magnesium alloys, mechanical integrity and, the effects of amino acids and proteins on the performance of surface modified magnesium.

Part 3 delves in to testing and characterization, exploring the biocompatibility and effects on fatigue life alongside the primary characteristics of surface modified magnesium.

All chapters are written by experts, this two volume series provides systematic and thorough coverage of all major modification technologies and coating types of magnesium and its alloys for biomedical applications.



# DATABOOK OF Nucleating Agents

Anna & George Wypych

 ChemTec PUBLISHING

**ISBN:** 978-1-895198-94-2

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 480

## AUDIENCE

Engineers and Scientists involved in the design and development of plastics materials and products, and the design and optimization of production processes using plastics. Research and development professionals, production chemists and engineers, environmental engineers, environmental professionals, industrial hygienists, legislators, medical professionals, civil engineers, university professors, students

## Databook of Nucleating Agents

George Wypych ChemTec Publishing, Ontario, Canada

Anna Wypych Chemtec Publishing, Toronto, Canada



ChemTec Publishing

As an up-to-date guide on nucleating agents, this book gives engineers and materials scientists the information they need to increase the production rate, modify structure and morphology, and reduce haze of polymeric products with proper selection of nucleating agents and clarifying agents

### KEY FEATURES

- Enables engineers to use nucleating agents more effectively to increase production rate, modify structure and morphology, and reduce haze of polymer products
- Provides the thorough theoretical grounding required for proper selection and use of nucleating and clarifying agents
- Presents an extensive review of the current applications of nucleating agents in different formulations

### DESCRIPTION

*Databook of Nucleating Agents* gives engineers and materials scientists the information they need to increase the production rate, modify structure and morphology, and reduce haze of polymeric products with proper selection of nucleating agents and clarifying agents. Chemical origin and related properties of nucleating agents are analyzed in general terms to highlight the differences in their properties, including the essential theoretical knowledge required for correct selection and use of nucleating and clarifying agents.

This includes methods of chemical modification of nucleating agents and their deposition on suitable substrates; methods, and results of dispersion of nucleating agents, influence of their concentration and cooling rate on final result and rate of crystallization, nucleation efficiency of different products and the reasons behind it, and generally accepted mechanisms of nucleation.

The book also covers application aspects in different formulations. Patent literature and research papers are extensively reviewed for different applications, and polymer processing methods which require use of nucleating agents are discussed, with an emphasis on the intricacies of use of nucleating agents in different polymers and products.

ENGINEERING  
CHEMICAL

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# HANDBOOK OF Nucleating Agents

George Wypych



ChemTec Publishing

## Handbook of Nucleating Agents

George Wypych ChemTec Publishing, Ontario, Canada



ChemTec Publishing

**This practical guide provides engineers and material scientists the information they need to increase production rates, modify structure and morphology, and reduce haze of polymeric products with proper selection of nucleating and clarifying agents**

### KEY FEATURES

- Enables engineers to use nucleating agents more effectively to increase production rate, modify structure and morphology, and reduce haze of polymer products
- Provides a thorough theoretical grounding required for proper selection and use of nucleating and clarifying agents
- Offers an extensive review of current applications of nucleating agents in different formulations
- Includes analysis of the chemical origin and related properties of nucleating agents to highlight differences in their properties

### DESCRIPTION

*Handbook of Nucleating Agents* gives engineers and materials scientists the information they need to increase the production rate, modify structure and morphology, and reduce haze of polymeric products with proper selection of nucleating agents and clarifying agents. Chemical origin and related properties of nucleating agents are analyzed in general terms to highlight the differences in their properties, including the essential theoretical knowledge required for correct selection and use of nucleating and clarifying agents. This includes methods of chemical modification of nucleating agents and their deposition on suitable substrates; methods and results of dispersion of nucleating agents; influence of their concentration and cooling rate on final result and rate of crystallization; nucleation efficiency of different products and the reasons behind it; and generally accepted mechanisms of nucleation.

The book also covers application aspects in different formulations. Patent literature and research papers are extensively reviewed for different applications, and polymer processing methods which require use of nucleating agents are discussed, with an emphasis on the intricacies of use of nucleating agents in different polymers and products.

**ISBN:** 978-1-895198-93-5

**PUB DATE:** April 2016

**FORMAT:** Hardback

**PAGES:** c. 280

### AUDIENCE

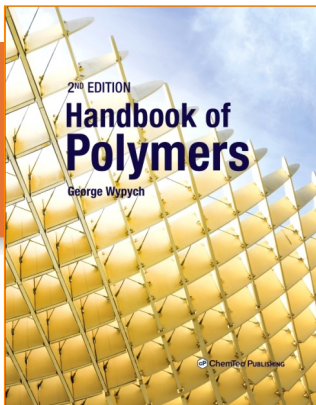
Engineers and Scientists involved in the design and development of plastics materials and products, and the design and optimization of production processes using plastics.

Research and development, production chemists and engineers, environmental engineers, environmental professionals, industrial hygienists, legislators, medical professionals, civil engineers, university professors, students

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## Handbook of Polymers, 2e

George Wypych ChemTec Publishing, Ontario, Canada



ChemTec Publishing

Designed by an engineer for engineers, this book provides the most sought after data for over 200 of the most widely used polymers, presenting normalized, up-to-date data in a consistent and easily referenceable layout that includes new values for many commercially available products and verification of existing data

**ISBN:** 978-1-895198-92-8

**PREVIOUS EDITION ISBN:**  
9781895198478

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 702

### AUDIENCE

Plastics engineers and processors, designers, manufacturers, materials scientists, chemical engineers, polymer chemists in a broad range of industries, including aerospace, automotive, construction, electronics, packaging, and pharmaceutical/medical.

### KEY FEATURES

- Includes practical data on the most widely used polymers for engineers and materials scientists in design, manufacture, and applications research
- Presents data on polymer synthesis, properties, chemical resistance, processing, and their related environmental impacts
- Provides a comprehensive update to the data, including new information and the verification of existing datasets

### DESCRIPTION

*Handbook of Polymers, Second Edition*, presents normalized, up-to-date polymer data in a consistent and easily referenceable layout. This new edition represents an update of the available data, including new values for many commercially available products, verification of existing data, and removal of older data where it is no longer useful.

The book includes data on all major polymeric materials used by the plastics industry and all branches of the chemical industry, as well as specialty polymers used in the electronics, pharmaceutical, medical, and space fields. The entire scope of the data is divided into sections to make data comparison and search easy, including synthesis, physical, mechanical, and rheological properties, chemical resistance, toxicity and environmental impact, and more.

The data enables engineers and materials scientists to solve practical problems, be that in applications, research and development, or legislation. The most current grades of materials have been selected to provide readers with information that is characteristic of currently available products.

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4<sup>TH</sup> EDITION

# HANDBOOK OF FILLERS

George Wypych

ChemTec PUBLISHING

**ISBN:** 978-1-895198-91-1

**PREVIOUS EDITION ISBN:**  
9781895198416

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 928

## AUDIENCE

Engineers, Processors, Compounders, and R&D Scientists dealing with processing of plastics, elastomers and composites. Students of polymer and mechanical engineering, materials science, automotive engineering, and aerospace engineering; End users of products made of plastics and elastomers with fillers.

## Handbook of Fillers, 4e

George Wypych ChemTec Publishing, Ontario, Canada



ChemTec Publishing

**This definitive reference on the use of fillers covers all that engineers and materials scientists need to know about the properties, effects, and industrial applications of fillers in a range of materials, including plastics, rubber, adhesives, and paper**

### KEY FEATURES

- Provides up-to-date, applicable information on the use of fillers in plastics, rubber, adhesives, and paper
- Presents comprehensive coverage on the effect of fillers on materials, including their mechanical properties, their effects on material rheology, the morphology of the filled system, material durability, and more
- Includes essential guidance on the industrial scale use of fillers and their transportation, storage, processing, equipment, quality control, and health and safety considerations

### DESCRIPTION

*Handbook of Fillers, Fourth Edition*, discusses the rapidly advancing field of fillers, the substances added to plastics and composites that add value by improving and modifying the properties of materials and reducing costs. This new edition is an essential reference for engineers and scientists using fillers in a range of materials, including plastics, rubber, adhesives, and paper.

The book is designed to be a comprehensive reference for both experienced practitioners and those new to fields where fillers are used. It covers available fillers and their properties, their effect on filled materials, such as mechanical properties, rheology, morphology, flammability, and recycling, and their use in practical applications.

In particular, this new edition provides extensive coverage of nanofillers, along with the practical information needed to deploy these new technologies in the real world. The book includes the latest advances in filler technology, with consolidated technical information from over 4,000 research papers, data from over 160 filler and equipment manufacturers, and a thorough review of the patent literature.

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# Databook of PRESERVATIVES

Anna & George Wypych



ChemTec Publishing

## Databook of Preservatives

George Wypych ChemTec Publishing, Ontario, Canada

Anna Wypych Chemtec Publishing, Toronto, Canada



ChemTec Publishing

**An authoritative, up-to-date source of critical properties and usage data on preservatives for products during transport and storage.**

### KEY FEATURES

- Practical, up-to-date data, including an assessment of features and benefits of each preservative
- Particular emphasis given to environmental, health and safety properties to ensure safe use
- Supported by real world examples of products produced using the compounds detailed in the book

### DESCRIPTION

*Databook of Preservatives* contains data for preservatives for products during transport and storage, film preservatives, wood preservatives, fiber, leather, rubber and polymerized materials preservatives, construction material preservatives, preservatives for liquid cooling and processing systems, slimicides, and cutting fluid preservatives. The selection of preservatives includes generic and commercial products, thus allowing for a comparison of properties of products coming from different sources.

As well as general information about each preservative, the book also covers physical properties, health and safety issues and ecological properties. Over 100 data fields are included. Emphasis is particularly placed on usage and performance considerations, including information on manufacturers, an assessment of particularly notable properties, features and benefits, which combinations are recommended, and the effect of the preservative on microorganisms.

**ISBN:** 978-1-895198-90-4

**PUB DATE:** June 2015

**FORMAT:** Hardback

**PAGES:** c. 516

### AUDIENCE

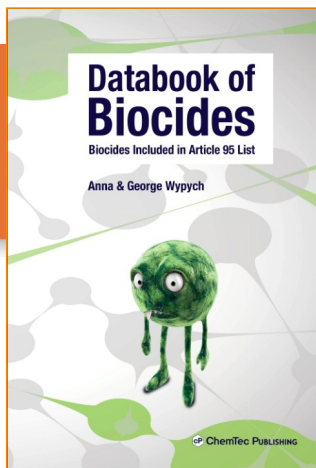
Engineers and materials scientists in research and development, production chemists and engineers, environmental engineers, environmental professionals, industrial hygienists, legislators, medical professionals, civil engineers, university professors, students

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**ISBN:** 978-1-895198-89-8

**PUB DATE:** June 2015

**FORMAT:** Hardback

**PAGES:** c. 456

**AUDIENCE**

Production chemists and engineers;  
Environmental engineers; Plastics  
engineers, polymer scientists.

## Databook of Biocides

Anna Wypych Chemtec Publishing, Toronto, Canada

George Wypych ChemTec Publishing, Ontario, Canada



ChemTec Publishing

**A comprehensive, easily accessible reference to assist engineers, academics, and researchers in the selection and deployment of safe and environmentally sustainable biocides.**

### KEY FEATURES

- Presents practical information for use in the lab and the field, including recommended processing methods, recommended dosages, and potential substitutes
- Emphasizes environmental, health, and safety properties to ensure safe deployment
- Includes the most commonly used biocides in compliance with the latest regulations in the European Union, US, and worldwide
- Covers the physical properties, ecological properties, and performance indicators of biocides

### DESCRIPTION

*Databook of Biocides* contains critical data on the most important biocides in use today. The selection includes generic and commercial biocides, which are approved for use in the European Union and the US. Data on generic biocides come from numerous sources, and can be easily compared with manufacturer information on commercial biocides, which are also included.

Physical properties are presented—including volatility, solubility, and concentration—as are health and safety considerations (such as flash point, autoignition temperature, risks of skin and eye irritation, mutagenicity and carcinogenicity) and first-aid guidance. Ecological properties are also emphasized, with data on biodegradation and aquatic toxicity.

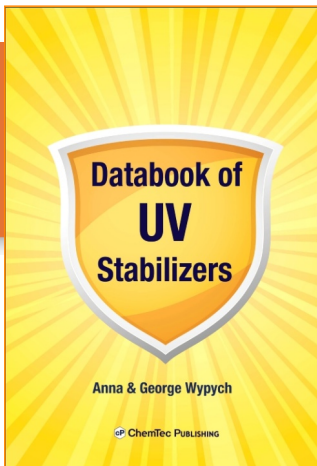
Particular emphasis is placed on usage considerations, including recommended material-biocide combinations, processing methods and dosages, and features and benefits for each biocide. The book also contains an introductory chapter in which general indicators of performance of biocides are discussed.

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## Databook of UV Stabilizers

Anna Wypych Chemtec Publishing, Toronto, Canada



ChemTec Publishing

**A comprehensive assessment of UV stabilizers, including sections on their physical properties, health and safety, ecological properties, and use and performance**

### KEY FEATURES

- Provides information on the most frequently used UV stabilizers
- Includes five distinct sections, breaking the content up into useful and manageable topics
- Data presented belongs to over 100 data fields, accommodating a variety of data available in source publications

### DESCRIPTION

*Databook of UV Stabilizers* contains information on the most frequently used UV stabilizers, dividing the topic into five distinct sections: General Information, Physical Properties, Health and Safety, Ecological Properties, and Use and Performance. The data belongs to over 100 data fields, accommodating a variety of data available in source publications. A key part of the text is an introductory chapter in which general indicators of performance of UV stabilizers are discussed and a chapter containing information on the data fields included in the description of individual stabilizers.

**ISBN:** 978-1-895198-88-1

**PUB DATE:** June 2015

**FORMAT:** Hardback

**PAGES:** c. 460

#### AUDIENCE

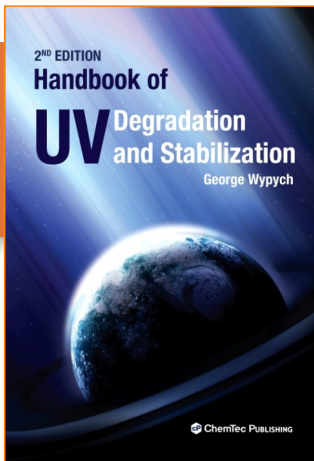
Plastics engineers, product designers, materials scientists. Core sectors – construction, consumer goods (e.g., toys, cosmetics), automotive/aerospace.

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**ISBN:** 978-1-895198-86-7

**PREVIOUS EDITION ISBN:**  
978-1-895198-46-1

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 430

**AUDIENCE**

Plastics engineers, product designers, materials scientists. Core sectors – construction, consumer goods (e.g., toys, cosmetics), automotive/aerospace.

## Handbook of UV Degradation and Stabilization, 2e

George Wypych ChemTec Publishing, Ontario, Canada



ChemTec Publishing

**A professional reference guide to the selection and use of UV stabilizers to reduce the susceptibility of plastics materials and products to UV damage**

**KEY FEATURES**

- A practical and up-to-date reference guide for engineers and scientists designing with plastics, and formulating plastics materials
- Explains the effects of UV light on plastics, and how to mitigate its effects through the use of UV stabilizers
- Surveys the range of UV stabilizers on the market, and provides advice on their selection and use

**DESCRIPTION**

This book, the second edition of the first monograph fully devoted to UV degradation and stabilization ever published in English, has 12 chapters discussing different aspects of UV related phenomena occurring when polymeric materials are exposed to UV radiation.

In the introduction the existing literature has been reviewed to find out how plants, animals and humans protect themselves against UV radiation. This review permits evaluation of mechanisms of protection against UV used by living things and potential application of these mechanisms in protection of natural and synthetic polymeric materials. This is followed by chapters with a more detailed look at more specific aspects of UV degradation and stabilization.

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2<sup>ND</sup> EDITION

# Handbook of Biodegradation, Biodeterioration, and Biostabilization

Falkiewicz-Dulik, M; Janda, K; Wypych, G

CP ChemTec Publishing

**ISBN:** 978-1-895198-87-4

**PREVIOUS EDITION ISBN:**

978-1-895198-44-7

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 474

## AUDIENCE

Production chemists and engineers;  
Environmental engineers; Plastics  
engineers and polymer scientists.

## Handbook of Material Biodegradation, Biodeterioration, and Biostabilization, 2e

*Michalina Falkiewicz-Dulik* Institute of the Leather Industry, Krakow, Poland

*Katarzyna Janda* Department of Biochemistry and Human Nutrition, Pomeranian Medical University in Szczecin

*George Wypych* ChemTec Publishing, Ontario, Canada



ChemTec Publishing

**An essential, up-to-date reference for anybody working with biocides that includes the latest health, safety, environmental, and regulatory information for practitioners**

### KEY FEATURES

- Enables practitioners to identify the organisms responsible for biodeterioration in materials, select suitable preventative measures, and safely deploy methods of biostabilization
- Contains information on the biostabilization of various industrial products, including 24 groups of polymers
- Includes critical (and current) health and safety, environmental, and regulatory guidelines and best practices, and their relationships to legislation, regulation, toxicity, micro-organisms, biocides, and polymers
- Essential reading for scientists and practitioners as new regulations eliminate the use of previously used materials
- Contains up-to-date information on legislation and regulations governing the use of biocides in the European Union, the United States, and worldwide

### DESCRIPTION

*Handbook of Material Biodegradation, Biodeterioration, and Biostabilization, Second Edition* gives extensive information on the microorganisms involved in the biodegradation of materials, along with the biocides which are permitted for use according to the most up-to-date worldwide legislation.

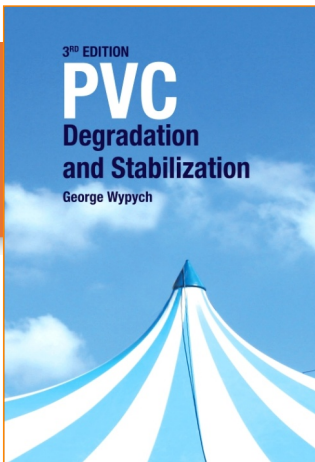
Mechanisms of biodegradation and biodeterioration, results of biodeterioration, and methods of biostabilization are covered for a large number of products, making the title relevant for a range of industries and applications, including construction, coatings/paints, medical and pharmaceutical applications, and electronics.

In addition, the health and safety aspects of biocide application are covered in detail, as well as the personal protection of practitioners who are required to use them. The contents and the most-up-to-date information make this book essential for almost all the fields of applied chemistry.

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**ISBN:** 978-1-895198-85-0

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 484

**AUDIENCE**

Plastics engineers, product designers, materials scientists. Core sectors – construction, consumer goods (eg toys, cosmetics), automotive/aerospace.

## PVC Degradation and Stabilization, 3e

George Wypych ChemTec Publishing, Ontario, Canada



ChemTec Publishing

**A one stop shop for engineers and materials scientists working with PVC, covering a range of degradation processes and containing all of the information required to stabilize the polymer.**

### KEY FEATURES

- A practical and up-to-date reference guide for engineers and scientists designing with PVC
- Covers thermal, UV, gamma radiation, chemical, and other forms of degradation
- Includes a critical discussion of the sustainability issues faced by PVC and its additives, as well as health and safety concerns

### DESCRIPTION

PVC stabilization, the most important aspect of formulation and performance of this polymer, is discussed in details. This book contains all information required to design successful stabilization formula for any product made out of PVC.

Separate chapters review information on chemical structure, PVC manufacturing technology, morphology, degradation by thermal energy, UV, gamma, other forms of radiation, mechanodegradation, and chemical degradation. The chapter on analytical methods used in studying of degradative and stabilization processes helps in establishing system of checking results of stabilization with different stabilizing systems. Stabilization and stabilizers are discussed in full detail in the most important chapter of this book. The final chapter contains information on the effects of PVC and its additives on health, safety and environment.

This book contains analysis of all essential papers and patents published until recently on the above subject. It either locates the answers to relevant questions and offers solutions or gives references in which such answers can be found.

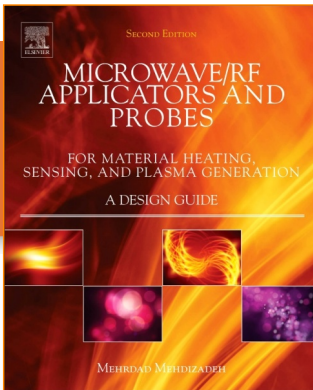
*PVC Degradation and Stabilization* is must to have for chemists, engineers, scientists, university teachers and students, designers, material scientists, environmental chemists, and lawyers who work with polyvinyl chloride and its additives or have any interest in these products. This book is the one authoritative source on the subject.

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**ISBN:** 978-0-323-32256-0

**PREVIOUS EDITION ISBN:**  
9780815515920

**PUB DATE:** September 2015

**FORMAT:** Hardback

**PAGES:** c. 426

**AUDIENCE**

Electronic and Electrical Engineers and Scientists in sectors including materials processing, medical/biomedical devices, food science and technology, high tech and defense. Academics in Electrical Engineering, Microwave/RF Engineering, Electro-physics, Chemical and Biomedical Engineering.

## Microwave/RF Applicators and Probes, 2e

*for Material Heating, Sensing, and Plasma Generation*  
Mehrdad Mehdizadeh Principal Investigator, DuPont Company, USA

**William Andrew**  
Applied Science Publishers

How the interactions of electromagnetic fields with materials at high frequencies have given rise to a vast array of industrial, science, medicine, and consumer applications

**KEY FEATURES**

- Presents new information on how the interactions of electromagnetic fields with materials at high frequencies have given rise to a vast array of practical applications in industry, science, medicine, and consumer markets
- Thoroughly revised and expanded edition, providing an update on the most recent trends and findings
- Contains many new sections within existing chapters, along with new chapters on applicators for plasmas at microwave/RF frequencies

**DESCRIPTION**

*Microwave/RF Applicators and Probes for Material Heating, Sensing, and Plasma Generation, Second Edition*, encompasses the area of high-frequency applicators and probes for material interactions as an integrated science.

Based on practical experience rather than entirely on theoretical concepts, and emphasizing phenomenological explanations and well-annotated figures, the book represents one of the most important resources on the topics of microwave technologies, applications of RF and microwaves in industry (industrial heating and drying), and microwave engineering.

After covering the basics of field-material interactions, the book reviews and categorizes probes and applicators, demonstrates their real-world applications, and offers numerically solved examples.

Readers will find valuable design rules and principles of high-frequency applicators and probes for material processing and sensing applications in this expanded edition.

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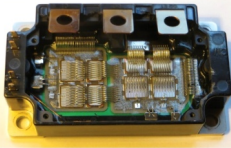






## The IGBT Device

Physics, Design and Applications of the Insulated Gate Bipolar Transistor



B. Jayant Baliga

ISBN: 978-1-4557-3143-5

PUB DATE: March 2015

FORMAT: Hardback

PAGES: c. 705

### AUDIENCE

Applications engineers working in the consumer, industrial, transportation, lighting, medical, and renewable energy sectors; Electrical Engineers involved with the control and management of electrical power and semiconductor device technology; Semiconductor specialists.

## The IGBT Device

*Physics, Design and Applications of the Insulated Gate Bipolar Transistor*

B. Jayant Baliga Distinguished University Professor, North Carolina State University, Raleigh, NC, USA



The inventor of the IGBT provides essential design and applications information to enable engineers and designers to build the IGBTs into consumer, industrial, transportation, lighting, medical, and renewable energy products

"Who else would you want to author a book about the IGBT (insulated gate bipolar transistor) than its inventor, Dr. B. Jayant Baliga? This invention is widely used around the globe for a broad range of applications."--**Power Electronics, *The IGBT Device***

### KEY FEATURES

- Essential design information for applications engineers utilizing IGBTs in the consumer, industrial, lighting, transportation, medical and renewable energy sectors.
- Readers will learn the methodology for the design of IGBT chips including edge terminations, cell topologies, gate layouts, and integrated current sensors.
- The first book to cover applications of the IGBT, a device manufactured around the world by more than a dozen companies with sales exceeding \$5 Billion; written by the inventor of the device.

### DESCRIPTION

The IGBT device has proved to be a highly important Power Semiconductor, providing the basis for adjustable speed motor drives (used in air conditioning and refrigeration and railway locomotives), electronic ignition systems for gasolinepowered motor vehicles and energy-saving compact fluorescent light bulbs. Recent applications include plasma displays (flat-screen TVs) and electric power transmission systems, alternative energy systems and energy storage. This book is the first available to cover the applications of the IGBT, and provide the essential information needed by applications engineers to design new products using the device, in sectors including consumer, industrial, lighting, transportation, medical and renewable energy.

The author, B. Jayant Baliga, invented the IGBT in 1980 while working for GE. His book will unlock IGBT for a new generation of engineering applications, making it essential reading for a wide audience of electrical engineers and design engineers, as well as an important publication for semiconductor specialists.

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SEMICONDUCTORS AND SEMIMETALS

VOLUME 94

Semiconductor Nanowires II:  
Properties and Applications

Edited By  
Shadi A. Dayeh, Anna Fontcuberta i Morral  
and Chennupati Jagadish



## Semiconductors and Semimetals, Vol 94

### *Semiconductor Nanowires II: Properties and Applications*

Edited by: *Shadi A. Dayeh* University of California San Diego, CA, USA  
*Anna Fontcuberta i Morral* EPFL STI IMX LMSC, Lausanne, Switzerland  
*Chennupati Jagadish* Australian National University, Australia



Presents a comprehensive reference book in semiconductor physics and engineering, with chapters reviewing semiconductor nanowires

#### KEY FEATURES

- Includes experts contributors who review the most important recent literature
- Contains a broad view, including examination of semiconductor nanowires

#### DESCRIPTION

*Semiconductor Nanowires: Part B*, and Volume 94 in the *Semiconductor and Semimetals* series, focuses on semiconductor nanowires.

**ISBN:** 978-0-12-804016-4

**PUB DATE:** January 2016

**FORMAT:** Hardback

**PAGES:** c. 410

#### AUDIENCE

This book will be of interest to scientists and engineers performing fundamental and applied research and technology development in the field of one-dimensional nanowires. The book will particularly appeal to physicists, chemists, materials scientists, electronics engineers and mechanical engineers. This book will be of interest to students, researchers and practitioners working in the field of semiconductors, mechanical, electronic and optoelectronic devices.

ENGINEERING  
HEALTH & SAFETY

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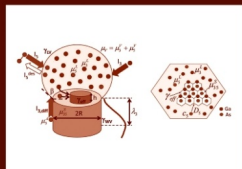


SEMICONDUCTORS AND SEMIMETALS

VOLUME 93

Semiconductor Nanowires I:  
Growth and Theory

Edited By  
Anna Fontcuberta i Morral, Shadi A. Dayeh  
and Chennupati Jagadish



**ISBN:** 978-0-12-803027-1

**PUB DATE:** November 2015

**FORMAT:** Hardback

**PAGES:** c. 314

**AUDIENCE**

This book will be of interest for scientists and engineers performing fundamental and applied research and technology development in the field of one-dimensional nanowires. The book will particularly appeal to physicists, chemists, materials scientists, electronics engineers and mechanical engineers. This book will be of interest to students, researchers and practitioners working in the field of semiconductors, mechanical, electronic and optoelectronic devices.

## Semiconductors and Semimetals, Vol 93

### *Semiconductor Nanowires I: Growth and Theory*

Edited by: *Anna Fontcuberta i Morral* EPFL STI IMX LMSC, Lausanne, Switzerland

*Shadi Dayeh* University of California San Diego, CA, USA

*Chennupati Jagadish* Australian National University, Australia



The latest in the *Semiconductors and Semimetals* series provides readers with a reference book in semiconductor physics and engineering, with chapters in this edition focusing on semiconductor nanowires

#### KEY FEATURES

- Contains comments from leading contributors in the field semiconductor nanowires
- Provides reviews of the most important recent literature
- Presents a broad view, including an examination of semiconductor nanowires
- Comprises up to date advancements in the technological development of nanowire devices and systems, and is comprehensive enough to be used as a reference book on nanowires as well as a graduate student text book.

#### DESCRIPTION

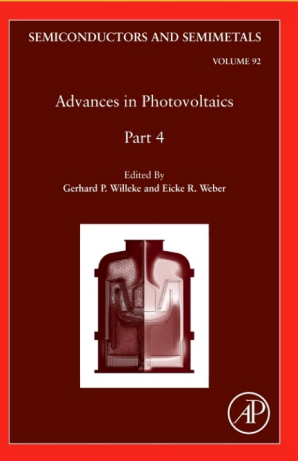
*Semiconductor Nanowires: Part A*, Number 93 in the Semiconductor and Semimetals series, focuses on semiconductor nanowires.

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**ISBN:** 978-0-12-801021-1

**PUB DATE:** June 2015

**FORMAT:** Hardback

**PAGES:** c. 182

**AUDIENCE**

students, researchers, decision makers and the general public interested in getting familiar with these technologies, and may serve well as a preparation for taking a job in this rapidly expanding technology field.

## Semiconductors and Semimetals, Vol 92

### *Advances in Photovoltaics: Part 4*

Edited by: **Gerhard P. Willeke** Fraunhofer-Institut für Solare Energiesysteme ISE, Freiburg, Germany

**Eicke R. Weber** Fraunhofer-Institut für Solare Energiesysteme ISE, Freiburg, Germany



**An overview of the underlying physics, important material aspects, production technologies, and prevailing and future solar cell design issues**

#### KEY FEATURES

- Written by leading, internationally known experts on his topic
- Provides an in-depth overview of the current status and perspectives of thin film PV technologies
- Discusses the challenges faced during the transformation of our energy supply system to more efficient, renewable energies
- Delves deep into photovoltaics, a cornerstone technology

#### DESCRIPTION

*Advances in Photovoltaics: Part Four* provides valuable information on the challenges faced during the transformation of our energy supply system to more efficient, renewable energies.

The volume discusses the topic from a global perspective, presenting the latest information on photovoltaics, a cornerstone technology.

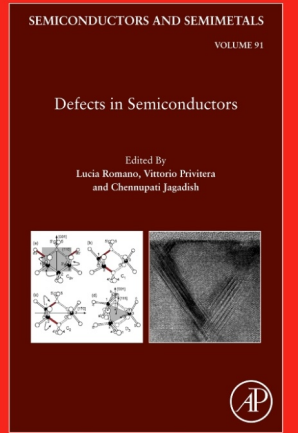
It covers all aspects of this important semiconductor technology, reflecting on the tremendous and dynamic advances that have been made on this topic since 1975, when the first book on solar cells—written by Harold J. Hovel of IBM—was published as volume 11 in the now famous series on Semiconductors and Semimetals.

Readers will gain a behind the scenes look at the continuous and rapid scientific development that leads to the necessary price and cost reductions in global industrial mass-production.

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**ISBN:** 978-0-12-801935-1

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 446

**AUDIENCE**

students, researchers in both academic and industrial settings dealing with semiconductor or semiconductor applications

## Semiconductors and Semimetals, Vol 91

### *Defects in Semiconductors*

Edited by: **Lucia Romano** University of Catania, Italy

**Vittorio Privitera** Unità di Catania-Università, Italy

**Chennupati Jagadish** Department of Electronic Materials Engineering, Australian National University, Canberra, Australia



**A reference book in semiconductor physics and engineering, with each chapter reviewing a specific type of semiconductor defect**

**KEY FEATURES**

- Expert contributors
- Reviews of the most important recent literature
- Clear illustrations
- A broad view, including examination of defects in different semiconductors

**DESCRIPTION**

This volume, number 91 in the *Semiconductor and Semimetals* series, focuses on defects in semiconductors. Defects in semiconductors help to explain several phenomena, from diffusion to getter, and to draw theories on materials' behavior in response to electrical or mechanical fields.

The volume includes chapters focusing specifically on electron and proton irradiation of silicon, point defects in zinc oxide and gallium nitride, ion implantation defects and shallow junctions in silicon and germanium, and much more. It will help support students and scientists in their experimental and theoretical paths.

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Second Edition

# Developments in Surface Contamination and Cleaning

Fundamentals and Applied Aspects



Volume One

Edited by  
Rajiv Kohli and K.L. Mittal

**ISBN:** 978-0-323-29960-2

**PREVIOUS EDITION ISBN:**  
978-0-8155-1555-5

**PUB DATE:** November 2015

**FORMAT:** Hardback

**PAGES:** c. 878

#### AUDIENCE

Researchers and Engineers in R&D, manufacturing, quality control and procurement specification situated in a multitude of industries such as: aerospace, automotive, biomedical, defense, energy, manufacturing, microelectronics, optics and xerography.

## Developments in Surface Contamination and Cleaning, Vol. 1, 2e

### *Fundamentals and Applied Aspects*

Edited by: *Rajiv Kohli* National Aeronautics and Space Administration (NASA), Houston, Texas, USA

*Kashmiri L. Mittal* Editor, Reviews of Adhesion and Adhesives



**This book provides a state-of-the-art reference for all major areas in surface contamination and cleaning for industries ranging from semiconductor fabrication to space exploration, presenting an excellent source of information on alternative cleaning techniques and methods for characterization of surface contamination and validation.**

#### KEY FEATURES

- Provides best-practice guidance for scientists and engineers engaged in surface cleaning or those who handle the consequences of surface contamination
- Addresses the continuing trends of shrinking device size and contamination vulnerability in a range of industries as spearheaded by the semiconductor industry
- Presents state-of-the-art survey information on precision cleaning and characterization methods as written by a team of world-class experts in the field

#### DESCRIPTION

*Developments in Surface Contamination and Cleaning, Vol. 1: Fundamentals and Applied Aspects, Second Edition*, provides an excellent source of information on alternative cleaning techniques and methods for characterization of surface contamination and validation.

Each volume in this series contains a particular topical focus, covering the key techniques and recent developments in the area. This volume forms the heart of the series, covering the fundamentals and application aspects, characterization of surface contaminants, and methods for removal of surface contamination.

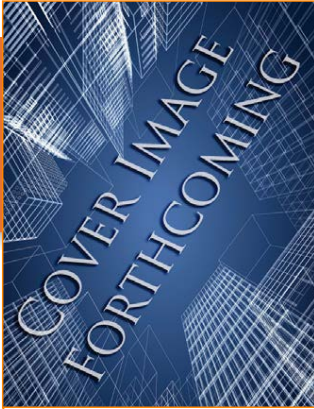
In addition, new cleaning techniques effective at smaller scales are considered and employed for removal where conventional cleaning techniques fail, along with new cleaning techniques for molecular contaminants.

The Volume is edited by the leading experts in small particle surface contamination and cleaning, providing an invaluable reference for researchers and engineers in R&D, manufacturing, quality control, and procurement specification in a multitude of industries such as aerospace, automotive, biomedical, defense, energy, manufacturing, microelectronics, optics and xerography.

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## Additive Manufacturing of Titanium Alloys

*State of the Art, Challenges and Opportunities*

*Bhaskar Dutta* COO, DIM3D Technology, LLC

*Francis H Froes* Dept. Chair, Materials Science and Engineering, University of Idaho (retired) Director, Institute for Materials and Advanced Processes (IMAP) (retired)



**This book explores the use of additive manufacturing in titanium alloys and its use as an alternative method to the conventional approach for the fabrication of the majority of titanium components produced via the cast and wrought technique, a process which involves a considerable amount of expensive machining.**

### KEY FEATURES

- Includes coverage of the fundamentals of microstructural evolution in titanium alloys
- Introduces readers to the various Additive Manufacturing Technologies, such as Powder Bed Fusion (PBF) and Directed Energy Deposition (DED)
- Looks at the future of Titanium Additive Manufacturing
- Provides a complete review of the science, technology, and applications of Titanium Additive Manufacturing (AM)

### DESCRIPTION

*Additive Manufacturing of Titanium Alloys: State of the Art, Challenges and Opportunities* provides alternative methods to the conventional approach for the fabrication of the majority of titanium components produced via the cast and wrought technique, a process which involves a considerable amount of expensive machining.

In contrast, the Additive Manufacturing (AM) approach allows very close to final part configuration to be directly fabricated minimizing machining cost, while achieving mechanical properties at least at cast and wrought levels. In addition, the book offers the benefit of significant savings through better material utilization for parts with high buy-to-fly ratios (ratio of initial stock mass to final part mass before and after manufacturing).

As titanium additive manufacturing has attracted considerable attention from both academicians and technologists, and has already led to many applications in aerospace and terrestrial systems, as well as in the medical industry, this book explores the unique shape making capabilities and attractive mechanical properties which make titanium an ideal material for the additive manufacturing industry.

**ISBN:** 978-0-12-804782-8

**PUB DATE:** June 2016

**FORMAT:** Paperback

**PAGES:** c. 113

### AUDIENCE

Scientists, scholars and technologists who are working in the field of additive manufacturing of Titanium and those who plan to pursue research in this field; researchers involved in alloy development and design.

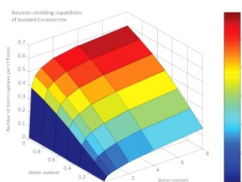




## CHEMICALLY BONDED PHOSPHATE CERAMICS

TWENTY-FIRST CENTURY MATERIALS WITH DIVERSE APPLICATIONS

SECOND EDITION



ARUN S. WAGH

ISBN: 978-0-08-100380-0

PREVIOUS EDITION ISBN:  
9780080445052

PUB DATE: June 2016

FORMAT: Hardback

PAGES: c. 400

### AUDIENCE

Researchers, graduate students, and engineers interested in structural ceramics, coatings, cements, hazardous and radioactive waste stabilization and nuclear shielding, oil and natural gas well cements, and bioceramics.

## Chemically Bonded Phosphate Ceramics, 2e

*Twenty-First Century Materials with Diverse Applications*

*Arun Wagh* President, Inorganic Polymer Solutions, Inc., Naperville, IL, USA



ELSEVIER

**A guide to the manufacture and applications of chemically bonded phosphate ceramics (CBPCs), including their use in nuclear waste storage, oil-well cements, anticorrosion coatings and biomedical implants**

### KEY FEATURES

- Explores the key applications of CBPCs including nuclear waste storage, oil-well cements, anticorrosion coatings and biomedical implants
- Demystifies the chemistry, processes and production methods of CBPCs
- Draws on 40 years of developments and applications in the field, including the latest developments from USA, Europe, Ukraine, Russia, China and India

### DESCRIPTION

This book brings together the latest developments in chemically bonded phosphate ceramics (CBPCs), including several novel ceramics, from US Federal Laboratories such as Argonne, Oak Ridge, and Brookhaven National Laboratories, as well as Russian and Ukrainian nuclear institutes. Coupled with further advances in their use as biomaterials, these materials have found uses in diverse fields in recent years. Applications range from advanced structural materials to corrosion and fire protection coatings, oil-well cements, stabilization and encapsulation of hazardous and radioactive waste, nuclear radiation shielding materials, and products designed for safe storage of nuclear materials. Such developments call for a single source to cover their science and applications. This book is a unique and comprehensive source to fulfil that need. In the second edition, the author covers the latest developments in nuclear waste containment and introduces new products and applications in areas such as biomedical implants, cements and coatings used in oil-well and other petrochemical applications, and flame-retardant anti-corrosion coatings.

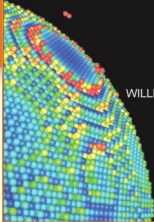
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# Atom Probe Tomography

Put Theory into Practice



Edited by  
WILLIAMS LEFEBVRE-ULRIKSON  
FRANÇOIS VURPILLOT  
XAVIER SAUVAGE



## Atom Probe Tomography

*Williams Lefebvre* Materials Physics Group, University of Rouen, France

*Francois Vurpillot* Materials Physics Group, University of Rouen, France

*Xavier Sauvage* Materials Physics Group, University of Rouen, France



**This indispensable reference provides an introduction to the capabilities and limitations of atom probe tomography when analyzing materials, including how to prepare specimens, set up the appropriate conditions for tomography, analyze data, and work with other tools to create the most accurate results.**

**ISBN:** 978-0-12-804647-0

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 350

### AUDIENCE

Master degree and Ph.D. students,  
Research engineers and senior  
scientists, University professors

### KEY FEATURES

- Provides an introduction to the capabilities and limitations of atom probe tomography when analyzing materials
- Written for both experienced researchers and new users
- Includes exercises, along with corrections, for users to practice the techniques discussed
- Contains coverage of more advanced and less widespread techniques, such as correlative APT and STEM microscopy

### DESCRIPTION

*Atom Probe Tomography* is aimed at beginners and researchers interested in expanding their expertise in this area. It provides the theoretical background and practical information necessary to investigate how materials work using atom probe microscopy techniques, and includes detailed explanations of the fundamentals, the instrumentation, contemporary specimen preparation techniques, and experimental details, as well as an overview of the results that can be obtained. The book emphasizes processes for assessing data quality and the proper implementation of advanced data mining algorithms.

For those more experienced in the technique, this book will serve as a single comprehensive source of indispensable reference information, tables, and techniques. Both beginner and expert will value the way the book is set out in the context of materials science and engineering. In addition, its references to key research outcomes based upon the training program held at the University of Rouen—the institution which developed the process of atom probe tomography and which remains one of the leading scientific research centers exploring the various aspects of the instrument—will further enhance understanding and the learning process.

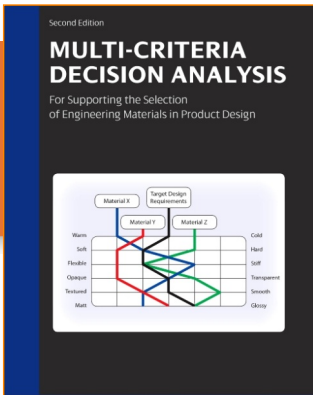
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Ali Jahan  
Kevin L. Edwards  
Marjan Bahraminasab



ISBN: 978-0-08-100536-1

PREVIOUS EDITION ISBN:  
9780080993867

PUB DATE: March 2016

FORMAT: Paperback

PAGES: c. 238

**AUDIENCE**

Researchers in materials engineering disciplines and in operational research in the area of multi criteria decision analysis; also serves as a reference text for engineering practitioners (from aerospace to biomedicine) to help select the best material(s) for advanced design applications.

**Multi-criteria Decision Analysis for Supporting the Selection of Engineering Materials in Product Design, 2e**  
**Ali Jahan** Department of Industrial Engineering, Semnan Branch, Islamic Azad University, Semnan, Iran  
**Kevin L. Edwards** School of Engineering & Applied Science, Aston University, Birmingham, UK; Editor-in-Chief, Materials and Design  
**Marjan Bahraminasab** Department of Materials Engineering, Buain Zahra Technical University, Qazvin, Iran



**This book introduces readers to the use of modern quantitative tools and decision-making techniques that are used in operations research and how they can be applied to materials selection, including discussions of multi-criteria decision-making (MCDM) methods that can help tackle complex design problems**

**KEY FEATURES**

- Describes the advantages of Quality Function Deployment (QFD) in the materials selection process through different case studies
- Presents a methodology for multi-objective material design optimization that employs Design of Experiments coupled with Finite Element Analysis
- Supplements existing quantitative methods of materials selection by allowing simultaneous consideration of design attributes, component configurations, and types of material
- Provides a case study for simultaneous materials selection and geometrical optimization processes

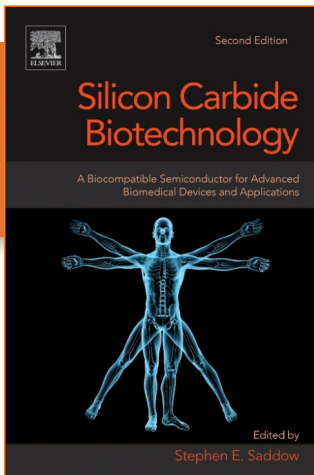
**DESCRIPTION**

*Multi-criteria Decision Analysis for Supporting the Selection of Engineering Materials in Product Design, Second Edition*, provides readers with tactics they can use to optimally select materials to satisfy complex design problems when they are faced with the vast range of materials available.

Current approaches to materials selection range from the use of intuition and experience, to more formalized computer-based methods, such as electronic databases with search engines to facilitate the materials selection process. Recently, multi-criteria decision-making (MCDM) methods have been applied to materials selection, demonstrating significant capability for tackling complex design problems.

This book describes the rapidly growing field of MCDM and its application to materials selection. It aids readers in producing successful designs by improving the decision-making process. This new edition updates and expands previous key topics, including new chapters on materials selection in the context of design problem-solving and multiple objective decision-making, also presenting a significant amount of additional case studies that will aid in the learning process.





ISBN: 978-0-12-802993-0

PREVIOUS EDITION ISBN:

9780123859068

PUB DATE: March 2016

FORMAT: Hardback

PAGES: c. 356

#### AUDIENCE

Biomedical and materials engineers and scientists, device professionals and related specialists searching for a robust biomedical option for implantation with semiconductor effects.

## Silicon Carbide Biotechnology, 2e

### *A Biocompatible Semiconductor for Advanced Biomedical Devices and Applications*

Edited by: **Stephen Saddow** Dept. of Electrical Engineering, College of Engineering and Dept. of Molecular Pharmacology and Physiology, College of Medicine, University of South Florida, Tampa, Florida, USA



**This book explores the popular biocompatible semiconductor and its uses in advanced biomedical applications, featuring cutting-edge content on recent devices and applications and offering information on high power densities and low energy losses that enable lighter, more compact, and higher efficiency products for biocompatible and long-term in vivo applications**

#### KEY FEATURES

- Discusses the properties, processing, characterization, and application of silicon carbide biomedical materials and related technology
- Assesses literature, patents, and FDA approvals for clinical trials, enabling rapid assimilation of data from current disparate sources and promoting the transition from technology R&D, to clinical trials
- Includes more on applications and devices, such as SiC nanowires, biofunctionalized devices, micro-electrode arrays, heart stent/cardiovascular coatings, and continuous glucose sensors, in this new edition

#### DESCRIPTION

*Silicon Carbide Biotechnology: A Biocompatible Semiconductor for Advanced Biomedical Devices and Applications, Second Edition*, provides the latest information on this wide-band-gap semiconductor material that the body does not reject as a foreign (i.e., not organic) material and its potential to further advance biomedical applications.

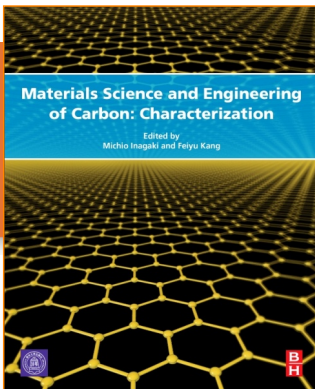
SiC devices offer high power densities and low energy losses, enabling lighter, more compact, and higher efficiency products for biocompatible and long-term in vivo applications, including heart stent coatings, bone implant scaffolds, neurological implants and sensors, glucose sensors, brain-machine-interface devices, smart bone implants, and organ implants.

This book provides the materials and biomedical engineering communities with a seminal reference book on SiC for developing technology, and is a resource for practitioners eager to identify and implement advanced engineering solutions to their everyday medical problems for which they currently lack long-term, cost-effective solutions.

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## Materials Science and Engineering of Carbon *Characterization*

Edited by: *Michio Inagaki* Professor Emeritus, Hokkaido University, Japan  
*Feiyu Kang* Professor, Department of Materials Science and Engineering,  
Tsinghua University, China



**Provides comprehensive understanding on the appropriate conditions for the characterization of carbon materials**

### KEY FEATURES

- Focuses on characterization techniques for carbon materials
- The author of each chapter has been working on carbon materials and is a specialist in the respective technique
- Presents practical results on various carbon materials, including fault results, which will help readers understand the optimum conditions for the characterization of carbon materials

### DESCRIPTION

Characterization of carbon materials has to be carefully done because the optimum conditions for the characterization of each carbon material are quite different. *Materials Science and Engineering of Carbon: Characterization* discusses 12 characterization techniques by focusing their application on carbon materials, including X-ray diffraction, X-ray small-angle scattering, transmission electron microscopy, Raman spectroscopy, scanning electron microscopy, image analysis, X-ray photoelectron spectroscopy, magnetoresistance, electrochemical performance, pore structure analysis, thermal analyses, and quantification of functional groups.

Each contributor of this book has been working on carbon materials for many years. Their background and experience will provide guidance on the development and research of carbon materials and their applications.

**ISBN:** 978-0-12-805256-3

**PUB DATE:** March 2016

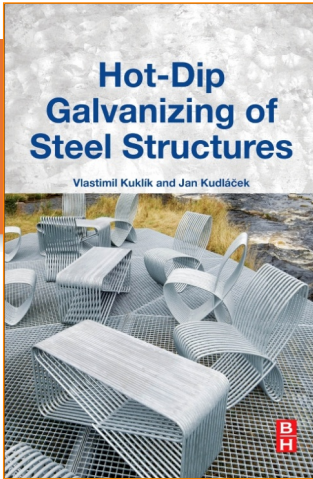
**FORMAT:** Hardback

**PAGES:** c. 290

### AUDIENCE

For graduate students and young scientists in universities, research institutes and industrial companies who are working on and/or interested in carbon materials. Also for university students and people who are interested in high technology science and engineering of carbon materials.





**ISBN:** 978-0-08-100753-2

**PUB DATE:** February 2016

**FORMAT:** Paperback

**PAGES:** c. 214

**AUDIENCE**

Researchers, engineers, graduate students, technicians, and inspectors working in the galvanization industry.

## Hot-Dip Galvanizing of Steel Structures

Vlastimil Kuklik Czech and Slovak Galvanizers Association

Jan Kudláček Faculty of Mechanical Engineering, Czech Technical University, Prague



This new publication is based on the authors' own research, contains well-arranged useful information on hot-dip galvanizing, mentions the related environmental aspects and also discusses the issue of reliability of hot-dip galvanized structures

### KEY FEATURES

- Provides practical information on hot-dip galvanizing from a scientific-disciplinary perspective, including coverage of design principles, reliability of galvanized structures, and legal aspects
- Features chapters devoted to qualitative assessments of the surface treatment and methods for correcting problems
- Includes discussion of hot-dip galvanizing with regard to environmental aspects and sustainable development

### DESCRIPTION

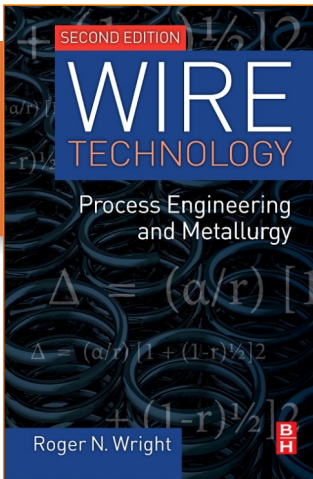
*Hot-Dip Galvanizing of Steel Structures* contains practical information that is useful for both researchers in hot-dip galvanizing and engineers, designers, and inspectors. The book draws from the empirical experience and research of the authors, complementing the current state of knowledge of morphological variations of the coating and causes of coating delamination.

The book includes chapters devoted to qualitative tests of the coating, and to methods of making corrections. A section describing the principle of protecting steel against corrosion through zinc coating is also provided, along with an extensive chapter on the principles of good design for hot-dip galvanizing. The chapter related to the safety of hot-dip galvanized steel structures offers a new hypothesis about the mechanism of nucleation of LMAC cracks during hot-dip galvanizing, thus enriching the knowledge regarding this phenomenon.

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## Wire Technology, 2e

### Process Engineering and Metallurgy

**Roger N. Wright** Leading wire industry trainer and consultant, and Professor Emeritus, School of Engineering, Rensselaer Polytechnic Institute, Troy, NY, USA



The practical guide to wire drawing and related processes for ferrous and non-ferrous metals provides readers with the latest developments in high-speed equipment and the drawing of ultra-high strength steels, along with new computer-based design and analysis software and techniques

#### KEY FEATURES

- Written by an internationally-recognized specialist in wire drawing with extensive academic and industry experience
- Provides real-world examples, problems, and case studies that allow engineers to easily apply the theory to their workplace, thus improving productivity and process efficiency
- Covers both ferrous and non-ferrous metals in one volume

#### DESCRIPTION

*Wire Technology: Process Engineering and Metallurgy, Second Edition*, covers new developments in high-speed equipment and the drawing of ultra-high strength steels, along with new computer-based design and analysis software and techniques, including Finite Element Analysis.

In addition, the author shares his design and risk prediction calculations, as well as several new case studies. New and extended sections cover measurement and instrumentation, die temperature and cooling, multiwire drawing, and high strength steel wire.

Coverage of process economics has been greatly enhanced, including an exploration of product yields and cost analysis, as has the coverage of sustainability aspects such as energy use and recycling. As with the first edition, questions and problems are included at the end of each chapter to reinforce key concepts.

**ISBN:** 978-0-12-802650-2

**PREVIOUS EDITION ISBN:**  
9780323164993

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 326

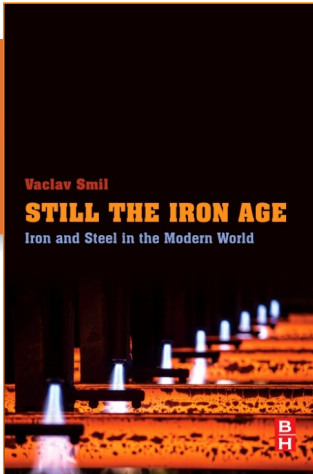
#### AUDIENCE

Mechanical Engineers, Materials Scientists (metals), wire drawing industry.

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**ISBN:** 978-0-12-804233-5

**PUB DATE:** February 2016

**FORMAT:** Paperback

**PAGES:** c. 268

**AUDIENCE**

This book would be of interest to metallurgists and non-metallurgists seeking a broader understanding of the history of steel and iron and their current and future impact on society as well as readers with backgrounds in environmental studies, industry, manufacturing and history.

## Still the Iron Age

### *Iron and Steel in the Modern World*

*Vaclav Smil* Distinguished Professor Emeritus, University of Manitoba and Fellow of the Royal Society of Canada (Science Academy), Canada



An exploration of iron and steel, from its genesis to modern steel production and reflections on the future, taking readers on a journey from the early discovery of techniques used to work with steel to recent developments in the manufacturing and use of steel

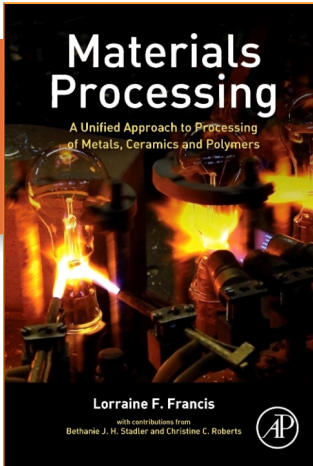
#### KEY FEATURES

- Incorporates an interdisciplinary discussion of the history and evolution of the iron- and steel-making industry and its impact on the development of the modern world
- Serves as a valuable contribution because of its unique perspective that compares steel to technological advances in other materials, perceived to be important
- Discusses how we can manufacture smarter rather than deny demand
- Explores future opportunities and new efforts for sustainable development in the industry

#### DESCRIPTION

Although the last two generations have seen an enormous amount of attention paid to advances in electronics, the fact remains that high-income, high-energy societies could thrive without microchips, etc., but, by contrast, could not exist without steel. Because of the importance of this material to contemporary civilization, a comprehensive resource is needed for metallurgists, non-metallurgists, and anyone with a background in environmental studies, industry, manufacturing, and history, seeking a broader understanding of the history of iron and steel and its current and future impact on society. Given its coverage of the history of iron and steel from its genesis to slow pre-industrial progress, revolutionary advances during the 19th century, magnification of 19th century advances during the past five generations, patterns of modern steel production, the ubiquitous uses of the material, potential substitutions, advances in relative dematerialization, and appraisal of steel's possible futures, *Still the Iron Age: Iron and Steel in the Modern World* by world-renowned author Vaclav Smil meets that need.





**ISBN:** 978-0-12-385132-1

**PUB DATE:** January 2016

**FORMAT:** Hardback

**PAGES:** c. 598

**AUDIENCE**

Junior/senior level undergraduate and first-year graduate students in Materials Science and Engineering.

## Materials Processing

*A Unified Approach to Processing of Metals, Ceramics and Polymers*

**Lorraine F. Francis** Distinguished University Teaching Professor and Professor of Chemical Engineering and Materials Science at the University of Minnesota, Minneapolis, MN, USA



**The fundamental concepts of the materials processing of metals, ceramics and polymers in a single, unified textbook for engineering students.**

### KEY FEATURES

Coverage of metal, ceramic and polymer processing in a single text provides a self-contained approach and consistent nomenclature that allow for easier comparisons between various materials and processes.

Emphasis on fundamental principles gives students a strong foundation for understanding processing and manufacturing methods.

Development of connections between processing and structure builds on students' existing knowledge of structure - property relationships.

Examples of both standard and newer additive manufacturing methods throughout provide students with an overview of the methods that they will likely encounter in their careers.

### DESCRIPTION

*Materials Processing* teaches students the fundamental principles involved in the processing of engineering materials, specifically metals, ceramics and polymers, from starting or raw materials through to the final functional forms. Processing is frequently treated from a materials specific point of view with courses and books that cover only one type of engineering material. This new text covers processing using a unified approach that is based on the state of matter most central to the shaping of the material: melt, solid, powder, dispersion and solution, and vapor. With this approach, students learn processing fundamentals and appreciate the similarities and differences between the materials classes.

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# Friction Stir Casting Modification for Enhanced Structural Efficiency

Saumyadeep Jana  
Rajiv S. Mishra  
Glenn J. Grant

B  
H

**ISBN:** 978-0-12-803359-3

**PUB DATE:** October 2015

**FORMAT:** Paperback

**PAGES:** c. 90

**AUDIENCE**

Researchers, materials processing engineers, design engineers, welding engineers, machining engineers and students.

## Friction Stir Casting Modification for Enhanced Structural Efficiency

*A Volume in the Friction Stir Welding and Processing Book Series*

*Saumyadeep Jana* Pacific Northwest National Laboratory

*Rajiv S. Mishra* Dept. of Materials Science and Engineering and NSF IUCRC for Friction Stir Processing, University of North Texas, Denton, TX, USA

*Glenn Grant* Senior staff scientist, Pacific Northwest National Laboratory



**This book provides the latest information and research on friction stir welding, a relatively new material joining process developed initially for aluminum alloys, demonstrating the benefit of this solid-state joining technique that is energy efficient, environmentally friendly, and versatile.**

A Volume in the Friction Stir Welding and Processing Series.

**KEY FEATURES**

- Provides the benefits of friction stir casting, including its solid phase process, low distortion of workpiece, good dimensional stability and repeatability, high joint strength, and more
- Summarizes current research and applications of friction stir processing techniques for casting modification
- Presents its usage in the production of products such as rags, wire, or any other gases, and its applications for decreased fuel consumption in light weight aircraft, and its automotive and ship applications

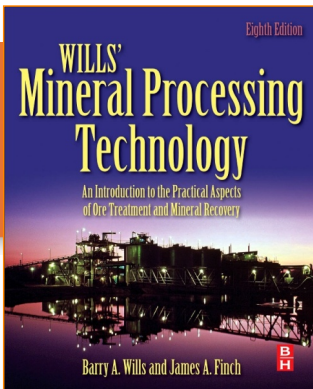
**DESCRIPTION**

*Friction Stir Casting Modification for Enhanced Structural Efficiency: A Volume in the Friction Stir Welding and Processing Book Series* summarizes current research and applications of friction stir processing techniques for casting modification.

Research in this area has shown significant benefit in terms of fatigue performance as a result of friction stir processing. This book addresses the latest research, providing readers with a summary of these results and new guidelines for designers.







## Wills' Mineral Processing Technology, 8e

*An Introduction to the Practical Aspects of Ore Treatment and Mineral Recovery*

Barry A. Wills Senior Partner, MEI, Cornwall, UK  
James Finch McGill University, Montreal, Canada



The industry standard reference for mineral processing, metallurgy and mining is now updated to address contemporary issues of waste disposal, recycling and sustainability.

“Mineral Processing Technology will continue to be a key reference book for mineral engineering professionals and a recommended textbook for mineral processing students.”

— Mark S. Klima, Mineral Processing and Geo-Environmental Engineering, Pennsylvania State University

ISBN: 978-0-08-097053-0

PREVIOUS EDITION ISBN:  
9780750644501

PUB DATE: September 2015

FORMAT: Paperback

PAGES: c. 498

### AUDIENCE

Practitioners in the fields of chemical, metallurgical and materials engineering, working in the areas of mining and mineralogy and students in one and two semester courses in minerals processing, as well as courses in metallurgy and chemical processing materials.

### KEY FEATURES

- Connects fundamentals with practical applications to benefit students and practitioners alike
- Ensures relevance internationally with new material and updates from renowned authorities in the UK, Australia, and Canada
- Introduces the latest technologies and incorporates environmental issues to place the subject of mineral processing in a contemporary context, addressing concerns of sustainability and cost effectiveness
- Provides new case studies, examples, and figures to bring a fresh perspective to the field

### DESCRIPTION

*Wills' Mineral Processing Technology: An Introduction to the Practical Aspects of Ore Treatment and Mineral Recovery* has been the definitive reference for the mineral processing industry for over thirty years. This industry standard reference provides practicing engineers and students of mineral processing, metallurgy, and mining with practical information on all the common techniques used in modern processing installations.

Each chapter is dedicated to a major processing procedure—from underlying principles and technologies to the latest developments in strategies and equipment for processing increasingly complex refractory ores. The eighth edition of this classic reference enhances coverage of practical applications via the inclusion of new material focused on meeting the pressing demand for ever greater operational efficiency, while addressing the pivotal challenges of waste disposal and environmental remediation.

Advances in automated mineralogy and analysis and high-pressure grinding rolls are given dedicated coverage. The new edition also contains more detailed discussions of comminution efficiency, classification, modeling, flocculation, reagents, liquid-solid separations, and beneficiation of phosphate, and industrial materials. Finally, the addition of new examples and solved problems further facilitates the book's pedagogical role in the classroom.

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Handbook of  
Materials Failure Analysis  
With Case Studies from the Chemical,  
Concrete and Power Industries



Edited by  
Abdel Salam Hamdy Makhlouf  
Mahmood Aliofkhaezai



## Handbook of Materials Failure Analysis with Case Studies from the Chemicals, Concrete and Power Industries

Edited by: **Abdel Salam Hamdy Makhlouf** RGV STAR Professor, Dept. of  
Manufacturing Engineering, Faculty of Engineering and Computer Science,  
University of Texas Pan-American, Edinburg, TX, USA  
**Mahmood Aliofkhaezai** Assistant Professor, Department of Materials  
Science, Tarbiat Modares University, Tehran, Iran



**Compelling case studies in failure analysis for engineers and researchers working to mitigate and eliminate materials-related failure in industries where a component or system failure could spell disaster**

### KEY FEATURES

- Introduces readers to modern analytical techniques in materials failure analysis
- Combines foundational knowledge with current research on the latest developments and innovations in the field
- Includes many compelling case studies of materials failure in chemical processing plants, concrete structures, and power generation systems

### DESCRIPTION

*Handbook of Materials Failure Analysis: With Case Studies from the Chemicals, Concrete and Power Industries* provides an in-depth examination of materials failure in specific situations, a vital component in both developing and engineering new solutions.

This handbook covers analysis of materials failure in the chemical, power, and structures arenas, where the failure of a single component can result in devastating consequences and costs.

Material defects, mechanical failure as a result of improper design, corrosion, surface fracture, and other failure mechanisms are described in the context of real world case studies involving steam generators, boiler tubes, gas turbine blades, welded structures, chemical conversion reactors and more. This book is an indispensable reference for engineers and scientists studying the mechanisms of failure in these fields.

**ISBN:** 978-0-08-100116-5

**PUB DATE:** September 2015

**FORMAT:** Hardback

**PAGES:** c. 450

### AUDIENCE

Materials engineers, chemists, and research scientists working in materials engineering and failure analysis, primarily in the oil & gas industry.

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SECOND EDITION

## COMPLETE CASTING HANDBOOK

Metal Casting Processes, Metallurgy, Techniques and Design

JOHN CAMPBELL



**ISBN:** 978-0-444-63509-9

**PREVIOUS EDITION ISBN:**  
9781856178099

**PUB DATE:** August 2015

**FORMAT:** Hardback

**PAGES:** c. 1034

### AUDIENCE

Metallurgists, metals solidification and foundry professionals in industry and academia; cast metal product and process designers; MS&E researchers; government, corporate and academic researchers and libraries.

## Complete Casting Handbook, 2e

*Metal Casting Processes, Metallurgy, Techniques and Design*

*John Campbell* Professor Emeritus of Casting Technology, University of Birmingham, UK



The essential reference guide to the 'art' and science of metal casting for metallurgists and foundry engineers

### KEY FEATURES

- Delivers the expert advice that engineers need to make successful and profitable casting decisions
- Ideal reference for those interested in solidification, vortex gates, nucleation, biofilm, remelting, and molding
- Follows a logical, two-part structure that covers both casting metallurgy and casting manufacture
- Contains established, must-have information, such as Campbell's '10 Rules' for successful casting manufacture
- Includes numerous updates and revisions based on recent breakthroughs in the industry

### DESCRIPTION

*Campbell's Complete Casting Handbook: Metal Casting Processes, Techniques and Design, Second Edition* provides an update to the first single-volume guide to cover modern principles and processes in such breadth and depth, while also retaining a clear, practical focus.

The work has a unique viewpoint, interpreting the behavior of castings, and metals as a whole, in terms of their biofilm content, the largely invisible casting defects which control much of the structure and behavior of metals.

This new edition includes new findings, many from John Campbell's own research, on crack initiation, contact pouring, vortex gates, and the Cosworth Process.

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Handbook of  
Materials Failure Analysis  
With Case Studies from the Aerospace  
and Automotive Industries



Edited by  
Abdel Salam Hamdy Makhlouf  
Mahmood Aliofkhaeae



ISBN: 978-0-12-800950-5

PUB DATE: August 2015

FORMAT: Hardback

PAGES: c. 504

#### AUDIENCE

Materials engineers, chemists, research scientists and grad students working in materials engineering and failure analysis, primarily in corrosion engineering-related industries such as aerospace, oil & gas, and chemicals.

## Handbook of Materials Failure Analysis with Case Studies from the Aerospace and Automotive Industries

Edited by: **Abdel Salam Hamdy Makhlouf** RGV STAR Professor, Dept. of Manufacturing Engineering, Faculty of Engineering and Computer Science, University of Texas Pan-American, Edinburg, TX, USA

**Mahmood Aliofkhaeae** Assistant Professor, Department of Materials Science, Tarbiat Modares University, Tehran, Iran



**A valuable reference on failure analysis of materials, combining the latest research on methods, tools, and techniques with actual case studies from key industries**

#### KEY FEATURES

- Covers the most common types of materials failure, analysis, and possible solutions
- Provides the most up-to-date and balanced coverage of failure analysis, combining foundational knowledge, current research on the latest developments, and innovations in the field
- Ideal accompaniment for those interested in materials forensic investigation, failure of materials, static failure analysis, dynamic failure analysis, fatigue life prediction, rotorcraft, failure prediction, fatigue crack propagation, bevel pinion failure, gasketless flange, thermal barrier coatings
- Presents compelling new case studies from key industries to demonstrate concepts
- Highlights the role of site conditions, operating conditions at the time of failure, history of equipment and its operation, corrosion product sampling, metallurgical and electrochemical factors, and morphology of failure

#### DESCRIPTION

*Handbook of Materials Failure Analysis: With Case Studies from the Aerospace and Automotive Industries* provides a thorough understanding of the reasons materials fail in certain situations, covering important scenarios, including material defects, mechanical failure as a result of improper design, corrosion, surface fracture, and other environmental causes.

The book begins with a general overview of materials failure analysis and its importance, and then logically proceeds from a discussion of the failure analysis process, types of failure analysis, and specific tools and techniques, to chapters on analysis of materials failure from various causes. Later chapters feature a selection of newer examples of failure analysis cases in such strategic industrial sectors as aerospace, oil & gas, and chemicals.





## Inorganic Controlled Release Technology

Materials and Concepts for Advanced Drug Formulation

Xiang Zhang and Mark Cresswell



ISBN: 978-0-08-099991-3

PUB DATE: August 2015

FORMAT: Hardback

PAGES: c. 250

### AUDIENCE

Pharmaceutical scientists, formulation specialists, engineers, doctors, clinicians, managers and later year undergraduates and postgraduates working in the pharmaceutical, cosmetic, veterinary and agricultural sectors.

## Inorganic Controlled Release Technology

### Materials and Concepts for Advanced Drug Formulation

**Xiang Zhang** Royal Society Industry Fellow, University of Cambridge and Principal Consultant, Lucideon, Stoke-on-Trent, UK

**Mark Cresswell** Development Scientist, Healthcare, Lucideon, Stoke-on-Trent, UK



**Innovative inorganic materials solutions for the controlled delivery of active pharmaceutical ingredients and therapeutic ions**

### KEY FEATURES

- Provides the first book on inorganic controlled release technology (iCRT), covering key aspects from chemistry, physics, synthetic methods, formulation design, characterization and evaluation
- Includes several industry-related case studies to provide practical guidance on how to use iCRT as an alternative to organic polymers systems for both future drug developments and other active ingredient applications
- Demonstrates how iCRT offers an unmet business need for improved, controlled release of actives versus traditional CRT systems, which are known to have difficulty with the controlled delivery of both poorly and highly water soluble drug compounds

### DESCRIPTION

*Inorganic Controlled Release Technology: Materials and Concepts for Advanced Drug Formulation* provides a practical guide to the use and applications of inorganic controlled release technology (iCRT) for drug delivery and other healthcare applications, focusing on newly developed inorganic materials such as bioresorbable glasses and bioceramics. The use of these materials is introduced for a wide range of applications that cover inorganic drug delivery systems for new drug development and the reformulation of existing drugs. The book describes basic concepts, principles, and industrial practices by discussing materials chemistry, physics, nano/microstructure, formulation, materials processing, and case studies, as well as the evaluation and characterization of iCRT systems commonly investigated during industrial R&D.

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Handbook of  
Materials Failure Analysis  
With Case Studies from the Oil  
and Gas Industries



Edited by  
Abdel Salam Hamdy Makhoulouf  
Mahmoud Aliofkhazraei



**ISBN:** 978-0-08-100117-2

**PUB DATE:** August 2015

**FORMAT:** Hardback

**PAGES:** c. 430

**AUDIENCE**

Materials engineers, chemists, and research scientists working in materials engineering and failure analysis, primarily in the oil & gas industry.

## Handbook of Materials Failure Analysis with Case Studies from the Oil and Gas Industry

Edited by: **Abdel Salam Hamdy Makhoulouf** RGV STAR Professor, Dept. of Manufacturing Engineering, Faculty of Engineering and Computer Science, University of Texas Pan-American, Edinburg, TX, USA  
**Mahmoud Aliofkhazraei** Assistant Professor, Department of Materials Science, Tarbiat Modares University, Tehran, Iran



**Compelling case studies in materials failure analysis for engineers and researchers working on ways to eliminate the potentially devastating effects of pipeline and other materials failures in the oil and gas industry**

**KEY FEATURES**

- Introduces readers to modern analytical techniques in materials failure analysis
- Combines foundational knowledge with current research on the latest developments and innovations in the field
- Includes numerous compelling case studies of materials failure in oil and gas pipelines and drilling platforms

**DESCRIPTION**

*Handbook of Materials Failure Analysis: With Case Studies from the Oil and Gas Industry* provides an updated understanding on why materials fail in specific situations, a vital element in developing and engineering new alternatives.

This handbook covers analysis of materials failure in the oil and gas industry, where a single failed pipe can result in devastating consequences for people, wildlife, the environment, and the economy of a region.

The book combines introductory sections on failure analysis with numerous real world case studies of pipelines and other types of materials failure in the oil and gas industry, including joint failure, leakage in crude oil storage tanks, failure of glass fibre reinforced epoxy pipes, and failure of stainless steel components in offshore platforms, amongst others.

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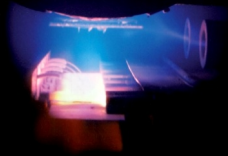
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Third Edition

# Vacuum Deposition onto Webs, Films and Foils, 3e



Charles A. Bishop

ISBN: 978-0-323-29644-1

PREVIOUS EDITION ISBN:  
9781437778670

PUB DATE: August 2015

FORMAT: Hardback

PAGES: c. 582

## AUDIENCE

Professionals and practitioners in the vacuum coating / vacuum metalizing industry: Engineers and technicians (systems, quality, process, and maintenance), production managers, machinery designers and engineers and vendor sales and tech support staff.

Engineers and managers in the main industry sectors utilizing vacuum coating: food packaging, electronics, film production, pigment manufacturing, solar energy. Research and Development staff

## Vacuum Deposition onto Webs, Films and Foils, 3e

Charles Bishop CAB Consulting, Ltd.



This updated third edition provides a broad audience of engineers, technicians, and production managers with an end-to-end understanding of roll-to-roll vacuum deposition systems, processes, and products, and includes a significant amount of new information on recent developments in barrier measurement techniques, improved in-vacuum monitoring technologies, and the latest in atomic layer deposition.

### KEY FEATURES

- Provides the know-how to maximize productivity of vacuum coating systems
- Thoroughly revised with a significant amount of new information added, including newly developed barrier measurement techniques, improved in-vacuum monitoring technologies, and the latest on Atomic Layer Deposition (ALD)
- Presents the latest information on vacuum deposition, the technology that applies an even coating to a flexible material that can be held on a roll, thereby offering a much faster and cheaper method of bulk coating
- Enables engineers to specify systems more effectively and enhances dialogue between non-specialists and suppliers/engineers
- Empowers those in rapidly expanding fields such as solar energy, display panels, and flexible electronics to unlock the potential of vacuum coating to transform their processes and products

### DESCRIPTION

*Vacuum Deposition onto Webs: Films and Foils, Third Edition*, provides the latest information on vacuum deposition, the technology that applies an even coating to a flexible material that can be held on a roll, thereby offering a much faster and cheaper method of bulk coating than deposition onto single pieces or non-flexible surfaces such as glass.

This technology has been used in industrial-scale applications for some time, including a wide range of metalized packaging. Its potential as a high-speed, scalable process has seen an increasing range of new products emerging that employ this cost-effective technology, including solar energy products that are moving from rigid panels onto cheaper and more versatile flexible substrates, flexible electronic circuit 'boards', and flexible displays.

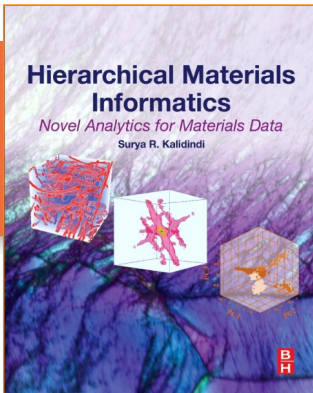
In this third edition, all chapters are thoroughly revised with a significant amount of new information added, including newly developed barrier measurement techniques, improved in-vacuum monitoring technologies, and the latest developments in Atomic Layer Deposition (ALD).

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ISBN: 978-0-12-410394-8

PUB DATE: August 2015

FORMAT: Hardback

PAGES: c. 220

#### AUDIENCE

Materials scientists and engineers and mechanical engineers and researchers across academia, government and industry who are working in the area of new materials design, development and deployment; graduate students in materials science and engineering.

## Hierarchical Materials Informatics

### *Novel Analytics for Materials Data*

Surya R. Kalidindi George W. Woodruff School of Mechanical Engineering and the School of Computational Science and Engineering, Georgia Institute of Technology, Atlanta, GA, USA



Discover how microstructure informatics will enable materials scientists and engineers to more quickly and efficiently design, develop and bring to market new advanced materials

#### KEY FEATURES

- Addresses a critical gap in new materials research and development by presenting a rigorous statistical framework for the quantification of microstructure
- Contains several case studies illustrating the use of modern data analytic tools on microstructure datasets (both experimental and modeling)

#### DESCRIPTION

Custom design, manufacture, and deployment of new high performance materials for advanced technologies is critically dependent on the availability of invertible, high fidelity, structure-property-processing (SPP) linkages. Establishing these linkages presents a major challenge because of the need to cover unimaginably large dimensional spaces. **Hierarchical Materials Informatics** addresses objective, computationally efficient, mining of large ensembles of experimental and modeling datasets to extract this core materials knowledge. Furthermore, it aims to organize and present this high value knowledge in highly accessible forms to end users engaged in product design and design for manufacturing efforts. As such, this emerging field has a pivotal role in realizing the goals outlined in current strategic national initiatives such as the Materials Genome Initiative (MGI) and the Advanced Manufacturing Partnership (AMP). This book presents the foundational elements of this new discipline as it relates to the design, development, and deployment of hierarchical materials critical to advanced technologies.





# Computational Materials Engineering

Achieving high accuracy and efficiency in metals processing simulations



Maciej Pietrzyk, Lukasz Madej,  
Lukasz Rauch and Danuta Szeliga



**ISBN:** 978-0-12-416707-0

**PUB DATE:** July 2015

**FORMAT:** Hardback

**PAGES:** c. 370

#### **AUDIENCE**

Researchers focused on numerical modeling of microstructure evolution phenomena and materials processing and PhD students of material and applied computer sciences.

## Computational Materials Engineering *Achieving High Accuracy and Efficiency in Metals Processing Simulations*

**Maciej Pietrzyk** Dept. of Applied Comp. Sci. and Modelling, Faculty of Metals Eng. and Industrial Comp. Sci., Akademia Górniczo – Hutnicza, Poland; **Lukasz Madej** Dept. of Applied Comp. Sci. and Modelling, Faculty of Metals Eng. and Industrial Comp. Sci., Akademia Górniczo – Hutnicza, Poland; **Lukasz Rauch** AGH University of Science and Technology, Krakow, Poland; **Danuta Szeliga** Dept. of Applied Comp. Sci. and Modelling, Faculty of Metals Eng. and Industrial Comp. Sci., Akademia Górniczo – Hutnicza, Poland



**Computational materials processing experts present current metals processing modeling and simulation methods for plus new ways to improve modeling accuracy and efficiency**

#### **KEY FEATURES**

- Presents the numerical approaches for high-accuracy calculations
- Provides researchers with essential information on the methods capable of exact representation of microstructure morphology
- Helpful to those working on model classification, computing costs, heterogeneous hardware, modeling efficiency, numerical algorithms, metamodeling, sensitivity analysis, inverse method, clusters, heterogeneous architectures, grid environments, finite element, flow stress, internal variable method, microstructure evolution, and more
- Discusses several techniques to overcome modeling and simulation limitations, including distributed computing methods, (hyper) reduced-order-modeling techniques, regularization, statistical representation of material microstructure, and the Gaussian process
- Covers both software and hardware capabilities in the area of improved computer efficiency and reduction of computing time

#### **DESCRIPTION**

*Computational Materials Engineering: Achieving High Accuracy and Efficiency in Metals Processing Simulations* describes the most common computer modeling and simulation techniques used in metals processing, from so-called "fast" models to more advanced multiscale models, also evaluating possible methods for improving computational accuracy and efficiency.

Beginning with a discussion of conventional fast models like internal variable models for flow stress and microstructure evolution, the book moves on to advanced multiscale models, such as the CAFÉ method, which give insights into the phenomena occurring in materials in lower dimensional scales.

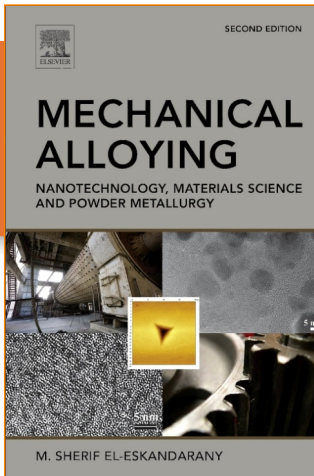
The book then delves into the various methods that have been developed to deal with problems, including long computing times, lack of proof of the uniqueness of the solution, difficulties with convergence of numerical procedures, local minima in the objective function, and ill-posed problems. It then concludes with suggestions on how to improve accuracy and efficiency in computational materials modeling, and a best practices guide for selecting the best model for a particular application.

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## Mechanical Alloying, 2e

*Nanotechnology, Materials Science and Powder Metallurgy*  
M. Sherif El-Eskandarany Al Azhar University, Cairo, Egypt

**William Andrew**  
Applied Science Publishers

**A detailed introduction to mechanical alloying, guiding readers through each step of the process, and presenting the latest research on new and emerging applications**

### KEY FEATURES

- Guides readers through each step of the mechanical alloying process, covering best practice techniques and offering guidelines on the required equipment
- Tables and graphs are used to explain the stages of the milling processes and provide an understanding of the properties and characteristics of the resulting materials
- A comprehensive update on the previous edition, including new chapters to cover new applications

### DESCRIPTION

This book is a detailed introduction to mechanical alloying, offering guidelines on the necessary equipment and facilities needed to carry out the process and giving a fundamental background to the reactions taking place. El-Eskandarany, a leading authority on mechanical alloying, discusses the mechanism of powder consolidations using different powder compaction processes. A new chapter will also be included on thermal, mechanically-induced and electrical discharge-assisted mechanical milling.

Fully updated to cover recent developments in the field, this second edition also introduces new and emerging applications for mechanical alloying, including the fabrication of carbon nanotubes, surface protective coating and hydrogen storage technology. El-Eskandarany discusses the latest research into these applications, and provides engineers and scientists with the information they need to implement these developments. The industrial applications of nanocrystalline and metallic glassy powders are presented.

The book also contains over 200 tables and graphs to illustrate the milling processes and present the properties and characteristics of the resulting materials.

ISBN: 978-1-4557-7752-5

PREVIOUS EDITION ISBN:  
9780815514626

PUB DATE: May 2015

FORMAT: Hardback

PAGES: c. 332

### AUDIENCE

Metallurgists, Materials Scientists and Engineers, Process and Production Engineers, Design Engineers (especially in the automotive, aerospace and energy sectors), scientists and engineers involved in relevant specialties in the fields of advanced materials and nanotechnology.

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Andrzej Ziolkowski

## Pseudoelasticity of Shape Memory Alloys

Theory and Experimental Studies



**ISBN:** 978-0-12-801697-8

**PUB DATE:** March 2015

**FORMAT:** Paperback

**PAGES:** c. 244

### AUDIENCE

Materials scientists and engineers, mechanical engineers, bioengineers, aerospace engineers and physical metallurgists.

## Pseudoelasticity of Shape Memory Alloys

### Theory and Experimental Studies

**Andrzej Ziolkowski** Department of Mechanics of Materials, Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland



**A case study for developing a superior model of SMA materials behavior, paying special attention to the relationships between thermo-mechanical properties of SMA materials and their molecular structure, behavior, and underlying physical phenomena**

### KEY FEATURES

- Introduces the phenomenon of pseudoelasticity exhibited by shape memory alloy materials
- Features a survey of modeling approaches targeted at reliable prediction of SMN materials' behavior on different scales of observation
- Provides extensive coverage of the state-of-the-art in the field
- Ideal reference for researchers and graduate students interested in the modern methodologies used in the process of building constitutive models of advanced materials

### DESCRIPTION

*Pseudoelasticity of Shape Memory Alloys: Theory and Experimental Studies* is devoted to the phenomenon of pseudoelasticity (superelasticity) exhibited by shape memory alloy materials. It provides extensive introductory content on the state-of-the-art in the field, including SMA materials development, definition of shape memory effects, and discussions on where shape memory behavior is found in various engineering application areas.

The book features a survey of modeling approaches targeted at reliable prediction of SMA materials' behavior on different scales of observation, including atomistic, microscopic, mesoscopic, and macroscopic.

Researchers and graduate students will find detailed information on the modern methodologies used in the process of building constitutive models of advanced materials exhibiting complex behavior.

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# Friction Stir Welding of Dissimilar Alloys and Materials

Nilesh Kumar  
Wei Yuan  
Rajiv S. Mishra

B  
H

**ISBN:** 978-0-12-802418-8

**PUB DATE:** March 2015

**FORMAT:** Paperback

**PAGES:** c. 126

**AUDIENCE**

Researchers, materials processing engineers, design engineers, welding engineers, and students.

## Friction Stir Welding of Dissimilar Alloys and Materials

*Nilesh Kumar* Department of Materials Science and Engineering, University of North Texas, Denton, TX, USA

*Rajiv S. Mishra* Dept. of Materials Science and Engineering and NSF IUCRC for Friction Stir Processing, University of North Texas, Denton, TX, USA

*Wei Yuan* Senior Researcher, Hitachi America, Ltd., Tarrytown, NY, USA



Covers this relatively new material joining process--developed initially for aluminum alloys by UK-based The Welding Institute (TWI) - that is energy efficient, environment friendly, and versatile

A Volume in the Friction Stir Welding and Processing Series.

**KEY FEATURES**

- Explains solid phase process and distortion of work piece
- Addresses dimensional stability and repeatability
- Addresses joint strength
- Covers metallurgical properties in the joint area
- Covers fine microstructure
- Introduces improved materials use (e.g., joining different thicknesses)
- Covers decreased fuel consumption in light weight aircraft
- Addresses automotive and ship applications

**DESCRIPTION**

This book will summarize research work carried out so far on dissimilar metallic material welding using friction stir welding (FSW). Joining of dissimilar alloys and materials are needed in many engineering systems and is considered quite challenging. Research in this area has shown significant benefit in terms of ease of processing, material mixing, and superior mechanical properties such as joint efficiencies. A summary of these results will be discussed along with potential guidelines for designers.

# Titanium Powder Metallurgy

MA QIAN  
F. H. FROES



ISBN: 978-0-12-800054-0

PUB DATE: February 2015

FORMAT: Hardback

PAGES: c. 628

## AUDIENCE

Titanium and powder metallurgy engineers and researchers, titanium powder and parts producers, graduate students in metallurgy and light alloys

## Titanium Powder Metallurgy

### *Science, Technology and Applications*

Edited by: *Ma Qian* School of Aerospace, Mechanical and Manufacturing Engineering, RMIT University, Melbourne, Australia

*Francis H Froes* Materials Science & Engineering Dept. and Institute for Materials & Advanced Processes, University of Idaho, Moscow, ID, USA



**An indispensable resource covering all important aspects of titanium powder metallurgy, including powder production and processing, green shape formation, consolidation, current industrial applications and predictions of future developments**

### KEY FEATURES

- Provides a comprehensive and in-depth treatment of the science, technology and industrial practice of titanium powder metallurgy
- Each chapter is delivered by the most knowledgeable expert on the topic, half from industry and half from academia, including several pioneers in the field, representing our current knowledge base of Ti PM.
- Includes a critical review of the current key fundamental and technical issues of Ti PM.
- Fills a critical knowledge gap in powder metal science and engineering and in the manufacture of titanium metal and alloys

### DESCRIPTION

***Titanium Powder Metallurgy*** contains the most comprehensive and authoritative information for, and understanding of, all key issues of titanium powder metallurgy (Ti PM). It summarizes the past, reviews the present and discusses the future of the science and technology of Ti PM while providing the world titanium community with a unique and comprehensive book covering all important aspects of titanium powder metallurgy, including powder production, powder processing, green shape formation, consolidation, property evaluation, current industrial applications and future developments. It documents the fundamental understanding and technological developments achieved since 1937 and demonstrates why powder metallurgy now offers a cost-effective approach to the near net or net shape fabrication of titanium, titanium alloys and titanium metal matrix composites for a wide variety of industrial applications.

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## Materials and Sustainable Development

Michael F. Ashby Professor Emeritus, Cambridge University, Cambridge, UK



**Brings together the materials and environmental, regulatory, social and economic aspects of sustainable developments providing a methodological tool-set, path and examples of how to use them.**

### KEY FEATURES

- Describes sustainable development in increasingly detailed progression, from a broad overview to specific tools and methods
- Six chapter length case studies on such topics as biopolymers, electric cars, bamboo, and lighting vividly illustrate the sustainable development process from a materials perspective
- Business and economic aspects are covered in chapters on corporate sustainability and the "circular materials economy"
- Support for course use includes online solutions manual and image bank

### DESCRIPTION

This book, from noted materials selection authority Mike Ashby, provides a structure and framework for analyzing sustainable development and the role of materials in it. The aim is to introduce ways of exploring sustainable development to readers in a way that avoids simplistic interpretations and approaches complexity in a systematic way. There is no completely "right" answer to questions of sustainable development – instead, there is a thoughtful, well-researched response that recognizes concerns of stakeholders, the conflicting priorities and the economic, legal and social aspects of a technology as well as its environmental legacy. The intent is not to offer solutions to sustainability challenges but rather to improve the quality of discussion and enable informed, balanced debate.

**ISBN:** 978-0-08-100176-9

**PUB DATE:** January 2015

**FORMAT:** Paperback

**PAGES:** c. 314

### AUDIENCE

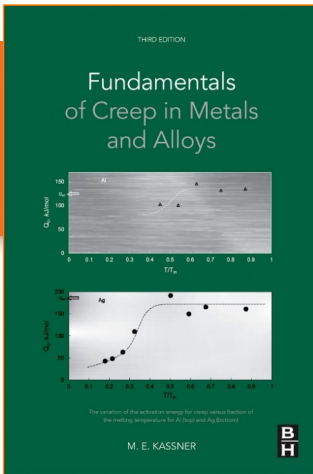
Students of materials science and sustainable engineering at the undergraduate and graduate level, including interdisciplinary courses and programs in sustainability; materials and design engineers

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## Fundamentals of Creep in Metals and Alloys, 3e

*Michael E. Kassner* Department of Aerospace and Mechanical Engineering, University of Southern California, Los Angeles, CA, USA



### KEY FEATURES

- Numerous line drawings with consistent format and units allow easy comparison of the behavior of a very wide range of materials.
- Transmission electron micrographs provide direct insight into the basic microstructure of metals deforming at high temperatures.
- Extensive literature review of about 1000 references provides an excellent overview of the field.

### DESCRIPTION

Although the present edition of *Fundamentals of Creep in Metals and Alloys* remains broadly up to date for metals, there are a range of improvements and updates that are either desirable, or required, in order to ensure that the book continues to meet the needs of researchers and scholars in the general area of creep plasticity. Besides updating the areas currently covered in the second edition with recent advances, the third edition will broaden its scope beyond metals and alloys to include ceramics, covalent solids, minerals and polymers, thus addressing the fundamentals of creep in *all* basic classes of materials.

**ISBN:** 978-0-08-099427-7

**PREVIOUS EDITION ISBN:**  
978-0-08-047561-5

**PUB DATE:** January 2015

**FORMAT:** Hardback

**PAGES:** c. 338

#### AUDIENCE

Researchers and practitioners including metallurgists, ceramists, industrial designers, aerospace R&D personnel, and structural engineers from a wide range of fields and industry sectors.

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# LAMINAR COMPOSITES

GEORGE H. STAAB



**ISBN:** 978-0-12-802400-3

**PREVIOUS EDITION ISBN:**  
978-0-7506-7124-8

**PUB DATE:** September 2015

**FORMAT:** Hardback

**PAGES:** c. 456

#### **AUDIENCE**

Senior undergraduate and graduate courses, and professional engineers in Mechanical, Civil and Aerospace Engineering and Materials Science.

## Laminar Composites, 2e

*George Staab* Faculty Emeritus, Mechanical & Aerospace Engineering,  
Ohio State University



**The leading reference text for this important class of composite materials – brought fully up-to-date and extended with the addition of key advanced topics.**

#### **KEY FEATURES**

- Tutorial style ideal for self-study or use on strength of materials courses (undergraduate and graduate – online solutions manual available)
- A foundational reference work for a class of composite materials of growing commercial importance
- Coverage of test methods and experimental techniques distinguished Staab from the many theory-led books on composites, making it ideal for practicing engineers and courses with a practical emphasis

#### **DESCRIPTION**

This reference text provides students and practicing engineers with the theoretical knowledge and practical skills needed to identify, model, and solve structural analysis problems involving continuous fiber laminated composites. The principles are illustrated throughout with numerous examples and case studies, as well as example problems similar in nature to those found in strength of materials texts. A solutions manual is available. Extensive coverage of test methods and experimental techniques distinguished Staab from the many theory-led books on composites, making it ideal for practicing engineers and courses with a practical emphasis.

The second edition of Laminar Composites is ideal for engineers with a firm understanding of basic structural analysis discovering for the first time the intricacies of orthotropic material behavior and laminate analysis. The fundamental equations required to formulate and assess the behavior of laminated composites are presented in an easy to follow format.

Revised and updated throughout, the second edition also includes three new chapters; beams, plates, shells, each covering aspects such as bending, deformation and vibration accompanied by the relevant equations of equilibrium and motion.

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## Characteristics and Uses of Steel Slag in Building Construction

Ivanka Netinger Grubeša, Ivana Barisic, Aleksandra Fucic and Samitinjay S. Bansode

WP  
WOODHEAD  
PUBLISHING

ISBN: 978-0-08-100976-5

PUB DATE: June 2016

FORMAT: Hardback

PAGES: c. 185

### AUDIENCE

slag/waste management companies, metallurgical industries, government agencies, students, construction materials sector and concrete technologists

### Characteristics and Uses of Steel Slag in Building Construction

*Ivanka Netinger Grubeša* Faculty of Civil Engineering, University of Osijek, Croatia

*Ivana Barisic* Faculty of Civil Engineering, University of Osijek, Croatia

*Aleksandra Fucic* Institute for Medical Research and Occupational Health, Croatia

*Samitinjay Sadashivrao Bansode* Assistant Professor, Civil Engineering, S B Patil College of Engineering, India



**This book provides a state-of-the-art review on the characterization and current utilization of ferrous slag (blast furnace and steel) in building construction**

### KEY FEATURES

- Comprehensively reviews the literature on the use of blast furnace and steel slag in civil engineering
- Examines the environmental impact of slag production and its effect on human health
- Presents cutting-edge research from worldwide studies on the use of blast furnace and steel slag

### DESCRIPTION

Civil engineering is a discipline that has traditionally relied on the exploitation of natural resources. This practice is slowly starting to change, with a move towards the growing application of recycled and alternative construction materials to produce more environmentally friendly buildings. Most of these studies have focused on the use of waste materials to address the problem of waste disposal, and also to preserve natural, non-renewable materials. As a by-product of steel production, slag is classified as a waste material.

*Characteristics and Uses of Steel Slag in Building Construction* focuses predominantly on the utilization of ferrous slag (blast furnace and steel slag) in building construction. This extensive literature review discusses the worldwide utilization of ferrous slag and applications in all sectors of civil engineering: structural engineering, road construction and hydro-technical structures. It presents cutting-edge research on the characteristics and properties of ferrous slag, and its overall impact on the environment.





## Lightweight Ballistic Composites

Military and Law-Enforcement Applications

Second Edition

Edited by Ashok Bhatnagar



**ISBN:** 978-0-08-100406-7

**PREVIOUS EDITION ISBN:**  
978-1-85573-941-3

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 560

### AUDIENCE

Ballistic composite design engineers, product development engineers, sales and marketing people promoting new products for the defense and law-enforcement industries

## Lightweight Ballistic Composites, 2e

*Military and Law-Enforcement Applications*

Edited by: *A Bhatnagar* Honeywell International Inc., USA



**A fully revised and updated edition that provides a comprehensive review of the current use of lightweight ballistic composites in both military and law-enforcement applications**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Gives comprehensive coverage on all aspects of lightweight ballistic composites, from fiber manufacturing, to commercial products and testing
- Discusses the wider applications of lightweight ballistic composites in military and law-enforcement industries
- Edited by a highly respected industry expert with over thirty years' experience developing lightweight composite ballistic materials and products

### DESCRIPTION

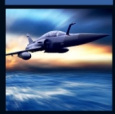
*Lightweight Ballistic Composites: Military and Law-Enforcement Applications, Second Edition*, is a fully revised and updated version of this informative book that explores the many changes in composite materials technology that have occurred since the book's first release in 2008, especially the type of commercial products used by armed forces around the world.

Some changes can be attributed to the wars in Iraq and Afghanistan, whereas others are due to massive investment by private companies to neutralize the ever-increasing global threats and fulfill the military's appetite for lighter materials. Soldiers are now better protected against new ballistic threats and the overall weight of body protection has been reduced, while comfort has increased.

New military vehicles are no longer purely armored with steel, and are instead lined with lightweight ballistic materials that increase the distance military vehicles can travel without refueling and also improve maneuverability. The book considers all aspects of lightweight ballistic composites from fiber manufacturing to commercial products and testing.

Chapters also cover the many uses of lightweight ballistic composites in the military and law-enforcement industries. It will be an invaluable reference for ballistic composite design engineers, product development engineers, and all those involved in promoting new products for both defense and the law-enforcement industry.





## Advanced Composite Materials for Aerospace Engineering

Edited by Sohel Rana and Raul Figueiro



**ISBN:** 978-0-08-100939-0

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 464

### AUDIENCE

R&D managers and engineers in aerospace; researchers working in industry, academia and government research agencies developing composite materials for aerospace structures; materials scientists and engineers currently working in the field or students doing selected courses on advanced composite or aerospace materials.

## Advanced Composite Materials for Aerospace Engineering

### *Processing, Properties and Applications*

Edited by: *Sohel Rana* Fibrous Materials Research Group, School of Engineering, University of Minho, Portugal

*Raul Figueiro* Fibrous Materials Research Group, School of Engineering, University of Minho, Portugal



**As a comprehensive resource on the use of advanced composite materials in the aerospace industry, this book focuses on the use of advanced composite materials in aerospace engineering, discussing both the basic and advanced requirements of these materials for various applications and the main types of commercial composites that are reviewed and compared to those of metals**

### KEY FEATURES

- Contains contributions from leading experts in the field
- Provides a comprehensive resource on the use of advanced composite materials in the aerospace industry
- Discusses both existing commercial composite materials and those currently under research or development

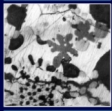
### DESCRIPTION

*Advanced Composite Materials for Aerospace Engineering: Processing, Properties and Applications* predominately focuses on the use of advanced composite materials in aerospace engineering. It discusses both the basic and advanced requirements of these materials for various applications in the aerospace sector, and includes discussions on all the main types of commercial composites that are reviewed and compared to those of metals.

Various aspects, including the type of fibre, matrix, structure, properties, modeling, and testing are considered, as well as mechanical and structural behavior, along with recent developments. There are several new types of composite materials that have huge potential for various applications in the aerospace sector, including nanocomposites, multiscale and auxetic composites, and self-sensing and self-healing composites, each of which is discussed in detail.

The book's main strength is its coverage of all aspects of the topics, including materials, design, processing, properties, modeling and applications for both existing commercial composites and those currently under research or development. Valuable case studies provide relevant examples of various product designs to enhance learning.





## Materials Characterization Using Nondestructive Evaluation (NDE) Methods

Edited by Gerhard Huebschen, Iris Altpeter, Ralf Tschuncky and Hans-Georg Herrmann



ISBN: 978-0-08-100040-3

PUB DATE: April 2016

FORMAT: Hardback

PAGES: c. 260

### AUDIENCE

civil, structural and mechanical engineers, materials scientists, physicists developing characterization techniques, and R&D managers in the automotive and aerospace and power generation industry.

## Materials Characterization Using Nondestructive Evaluation (NDE) Methods

Edited by: **Gerhard Huebschen** formerly of the Fraunhofer Institute for Nondestructive Testing (IZFP), Germany

**Iris Altpeter** formerly of the Fraunhofer Institute for Nondestructive Testing (IZFP), Germany

**Ralf Tschuncky** The Fraunhofer Institute for Nondestructive Testing (IZFP), Germany

**Hans-Georg Herrmann** Saarland University, Germany; the Fraunhofer Institute for Nondestructive Testing (IZFP), Germany



**This valuable resource provides an overview of established and new nondestructive testing (NDT) techniques for both long-term monitoring and short-term assessment and characterization of materials, focusing on methods and materials with applications in the automotive, aerospace, power, and infrastructure construction industries**

### KEY FEATURES

- Gives an overview of established and new NDT techniques, including scanning and transmission electron microscopy, X-ray microtomography and diffraction, ultrasonic, electromagnetic, microwave, and hybrid techniques
- Reviews the determination of microstructural and mechanical properties
- Focuses on materials used in the automotive, aerospace, power plants, and infrastructure construction industries
- Serves as a highly desirable resource for both long-term monitoring and short-term assessment of materials

### DESCRIPTION

*Materials Characterization Using Nondestructive Evaluation (NDE) Methods* discusses NDT methods and how they are highly desirable for both long-term monitoring and short-term assessment of materials, providing crucial early warning that the fatigue life of a material has elapsed, thus helping to prevent service failures.

*Materials Characterization Using Nondestructive Evaluation (NDE) Methods* gives an overview of established and new NDT techniques for the characterization of materials, with a focus on materials used in the automotive, aerospace, power plants, and infrastructure construction industries.

Each chapter focuses on a different NDT technique and indicates the potential of the method by selected examples of applications. Methods covered include scanning and transmission electron microscopy, X-ray microtomography and diffraction, ultrasonic, electromagnetic, microwave, and hybrid techniques. The authors review both the determination of microstructure properties, including phase content and grain size, and the determination of mechanical properties, such as hardness, toughness, yield strength, texture, and residual stress.





## Structural Health Monitoring (SHM) in Aerospace Structures

Edited by F.-G. Yuan

WP

**ISBN:** 978-0-08-100148-6

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 560

### AUDIENCE

R&D managers and engineers in aerospace; researchers working in industry, academia and government research agencies developing new systems for the SHM of aerospace structures, materials scientists.

## Structural Health Monitoring (SHM) in Aerospace Structures

Edited by: *Fuh-Gwo Yuan* Professor, Department of Mechanical and Aerospace Engineering, North Carolina State University, USA



**As an insight into structural health monitoring (SHM) techniques and its application to aircraft structures that includes a particular emphasis on composite materials, this book provides readers with information on the spectacular progress that has taken place over the last twenty years, including such transdisciplinary areas as smart materials, sensors and actuator, and damage diagnosis and prognosis, amongst others**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Provides key information on the potential of SHM in reducing maintenance and repair costs
- Analyzes current SHM technologies and sensing systems, highlighting the innovation in each area
- Encompasses chapters on smart materials such as electroactive polymers and optical fibers

### DESCRIPTION

*Structural Health Monitoring (SHM) in Aerospace Structures* provides readers with the spectacular progress that has taken place over the last twenty years with respect to the area of Structural Health Monitoring (SHM). The widespread adoption of SHM could both significantly improve safety and reduce maintenance and repair expenses that are estimated to be about a quarter of an aircraft fleet's operating costs.

The SHM field encompasses transdisciplinary areas, including smart materials, sensors and actuators, damage diagnosis and prognosis, signal and image processing algorithms, wireless intelligent sensing, data fusion, and energy harvesting. This book focuses on how SHM techniques are applied to aircraft structures with particular emphasis on composite materials, and is divided into four main parts.

Part One provides an overview of SHM technologies for damage detection, diagnosis, and prognosis in aerospace structures. Part Two moves on to analyze smart materials for SHM in aerospace structures, such as piezoelectric materials, optical fibers, and flexoelectricity. In addition, this also includes two vibration-based energy harvesting techniques for powering wireless sensors based on piezoelectric electromechanical coupling and diamagnetic levitation. Part Three explores innovative SHM technologies for damage diagnosis in aerospace structures. Chapters within this section include sparse array imaging techniques and phase array techniques for damage detection. The final section of the volume details innovative SHM technologies for damage prognosis in aerospace structures.

This book serves as a key reference for researchers working within this industry, academic, and government research agencies developing new systems for the SHM of aerospace structures and materials scientists.





## Corrosion of Steel in Concrete Structures

Edited by A. Poursaei



**ISBN:** 978-1-78242-381-2

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 296

### AUDIENCE

Researchers, practitioners and engineers who are involved in materials characterisation and corrosion of steel in concrete structures. The book will also be essential reading for undergraduate and postgraduate-level courses in infrastructure corrosion.

## Corrosion of Steel in Concrete Structures

Edited by: *Amir Poursaei* Assistant Professor, Glenn Department of Civil Engineering, Clemson University, USA



**As the corrosion of reinforcing steel is recognized as a major cause of degradation in concrete structures, this book provides a comprehensive review of the subject, as well as analysis of the major advances and technological developments that have taken place in recent years regarding the topic and its indisputable societal and economic importance**

A Volume in the Woodhead Publishing Series in Civil and Structural Engineering.

### KEY FEATURES

- Provides comprehensive coverage on a broad range of topics related to the corrosion of steel bars in concrete
- Discusses the latest measuring methods and advanced modeling techniques
- Reviews the range of reinforcing materials and types of concrete

### DESCRIPTION

Corrosion of reinforcing steel is now recognized as the major cause of degradation of concrete structures in many parts of the world. Despite this, infrastructure expenditure is being unreasonably decreased by sequestration and the incredible shrinking discretionary budget. All components of our infrastructure including highways, airports, water supply, waste treatment, energy supply, and power generation require significant investment and are subjected to degradation by corrosion, which significantly reduces the service life, reliability, functionality of structures and equipment, and safety. *Corrosion of Steel in Concrete Structures* provides a comprehensive review of the subject, in addition to recent advances in research and technological developments, from reinforcing materials to measurement techniques and modelling.

This book contains not only all the important aspects in the field of corrosion of steel reinforced concrete but also discusses new topics and future trends. Part One of the book tackles theoretical concepts of corrosion of steel in concrete structures. The second part moves on to analyse the variety of reinforcing materials and concrete, including stainless steel and galvanized steel. Part Three covers measurements and evaluations, such as electrochemical techniques and acoustic emission. Part Four reviews protection and maintenance methods, whilst the final section analyses modelling, latest developments and future trends in the field.

The book is essential reading for researchers, practitioners and engineers who are involved in materials characterisation and corrosion of steel in concrete structures.





## Textile Fibre Composites in Civil Engineering

Edited by T. C. Triantafillou



**ISBN:** 978-1-78242-446-8

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 452

### AUDIENCE

Researchers, academics, practitioners and students working in civil and structural engineering and advanced construction materials.

## Textile Fibre Composites in Civil Engineering

Edited by: *Thanasis Triantafillou* Professor, Department of Civil Engineering, University of Patras, Greece



**This book provides an overview of the developments in the use of textile fiber composites in civil engineering, with a particular focus on both new and existing structures, all presented by leading experts in the field who review materials, production technologies, fundamental properties, testing, design aspects, applications, and directions for future research and developments**

A Volume in the Woodhead Publishing Series in Civil and Structural Engineering.

### KEY FEATURES

- Details the range of materials and production technologies used in textile fiber composites
- Analyzes the durability of textile fiber composites, including case studies into the structural behavior of textile reinforced concrete
- Reviews the processes involved in strengthening existing concrete structures

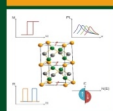
### DESCRIPTION

*Textile Fibre Composites in Civil Engineering* provides a state-of-the-art review from leading experts on recent developments, the use of textile fiber composites in civil engineering, and a focus on both new and existing structures. Textile-based composites are new materials for civil engineers. Recent developments have demonstrated their potential in the prefabrication of concrete structures and as a tool for both strengthening and seismic retrofitting of existing concrete and masonry structures, including those of a historical value.

The book reviews materials, production technologies, fundamental properties, testing, design aspects, applications, and directions for future research and developments. Following the opening introductory chapter, Part One covers materials, production technologies, and the manufacturing of textile fiber composites for structural and civil engineering. Part Two moves on to review testing, mechanical behavior, and durability aspects of textile fiber composites used in structural and civil engineering. Chapters here cover topics such as the durability of structural elements and bond aspects in textile fiber composites.

Part Three analyzes the structural behavior and design of textile reinforced concrete. This section includes a number of case studies providing thorough coverage of the topic. The final section of the volume details the strengthening and seismic retrofitting of existing structures. Chapters investigate concrete and masonry structures, in addition to providing information and insights on future directions in the field. The book is a key volume for researchers, academics, practitioners, and students working in civil and structural engineering and those working with advanced construction materials.





**Rare Earth and Transition Metal Doping of Semiconductor Materials: Synthesis, Magnetic Properties and Room Temperature Spintronics**

Edited by V. Dierolf, I. Ferguson and J. M. Zavada



**ISBN:** 978-0-08-100041-0

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 460

**AUDIENCE**

Postgraduate students, scientists, applied researchers and production engineers working in the fabrication, design, testing, characterization and analysis of new semiconductor materials for spintronics applications.

**Rare Earth and Transition Metal Doping of Semiconductor Materials**

***Synthesis, Magnetic Properties and Room Temperature Spintronics***

Edited by: **Volkmar Dierolf** Chair of the Physics Department, Lehigh University, Bethlehem, PA, USA

**Ian Ferguson** Chair of Electrical and Computer Engineering, University of North Carolina, Charlotte, NC, USA

**John M Zavada** Program Director for the NSF in the area of Electronics, Photonics, and Magnetic Devices



**This book provides a thorough exploration of the semiconductor materials used for spintronics applications, with a specific focus on wide band-gap semiconductors doped with transition metals and rare earths**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

**KEY FEATURES**

- Examines materials which are of commercial interest for producing smaller, faster, and more power-efficient computers and other devices
- Analyzes the theory behind magnetism in semiconductors and the growth of semiconductors for spintronics
- Details the properties of semiconductors for spintronics

**DESCRIPTION**

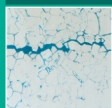
*Rare Earth and Transition Metal Doping of Semiconductor Material* explores traditional semiconductor devices that are based on control of the electron's electric charge.

This book looks at the semiconductor materials used for spintronics applications, in particular focusing on wide band-gap semiconductors doped with transition metals and rare earths. These materials are of particular commercial interest because their spin can be controlled at room temperature, a clear opposition to the most previous research on Gallium Arsenide, which allowed for control of spins at supercold temperatures.

Part One of the book explains the theory of magnetism in semiconductors, while Part Two covers the growth of semiconductors for spintronics. Finally, Part Three looks at the characterization and properties of semiconductors for spintronics, with Part Four exploring the devices and the future direction of spintronics.







European Federation of  
Corrosion Publications  
Number 67

## Stress Corrosion Cracking of Nickel-based Alloys in Water-cooled Nuclear Reactors

The Coriou Effect

Edited by Damien FERON and Roger W. Staehle



ISSN 1354-5116

**ISBN:** 978-0-08-100049-6

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 368

### AUDIENCE

Nuclear metallurgists, materials scientists and engineers, nuclear facility operators and regulators, consultants, researchers and academics working in this field.

## Stress Corrosion Cracking of Nickel Based Alloys in Water-Cooled Nuclear Reactors

### *The Coriou Effect*

Edited by: **Damien FERON** National Institute for Nuclear Science and  
Technology (INSTN), France

**Roger W Staehle** Formerly University of Minnesota, USA



**This comprehensive book reviews the mechanisms of stress corrosion cracking (SCC) in nickel alloys used in water-cooled nuclear reactors**

### KEY FEATURES

- Up-to-date reviews of recent research findings from leading experts in the field
- Authoritative and comprehensively reviewed by the Working Party 4 on Nuclear Corrosion
- Showcases the excellent quality and technical accomplishments of Henri Coriou and CEA

### DESCRIPTION

*Stress Corrosion Cracking of Nickel Based Alloys in Water-Cooled Nuclear Reactors: The Coriou Effect* presents the latest information on brittle failure of metals in corrosive chemical environments under the influence of tensile stresses.

Nickel alloys are more resistant to SCC as well as high temperatures and have been widely used in more challenging environments such as nuclear power plants. However, these alloys can suffer SCC under certain conditions, resulting in component failure. A key figure in understanding the mechanisms of SCC in nickel alloys in water-cooled nuclear reactors is Henri Coriou of the CEA, France's leading center for nuclear research. This book assesses his work in the context of the latest research on SCC in nickel alloys in nuclear power plants.





## Lightweight Composite Structures in Transport

Design, Manufacturing, Analysis and Performance

Edited by James Njuguna



## Lightweight Composite Structures in Transport

*Design, Manufacturing, Analysis and Performance*

Edited by: *James Njuguna* Centre for Automotive Technology, Cranfield University, UK



**This book presents a review of lightweight composite materials and structures and their use in the transport industry**

### KEY FEATURES

- Comprehensively covers materials selection, design solutions, manufacturing techniques, structural analysis, and performance of lightweight composite structures in the transport industry
- Includes commentary from leading industrial and academic experts in the field who present cutting-edge research on advanced lightweight materials for the transport industry
- Includes case studies on lightweight composite design for transport structures

### DESCRIPTION

*Lightweight Composite Structures in Transport: Design, Manufacturing, Analysis and Performance* provides a detailed review of lightweight composite materials and structures and discusses their use in the transport industry, specifically surface and air transport. The book covers materials selection, the properties and performance of materials, and structures, design solutions, and manufacturing techniques.

A broad range of different material classes is reviewed with emphasis on advanced materials. Chapters in the first two parts of the book consider the lightweight philosophy and current developments in manufacturing techniques for lightweight composite structures in the transport industry, with subsequent chapters in parts three to five discussing structural optimization and analysis, properties, and performance of lightweight composite structures, durability, damage tolerance and structural integrity. Final chapters present case studies on lightweight composite design for transport structures.

**ISBN:** 978-1-78242-325-6

**PUB DATE:** February 2016

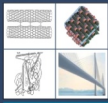
**FORMAT:** Hardback

**PAGES:** c. 454

### AUDIENCE

R&D managers, designers, materials engineers and manufacturers in the aerospace, motorsport, defence and automotive engineering industries will find this an invaluable reference book.





## Innovative Developments of Advanced Multifunctional Nanocomposites in Civil and Structural Engineering

Edited by Kenneth J. Loh and Satish Nagarajaiah



**ISBN:** 978-1-78242-326-3

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 360

### AUDIENCE

Managers, research scientists and engineers working in materials science and nanotechnology in both industry and academia and civil and structural engineers.

## Innovative Developments of Advanced Multifunctional Nanocomposites in Civil and Structural Engineering

Edited by: **Kenneth Loh** Director of CITRIS, UC Davis and Associate Professor, Department of Civil & Environmental Engineering, University of California, Davis, USA

**Satish Nagarajaiah** Professor, Civil Engineering and Mechanical Engineering, Rice University, Houston, TX, USA



**This comprehensive book provides an essential reference tool on the innovative developments in advanced nanocomposites and integration of nanomaterials in both civil and structural engineering, presenting the main challenges associated with the integration of nanomaterials and nano-scale design principles in these disciplines**

A Volume in the Woodhead Publishing Series in Civil and Structural Engineering.

### KEY FEATURES

- Examines nanotechnology and its application to not only structural engineering, but also transportation, new infrastructure materials, and the applications of nanotechnology to existing structural systems
- Focuses on how nanomaterials can provide enhanced sensing capabilities and mechanical reinforcement of the original structural material
- Analyzes experimental and computational work carried out by world-renowned researchers

### DESCRIPTION

*Innovative Developments of Advanced Multifunctional Nanocomposites in Civil and Structural Engineering* focuses on nanotechnology, the innovation and control of materials at 100 nm or smaller length scales, and how they have revolutionized almost all of the various disciplines of science and engineering study.

In particular, advances in synthesizing, imaging, and manipulating materials at the nano-scale have provided engineers with a broader array of materials and tools for creating high-performance devices. Nanomaterials possess drastically different properties than those of their bulk counterparts mainly because of their high surface-to-mass ratios and high surface energies/reactivity. For instance, carbon nanotubes have been shown to possess impressive mechanical strength, stiffness, and electrical conductivity superior to that of bulk carbon.

Whilst nanotechnology has become deeply rooted in electrical, chemical, and materials engineering disciplines, its proliferation into civil engineering did not begin until fairly recently. This book covers that proliferation and the main challenges associated with the integration of nanomaterials and nano-scale design principles into civil and structural engineering.





## Nonconventional and Vernacular Construction Materials

Characterisation, Properties and Applications

Edited by Kent A. Harries and Bhavna Sharma



**ISBN:** 978-0-08-100871-3

**PUB DAT:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 510

### AUDIENCE

Engineers, architects, material scientists, academics and postgraduate students interested in nonconventional materials

## Nonconventional and Vernacular Construction Materials *Characterisation, Properties and Applications*

Edited by: **Kent A Harries** Associate Professor of Structural Engineering and Mechanics, Department of Civil and Environmental Engineering, University of Pittsburgh, PA, USA

**Bhavna Sharma** Senior Research Associate, Department of Architecture, University of Cambridge, UK



Through a thorough review of materials science and the modern structural engineering applications of ancient, vernacular, and nonconventional building materials, this book provides a comprehensive repository of information on the topic, with leading experts contributing chapters that focus on current applications and the engineering of these construction materials

### KEY FEATURES

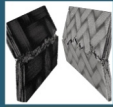
- Provides a state-of-the-art review of the modern use and engineering of nonconventional building materials
- Contains chapters that focus on individual construction materials and address both material characterization and structural applications
- Covers sustainable engineering and the trend towards engineering for humanity

### DESCRIPTION

*Nonconventional and Vernacular Construction Materials: Characterisation, Properties and Applications* provides a comprehensive repository of information on materials science and the modern structural engineering application of ancient, vernacular, and nonconventional building materials, with leading experts contributing chapters that focus on current applications and the engineering of these construction materials.

Opening with a historic retrospective of nonconventional materials, Part One includes a review of vernacular construction and a discussion of the future directions for nonconventional and vernacular materials research and applications. Chapters in Part Two focus on natural fibers, including their application in cementitious composites, non-cementitious composites, and strawbale construction. In Part Three, chapters cover the use of industrial by-products and natural ashes in cement mortar and concrete, and construction using soil-cement blocks, clay-based materials, adobe and earthen materials, and ancient stone masonry. Timber, bamboo, and paper construction materials are investigated in the final section of the book.





## Dynamic Deformation, Damage and Fracture in Composite Materials and Structures

Edited by Vadim V. Silberschmidt



## Dynamic Deformation, Damage and Fracture in Composite Materials and Structures

Edited by: **Vadim Silberschmidt** Professor, Chair of Mechanics of Materials, Associate Dean (Research), ICoVIS Director, and Head of the Mechanics of Advanced Materials Research Group, Loughborough University, UK



**Reviews of state-of-the-art studies of various aspects of dynamic deformation, damage and fracture, mostly in laminates and sandwich structures because of their ubiquity in applications, current and future**

### KEY FEATURES

- Examines dynamic deformation and fracture of composite materials
- Covers experimental, analytical and numerical aspects
- Addresses important application areas such as aerospace, automotive, wind energy and defence, with a special section on sport applications

### DESCRIPTION

Composite materials, with their higher exposure to dynamic loads, have increasingly been used in aerospace, naval, automotive, sports and other sectors over the last few decades. *Dynamic Deformation, Damage and Fracture in Composite Materials and Structures* reviews various aspects of dynamic deformation, damage and fracture, mostly in composite laminates and sandwich structures, in a broad range of application fields including aerospace, automotive, defense and sports engineering.

As the mechanical behavior and performance of composites varies under different dynamic loading regimes and velocities, the book is divided into sections that examine the different loading regimes and velocities. Part one examine low-velocity loading and part two looks at high-velocity loading. Part three then assesses shock and blast (i.e. contactless) events and the final part focuses on impact (contact) events. As sports applications of composites are linked to a specific subset of dynamic loading regimes, these applications are reviewed in the final part.

**ISBN:** 978-0-08-100870-6

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 600

### AUDIENCE

R&D industry specialists in the aerospace, automotive, wind energy, defense and sports engineering sectors, and researchers and postgraduate students in these fields





# Advanced Fibrous Composite Materials for Ballistic Protection

Edited by Xiaogang Chen

WP  
WOODHEAD  
PUBLISHING

**ISBN:** 978-1-78242-461-1

**PUB DATE:** January 2016

**FORMAT:** Hardback

**PAGES:** c. 532

## AUDIENCE

Materials scientists and textile technologists, ballistic scientists, manufacturers and engineers and all those working in ballistics technology in university, industry and government including national defence research.

## Advanced Fibrous Composite Materials for Ballistic Protection

Edited by: *Xiaogang Chen* University of Manchester, UK



**An overview of cutting edge developments in innovative ballistic fabrics engineering and the design, manufacture, testing, and analysis of their ballistic performance**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Contributions from leading experts in the field
- Cutting edge developments on the engineering of ballistic materials
- Comprehensive analysis of the development and uses of advanced fibrous composite materials

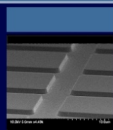
### DESCRIPTION

*Advanced Fibrous Composite Materials for Ballistic Protection* provides the latest information on ballistic protection, a topic that remains an important issue in modern times due to ever increasing threats coming from regional conflicts, terrorism, and anti-social behavior.

The basic requirements for ballistic protection equipment are first and foremost, the prevention of a projectile from perforating, the reduction of blunt trauma to the human body caused by ballistic impact, the necessity that they are thermal and provide moisture comfort, and that they are lightweight and flexible to guarantee wearer's mobility.

The main aim of this book is to present some of the most recent developments in the design and engineering of woven fabrics and their use as layering materials to form composite structures for ballistic personal protection. Chapter topics include High Performance Ballistic Fibres, Ultra-High Molecular Weight Polyethylene (UHMWPE), Ballistic Damage of Hybrid Composite Materials, Analysis of Ballistic Fabrics and Layered Composite Materials, and Multi-Scale Modeling of Polymeric Composite Materials for Ballistic Protection.





# Fundamentals and Applications of Nanophotonics

Edited by Joseph W. Haus

WP  
WOODHEAD  
PUBLISHING

## Fundamentals and Applications of Nanophotonics

Edited by: *Joseph W. Haus* University of Dayton, OH, USA



**A thorough guide to the theoretical underpinnings of the latest advances in the growing field of nanophotonics, including application domains such as ICT, the environment, healthcare, military, transport, manufacturing, and energy**

### KEY FEATURES

- Covers electrodynamics, quantum mechanics and computation as these relate to nanophotonics
- Reviews materials, fabrication and characterization techniques for nanophotonics
- Describes applications of the technology such as lasers, LEDs and photodetectors

### DESCRIPTION

*Fundamentals and Applications of Nanophotonics* includes a comprehensive discussion of the field of nanophotonics, including key enabling technologies that have the potential to drive economic growth and impact numerous application domains such as ICT, the environment, healthcare, military, transport, manufacturing, and energy.

This book gives readers the theoretical underpinnings needed to understand the latest advances in the field. After an introduction to the area, chapters two and three cover the essential topics of electrodynamics, quantum mechanics, and computation as they relate to nanophotonics.

Subsequent chapters explore materials for nanophotonics, including nanoparticles, photonic crystals, nanosilicon, nanocarbon, III-V, and II-VI semiconductors. In addition, fabrication and characterization techniques are addressed, along with the importance of plasmonics, and the applications of nanophotonics in devices such as lasers, LEDs, and photodetectors.

**ISBN:** 978-1-78242-464-2

**PUB DATE:** January 2016

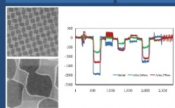
**FORMAT:** Hardback

**PAGES:** c. 408

### AUDIENCE

academics and postgraduate students in photonics, optics and nanoscience as well as those working industrially in nanotechnology, photonics, microelectronics, nanoelectronics, semiconductors, sensors, lasers, optical materials and devices, biology and nanomaterials.





## Advances in Chemical Mechanical Planarization (CMP)

Edited by Suryadevara Babu



**ISBN:** 978-0-08-100165-3

**PUB DATE:** January 2016

**FORMAT:** Hardback

**PAGES:** c. 512

### AUDIENCE

postgraduate students and academic researchers in electronics, semiconductors and nanotechnology, physics, chemistry, materials science and engineering; R&D managers or design and test engineers in industrial sectors such as semiconductors, integrated circuits, memory devices, MEMS, and nanoelectronics.

## Advances in Chemical Mechanical Planarization (CMP)

Suryadevara Babu Clarkson University, Potsdam, NY, USA



**This comprehensive book on chemical mechanical planarization provides a presentation of the fundamentals and advances in CMP and the latest techniques in the science**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

- Considers techniques and processes for CMP of dielectric and metal films
- Includes chapters devoted to CMP for particular materials
- Addresses consumables and process control for improved CMP

### DESCRIPTION

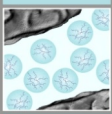
*Advances in Chemical Mechanical Planarization (CMP)* provides the latest information on a mainstream process that is critical for high-volume, high-yield semiconductor manufacturing, and even more so as device dimensions continue to shrink. The technology has grown to encompass the removal and planarization of multiple metal and dielectric materials and layers both at the device and the metallization levels, using different tools and parameters, requiring improvements in the control of topography and defects.

This important book offers a systematic review of fundamentals and advances in the area. Part One covers CMP of dielectric and metal films, with chapters focusing on the use of particular techniques and processes, and on CMP of particular various materials, including ultra low-k materials and high-mobility channel materials, and ending with a chapter reviewing the environmental impacts of CMP processes.

Part Two addresses consumables and process control for improved CMP, and includes chapters on the preparation and characterization of slurry, diamond disc pad conditioning, the use of FTIR spectroscopy for characterization of surface processes, and approaches for deflection characterization, mitigation, and reduction.







## Biopolymers and Biotech Admixtures for Eco-Efficient Construction Materials

Edited by Fernando Pacheco-Torgal, Volodymyr Ivanov, Niranjan Karak and Henk Jonkers



ISBN: 978-0-08-100214-8

PUB DATE: January 2016

FORMAT: Hardback

PAGES: c. 444

### AUDIENCE

Civil and construction engineers, architects and materials scientists, producers of biopolymer modified cement-based materials.

## Biopolymers and Biotech Admixtures for Eco-Efficient Construction Materials

Edited by: **Fernando Pacheco-Torgal** University of Minho, Portugal  
**Volodymyr Ivanov** Nanyang Technological University, Singapore  
**Niranjan Karak** Tezpur University, India  
**Henk Jonkers** Department of Structural Engineering, Section of Materials & Environment, Delft University of Technology, Delft, NL



**This book provides an updated state of the art review on the use of biopolymers and biotech admixtures in eco-efficient construction materials**

A Volume in the Woodhead Publishing Series in Civil and Structural Engineering.

*"The book provides basic concepts, production aspects and environmental impact assessment on the use of biopolymers and biotech admixtures ... It provides new knowledge, is well structured, really up-to-date, and has an enormous number of references."*

**Professor Lech Czarnecki, Building Research Institute, Poland (from the foreword)**

### KEY FEATURES

- Provides essential knowledge for researchers and producers working on the development of biopolymer-modified construction materials
- Discusses the various types of biopolymers currently available, their different production techniques, their use as bio-admixtures in concretes and mortars and applications in other areas of civil engineering such as soil stability, wood preservation, adhesives and coatings
- All contributions are made from leading researchers, who have intensive involvement in the design and use of biopolymers in construction materials

### DESCRIPTION

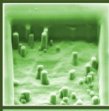
Since 1930 more than 100,000 new chemical compounds have been developed and insufficient information exists on the health assessment of 95 percent of these chemicals in which a relevant percentage are used in construction products. For instance Portland cement concrete, the most used material on the Planet (10.000 million tons/year that in the next 40 years will increase around 100 %) currently used in around 15% of total concrete production contains chemicals used to modify their properties, either in the fresh or hardened state.

Biopolymers are materials that are developed from natural resources. They reduce dependence on fossil fuels and reduce carbon dioxide emissions. There is a worldwide demand to replace petroleum-based materials with renewable resources.

Currently bio-admixtures represent just a small fraction of the chemical admixtures market (around 20%) but with environmental awareness for constituents in construction materials generally growing (the Construction Products Regulation is being enforced in Europe since 2013), the trend towards bio-admixtures is expected to continue.

This book provides an updated state-of-the-art review on biopolymers and their influence and use as admixtures in the development of eco-efficient construction materials.





## Smart Composite Coatings and Membranes

Transport, Structural, Environmental and Energy Applications

Edited by M. F. Montemor



**ISBN:** 978-1-78242-283-9

**PUB DATE:** November 2015

**FORMAT:** Hardback

**PAGES:** c. 470

### AUDIENCE

industry professionals in coatings and steel companies and R&D managers in industrial sectors such as chemical and mechanical engineering, materials science and materials chemistry, as well as academics and students with an interest in this field

## Smart Composite Coatings and Membranes

### Transport, Structural, Environmental and Energy Applications

Edited by: *M F Montemor* Professor, Department of Chemical Engineering, Instituto Superior Técnico, Portugal



**This book provides a comprehensive examination of recent developments in smart composite materials and their use in various technological applications, including energy generation and storage, water management, and stone conservation**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Explores the use of smart composite materials for coatings, barriers and membranes
- Comprehensively reviews the latest developments in smart composite materials, with a special focus on corrosion protection, transportation, structure, and the wide range of applications
- Examines the properties, processing, manufacture and behavior modeling of smart composite materials
- Focuses on applications that have an impact on more effective energy savings and efficiency, green-house emissions, and environmental protection

### DESCRIPTION

*Smart Composite Coatings and Membranes: Transport, Structural, Environmental and Energy Applications* provides the latest information on the increase in demand for new smart materials for a wide array of different technological applications.

The book comprehensively reviews the latest developments in smart composite materials used as membranes, barriers, and coatings, with a special focus on corrosion protection, transportation, structure, and the wide range of applications.

Part one examines the properties, processing, and manufacture of smart composite materials, along with techniques for modeling the behavior of these materials, while other sections review the use of smart composite coatings in aerospace, marine, and metal structural applications, examine the protective properties and applications of smart composite coatings, and introduce specific low environmental impact and energy efficient applications, such as energy generation and storage, water management, and stone conservation.





## Science and Technology of Concrete Admixtures

Edited by Pierre-Claude Aitcin and Robert J Flatt



**ISBN:** 978-0-08-100693-1

**PUB DATE:** November 2015

**FORMAT:** Hardback

**PAGES:** c. 614

### AUDIENCE

Engineers, specifiers and chemists working in the construction materials industries, as well as academics, materials scientists and graduate-level students attending courses on civil engineering and materials chemistry and engineering.

## Science and Technology of Concrete Admixtures

Edited by: *Pierre-Claude Aitcin* Professor Emeritus, Dept. of Civil Engineering, Faculty of Engineering, Université de Sherbrooke, Quebec, Canada

*Robert J Flatt* Professor of Building Materials, ETH Zürich, Switzerland



**This book discusses admixtures both from the theoretical and practical point-of-view. In particular, the authors emphasize key concepts that can be used to better understand the working mechanisms of these products and how to optimally use them in concrete.**

### KEY FEATURES

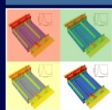
- Combines the knowledge of two leading authors to present both the scientific and technology of admixtures
- Explains what admixtures are from a chemical point-of-view and illustrates by which mechanisms they modify the properties of fresh and hardened concrete
- Presents a fundamental, practical, and innovative reference book on the topic
- Contains three detailed appendices that can be used to learn how to use admixtures more efficiently

### DESCRIPTION

Science and Technology of Concrete Admixtures presents admixtures from both a theoretical and practical point-of-view. The authors emphasize key concepts that can be used to better understand the working mechanisms of these products by presenting a concise overview on the fundamental behavior of Portland cement and hydraulic binders as well as their chemical admixtures, also discussing recent effects in concrete in terms of rheology, mechanics, durability, and sustainability, but never forgetting the fundamental role played by the water/binder ratio and proper curing in concrete technology.

Part One presents basic knowledge on Portland cement and concrete, while Part Two deals with the chemical and physical background needed to better understand what admixtures are chemically, and through which mechanism they modify the properties of the fresh and hardened concrete. Subsequent sections present discussions on admixtures technology and two particular types of concrete, self-consolidating and ultra-high strength concretes, with final remarks on their future.





## Photodetectors

Materials, Devices  
and Applications

Edited by Bahram Nabet



**ISBN:** 978-1-78242-445-1

**PUB DATE:** late October 2015

**FORMAT:** Hardback

**PAGES:** c. 530

### AUDIENCE

postgraduate students and academic researchers in electronics, optics, photonics, sensors, physics, material science and engineering; R&D managers in industrial sectors such as communications, medical imaging and photovoltaics

## Photodetectors

*Materials, Devices and Applications*

Bahram Nabet Drexel University, Philadelphia, USA



**This book provides readers with an important review of key advances in photodetectors and their use in in communication, computation, and imaging systems, and includes discussions of materials, detector types, devices, and important and emerging applications of photodetectors.**

### KEY FEATURES

- Reviews materials, detector types and devices
- Addresses fabrication techniques, and the advantages and limitations and different types of photodetector
- Considers a range of application for this important technology
- Includes discussions of silicon photonics, detectors based on reduced dimensional charge systems, carbon nanotubes, graphene, nanowires, and more

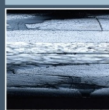
### DESCRIPTION

*Photodetectors: Materials, Devices and Applications* discusses the devices that convert light to electrical signals, key components in communication, computation, and imaging systems.

In recent years, there has been significant improvement in photodetector performance, and this important book reviews some of the key advances in the field.

Part one covers materials, detector types, and devices, and includes discussion of silicon photonics, detectors based on reduced dimensional charge systems, carbon nanotubes, graphene, nanowires, low-temperature grown gallium arsenide, plasmonic, Si photomultiplier tubes, and organic photodetectors, while part two focuses on important applications of photodetectors, including microwave photonics, communications, high-speed single photon detection, THz detection, resonant cavity enhanced photodetection, photo-capacitors and imaging.





## Modelling Damage, Fatigue and Failure of Composite Materials

Edited by Ramesh Talreja and Janis Varna



**ISBN:** 978-1-78242-286-0

**PUB DATE:** October 2015

**FORMAT:** Hardback

**PAGES:** c. 454

### AUDIENCE

industrial and academic researchers working in composite materials, and structural designers in aeronautical, automotive and energy applications

## Modelling Damage, Fatigue and Failure of Composite Materials

Edited by: **R. Talreja** Tenneco Endowed Professor in the Department of Aerospace Engineering, Texas A&M University, College Station, TX, USA  
**J Varna** Professor, Department of Engineering Sciences and Mathematics, Luleå University of Technology, Luleå, Sweden



**This book provides a comprehensive source of physics-based models for the analysis of progressive and critical failure phenomena in composite materials, also reviewing treatments to give the reader thorough direction for analyzing failure in these types of structures.**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Examines current research in modeling damage, fatigue, and failure of composite materials
- Provides a comprehensive source of physics-based models for the analysis of progressive and critical failure phenomena in composite materials
- Assesses the failure and life prediction in composite materials
- Discusses the applications of predictive failure models such as computational approaches to failure analysis

### DESCRIPTION

*Modelling Damage, Fatigue and Failure of Composite Materials* provides the latest research on the field of composite materials, an area that has attracted a wealth of research, with significant interest in the areas of damage, fatigue, and failure.

The book is a comprehensive source of physics-based models for the analysis of progressive and critical failure phenomena in composite materials, and focuses on materials modeling, while also reviewing treatments to give the reader thorough direction for analyzing failure in composite structures.

Part one of the book reviews the damage development in composite materials such as generic damage and damage accumulation in textile composites and under multiaxial loading, while part two focuses on the modeling of failure mechanisms in composite materials with attention given to fibre/matrix cracking and debonding, compression failure, and delamination fracture. Final sections examine the modeling of damage and materials response in composite materials, including micro-level and multi-scale approaches, the failure analysis of composite materials and joints, and the applications of predictive failure models.





## Industrial Wireless Sensor Networks

Monitoring, Control and Automation

Edited by Ramakrishna Budampati and Soumitri Kolavennu



## Industrial Wireless Sensor Networks

*Monitoring, Control and Automation*

Edited by: *R Budampati* Ingersoll Rand  
*S Kolavennu* Honeywell, USA



**This book provides a review of important issues in the growing area of wireless sensor networks that includes their applications in industry, and how they can reduce costs, increase productivity, and ease maintenance, also addressing standardization efforts regarding reliability, security, performance, power consumption, and integration.**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

- Reviews technologies and standards for industrial wireless sensor networks
- Considers particular applications for the technology and their ability to reduce costs, increase productivity, and ease maintenance
- Focuses on industry needs and standardization efforts regarding reliability, security, performance, power consumption, and integration.

### DESCRIPTION

Industrial Wireless Sensor Networks: Monitoring, Control and Automation explores the explosive growth that has occurred in the use of wireless sensor networks in a variety of applications during the last few years. As wireless technology can reduce costs, increase productivity, and ease maintenance, the book looks at the progress in standardization efforts regarding reliability, security, performance, power consumption, and integration.

Early sections of the book discuss issues such as media access control (MAC), antenna design and site survey, energy harvesting, and explosion-proof design. Subsequent sections present WSN standards, including ISA100, ZigBee™, Wifi™, WirelessHART™ and 6LoWPAN, and the applications of WSNs in the oil and gas, chemical, food, and nuclear power industries.

**ISBN:** 978-1-78242-230-3

**PUB DATE:** October 2015

**FORMAT:** Hardback

**PAGES:** c. 234

### AUDIENCE

Postgraduate students and academic researchers in physics, material science and engineering, R&D managers in industrial sectors such as oil and gas, chemical processing, food and beverage, paper and pulp, nuclear power and factory automation, and engineers working with radio frequency devices and wireless networks





## Marine Applications of Advanced Fibre-reinforced Composites

Edited by J. Graham-Jones and J. Summerscales



**ISBN:** 978-1-78242-250-1

**PUB DATE:** September 2015

**FORMAT:** Hardback

**PAGES:** c. 342

### AUDIENCE

marine scientists, naval architects, offshore platforms and marine renewable design engineers, boat manufacturers, coastal engineers, R&D personnel, materials engineers, manufacturers, mechanical engineers, civil engineers and academics interested in this field

## Marine Applications of Advanced Fibre-Reinforced Composites

Edited by: *J. Graham-Jones* Plymouth University, UK  
*J. Summerscales* Advanced Composites Manufacturing Centre,  
 Department of Mechanical Engineering, Polytechnic South West,  
 Plymouth, UK.



**A detailed examination of the technology, application, performance and environmental considerations of advanced fibre-reinforced composites used in marine structures.**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

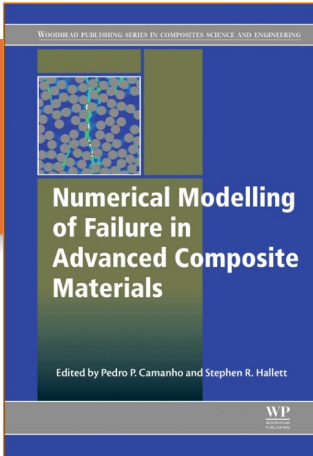
- Comprehensively examines all aspects of fibre-reinforced marine composites, including the latest advances in design, manufacturing methods and performance
- Assesses the environmental impacts of using fibre-reinforced composites in marine environments, including end of life considerations
- Reviews advanced fibre-reinforced composites for renewable energy devices, rigging, sail textiles, sail shape optimisation and offshore oil and gas applications

### DESCRIPTION

The marine environment presents significant challenges for materials due to the potential for corrosion by salt water, extreme pressures when deeply submerged and high stresses arising from variable weather. Well-designed fibre-reinforced composites can perform effectively in the marine environment and are lightweight alternatives to metal components and more durable than wood. *Marine Applications of Advanced Fibre-Reinforced Composites* examines the technology, application and environmental considerations in choosing a fibre-reinforced composite system for use in marine structures.

This book is divided into two parts. The chapters in Part One explore the manufacture, mechanical behavior and structural performance of marine composites, and also look at the testing of these composites and end of life environmental considerations. The chapters in Part Two then investigate the applications of marine composites, specifically for renewable energy devices, offshore oil and gas applications, rigging and sails. Underwater repair of marine composites is also reviewed.





# Numerical Modelling of Failure in Advanced Composite Materials

Edited by Pedro P. Camanho and Stephen R. Hallett



**ISBN:** 978-0-08-100332-9

**PUB DATE:** August 2015

**FORMAT:** Hardback

**PAGES:** c. 552

## AUDIENCE

Industrial and academic researchers working in composite materials, aeronautics, automotive and energy applications and the development of technical textiles.

## Numerical Modelling of Failure in Advanced Composite Materials

Edited by: **Pedro Camanho** Professor at the Department of Mechanical Engineering, University of Porto, Portugal

**Stephen Hallett** Professor in Composite Structures, Faculty of Engineering, University of Bristol, UK



**A comprehensive review by leading authors of the most recent failure analysis models for advanced composite materials, covering basic fundamentals through applications.**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Examines the most recent analysis models for advanced composite materials in a coherent and comprehensive manner
- Investigates numerical modelling approaches to interlaminar failure and intralaminar failure in advanced composite materials
- Reviews advanced numerical algorithms for modeling and simulation of failure
- Examines various engineering and scientific applications of numerical modelling for analysis of failure in advanced composite materials

### DESCRIPTION

*Numerical Modelling of Failure in Advanced Composite Materials* comprehensively examines the most recent analysis techniques for advanced composite materials. Advanced composite materials are becoming increasingly important for lightweight design in aerospace, wind energy, and mechanical and civil engineering. Essential for exploiting their potential is the ability to reliably predict their mechanical behaviour, particularly the onset and propagation of failure.

Part One investigates numerical modeling approaches to interlaminar failure in advanced composite materials. Part Two considers numerical modelling approaches to intralaminar failure. Part Three presents new and emerging advanced numerical algorithms for modeling and simulation of failure.

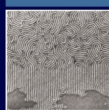
Part Four closes by examining the various engineering and scientific applications of numerical modeling for analysis of failure in advanced composite materials, such as prediction of impact damage, failure in textile composites, and fracture behavior in through-thickness reinforced laminates.

**ENGINEERING  
MATERIALS**

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## Directed Self-assembly of Block Copolymers for Nano-manufacturing

Edited by Roel Gronheid and Paul Nealey

WP

WOODHEAD  
PUBLISHING

**ISBN:** 978-0-08-100250-6

**PUB DATE:** August 2015

**FORMAT:** Hardback

**PAGES:** c. 314

### AUDIENCE

Academics and post-graduate students in electrical and electronic engineering and nanotechnology, as well as industry professionals working in the following areas: nanotechnology, MEMS, lithography, photonics, microelectronics, nanoelectronics, semiconductors, sensors, optical materials and devices and carbon nanomaterials.

## Directed Self-assembly of Block Co-polymers for Nano-manufacturing

Edited by: *Roel Gronheid* IMEC, Belgium

*Paul Nealey* University of Chicago, USA



**A comprehensive review of the key principles and techniques in utilising directed self-assembly for a range of important nano-manufacturing applications**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

- Authoritative outlining of theoretical principles and modeling techniques to give a thorough introduction to the topic
- Discusses a broad range of practical applications for directed self-assembly in nano-manufacturing
- Highlights the importance of this technology to both the present and future of nano-manufacturing by exploring its potential use in a range of fields

### DESCRIPTION

The directed self-assembly (DSA) method of patterning for microelectronics uses polymer phase-separation to generate features of less than 20nm, with the positions of self-assembling materials externally guided into the desired pattern. *Directed self-assembly of Block Co-polymers for Nano-manufacturing* reviews the design, production, applications and future developments needed to facilitate the widescale adoption of this promising technology.

Beginning with a solid overview of the physics and chemistry of block copolymer (BCP) materials, Part 1 covers the synthesis of new materials and new processing methods for DSA. Part 2 then goes on to outline the key modelling and characterization principles of DSA, reviewing templates and patterning using topographical and chemically modified surfaces, line edge roughness and dimensional control, x-ray scattering for characterization, and nanoscale driven assembly. Finally, Part 3 discusses application areas and related issues for DSA in nano-manufacturing, including for basic logic circuit design, the inverse DSA problem, design decomposition and the modelling and analysis of large scale, template self-assembly manufacturing techniques.





## Biocomposites: Design and Mechanical Performance

Edited by Manjuri Misra,  
Jitendra K. Pandey and Amar K. Mohanty



**ISBN:** 978-1-78242-373-7

**PUB DATE:** August 2015

**FORMAT:** Hardback

**PAGES:** c. 514

### AUDIENCE

R&D managers and product designers in packaging, electronic, automotive, aerospace and construction industries; postgraduates and researchers with an interest in biocomposites

## Biocomposites: Design and Mechanical Performance

Edited by: **Manjuri Misra** Associate Professor, School of Engineering, University of Guelph  
**Jitendra Kumar Pandey** Assistant research professor, Institute of Advanced Machinery and Design, Seoul National University, Seoul, Korea  
**Amar Mohanty** Professor, Premier's Research Chair in Biomaterials and Transportation and Director, Bioproducts Discovery and Development Centre (BDDC), School of Engineering, University of Guelph



**A comprehensive review of the mechanical properties, performance, and applications of various types of biocomposites materials**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Describes recent research to improve the mechanical properties and performance of a wide range of biocomposite materials
- Explores the mechanical properties of a wide range of biocomposite materials, including polylactic, polyethylene, polycarbonate, oil palm, natural fiber epoxy, polyhydroxyalkanoate, polyvinyl acetate, and polyurethane
- Evaluates the potential of biocomposites as substitutes for petroleum-based plastics in industries such as packaging, electronic, automotive, aerospace and construction
- Includes contributions from leading experts in this field

### DESCRIPTION

*Biocomposites: Design and Mechanical Performance* describes recent research on cost-effective ways to improve the mechanical toughness and durability of biocomposites, while also reducing their weight.

Beginning with an introduction to commercially competitive natural fiber-based composites, chapters then move on to explore the mechanical properties of a wide range of biocomposite materials, including polylactic, polyethylene, polycarbonate, oil palm, natural fiber epoxy, polyhydroxyalkanoate, polyvinyl acetate, polyurethane, starch, flax, poly (propylene carbonate)-based biocomposites, and biocomposites from biodegradable polymer blends, natural fibers, and green plastics, giving the reader a deep understanding of the potential of these materials.





# Advances in Composites Manufacturing and Process Design

Edited by Philippe Boisse

WP

## Advances in Composites Manufacturing and Process Design

Edited by: *Philippe Boisse* LaMCoS Laboratory, INSA de Lyon, France



**An essential, up-to-date guide on composites manufacturing and process design, with a strong focus on recent advances, modeling, and simulation of the design process**

### KEY FEATURES

- Outlines the advances in the different methods of composite manufacturing processes
- Provides extensive information on the thermo-mechanical behavior of reinforcements and composite prepregs
- Reviews numerical simulations of forming and flow processes, as well as pultrusion processes and modeling chemical vapor infiltration

### DESCRIPTION

The manufacturing processes of composite materials are numerous and often complex. Continuous research into the subject area has made it hugely relevant with new advances enriching our understanding and helping us overcome design and manufacturing challenges. *Advances in Composites Manufacturing and Process Design* provides comprehensive coverage of all processing techniques in the field with a strong emphasis on recent advances, modeling and simulation of the design process.

Part One reviews the advances in composite manufacturing processes and includes detailed coverage of braiding, knitting, weaving, fibre placement, draping, machining and drilling, and 3D composite processes. There are also highly informative chapters on thermoplastic and ceramic composite manufacturing processes, and repairing composites. The mechanical behaviour of reinforcements and the numerical simulation of composite manufacturing processes are examined in Part Two. Chapters examine the properties and behaviour of textile reinforcements and resins. The final chapters of the book investigate finite element analysis of composite forming, numerical simulation of flow processes, pultrusion processes and modeling of chemical vapour infiltration processes.

**ISBN:** 978-1-78242-307-2

**PUB DATE:** July 2015

**FORMAT:** Hardback

**PAGES:** c. 470

### AUDIENCE

Engineers and scientists working in the fields of applied mechanics and materials engineering





## Wood Composites

Edited by Martin P. Ansell

WP

WOODHEAD  
PUBLISHING

**ISBN:** 978-1-78242-454-3

**PUB DATE:** July 2015

**FORMAT:** Hardback

**PAGES:** c. 426

### AUDIENCE

Wood scientists, timber engineers, architects, civil engineers, and postgraduates and academic researchers with an interest in wood composites and their applications

## Wood Composites

Edited by: *Martin Ansell* Reader (Associate Professor), University of Bath, UK



**A state-of-the-art review of the field of wood composites from both scientific and engineering perspectives, with focus on their materials, applications and recent engineering and scientific advances**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Comprehensively reviews the entire field of wood composites in a single volume
- Examines recent progress in enhancing and refining the performance and properties of wood composites by chemical and thermal modification and the application of smart multi-functional coatings
- Explores the range of wood composites, including both new and traditional products

### DESCRIPTION

Recent progress in enhancing and refining the performance and properties of wood composites by chemical and thermal modification and the application of smart multi-functional coatings have made them a particular area of interest for researchers. *Wood Composites* comprehensively reviews the whole field of wood composites, with particular focus on their materials, applications and engineering and scientific advances, including solutions inspired biomimetically by the structure of wood and wood composites.

Part One covers the materials used for wood composites and examines wood microstructure, and wood processing and adhesives for wood composites. Part Two explores the many applications of wood composites, for example plywood, fibreboard, chipboard, glulam, cross-laminated timber, I-beams and wood-polymer composites. The final part investigates advances in wood composites and looks at the preservation and modification of wood composites, environmental impacts and legislative obligations, nano-coatings and plasma treatment, biomimetic composite materials, the integration of wood composites with other materials and carbonized and mineralized wood composites.





## Biomimetic Technologies

### Principles and Applications

Edited by Trung Dung Ngo



**ISBN:** 978-0-08-100249-0

**PUB DATE:** July 2015

**FORMAT:** Hardback

**PAGES:** c. 384

#### AUDIENCE

Postgraduate students and academic researchers in electronics, sensors, functional materials, robotics, physics, materials science, and bio-engineering and mechanical engineering; R&D managers in industrial sectors such as biotechnology, sensors, actuators, electronics, robotics, manufacturing, and structural and environmental monitoring.

## Biomimetic Technologies

### *Principles and Applications*

Edited by: *Trung Dung Ngo* Aalborg University, Denmark



**A fascinating guide to the theoretical principles and practical applications of this groundbreaking, nature-inspired technology**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

#### KEY FEATURES

- Includes a solid overview of modern artificial intelligence as background to the principles of biomimetic engineering
- Reviews a selection of key bio-inspired materials and sensors, highlighting their current strengths and future potential
- Features cutting-edge examples of biomimetic technologies employed for a broad range of applications

#### DESCRIPTION

Biomimetic engineering takes the principles of biological organisms and copies, mimics or adapts these in the design and development of new materials and technologies. *Biomimetic Technologies* reviews the key materials and processes involved in this groundbreaking field, supporting theoretical background by outlining a range of applications.

Beginning with an overview of the key principles and materials associated with biomimetic technologies in Part One, the book goes on to explore biomimetic sensors in more detail in Part Two, with bio-inspired tactile, hair-based, gas-sensing and sonar systems all reviewed. Biomimetic actuators are then the focus of Part Three, with vision systems, tissue growth and muscles all discussed. Finally, a wide range of applications are investigated in Part Four, where biomimetic technology and artificial intelligence are reviewed for such uses as bio-inspired climbing robots and multi-robot systems, microrobots with CMOS IC neural networks locomotion control, central pattern generators (CPG's) and biologically inspired antenna arrays.





## Iron Ore

Mineralogy, Processing and  
Environmental Sustainability

Edited by Liming Lu



**ISBN:** 978-1-78242-156-6

**PUB DATE:** July 2015

**FORMAT:** Hardback

**PAGES:** c. 648

### AUDIENCE

Industry professionals and academics in the field of iron ore extraction processing and iron making companies; steel processors; academic metallurgists

## Iron Ore

*Mineralogy, Processing and Environmental Sustainability*

Edited by: *Liming Lu* CSIRO, Australia



**Recent research on characterizing iron ores, including beneficiation, agglomeration, blast furnace smelting technology, and environmental issues relating to iron ore production**

### KEY FEATURES

- Provides a comprehensive overview of the global iron ore industry, exploring its characteristics and characterization
- Expert analysis of quality requirements for iron production, iron ore agglomeration technologies, environmental issues, and low-emission technologies
- Timely text to accompany the increased iron ore production occurring in developing countries like India and China

### DESCRIPTION

*Iron Ore: Mineralogy, Processing and Environmental Issues* summarizes recent, key research on the characterization of iron ores, including important topics such as beneficiation (separation and refining), agglomeration (e.g., production of pellets or powders), blast furnace technology for smelting, and environmental issues relating to its production.

The text is an ideal reference on the topic during a time when iron ore production has increased significantly, driven by increasing demand from countries such as India and China.





## Fillers and Reinforcements for Advanced Nanocomposites

Edited by Yu Dong, Rehan Umer  
and Alan Kin-Tak Lau



**ISBN:** 978-0-08-100079-3

**PUB DATE:** July 2015

**FORMAT:** Hardback

**PAGES:** c. 564

### AUDIENCE

Industrial and academic researchers working in chemical, materials, manufacturing and mechanical engineering

## Fillers and Reinforcements for Advanced Nanocomposites

Edited by: **Yu Dong** Department of Mechanical Engineering, Curtin University, Perth, Australia

**Rehan Umer** Department of Aerospace Engineering, Khalifa University of Science and Technology & Research, United Arab Emirates

**Alan Kin Tak Lau** Department of Mechanical Engineering, The Hong Kong Polytechnic University, Hong Kong



**A comprehensive review of state-of-the-art research on the effective use of nanoscaled fillers and reinforcements to enhance the performance of advanced nanocomposites**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Covers topics such as nanocelluloses, nanotubes, nanoplatelets, and nanoparticles, as well as their extensive applications
- Discusses the latest research on the effective use of nanoscaled fillers and reinforcements to enhance the performance of advanced nanocomposites
- Explains how fillers and reinforcements are used in the fabrication, synthesis and characterization of advanced nanocomposites

### DESCRIPTION

*Fillers and Reinforcements for Advanced Nanocomposites* reviews cutting-edge, state-of-the-art research on the effective use of nanoscaled fillers and reinforcements to enhance the performance of advanced nanocomposites, both in industrial and manufacturing applications. It covers a broad range of topics such as nanocelluloses, nanotubes, nanoplatelets, and nanoparticles, as well as their extensive applications. The chapters provide detailed information on how fillers and reinforcements are used in the fabrication, synthesis and characterization of advanced nanocomposites to achieve extraordinary performance of new materials and significant enhancements in their mechanical, thermal, structural and multi-functional properties. It also highlights new technologies for the fabrication of advanced nanocomposites using innovative electrospinning techniques.





## Manufacturing of Nanocomposites with Engineering Plastics

Edited by Vikas Mittal

WP

WOODHEAD PUBLISHING

**ISBN:** 978-1-78242-308-9

**PUB DATE:** July 2015

**FORMAT:** Hardback

**PAGES:** c. 306

### AUDIENCE

Managers, research scientists and engineers working in polymer chemistry, engineering, and materials science in both industry and academia

## Manufacturing of Nanocomposites with Engineering Plastics

Edited by *Vikas Mittal* The Petroleum Institute, Abu Dhabi, UAE



**A comprehensive collection of recent research findings on the manufacturing, properties, and applications of nanocomposites with engineering plastics**

### KEY FEATURES

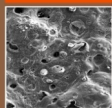
- Provides a comprehensive review of the most recent research findings
- A single one-stop ready reference that assimilates knowledge on the development of nanocomposites with engineering plastics
- Contributions from leading experts in the field
- Provides examples of applications that will help with material selection
- Chapters are designed to provide not only introductory information, but also to lead the reader to more advanced characterization tools

### DESCRIPTION

*Manufacturing of Nanocomposites with Engineering Plastics* collates recent research findings on the manufacturing, properties, and applications of nanocomposites with engineering plastics in one comprehensive volume. The book specifically examines topics of engineering plastics, rheology, thermo-mechanical properties, wear, flame retardancy, modeling, filler surface modification, and more. It represents a ready reference for managers and scholars working in the areas of polymer and nanocomposite materials science, both in industry and academia, and provides introductory information for people new to the field.







## Future Development of Thermal Spray Coatings

Types, Designs,  
Manufacture and Applications

Edited by Nuria Espallargas



## Future Development of Thermal Spray Coatings

*Types, Designs, Manufacture and Applications*

Edited by: *Nuria Espallargas* Norwegian University of Science and Technology (NTNU), Trondheim, Norway



An ideal reference guide to advancements in thermal spray technology and the applications of thermal spray coatings

### KEY FEATURES

- Timely guide on the current advancements and research trends in thermal spray technology
- Reviews different types of thermal spray coatings
- Presents a wide variety of applications for this emerging technology

### DESCRIPTION

*Future Development of Thermal Spray Coatings* discusses the latest developments and research trends in the thermal spray industry. The book presents a timely guide to new applications and techniques.

After an introduction to thermal spray coatings by the editor, Part One covers new types and properties of thermal spray coatings. Chapters look at feedstock suspensions and solutions, the application of solution precursor spray techniques to obtain ceramic films and coatings, cold spray techniques and warm spray technology amongst others. Part Two of the book moves on to discuss new applications for thermal spray coatings such as the use of thermal spray coatings in environmental barrier coatings, thermal spray coatings in renewable energy applications and manufacturing engineering in thermal spray technologies by advanced robot systems and process kinematics.

**ISBN:** 978-0-85709-769-9

**PUB DATE:** June 2015

**FORMAT:** Hardback

**PAGES:** c. 288

### AUDIENCE

R&D managers in thermal spray coating industries; researchers and postgraduate and undergraduate students with an academic interest in this field





## Recent Advances in Smart Self-healing Polymers and Composites

Edited by Guoqiang Li and Harper Meng

WP  
WOODHEAD  
PUBLISHING

**ISBN:** 978-1-78242-280-8

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 408

### AUDIENCE

Scientists and engineers working in smart composite materials research from diverse backgrounds such as chemistry, materials science, aerospace, physics, engineering, and biological science, as well as materials developers working in the manufacturing industries.

## Recent Advances in Smart Self-Healing Polymers and Composites

Edited by: *G Li* Louisiana State University, Baton Rouge, LA, USA  
*H Meng* Southern University, Baton Rouge, LA, USA



Learn groundbreaking advances in the field of smart self-healing polymers and composites and their applications

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Examines the advances made in smart materials over the last few decades
- Presents significant applications in aerospace, automotive, civil, mechanical, medical, and communication engineering fields
- Compiled by a large pool of researchers who not only studied the latest datasets, but also reached out to leading contributors for insights and forward-thinking analogies

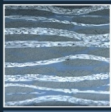
### DESCRIPTION

*Recent Advances in Smart Self-Healing Polymers and Composites* examines the advances made in smart materials over the last few decades and their significant applications in aerospace, automotive, civil, mechanical, medical, and communication engineering fields.

Based on a thorough review of the literature, the book identifies “smart self-healing polymers and composites” as one of the most popular, challenging, and promising areas of research.

Readers will find valuable information compiled by a large pool of researchers who not only studied the latest datasets, but also reached out to leading contributors for insights and forward-thinking analogies.





## Fatigue of Textile Composites

Edited by Valter Carvelli and Stepan V. Lomov



**ISBN:** 978-1-78242-281-5

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 492

### AUDIENCE

Industrial and academic researchers working on composite materials, aeronautic, automotive and energy engineering, and the development of technical textiles.

## Fatigue of Textile Composites

Edited by: *V Carvelli* Politecnico di Milano, Italy  
*S V Lomov* Katholieke Universiteit Leuven, Belgium



**Provides a current, state-of-art review of recent investigations on the fatigue behavior of composite materials, mainly those reinforced with textiles**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Presents the current state-of-the-art investigations on fatigue behavior of composite materials, mainly those reinforced with textiles
- Contains invaluable information pertaining to a wide variety of industries, including automotive, aeronautical, and marine, amongst others
- Provides comprehensive information on the huge variety of interlacement geometric architectures that are suitable for a broad range of different applications

### DESCRIPTION

*Fatigue of Textile Composites* provides a current, state-of-art review on recent investigations on the fatigue behavior of composite materials, mainly those reinforced with textiles.

As this particular group of composite materials is extremely important for a wide variety of industrial applications, including automotive, aeronautical, and marine, etc., mainly due to their peculiarities and advantages with respect to unidirectional laminated composites, the text presents comprehensive information on the huge variety of interlacement geometric architectures that are suitable for a broad range of different applications, their excellent drapability and versatility, which is highly important for complex double-curvature shape components and three-dimensional woven fabrics without plane reinforcement, and their main mechanical characteristics which are currently in high demand from industry.





## Rehabilitation of Pipelines Using Fiber-reinforced Polymer (FRP) Composites

Edited by Vistasp M. Karbhari



## Rehabilitation of Pipelines Using Fiber-reinforced Polymer (FRP) Composites

Edited by: *V M Karbhari* University of Texas at Arlington, TX, USA



An overview of the increasingly popular use of Fibre-reinforced polymer composites for pipe repair

### KEY FEATURES

- Reviews key issues and techniques in the use of fiber reinforced polymer (FRP) composites as a flexible and cost-effective means to repair aging, corroded, or damaged pipelines
- Examines general issues, including the range of techniques using FRP composites and how they compare with the use of steel sleeves
- Discusses particular techniques such as sleeve repair, patching, and overwrap systems

### DESCRIPTION

*Rehabilitation of Pipelines Using Fibre-reinforced Polymer (FRP) Composites* presents information on this critical component of industrial and civil infrastructures, also exploring the particular challenges that exist in the monitor and repair of pipeline systems.

This book reviews key issues and techniques in this important area, including general issues such as the range of techniques using FRP composites and how they compare with the use of steel sleeves. In addition, the book discusses particular techniques, such as sleeve repair, patching, and overwrap systems.

**ISBN:** 978-0-85709-684-5

**PUB DATE:** May 2015

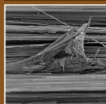
**FORMAT:** Hardback

**PAGES:** c. 300

### AUDIENCE

Engineers and designers in the pipeline and fibre-reinforced polymer areas and manufacturers of pipelines





## Toughening Mechanisms in Composite Materials

Edited by  
Qinghua Qin and  
Jianqiao Ye

WP  
WOODHEAD  
PUBLISHING

**ISBN:** 978-1-78242-279-2

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 402

### AUDIENCE

Professional engineers in industry and academia, research scientists, workers and students in applied mechanics and materials engineering, physicists and materials scientists.

## Toughening Mechanisms in Composite Materials

Edited by: **Q Qin** Professor and Leader of Materials and Manufacturing Group at The Australian National University, Australia

**J Ye** Professor and the Chair of Mechanical Engineering at Lancaster University, UK



**A technical work detailing the development of toughening mechanisms, their techniques, principles and concepts**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

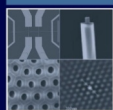
### KEY FEATURES

- Covers particle-reinforced composites, fibre-reinforced composites and other toughening mechanisms
- Analyses toughening mechanisms in a broad range of composite materials
- Developments in nanotube toughened composites and toughened graphene ceramic composites are examined

### DESCRIPTION

*Toughening Mechanisms in Composite Materials* aims to provide a comprehensive and technically detailed coverage of composites and their toughening mechanisms. Unique in its direct and comprehensive approach, the book presents fundamental knowledge on composites' toughening mechanisms as well as a comprehensive treatment of numerical methods. This volume summarizes the current state-of-the-art and presents the most recent research outcomes in the field. It details the development of each of the techniques, beginning with basic principles, and new concepts are illustrated with examples wherever possible.





## Magnetic Nano- and Microwires

Design, Synthesis,  
Properties and Applications

Edited by Manuel Vázquez



**ISBN:** 978-0-08-100164-6

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 848

### AUDIENCE

Academics and post-graduate students studying physics, chemistry, material science, electrical and electronic engineering and nanoscience in particular, as well as industry professionals working with magnetism, nanotechnology and nanophotonics, micro- and nanoelectronics, spintronics, sensors, memory, nanorobotics and biology.

## Magnetic Nano- and Microwires

*Design, Synthesis, Properties and Applications*

Edited by: *Manuel Vázquez* Instituto de Ciencia de Materiales de Madrid, Spain



**Reviews the design, development and application of magnetic nanowires and microwires for enhanced information technology and sensing devices.**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

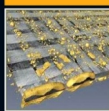
- Detailed coverage of multiple key techniques for the growth and processing of nanowires and microwires
- Reviews the principles and difficulties involved in applying magnetic nano and microwires to a wide range of applications
- Combines the expertise of specialists from around the globe to give a broad overview of current and future trends

### DESCRIPTION

Magnetic nanowires and microwires are key tools in the development of enhanced devices for information technology (memory and data processing) and sensing. Offering the combined characteristics of high density, high speed, and non-volatility, they facilitate reliable control of the motion of magnetic domain walls; a key requirement for the development of novel classes of logic and storage devices.

Part One introduces the design and synthesis of magnetic nanowires and microwires, reviewing the growth and processing of nanowires and nanowire heterostructures using such methods as sol-gel and electrodeposition combinations, focused-electron/ion-beam-induced deposition, chemical vapour transport, quenching and drawing and magnetic interactions. Magnetic and transport properties, alongside domain walls, in nano- and microwires are then explored in Part Two, before Part Three goes on to explore a wide range of applications for magnetic nano- and microwire devices, including memory, microwave and electrochemical applications, in addition to thermal spin polarization and configuration, magnetocaloric effects and Bloch point dynamics.





## Structural Integrity and Durability of Advanced Composites

Innovative Modelling Methods and Intelligent Design

Edited by P.W.R. Beaumont, C. Soutis and A. Hodzic

WP

WOODHEAD PUBLISHING

**ISBN:** 978-0-08-100137-0

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 840

### AUDIENCE

Industrial and academic researchers working in composite materials in aeronautic, automotive, and energy applications, and in the development of technical textiles

## Structural Integrity and Durability of Advanced Composites

### *Innovative Modelling Methods and Intelligent Design*

Edited by: **Peter Beaumont** Cambridge University Department of Engineering and Wolfson College, Cambridge, UK

**Constantinos Soutis** School of Mechanical, Aerospace and Civil Engineering and the Aerospace Research Institute, University of Manchester, UK

**Alma Hodzic** Faculty of Engineering, The University of Sheffield, UK



**Presents research from leading composite materials scientists and engineers showcasing the fundamental issues and problems that affect the development and exploitation of large composite structures**

A Volume in the Woodhead Publishing Series in Composites Science and Engineering.

### KEY FEATURES

- Presents scientific and technological research from leading composite materials scientists and engineers that showcase fundamental issues and practical problems
- Provides the information users need to understand deformation and fracture phenomena resulting from impact, fatigue, creep, and stress corrosion cracking
- Enables readers to transfer key ideas from research and development to both the design engineer and end-user of composite materials

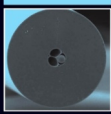
### DESCRIPTION

*Structural Integrity and Durability of Advanced Composites: Innovative Modelling Methods and Intelligent Design* presents scientific and technological research from leading composite materials scientists and engineers that showcase the fundamental issues and practical problems that affect the development and exploitation of large composite structures.

As predicting precisely where cracks may develop in materials under stress is an age old mystery in the design and building of large-scale engineering structures, the burden of testing to provide "fracture safe design" is imperative. Readers will learn to transfer key ideas from research and development to both the design engineer and end-user of composite materials.

This comprehensive text provides the information users need to understand deformation and fracture phenomena resulting from impact, fatigue, creep, and stress corrosion cracking and how these phenomena can affect reliability, life expectancy, and the durability of structures.





## Optofluidics, Sensors and Actuators in Microstructured Optical Fibres

Edited by Stavros Pissadakis and Stefano Selleri

WP

## Optofluidics, Sensors and Actuators in Microstructured Optical Fibres

Edited by: *Stavros Pissadakis* Foundation for Research and Technology - Hellas (FORTH), Greece  
*Stefano Selleri* University of Parma, Italy



**A detailed guide to the design, development and application of these complex, highly specialised structures**

### KEY FEATURES

- Provides users with the necessary knowledge to successfully design and implement microstructured optical fibres for a broad range of uses
- Outlines techniques for developing both traditional and novel types of optical fibre
- Highlights the adaptability of microstructured optical fibres achieved via the use of optofluidics, sensors and actuators, by presenting a diverse selection of applications

### DESCRIPTION

Combining the positive characteristics of microfluidics and optics, microstructured optical fibres (MOFs) have revolutionized the field of optoelectronics. Tailored guiding, diffractive structures and photonic band-gap effects are used to produce fibres with highly specialised, complex structures, facilitating the development of novel kinds of optical fibre sensors and actuators.

Part One outlines the key materials and fabrication techniques used for microstructured optical fibres. Microfluidics and heat flows, MOF-based metamaterials, novel and liquid crystal infiltrated photonic crystal fibre (PCF) designs, MOFs filled with carbon nanotubes and melting of functional inorganic glasses inside PCFs are all reviewed. Part Two then goes on to investigate sensing and optofluidic applications, with the use of MOFs in structural sensing, sensing units and mechanical sensing explored in detail. PCF's for switching applications are then discussed before the book concludes by reviewing MOFs for specific nucleic acid detection and resonant bio- and chemical sensing.

**ISBN:** 978-1-78242-329-4

**PUB DATE:** May 2015

**FORMAT:** Hardback

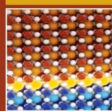
**PAGES:** c. 292

### AUDIENCE

Postgraduate students and academic researchers in electronics, optics, photonics, sensors, physics, material science and engineering, as well as R&D managers in such industrial sectors as industrial process monitoring, structural health monitoring and environmental monitoring







## Epitaxial Growth of Complex Metal Oxides

Edited by G. Koster, M. Huijben and G. Rijnders



**ISBN:** 978-1-78242-245-7

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 486

### AUDIENCE

All those who are working in the analysis, characterization, fabrication and application of new complex metal oxides, thin films, nano-materials and related technologies, including scientists, applied researchers, production engineers, post-graduates and academic researchers.

## Epitaxial Growth of Complex Metal Oxides

Edited by: **G Koster** University of Twente, The Netherlands

**Mark Huijben** University of Twente, The Netherlands

**G Rijnders** University of Twente, The Netherlands



**Ideal for those interested in the improvements in epitaxial growth processes that have resulted in higher quality films of complex metal oxides and the further advances and applications they have created for electronic and optical purposes**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

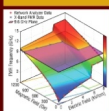
- Provides valuable information on the improvements in epitaxial growth processes that have resulted in higher quality films of complex metal oxides and further advances in applications for electronic and optical purposes
- Examines the techniques used in epitaxial thin film growth
- Describes the epitaxial growth and functional properties of complex metal oxides and explores the effects of strain and defects

### DESCRIPTION

The atomic arrangement and subsequent properties of a material are determined by the type and conditions of growth leading to epitaxy, making control of these conditions key to the fabrication of higher quality materials. *Epitaxial Growth of Complex Metal Oxides* reviews the techniques involved in such processes and highlights recent developments in fabrication quality which are facilitating advances in applications for electronic, magnetic and optical purposes.

Part One reviews the key techniques involved in the epitaxial growth of complex metal oxides, including growth studies using reflection high-energy electron diffraction, pulsed laser deposition, hybrid molecular beam epitaxy, sputtering processes and chemical solution deposition techniques for the growth of oxide thin films. Part Two goes on to explore the effects of strain and stoichiometry on crystal structure and related properties, in thin film oxides. Finally, the book concludes by discussing selected examples of important applications of complex metal oxide thin films in Part Three.





## Composite Magnetoelectrics

Materials, Structures  
and Applications

Gopalan Srinivasan, Shashank Priya  
and Nian Sun



## Composite Magnetoelectrics

*Materials, Structures, and Applications*

*G Srinivasan* Oakland University

*S Priya* Virginia Tech, Blacksburg, VA, USA

*N Sun* Northeastern University, Boston, MA, USA



**An indispensable guide to the theory behind magnetoelectric phenomena and magnetoelectric materials, and the techniques used to harness them for a multitude of applications**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

- Summarises clearly the theory behind magnetoelectric phenomena
- Strong coverage of fabrication and characterisation techniques
- Reviews a broad range of current and potential magnetoelectric devices

### DESCRIPTION

*Composite Magnetoelectrics: Materials, Structures, and Applications* gives the reader a summary of the theory behind magnetoelectric phenomena, later introducing magnetoelectric materials and structures and the techniques used to fabricate and characterize them. Part two of the book looks at magnetoelectric devices. Applications include magnetic and current sensors, transducers for energy harvesting, microwave and millimeter wave devices, miniature antennas and medical imaging. The final chapter discusses progress towards magnetoelectric memory.

**ISBN:** 978-1-78242-254-9

**PUB DATE:** May 2015

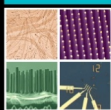
**FORMAT:** Hardback

**PAGES:** c. 366

### AUDIENCE

Postgraduate students and academic researchers in physics, chemistry, biology and engineering; R&D managers in industrial sectors such as semiconductor electronics, communication engineering, sensors and transducers, energy harvesting, spintronics and nanotechnology.





## Semiconductor Nanowires

Materials, Synthesis,  
Characterization and Applications

Edited by Jordi Arbiol and Qihua Xiong



## Semiconductor Nanowires

*Materials, Synthesis, Characterization and Applications*

Edited by: *J Arbiol* ICREA, Spain

*Q Xiong* Nanyang Technological University, Singapore



**Covers materials, growth and synthesis, characterization, and use of semiconductor nanowires, with a focus on solar cells, battery electrodes, sensors, optoelectronics and biology**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

- Explores a selection of advanced materials for semiconductor nanowires
- Outlines key techniques for the property assessment and characterization of semiconductor nanowires
- Covers a broad range of applications across a number of fields

### DESCRIPTION

Semiconductor nanowires promise to provide the building blocks for a new generation of nanoscale electronic and optoelectronic devices. *Semiconductor Nanowires: Materials, Synthesis, Characterization and Applications* covers advanced materials for nanowires, the growth and synthesis of semiconductor nanowires—including methods such as solution growth, MOVPE, MBE, and self-organization. Characterizing the properties of semiconductor nanowires is covered in chapters describing studies using TEM, SPM, and Raman scattering. Applications of semiconductor nanowires are discussed in chapters focusing on solar cells, battery electrodes, sensors, optoelectronics and biology.

**ISBN:** 978-1-78242-253-2

**PUB DATE:** April 2015

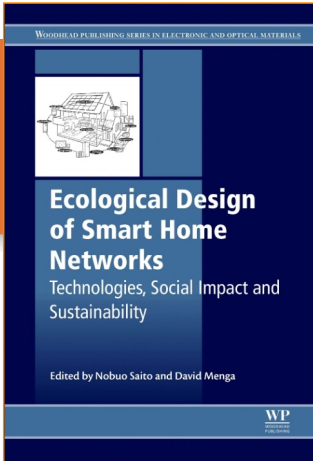
**FORMAT:** Hardback

**PAGES:** c. 554

### AUDIENCE

Academics and post-graduate students in physics, chemistry, material science, electrical and electronic engineering and nanoscience, and industry professionals working in the following areas: nanotechnology, NEMS, lithography, photonics, microelectronics, nanoelectronics, semiconductors, sensors, optical materials and devices, biology and nanomaterials.





## Ecological Design of Smart Home Networks

*Technologies, Social Impact and Sustainability*

Edited by: *N. Saito* Toyama University, Faculty of Education, Toyama, Japan

*D Menga* Électricité de France, France



### Ecological Design of Smart Home Networks

Technologies, Social Impact and Sustainability

Edited by Nobuo Saito and David Menga



**ISBN:** 978-1-78242-119-1

**PUB DATE:** April 2015

**FORMAT:** Hardback

**PAGES:** c. 118

#### AUDIENCE

Postgraduate students and academic researchers in electronics, computer engineering, telecommunications, networking, energy technology, and home automation. R&D managers in industrial sectors such as wireless technology, consumer electronics, telecommunications and networking, information technology, energy technology, and home automation.

**Reviews the principles and challenges of achieving smart home networks that can efficiently and sustainably control almost any electrical component in a house**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

#### KEY FEATURES

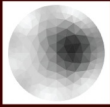
- More systematic and comprehensive coverage: the book covers ecological design and technology requirements, performance and applications for smart home networks
- Better focus on industry needs: the book covers current and emerging smart home networking technologies. It explains how the technologies work, how they have developed, their capabilities and the markets that they target
- Better coverage of the best international research: the book is multi-contributor and brings together the leading researchers from around the world

#### DESCRIPTION

This book provides an authoritative guide for postgraduate students and academic researchers in electronics, computer and network engineering, telecommunications, energy technology and home automation, as well as R&D managers in industrial sectors such as wireless technology, consumer electronics, telecommunications and networking, information technology, energy technology and home automation.

Part One outlines the key principles and technologies needed for ecological smart home networks. Beginning with a thorough overview of the concept behind ecological smart home network design, the book reviews such important areas as power line communications, hybrid systems and middleware platforms. Part Two then goes on to discuss some important applications of this technology, with wireless smart sensor networks for home and telecare, and smart home networking for content and energy management (including the intelligent Zero Emission Urban System), all explored in detail.





## Industrial Tomography

Systems and Applications

Edited by Mi Wang



**ISBN:** 978-1-78242-118-4

**PUB DATE:** April 2015

**FORMAT:** Hardback

**PAGES:** c. 28

### AUDIENCE

Applied physicists, materials scientists and engineers working in the photonics and optoelectronics industry or in the applications industries.

## Industrial Tomography

### Systems and Applications

Edited by: *M Wang* Professor, University of Leeds, UK



**Explores the use of industrial tomography in a wide variety of industrial processes, bringing to light new advancements made in image reconstruction, systems, and their applications**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

- Provides a comprehensive discussion on the different formats of tomography
- Includes an excellent overview of image reconstruction using a wide range of applications
- Presents a comprehensive discussion of tomography systems and their application in a wide variety of industrial processes

### DESCRIPTION

*Industrial Tomography: Systems and Applications* thoroughly explores the important tomographic techniques of industrial tomography, also discussing image reconstruction, systems, and applications.

The text presents complex processes, including the way three-dimensional imaging is used to create multiple cross-sections, and how computer software helps monitor flows, filtering, mixing, drying processes, and chemical reactions inside vessels and pipelines.

Readers will find a comprehensive discussion on the ways tomography systems can be used to optimize the performance of a wide variety of industrial processes.





## Advances in Asphalt Materials

Road and Pavement Construction

Edited by Shin-Che Huang  
and Hervé Di Benedetto



**ISBN:** 978-0-08-100269-8

**PUB DATE:** April 2015

**FORMAT:** Hardback

**PAGES:** c. 470

### AUDIENCE

Researchers, practitioners, and state department transportation engineers who are involved in materials characterization and field validation for both short- and long-term performance of various sustainable asphalt pavements

## Advances in Asphalt Materials

### Road and Pavement Construction

Edited by: *Shin-Che Huang* Lead Engineer Western Research Institute, USA  
*Hervé Di Benedetto* Professor, University of Lyon, ENTPE, France



**A key resource documenting advances in the research and technological developments of bituminous materials**

A Volume in the Woodhead Publishing Series in Civil and Structural Engineering.

### KEY FEATURES

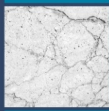
- Provides an insight into advances and techniques for bituminous materials
- Comprehensively reviews the physicochemical characteristics of bituminous materials
- Investigate asphalt materials on the nano-scale, including how RAP/RAS materials can be recycled and how asphalt materials can self-heal and rejuvenator selection

### DESCRIPTION

The urgent need for infrastructure rehabilitation and maintenance has led to a rise in the levels of research into bituminous materials. Breakthroughs in sustainable and environmentally friendly bituminous materials are certain to have a significant impact on national economies and energy sustainability. This book will provide a comprehensive review on recent advances in research and technological developments in bituminous materials.

Opening with an introductory chapter on asphalt materials and a section on the perspective of bituminous binder specifications, Part One covers the physicochemical characterisation and analysis of asphalt materials. Part Two reviews the range of distress (damage) mechanisms in asphalt materials, with chapters covering cracking, deformation, fatigue cracking and healing of asphalt mixtures, as well as moisture damage and the multiscale oxidative aging modelling approach for asphalt concrete. The final section of this book investigates alternative asphalt materials. Chapters within this section review such aspects as alternative binders for asphalt pavements such as bio binders and RAP, paving with asphalt emulsions and aggregate grading optimization.





**Acoustic Emission (AE) and Related Non-destructive Evaluation (NDE) Techniques in the Fracture Mechanics of Concrete**

Fundamentals and Applications

Edited by Masayasu Ohtsu



**ISBN:** 978-1-78242-327-0

**PUB DATE:** April 2015

**FORMAT:** Hardback

**PAGES:** c. 292

**AUDIENCE**

Civil engineers, contractors working in construction and materials scientists working both in industry and academia as well as R&D managers in the textile industry, postgraduate students and academic researchers in textile science

## Acoustic Emission and Related Non-destructive Evaluation Techniques in the Fracture Mechanics of Concrete

*Fundamentals and Applications*

Masayasu Ohtsu Kumamoto University, Japan



An authoritative guide to the research and application of acoustic emission and non-destructive evaluation techniques

A Volume in the Woodhead Publishing Series in Civil and Structural Engineering.

**KEY FEATURES**

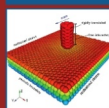
- Presents innovative Acoustic Emission (AE) and related non-destructive evaluation (NDE) techniques, used for damage detection and inspection of aged and deteriorated concrete structures
- Contributions from recognized world-leaders in the application of acoustic emission (AE) and NDE techniques used for the damage assessment of concrete and concrete structures
- With the move towards a more sustainable society, and the need to extend the long-term service life of infrastructure and damage due to recent earthquakes, this book is of critical importance
- An essential knowledge resource for civil engineers, contractors working in construction and materials scientists working both in industry and academia

**DESCRIPTION**

The development of NDT (non-destructive testing) techniques used for the inspection of concrete structures is currently in high demand, because many existing structures have become aged and deteriorated in service. In order to formulate predictions on their stability and to estimate their safety, it is necessary to identify damage signals and to determine their causes. In this regard, the development and establishment of innovative and highly advanced non-destructive methods are required. Acoustic Emission (AE) and related NDE (non-destructive evaluation) techniques have been extensively used to determine crack detection and damage evaluation in concrete.

With the move towards a more sustainable society, and the need to extend the long-term service life of infrastructure and aging and disastrous damage due to recent earthquakes, *Acoustic Emission (AE) and Related Non-destructive Evaluation (NDE) Techniques in the Fracture Mechanics of Concrete: Fundamentals and Applications* is a critical reference source for civil engineers, contractors working in construction and materials scientists working both in industry and academia.





## Modeling, Characterization and Production of Nanomaterials

Electronics, Photonics and  
Energy Applications

Edited by Vinod K. Tewary and Yong Zhang



**ISBN:** 978-1-78242-228-0

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 536

### AUDIENCE

Postgraduate students and academic researchers in electronics, nanoscience and nanotechnology, physics, chemistry, material science and engineering; R&D managers in industrial sectors such as nanotechnology, nanoelectronics, semiconductors, sensors, energy, microsystems technology, optical materials and devices and carbon nanomaterials; design and test engineers working with nanomaterials and nanodevices.

## Modeling, Characterization and Production of Nanomaterials

*Electronics, Photonics and Energy Applications*

Edited by: *V Tewary* National Institute for Standards and Technology (NIST)

*Y Zhang* University of North Carolina, USA



Explores modeling techniques, characterization, structure and properties of nano-scale materials for nanofabrication and nanodevices.

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

- Comprehensive coverage of the close connection between modeling and experimental methods for studying a wide range of nanomaterials and nanostructures
- Focus on practical applications and industry needs, supported by a solid outlining of theoretical background
- Draws on the expertise of leading researchers in the field of nanomaterials from around the world

### DESCRIPTION

Nano-scale materials have unique electronic, optical, and chemical properties which make them attractive for a new generation of devices. Part one of *Modeling, Characterization, and Production of Nanomaterials: Electronics, Photonics and Energy Applications* covers modeling techniques incorporating quantum mechanical effects to simulate nanomaterials and devices, such as multiscale modeling and density functional theory. Part two describes the characterization of nanomaterials using diffraction techniques and Raman spectroscopy. Part three looks at the structure and properties of nanomaterials, including their optical properties and atomic behaviour. Part four explores nanofabrication and nanodevices, including the growth of graphene, GaN-based nanorod heterostructures and colloidal quantum dots for applications in nanophotonics and metallic nanoparticles for catalysis applications.







## Vehicular Communications and Networks

Architectures, Protocols,  
Operation and Deployment

Edited by Wai Chen

WP  
WOODHEAD  
PUBLISHING

**ISBN:** 978-1-78242-211-2

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 310

### AUDIENCE

Postgraduate students and academic researchers in automotive engineering, electronics, computer engineering, telecommunications and networking will find this a useful reference book. It will be of interest to R&D managers in industrial sectors such as the automotive industry, wireless technology, electronics, telecommunications and networking, and information technology, and also to government agencies and standards organisations.

## Vehicular Communications and Networks

*Architectures, Protocols, Operation and Deployment*

Edited by: *W Chen* Telcordia Technologies Inc., USA



**A comprehensive review of the design, development and deployment of vehicular communication systems**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

- Comprehensive coverage of the fundamental principles behind Vehicular Ad-hoc Networks (VANETS) and the rapidly growing need for their further development
- Thorough overview of the design and development of key technologies and devices
- Explores the practical application of this technology by outlining a number of case studies, testbeds and simulations employing vehicular communications and networks

### DESCRIPTION

*Vehicular Communications and Networks: Architectures, Protocols, Operation and Deployment* discusses VANETs (Vehicular Ad-hoc Networks) or VCS (Vehicular Communication Systems), which can improve safety, decrease fuel consumption, and increase the capacity of existing roadways and which is critical for the Intelligent Transportation System (ITS) industry. Part one covers architectures for VCS, part two describes the physical layer, antenna technologies and propagation models, part three explores protocols, algorithms, routing and information dissemination, and part four looks at the operation and deployment of vehicular communications and networks.





## Welding and Joining of Advanced High Strength Steels (AHSS)

Edited by Mahadev Shome  
and Muralidhar Tumuluru

WP

WOODHEAD  
PUBLISHING

## Welding and Joining of Advanced High Strength Steels (AHSS)

Edited by: *M Shome* Head, Material Characterization and Joining Research Group, R&D, Tata Steel, Jamshedpur, India

*Muralidhar Tumuluru* Research Consultant, United States Steel Corporation, USA



**Provides a comprehensive review of the range of welding and other joining technologies for advanced high strength steels (AHSS) and the ways they can best be used to maximize the potential of AHSS**

### KEY FEATURES

- Reviews the properties and manufacturing techniques of advanced high strength steels (AHSS)
- Examines welding processes, performance, and fatigue in AHSS
- Focuses on AHSS welding and joining within the automotive industry

### DESCRIPTION

*Welding and Joining of Advanced High Strength Steels (AHSS): The Automotive Industry* discusses the ways advanced high strength steels (AHSS) are key to weight reduction in sectors such as automotive engineering. It includes a discussion on how welding can alter the microstructure in the heat affected zone, producing either excessive hardening or softening, and how these local changes create potential weaknesses that can lead to failure.

This text reviews the range of welding and other joining technologies for AHSS and how they can be best used to maximize the potential of AHSS.

**ISBN:** 978-0-85709-436-0

**PUB DATE:** late February 2015

**FORMAT:** Hardback

**PAGES:** c. 190

### AUDIENCE

Professionals requiring information on the welding and joining of advanced high strength steels. Researchers and engineers within the steel and automotive industries will find it informative.





## Eco-efficient Materials for Mitigating Building Cooling Needs

Design, Properties and Applications

Edited by **F. Pacheco-Torgal**, J. A. Labrincha,  
L. F. Cabeza and C.-G. Granqvist

WP  
WOODHEAD  
PUBLISHING

**ISBN:** 978-1-78242-380-5

**PUB DATE:** February 2015

**FORMAT:** Hardback

**PAGES:** c. 534

### AUDIENCE

Architects, civil engineers, materials scientists and contractors working in the construction industry

## Eco-efficient Materials for Mitigating Building Cooling Needs

### *Design, Properties and Applications*

Edited by: **Fernando Pacheco-Torgal** Investigator, University of Minho, Portugal  
**João Labrincha** Associate Professor, University of Aveiro, Portugal  
**Luisa Cabeza** Professor, Lleida University, Spain  
**Claes Goeran Granqvist** Ångström Laboratory, Uppsala University, Sweden.



**A state of the art review on eco-efficient materials that could contribute significantly to mitigating building energy cooling needs**

"This book is an effort in promoting a cool scenario by wide-scale utilization of advanced materials to reduce cooling energy use in buildings...it is recommended as a good read to both academics and policy makers".

**Professor Ashem Akbari from Concordia University, Canada**

### KEY FEATURES

- An overview of materials to lessen the impact of urban heat islands
- Excellent coverage of building materials to reduce air conditioning needs
- Innovative products discussed such as Thermo and Electrochromic materials

### DESCRIPTION

Climate change is one of the most important environmental problems faced by Planet Earth. The majority of CO<sub>2</sub> emissions come from burning fossil fuels for energy production and improvements in energy efficiency shows the greatest potential for any single strategy to abate global greenhouse gas (GHG) emissions from the energy sector. Energy related emissions account for almost 80% of the EU's total greenhouse gas emissions. The building sector is the largest energy user responsible for about 40% of the EU's total final energy consumption.

In Europe the number of installed air conditioning systems has increased 500% over the last 20 years, but in that same period energy cooling needs have increased more than 20 times. The increase in energy cooling needs relates to the current higher living and working standards. In urban environments with low outdoor air quality (the general case) this means that in summer-time one cannot count on natural ventilation to reduce cooling needs. Do not forget the synergistic effect between heat waves and air pollution which means that outdoor air quality is worse in the summer aggravating cooling needs. Over the next few years this phenomenon will become much worse because more people will live in cities, more than 2 billion by 2050 and global warming will aggravate cooling needs.





## Reliability characterisation of electrical and electronic systems

Jonathan Swingler



ISBN: 978-1-78242-221-1

PUB DATE: January 2015

FORMAT: Hardback

PAGES: c. 258

**AUDIENCE**

Academics and postgraduate students in electrical and electronic engineering; reliability and testing engineers; electronic product manufacturers; and those working in the following areas: nanotechnology, MEMS, integrated circuits, discrete electronic components, power electronics, modular electronics, electronic medical devices, high-temperature electronics, automotive electronic systems, electronics in aviation, solar power generation systems, power grids.

## Reliability Characterisation of Electrical and Electronic Systems

Edited by: *J Swingler* Heriot-Watt University, UK

**A holistic approach to reliability engineering for electrical and electronic systems, looking at the failure mechanisms, testing methods, failure analysis, characterisation techniques and prediction models that can be used to increase reliability for a range of devices**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

"One chapter stands out in the book Reliability Characterization of Electrical and Electronic Systems, edited by Jonathan Swingler. That chapter is 'Reliability and Stupidity: Mistakes in Reliability Engineering and How to Avoid Them,'...Following are excerpts from that chapter."--

**Power Electronics, *Reliability Characterisation of Electrical and Electronic Systems***

**KEY FEATURES**

- Takes a holistic approach to reliability engineering
- Looks at the failure mechanisms, testing methods, failure analysis, characterisation techniques and prediction models that can be used to increase reliability
- Facilitates a greater understanding of operating conditions, failure mechanisms and the need for testing for a more realistic characterisation

**DESCRIPTION**

This book takes a holistic approach to reliability engineering for electrical and electronic systems by looking at the failure mechanisms, testing methods, failure analysis, characterisation techniques and prediction models that can be used to increase reliability for a range of devices.

The text describes the reliability behavior of electrical and electronic systems. It takes an empirical scientific approach to reliability engineering to facilitate a greater understanding of operating conditions, failure mechanisms and the need for testing for a more realistic characterisation. After introducing the fundamentals and background to reliability theory, the text moves on to describe the methods of reliability analysis and characterisation across a wide range of applications.





## Machine-to-machine (M2M) Communications

Architecture, Performance and Applications

Edited by Carles Antón-Haro and Mischa Dohler



**ISBN:** 978-1-78242-102-3

**PUB DATE:** January 2015

**FORMAT:** Hardback

**PAGES:** c. 410

### AUDIENCE

Postgraduate students and academic researchers in electronics, computer engineering, telecommunications and networking. R&D managers in industrial sectors such as wireless technology, electronics, cellular communications, networking, and information technology.

## Machine-to-machine (M2M) Communications

### Architecture, Performance and Applications

Edited by: **C Antón-Haro** Director of R&D Programs, Centre of Telecommunications Technology of Catalonia (CTTC), Spain

**M Dohler** Professor of Wireless Communications at King's College London, UK



**An important reference for academic researchers and industry specialists in the field of machine-to-machine communications and technologies**

A Volume in the Woodhead Publishing Series in Electronic and Optical Materials.

### KEY FEATURES

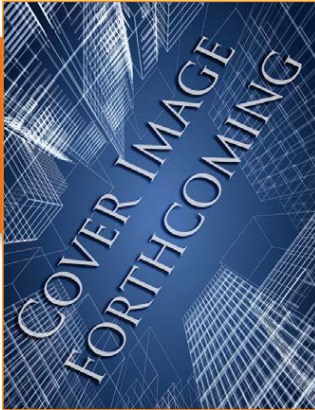
- Examines the opportunities in M2M for businesses
- Analyses the optimisation and development of M2M communications
- Chapters cover aspects of access, scheduling, mobility and security protocols within M2M communications

### DESCRIPTION

Part one of *Machine-to-Machine (M2M) Communications* covers machine-to-machine systems, architecture and components. Part two assesses performance management techniques for M2M communications. Part three looks at M2M applications, services, and standardization.

Machine-to-machine communications refers to autonomous communication between devices or machines. This book serves as a key resource in M2M, which is set to grow significantly and is expected to generate a huge amount of additional data traffic and new revenue streams, underpinning key areas of the economy such as the smart grid, networked homes, healthcare and transportation.





## Introduction to Bioplastics Engineering

Syed Ali Ashter

**William  
Andrew**  
Applied Science Publishers

**A practical engineering approach to the processing, characterization, and applications of biopolymers and biodegradable plastics**

A Volume in the Plastics Design Library Series.

### DESCRIPTION

This book is a practical, user-friendly reference for plastics engineers working with biopolymers and biodegradable plastics addressing topics that are required for the successful development of cohesive bioplastic products.

While there has been considerable demand for the use of bioplastics in industry, and there are many different types of bioplastic currently available, processing these bioplastics is a big challenge. The book provides plastics engineers and researchers with a fundamental, practical understanding of the differences between bioplastics and biodegradable polymers and guidance on the different methods used to process bioplastics.

The book also covers additives and modifiers for biopolymers and their effect on properties. Examples are included of commercial applications of bioplastics, as well as new bioplastics being developed and future trends in the industry.

This enables engineers, researchers, technicians and students to understand the decisive relationship between different processing techniques, morphology, mechanical properties and applications of bio-based polymers, and thus design better products. The book presents a true engineering approach for the industry on the processing of biopolymers and biodegradable plastics – discussing the ease of use of the polymer, mechanical and thermal properties, rate of biodegradation in particular environments, and pros and cons of particular bioplastics.

**ISBN:** 978-0-323-39396-6

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 280

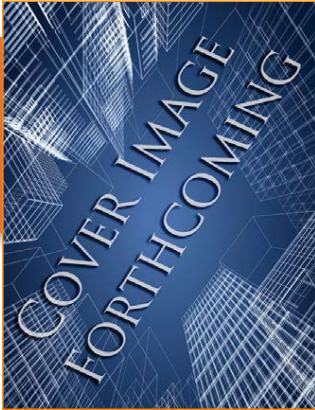
### AUDIENCE

Product development engineers in the field of plastics, particularly in processing and production of biopolymers. Design engineers involved in creating new products and substituting biopolymers into existing products, particularly in packaging, automotive, medical sectors. Biopolymer researchers seeking to learn more about processes and applications.

**ENGINEERING  
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## Chemical Resistance of Commodity Thermoplastics

Edited by: *William Woishnis* Founder, William Andrew Publishing & Plastics Design Library

*Erwin Baur*

*Katja Ruhrberg*

 William  
Andrew  
Applied Science Publishers

The definitive reference for engineers and scientists designing and working with plastics and elastomers in environments where they come into contact with corrosive or reactive substances, from food, pharmaceuticals and medical devices to automotive, aerospace and semiconductor industries

A Volume in the Plastics Design Library Series.

**ISBN:** 978-0-323-47358-3

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 1160

### DESCRIPTION

*Chemical Resistance of Commodity Thermoplastics* provides a comprehensive, cross-referenced compilation of chemical resistance data that explains the effect of thousands of reagents, the environment and other exposure media on the properties and characteristics of commodity thermoplastics – plastics which are generally used in high volumes in a range of applications.

A huge range of exposure media are included from aircraft fuel to alcohol, corn syrup to hydrochloric acid, and salt to silver acetate. This information has been substantially updated, curated and organized by the engineers at M-Base Engineering + Software, a leading supplier of material databases, material information systems, product information systems, and material related simulation software.

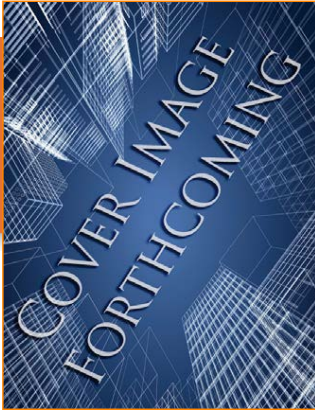
This book is as must-have reference for engineers and scientists designing and working with plastics and elastomers in environments where they come into contact with corrosive or reactive substances, from food, pharmaceuticals and medical devices to automotive, aerospace and semiconductor industries.

ENGINEERING  
MATERIALS

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## Chemical Resistance of Engineering Thermoplastics

Edited by: *William Woishnis* Founder, William Andrew Publishing & Plastics Design Library  
*Erwin Baur*  
*Katja Ruhrberg*

 William Andrew  
Applied Science Publishers

The definitive reference for engineers and scientists designing and working with plastics and elastomers in environments where they come into contact with corrosive or reactive substances, from food, pharmaceuticals and medical devices to automotive, aerospace and semiconductor industries

A Volume in the Plastics Design Library Series.

**ISBN:** 978-0-323-47357-6

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 1160

### DESCRIPTION

Chemical Resistance of Engineering Thermoplastics provides a comprehensive, cross-referenced compilation of chemical resistance data that explains the effect of thousands of reagents, the environment and other exposure media on the properties and characteristics of engineering thermoplastics – plastics which are generally used in higher performance applications.

A huge range of exposure media are included from aircraft fuel to alcohol, corn syrup to hydrochloric acid, and salt to silver acetate. This information has been substantially updated, curated and organized by the engineers at M-Base Engineering + Software, a leading supplier of material databases, material information systems, product information systems, and material related simulation software.

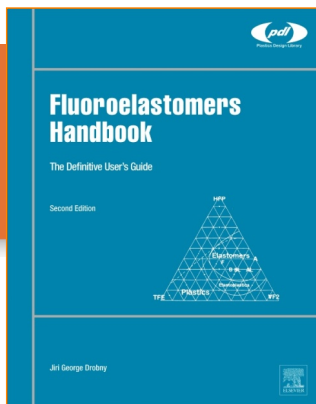
This book is a must-have reference for engineers and scientists designing and working with plastics and elastomers in environments where they come into contact with corrosive or reactive substances, from food, pharmaceuticals and medical devices to automotive, aerospace and semiconductor industries.

ENGINEERING  
MATERIALS

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## Fluoroelastomers Handbook, 2e

*The Definitive User's Guide*

Jiri George Drobny Drobny Polymer Associates, Inc.

**William  
Andrew**  
Applied Science Publishers

**The only comprehensive reference on fluoroelastomer chemistry, processing technology, and applications**

A Volume in the Plastics Design Library Fluorocarbon Series.

### KEY FEATURES

- The only definitive reference work on fluoroelastomer chemistry, processing technology, and applications
- Helps engineers and materials scientists both with day-to-day challenges of using fluoroelastomers, as well as long term research and development programs
- Includes fully updated chapters on chemistry, manufacture and processing of fluoroelastomers, as well as information on properties, applications and disposal and safety issues

### DESCRIPTION

*Fluoroelastomers Handbook* is a comprehensive reference on fluoroelastomer chemistry, processing technology, and applications. This is a must-have reference for materials scientists and engineers in the automotive, aerospace, chemical, chemical process, and power generation industries. Covering both physical and mechanical properties of fluoroelastomers, it is useful in addressing daily challenges in the use of these materials, as well as those of long term research and development programs.

Fluoroelastomers meet rigorous performance requirements in harsh environments, enhancing reliability, safety, and environmental friendliness. Fluoroelastomers are growing as products of choice for critical components such as O-rings, hoses, and seals in hostile fluid and temperature conditions.

Since the publication of the previous edition in 2005, many new findings and developments in chemistry, technology and applications of fluoroelastomers have taken place. This is the only book with updated information on the manufacturing process, cross-linking chemistry and formulation of compounds, as well as mixing, processing and curing methods. A fully revised chapter is included on applications and examples of fluoroelastomer compounds. Safety, hygiene and disposal standards and guidelines have been updated, and a new chapter has been added to discuss new developments and current trends, helping engineers and materials scientists to stay ahead of the curve.

**ISBN:** 978-0-323-39480-2

**PREVIOUS EDITION ISBN:**

978-0-8155-1517-3

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 360

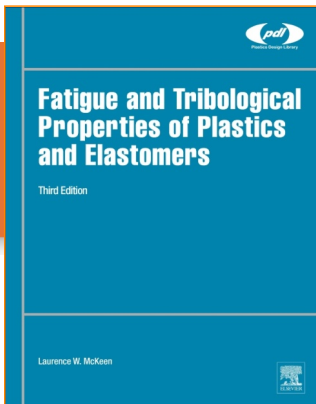
### AUDIENCE

Materials scientists and engineers, chemical engineers, mechanical engineers, machine and automotive designers, polymer scientists and engineers, advanced students of polymer science and engineering, advanced students of materials science, scientists and engineers working in automotive, aerospace and power generating industries

**ENGINEERING  
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## Fatigue and Tribological Properties of Plastics and Elastomers, 3e

Laurence W. McKeen Senior Research Associate, DuPont, Wilmington, DE, USA

**William Andrew**  
Applied Science Publishers

**The definitive databook for engineers and scientists involved in the plastics industry and product design with plastics, covering fatigue and tribology**

### DESCRIPTION

Part of a series of data-rich handbooks within the Plastics Design Library, *Fatigue and Tribological Properties of Plastics and Elastomers* provides a comprehensive collection of graphical multipoint data and tabular data covering the fatigue and tribological performance of plastics.

The handbook is structured by grouping together plastics of similar polymer types into ten chapters. Each of these chapters is split into two sections: Fatigue Properties and Tribological Properties, and together they provide a compendium of several hundred graphs and charts, supplying the core data needed by engineers and scientists on a day-to-day basis.

The data for this third edition has been updated to cover upwards of five years since the previous edition was published, and also includes an entirely new chapter covering sustainable and biodegradable polymers. The book also includes an extensive introductory section covering fatigue, what it is and how it is measured; the fundamentals of tribology; polymer chemistry and plastics composition. These chapters also provide readers with a full understanding of the data section, and how to put it to use as a hard-working information tool.

**ISBN:** 978-0-323-44201-5

**PREVIOUS EDITION ISBN:**

978-0-08-096450-8

**PUB DATE:** April 2016

**FORMAT:** Hardback

**PAGES:** c. 388

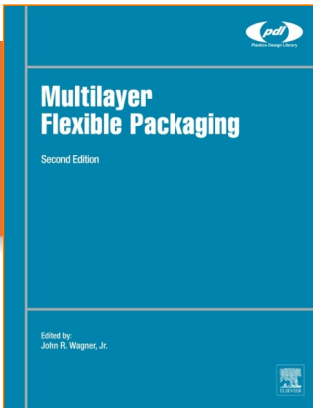
### AUDIENCE

Materials development researchers, academics and practitioners - material engineers/scientists, plastic part designers, process designers and fabricators and the large polymer manufacturers.

**ENGINEERING  
MATERIALS**

**Please contact your Elsevier Sales or Customer Service Representative**





## Multilayer Flexible Packaging, 2e

Edited by: *John R. Wagner, Jr.* Crescent Associates, Inc., Rochester, NY, USA

**William Andrew**  
Applied Science Publishers

**As a comprehensive guide on the topic, this book provides a thorough introduction to the manufacturing and applications of flexible plastic films, covering materials, hardware and processes, and multilayer film designs and applications, giving engineers and technicians a better understanding of the capabilities and limitations of multilayer flexible films and how to use them to make effective packaging**

**ISBN:** 978-0-323-37100-1

**PREVIOUS EDITION ISBN:**  
9780815520214

**PUB DATE:** April 2016

**FORMAT:** Hardback

**PAGES:** c. 284

### **AUDIENCE**

Plastics engineers, process engineers, quality assurance and reliability engineers and manufacturing engineers who manufacture, convert and use flexible plastic films.

A Volume in the Plastics Design Library Series.

### **KEY FEATURES**

- Provides a complete introduction to multilayer flexible packaging, assisting plastics practitioners with the development, design, and manufacture of flexible packaging for food, cosmetics, pharmaceuticals, and more
- Presents thorough, well-written, and up-to-date reviews of the current technology by experts in the field, making this an essential reference for any engineer or manager
- Includes discussion and analysis of the latest rules and regulations governing food packaging

### **DESCRIPTION**

*Multilayer Flexible Packaging, Second Edition*, provides a thorough introduction to the manufacturing and applications of flexible plastic films, covering materials, hardware and processes, and multilayer film designs and applications. The book gives engineers and technicians a better understanding of the capability and limitations of multilayer flexible films and how to use them to make effective packaging.

It includes contributions from world renowned experts and is fully updated to reflect the rapid advances made in the field since 2009, also including an entirely new chapter on the use of bio-based polymers in flexible packaging. The result is a practical, but detailed reference for polymeric flexible packaging professionals, including product developers, process engineers, and technical service representatives.

The materials coverage includes detailed sections on polyethylene, polypropylene, and additives. The dies used to produce multilayer films are explored in the hardware section, and the process engineering of film manufacture is explained, with a particular focus on meeting specifications and targets. In addition, a new chapter has been added on regulations for food packaging – including both FDA and EU regulations.

**ENGINEERING  
MATERIALS**

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## Future Trends in Medical Plastic Engineering and Manufacturing



Markus Schönberger  
Marc Hoffstetter



## Emerging Trends in Medical Plastic Engineering and Manufacturing

*Markus Schönberger* Research Associate, Institute of Medical and Polymer Engineering, Technische Universität München, Germany

*Marc Hoffstetter* Manager, Medical Devices at Scholz-HTIK, Germany

**William Andrew**  
Applied Science Publishers

**This book brings users a practical guide on the state-of-the-art technologies used in plastics for medical devices and healthcare applications, enabling engineers to anticipate new developments and gain a strategic advantage over their competitors**

### KEY FEATURES

- Provides a roadmap to the emerging technologies for polymers in the medical device industry, including coverage of 'intelligent' single use products, personalized medical devices, and the integration of manufacturing steps to improve workflows
- Helps engineers in the biomedical and medical devices industries to navigate and anticipate the special requirements of this field with relation to biocompatibility, sterilization methods, and government regulations
- Presents tactics readers can use to take advantage of rapid prototyping technologies, such as 3D printing, to reduce defects in production and develop products that enable entirely new treatment possibilities

### DESCRIPTION

*Future Trends in Medical Plastic Engineering and Manufacturing* gives engineers and materials scientists working in the field detailed insights into upcoming technologies in medical polymers. While plastic manufacturing combines the possibility of mass production and wide design variability, there are still opportunities within the plastic engineering field which have not been fully adopted in the medical industry. In addition, there are numerous additional challenges related to the development of products for this industry, such as ensuring tolerance to disinfection, biocompatibility, selecting compliant additives for processing, and more.

This book enables product designers, polymer processing engineers, and manufacturing engineers to take advantage of the numerous upcoming developments in medical plastics, such as autoregulated volume-correction to achieve zero defect production or the development of 'intelligent' single use plastic products, and methods for sterile manufacturing which reduce the need for subsequent sterilization processes.

Finally, as medical devices get smaller, the book discusses the challenges posed by miniaturization for injection molders, how to respond to these challenges, and the rapidly advancing prototyping technologies.

**ISBN:** 978-0-323-37023-3

**PUB DATE:** January 2016

**FORMAT:** Hardback

**PAGES:** c. 288

### AUDIENCE

Polymer processing and manufacturing engineers.  
Biomedical engineers. Medical device consultants, process development scientists, design engineers, application engineers.

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# Manufacturing and Novel Applications of Multilayer Polymer Films

Deepak Langhe  
Michael Ponting



**ISBN:** 978-0-323-37125-4

**PUB DATE:** January 2016

**FORMAT:** Hardback

**PAGES:** c. 240

## AUDIENCE

Engineers and polymer scientists in the polymer processing industry. Polymer film producers for various applications – energy, electrical. Academic and Industrial R&D groups related to the field of polymer processing, polymer films, optics, polymer film capacitors and polymer packaging.

## Manufacturing and Novel Applications of Multilayer Polymer Films

*Deepak Langhe* PolymerPlus LLC, Ohio, USA

*Michael Ponting* President of PolymerPlus LLC, Ohio, USA

**William Andrew**  
Applied Science Publishers

**Users will find this first comprehensive summary of state-of-the-art technology in multilayer film processing and related applications useful as a guide to the latest research in commercial production and real world products**

### KEY FEATURES

- Provides a fundamental knowledge of microlayer coextrusion processing, including how to fabricate microlayer structures, the properties of microlayers, and potential applications, including optics, polymer film capacitors, and semiconductors
- Includes an in-depth analysis of all technologies used for producing multilayered films and structures by coextrusion processing
- Thoroughly assesses potential future trends in multilayer coextrusion technology, thus enabling engineers and scientists to stay ahead of the curve in this rapidly advancing area

### DESCRIPTION

*Manufacturing and Novel Applications of Multilayer Polymer Films* discusses the advancements in multilayer technology, including its capability to produce hundreds of layers in a single film by a melt coextrusion process. These engineered films can have significantly enhanced performance properties, allowing films to be made thinner, stronger, and with better sealing properties.

As recent developments in feedstocks and materials have opened up a range of new possibilities, this book discusses different feedstocks, and viscosity and material considerations. It is the first comprehensive summary of the latest technology in multilayer film processing and related applications, and is written from a practical perspective, translating research into commercial production and real world products.

The book provides fundamental knowledge on microlayer coextrusion processing technology, how to fabricate such structures, structure and properties of such microlayers, and potential applications, thus helping research scientists and engineers develop products which not only fulfill their primary function, but can also be manufactured reliably, safely, and economically.

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# Specialized Injection Molding Techniques



Edited by  
Hans-Peter Heim



## Specialized Injection Molding Techniques

Hans-Peter Heim KTP Institute of Plastics Engineering, Paderborn, Germany

William Andrew  
Applied Science Publishers

**A timely survey of technologies, including comprehensive coverage of multicomponent products and processing techniques**

### KEY FEATURES

- Provides information about the basics needed for understanding several special injection molding techniques, including flow phenomena, bonding mechanisms, and thermal behavior
- Covers the basics of each technique and its main mechanisms, i.e., temperature, mold filling, bonding, residual stresses, and material behavior
- Discusses the most relevant processing parameters for each injection molding technique
- Presents a variety of techniques, including gas and water assisted injection molding, multi component injection molding, hybrid injection molding, injection molding of bio-based materials, and techniques for thermoset

### DESCRIPTION

*Special Injection Molding Techniques* covers several techniques used to create multicomponent products, hollow areas, and hard-soft combinations that cannot be produced with standard injection molding processes. It also includes information on the processing techniques of special materials, including foaming agents, bio-based materials, and thermosets.

The book describes the most industrially relevant special injection molding techniques, with a detailed focus on understanding the basics of each technique and its main mechanisms, i.e., temperature, mold filling, bonding, residual stresses, and material behavior, also providing an explanation of process routes and their variants, and discussions of the most influencing process parameters.

As special molding technologies have the potential to transform plastics processing to a highly-efficient, integrated type of manufacturing, this book provides a timely survey of these technologies, putting them into context, accentuating new opportunities, and giving relevant information on processing.

**ISBN:** 978-0-323-34100-4

**PUB DATE:** November 2015

**FORMAT:** Hardback

**PAGES:** c. 248

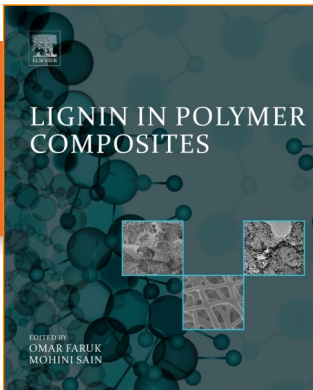
### AUDIENCE

All involved in the injection molding process – mold design engineers, plastic product designers, manufacturing engineers, process engineers and quality control. Automotive, aerospace, packaging, electrical components, medical, houseware and personal care industries.

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## Lignin in Polymer Composites

*Omar Faruk* University of Toronto, Canada

*Mohini Sain* University of Toronto, Canada

**William  
Andrew**  
Applied Science Publishers

**This book provides, for the first time in one place, the state-of-the-art in the development of lignin-based composite materials, also including the processing and property information required to put lignin-based materials into practice in a variety of industries, including automotive, construction, and packaging.**

**ISBN:** 978-0-323-35565-0

**PUB DATE:** October 2015

**FORMAT:** Hardback

**PAGES:** c. 334

### AUDIENCE

Lignin manufacturers, material engineers/scientists, plastic part designers, process designers and fabricators, and polymer manufacturers.

Professors and researchers in polymer composites and biomaterials research groups.

### KEY FEATURES

- Reviews the state-of-the-art on the topic and their applications to composites, including thermoplastic, thermosets, rubber, foams, bioplastics, nanocomposites, and lignin-based carbon fiber composites
- Presents the essential processing and properties information for engineers and materials scientists, enabling the use of lignin in composites
- Provides critical insight into the applications and future trends of lignin-based composites, including advantages, shortcomings, and economics
- Includes a thorough coverage of extraction, modification, processing, and applications of the material

### DESCRIPTION

*Lignin in Polymer Composites* presents the latest information on lignin, a natural polymer derived from renewable resources that has great potential as a reinforcement material in composites because it is non-toxic, inexpensive, available in large amounts, and is starting to be deployed in various materials applications due to its advantages over more traditional oil-based materials.

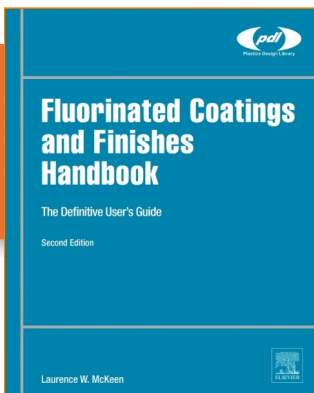
This book reviews the state-of-the-art on the topic and their applications to composites, including thermoplastic, thermosets, rubber, foams, bioplastics, nanocomposites, and lignin-based carbon fiber composites. In addition, the book covers critical assessments on the economics of lignin, including a cost-performance analysis that discusses its strengths and weaknesses as a reinforcement material.

Finally, the huge potential applications of lignin in industry are explored with respect to its low cost, recyclable properties, and fully biodegradable composites, and the way they apply to the automotive, construction, and packaging industries.

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## Fluorinated Coatings and Finishes Handbook,

2e

*The Definitive User's Guide*

Laurence W. McKeen Senior Research Associate, DuPont, Wilmington, DE, USA

William Andrew  
Applied Science Publishers

**This book provides a complete reference and tutorial for fluoropolymer coatings, including the basics of formulations, their effects on coating processes, and troubleshooting solutions for when things do not work as expected. It is the ideal resource for design engineers, coaters, and coatings suppliers interested in the topic.**

A Volume in the Plastics Design Library Series.

**ISBN:** 978-0-323-37126-1

**PREVIOUS EDITION ISBN:**  
978-0-8155-1522-7

**PUB DATE:** October 2015

**FORMAT:** Hardback

**PAGES:** c. 610

### AUDIENCE

Materials development researchers, academics and practitioners-i.e., material engineers/scientists, plastic part designers, process designers and fabricators and the large polymer manufacturers – for instance DuPont.

### KEY FEATURES

- Provides a practical handbook that covers the theory and practice of fluorinated coatings, including the structure and properties of binders and how to get a non-stick coating to stick to the substrate
- Covers liquid and power fluorocoatings, their applications methods, curing and baking processes, and their commercial end uses
- Presents detailed discussions of testing methods related to fluorocoatings, common coating defects, how they form, how to eliminate them, and the health and safety aspects of using and applying fluorocoatings
- Includes substrate preparation, coating properties, baking and curing processes, performance tests, applications, and health and safety

### DESCRIPTION

*Fluorinated Coatings and Finishes Handbook: The Definitive User's Guide, Second Edition*, addresses important, frequently posed questions by end-user design engineers, coaters, and coatings suppliers on fluorinated coatings and finishes, thus enabling them to achieve superior product qualities and shorter product and process development times.

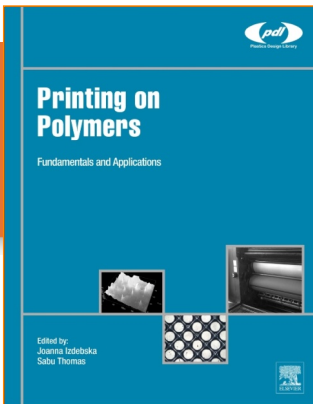
The book provides broad coverage of these fluorinated polymer coatings, including the best known PTFE, polytetrafluoroethylene, first trademarked as Teflon® and ePTFE (GoreTex®).

Their inherent qualities of low surface tension, non-stick, low friction, high melting point, and chemical inertness make fluoropolymer coatings widely desirable across thousands of industrial and consumer applications, but these properties also make it difficult to convert fluoropolymers to coatings that have sufficient adhesion to the substrate to be protected.

In this book, readers learn how fluoropolymer coatings are used and made, about their pigments and fillers, binders, dispersion processes, additives, and solvents. The book includes substrate preparation, coating properties, baking and curing processes, performance tests, applications, and health and safety.







## Printing on Polymers

### Fundamentals and Applications

**Joanna Izdebska** Institute of Mechanics and Printing, Faculty of Production Engineering, Warsaw University of Technology, Poland  
**Sabu Thomas** Mahatma Gandhi University, Kerala, India

**William Andrew**  
Applied Science Publishers

The first authoritative reference covering the most important developments in the field of printing on polymers, their composites, nanocomposites, and gels

#### KEY FEATURES

- Enables engineers to select the correct decoration method for each material and application, assess print quality, and reduce costs
- Increases familiarity with the terminology, tests, processes, techniques, and regulations of printing on plastic, which reduces the risk of adverse reactions, such as cracking, peeling, or dulling of the print
- Addresses the issues of environmental impact and cost when printing on polymeric substrates
- Features contributions from leading researchers from industry, academia, and private research institutions

#### DESCRIPTION

*Printing on Polymers: Fundamentals and Applications* is the first authoritative reference covering the most important developments in the field of printing on polymers, their composites, nanocomposites, and gels.

The book examines the current state-of-the-art and new challenges in the formulation of inks, surface activation of polymer surfaces, and various methods of printing. The book equips engineers and materials scientists with the tools required to select the correct method, assess the quality of the result, reduce costs, and keep up-to-date with regulations and environmental concerns.

Choosing the correct way of decorating a particular polymer is an important part of the production process. Although printing on polymeric substrates can have desired positive effects, there can be problems associated with various decorating techniques. Physical, chemical, and thermal interactions can cause problems, such as cracking, peeling, or dulling. Safety, environmental sustainability, and cost are also significant factors which need to be considered.

With contributions from leading researchers from industry, academia, and private research institutions, this book serves as a one-stop reference for this field—from print ink manufacture to polymer surface modification and characterization; and from printing methods to applications and end-of-life issues.

**ISBN:** 978-0-323-37468-2

**PUB DATE:** September 2015

**FORMAT:** Hardback

**PAGES:** c. 424

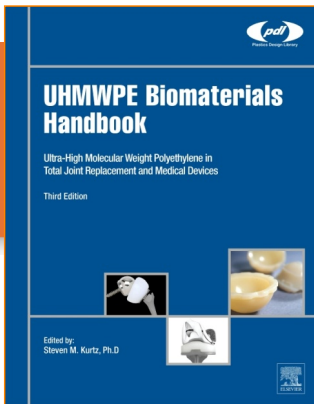
#### AUDIENCE

Plastics engineers and manufacturers, ink manufacturers, resin manufacturers, and packaging, automotive, aerospace, and consumer goods companies. Materials scientists, professors and specialized grad students in polymeric materials and printing.

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## UHMWPE Biomaterials Handbook, 3e

*Ultra High Molecular Weight Polyethylene in Total Joint Replacement and Medical Devices*

*Steven M. Kurtz* Director, Implant Research Center and Associate Professor, Drexel University; Research Assistant Professor, Thomas Jefferson University, Philadelphia, PA, USA

**William  
Andrew**  
Applied Science Publishers

**A one-stop reference work on the properties, clinical performance and latest developments of Ultra High Molecular Weight Polyethylene**

### KEY FEATURES

- The only complete reference for professionals, researchers, and clinicians working with ultra-high molecular weight polyethylene biomaterials technologies for joint replacement and implants
- New edition includes six new chapters on a wide range of topics, including the clinical performance of highly crosslinked polyethylene (HXLPE) in hip and knee replacement, an overview of antioxidant stabilization for UHMWPE, and the medical applications of UHMWPE fibers
- State-of-the-art coverage of the latest UHMWPE technology, orthopedic applications, biomaterial characterization, and engineering aspects from recognized leaders in the field

### DESCRIPTION

*UHMWPE Biomaterials Handbook, Third Edition*, describes the science, development, properties, and application of ultra-high molecular weight polyethylene (UHMWPE) used in artificial joints. UHMWPE is now the material of choice for joint replacements, and is increasingly being used in fibers for sutures. This book is a one-stop reference for information on this advanced material, covering both introductory topics and the most advanced developments.

The third edition adds six new chapters on a range of topics, including the latest in anti-oxidant technologies for stabilizing HXLPE and up-to-date systematic reviews of the clinical literature for HXLPE in hips and knees. The book chronicles the rise and fall of all-metal hip implants, as well as the increased use of ceramic biomaterials and UHMWPE for this application. This book also brings orthopedic researchers and practitioners up to date on the stabilization of UHMWPE with antioxidants, as well as the choices of antioxidant available for practitioners.

The book also thoroughly assesses the clinical performance of HXLPE, as well as alternative bearings in knee replacement and UHMWPE articulations with polyether ether ketone (PEEK).

Written and edited by the top experts in the field of UHMWPE, this is the only state-of-the-art reference for professionals, researchers, and clinicians working with this material.

**ISBN:** 978-0-323-35401-1

**PREVIOUS EDITION ISBN:**  
978-0-12-374721-1

**PUB DATE:** October 2015

**FORMAT:** Hardback

**PAGES:** c. 816

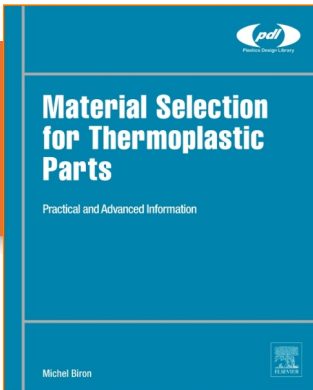
### AUDIENCE

Plastics Engineers, Materials Engineers, Biomedical Engineers; Professionals in Spine and Orthopedic Industry and Academia; Teachers and Students of Biomaterials, Medical Device sector OEMs.

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## Material Selection for Thermoplastic Parts

*Practical and Advanced Information*

Michel Biron Plastics Consultant, Les Ulis, France

**William  
Andrew**  
Applied Science Publishers

**Providing critical data and an intuitive systematic approach to material selection, this book is an important toolkit for any design engineer working with plastics.**

### KEY FEATURES

- Helps engineers to implement a systematic approach to material selection in their work
- Includes more than 300 subfamilies of thermoplastic, and a wide range of properties including chemical resistance, thermal degradation, creep and UV resistance
- Evaluates cost/performance relations and environmental considerations

### DESCRIPTION

As new applications are developed and plastics replace traditional materials in a widening spectrum of existing applications, the potential personal injury, property damage, financial and legal consequences of failure can be high. However, nearly half of plastics failure can be traced back to the original specification and selection of the material.

This book gives engineers the data they need to make an informed decision about the materials they use in their products, imparting a thorough knowledge of the advantages and disadvantages of the various materials to choose from. The data also suggests other candidate materials which the reader may not have originally considered. More than 30,000 thermoplastics grades are grouped into circa. 300 subfamilies, within which over 20 properties are assessed.

The abundance or scarcity of a material and its cost are also often important deciding factors. In this book, an economical overview of the plastics industry helps clarify the actual consumption and costs of thermoplastics including bioplastic, and the relationship of cost vs. performance is also examined for each thermoplastic subfamily. Immediate and long-term common properties are reviewed, including mechanical behavior, impact, thermal properties, and many more. Environmental considerations are also covered, including ease of recycling and sustainability.

ISBN: 978-0-7020-6284-1

PUB DATE: September 2015

FORMAT: Hardback

PAGES: c. 682

### AUDIENCE

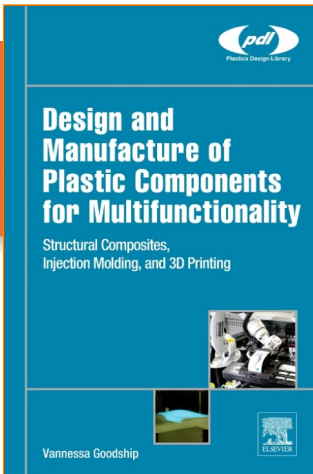
Engineers involved in specification, selection and processing of materials for thermoplastic parts.

R&D engineers in various industries – e.g., automotive and transport, aero, packaging (medical + food in particular), consumer

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ISBN: 978-0-323-34061-8

PUB DATE: September 2015

FORMAT: Hardback

PAGES: c. 218

**AUDIENCE**

Process Engineers, Designers and Manufacturers of both processing machines and materials. Key industries include aerospace, automotive, packaging (food/medical), biomedical.

## Design and Manufacture of Plastic Components for Multifunctionality

*Structural Composites, Injection Molding, and 3D Printing*

*Vanessa Dr Goodship* Warwick University, UK

*Bethany Middleton* Warwick University

*Ruth Cherrington* Warwick University

**William Andrew**  
Applied Science Publishers

**This book provides users with a unified approach to the manufacture of multifunctional materials, bringing together the latest process and material advances, and assessing the advantages and disadvantages of established, and new, manufacturing platforms that span the three core manufacturing methods for multifunctional materials, composites, injection molding, and 3D printing.**

### KEY FEATURES

- Provides an introduction to the latest technologies in the area of multifunctionality, enabling engineers to implement new breakthroughs in their own businesses
- Gives an understanding of the processes that need to be considered in both design and manufacture of future devices, while using materials from a broader palette than used in existing manufacturing processes
- Includes best practice guidance and flow charts to aid in material and process selection
- Covers revolutionary future products with built-in functionality such as sensors, smart packaging, and damage detection technology for everything from milk bottles and salad packaging to automotive bumpers and plane fuselages

### DESCRIPTION

*Design and Manufacture of Plastic Components for Multifunctionality: Structural Composites, Injection Molding, and 3D Printing* presents the latest information on how plastics manufacturers are increasingly being driven towards carbon emission reduction, lightweighting, and cost savings through process integration.

These technologies have the potential to revolutionize future products with built-in functionality such as sensors, smart packaging, and damage detection technology for everything from milk bottles and salad packaging to automotive bumpers and plane fuselages.

This book introduces the three core manufacturing methods for multifunctional materials, composites, injection molding, and 3D printing, all processes facing challenges for the implementation of new technology.

Users will find a book that brings together both process and material advances in this area, giving process engineers, designers, and manufacturers the information they need to choose the appropriate material and process for the product they are developing.

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## Bio-based Plant Oil Polymers and Composites

Edited by:  
Samy Madbouly  
Chaoqun Zhang  
Michael R. Kessler



**ISBN:** 978-0-323-35833-0

**PUB DATE:** August 2015

**FORMAT:** Hardback

**PAGES:** c. 218

### AUDIENCE

Industrial scientists and engineers and academic researchers who focus on plant oil-based polymers, bio-renewable polymers, nanocomposites and fiber reinforced composites.

## Bio-based Plant Oil Polymers and Composites

*Samy Madbouly* Iowa State University, USA

*Chaoqun Zhang* Iowa State University, USA

*Michael R. Kessler* Washington State University, USA

**William  
Andrew**  
Applied Science Publishers

**This go-to resource on processing, characterizing, and applying plant oil-based polymeric and composite materials helps engineers and scientists meet the growing demand for sustainable materials and products**

### KEY FEATURES

- Essential coverage of processing, characterization, and the latest research into polymeric materials and composites derived from plant oils (thermoplastics, thermosets, nanocomposites, and fiber reinforced composites)
- Critically reviews the potential applications of plant oil-based polymers, including sensors, structural parts, medical devices, and automotive interiors
- Includes the latest developments in multifunctional bio-based polymer composites

### DESCRIPTION

*Bio-based Plant Oil Polymers and Composites* provides engineers and materials scientists a useful framework to help take advantage of the latest research conducted in this rapidly advancing field—enabling them to develop and commercialize their own products quickly and more successfully.

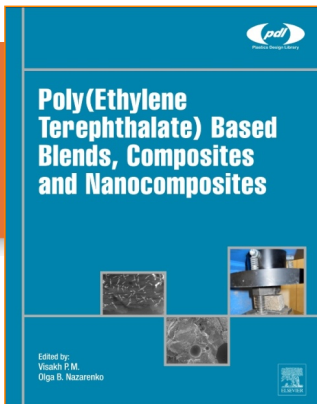
Plant oil is one of the most attractive options as a substitute for non-renewable resources in polymers and composites, and is producing materials with very promising thermomechanical properties relative to traditional, petroleum-based polymers. In addition to critical processing and characterization information, the book assists engineers in deciding whether or not they should use a plant oil-based polymer over a petroleum-based polymer, discussing sustainability concerns, biodegradability, associated costs, and recommended applications.

The book details the advancements in the development of polymeric materials and composites from plant oils, and provides a critical review of current applications in various fields, including packaging, biomedical, and automotive applications. Also includes the latest progress in developing multifunctional biobased polymers—by increasing thermal conductivity or adding antibacterial properties, for example.

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ISBN: 978-0-323-31306-3

PUB DATE: August 2015

FORMAT: Hardback

PAGES: c. 240

#### AUDIENCE

Engineers, Academics and R&D  
Researchers working in the area of poly(ethylene terephthalate) based blends, composites and nanocomposites; PhD students in Polymer Sciences and Nanotechnology

## Poly(Ethylene Terephthalate) Based Blends, Composites and Nanocomposites

Edited by: *P. M. Visakh* School of Chemical Sciences, Mahatma Gandhi University, India

*Mong Liang* Department of Applied Chemistry, National Chiayi University, Taiwan

William  
Andrew  
Applied Science Publishers

The first book on PET-materials, preparation, modification, structure-property relationships and characterization enables researchers and engineers to leverage PET in industries ranging from aerospace to energy

#### KEY FEATURES

- Provides a systematic overview on all types of poly(ethylene) terephthalate (PET) based blends, composites and nanocomposites
- Informs about characterization, structure-property relationships and types of modifications
- Links material properties to specific applications, enabling engineers to make the best material choice to increase product performance and cost efficiency, in industries ranging from aerospace to energy

#### DESCRIPTION

Poly(Ethylene Terephthalate) (PET) is an industrially important material which is not treated specifically in any other book.

*Poly(Ethylene Terephthalate) Based Blends, Composites and Nanocomposites* fills this gap and systematically guides the reader through all aspects of PET and its blends, composites and nanocomposites. It covers theoretical fundamentals, nanocomposites preparation, modification techniques, structure-property relationships, characterisation of the different blends and composites, and material choice for specific applications.

Consisting of contributions from experts in the field this book is a useful reference for the researchers and engineers working on the development and characterization of PET materials as well as on implementing them in real-world products. It can also be used as a standard reference for deeper insight in the mechanical, thermal, thermo-mechanical and visco-elastic aspects in product design decisions.

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## Biopolymers: Applications and Trends

Michael Niaounakis



**ISBN:** 978-0-323-35399-1

**PUB DATE:** August 2015

**FORMAT:** Hardback

**PAGES:** c. 588

### AUDIENCE

Product development engineers in the field of plastics, particular in processing and production of biopolymers. Design engineers involved in creating new products and substituting biopolymers into existing products, particularly in packaging, automotive, medical sectors. Biopolymer researchers seeking to learn more about processes and applications.

## Biopolymers: Applications and Trends

Michael Niaounakis European Patent Office, Rijswijk, Netherlands

**William  
Andrew**  
Applied Science Publishers

**Provides an up-to-date summary of the varying market applications of biopolymers characterized by biodegradability and sustainability**

### KEY FEATURES

- Provides an up-to-date summary of the varying market applications of biopolymers characterized by biodegradability and sustainability
- Includes tables with the commercial names and properties of each biopolymer family, along with biopolymers for each marketing segment
- Presents a thorough breakdown of the vast range of application areas, including medical and pharmaceutical, packaging, construction, automotive, and many more
- Uses recent patent information to convey the latest applications and techniques in the area, thus further illustrating the rapid pace of development and need for intellectual property

### DESCRIPTION

*Biopolymers: Applications and Trends* provides an up-to-date summary of the varying market applications of biopolymers characterized by biodegradability and sustainability. It includes tables with the commercial names and properties of each biopolymer family, along with biopolymers for each marketing segment, not only presenting all the major market players, but also highlighting trends and new developments in products.

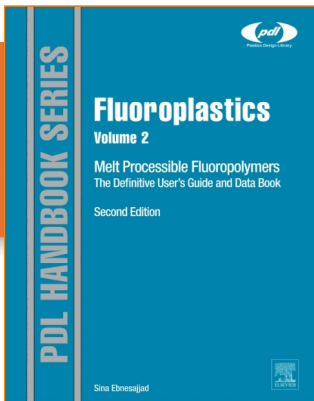
The book includes a thorough breakdown of the vast range of application areas, including medical and pharmaceutical, packaging, construction, automotive, and many more, giving engineers critical materials information in an area which has traditionally been more limited than conventional polymers.

In addition, the book uses recent patent information to convey the latest applications and techniques in the area, thus further illustrating the rapid pace of development and need for intellectual property for companies working on new and innovative products.

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**ISBN:** 978-1-4557-3197-8

**PREVIOUS EDITION ISBN:**

978-1-884207-96-9

**PUB DATE:** August 2015

**FORMAT:** Hardback

**PAGES:** c. 746

**AUDIENCE**

Engineers and other professionals that use and process fluoropolymers across different industries in all important segments including automotive, aerospace, electronic, pharmaceutical, food, beverage, chemical processing, semiconductor, furniture, printing/publishing, lubricant oil/grease, oil/gas, medical device, and plastic compounding. Professionals involved in polymer manufacturing and part fabrication. End-users of fluoropolymers and students.

## Fluoroplastics, Volume 2, 2e

*Melt Processible Fluoropolymers - The Definitive User's Guide and Data Book*

Sina Ebnesajjad Fluoroconsultants Group, Chadds Ford, PA, USA

 William Andrew  
Applied Science Publishers

**An all-encompassing handbook and unique reference for melt-processible fluoropolymers, including their material properties, fabrication, and applications**

### KEY FEATURES

- Exceptionally broad and comprehensive coverage of melt processible fluoropolymers processing and applications
- Provides a practical approach, written by long-standing authorities in the fluoropolymers industry
- Thoroughly updated and significantly expanded revision covering new technologies and applications, and addressing the changes that have taken place in the fluoropolymer markets

### DESCRIPTION

*Fluoroplastics, Volume 2: Melt Processible Fluoropolymers - The Definitive User's Guide and Data Book* compiles the working knowledge of the polymer chemistry and physics of melt processible fluoropolymers with detailed descriptions of commercial processing methods, material properties, fabrication and handling information, technologies, and applications, also including history, market statistics, and safety and recycling aspects.

Both volumes of *Fluoroplastics* contain a large amount of specific property data useful for users to readily compare different materials and align material structure with end use applications.

Volume Two concentrates on melt-processible fluoropolymers used across a broad range of industries, including automotive, aerospace, electronic, food, beverage, oil/gas, and medical devices.

This new edition is a thoroughly updated and significantly expanded revision covering new technologies and applications, and addressing the changes that have taken place in the fluoropolymer markets.

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# Mechanics of Solid Polymers

Theory and Computational Modeling

Jorgen Bergstrom



## Mechanics of Solid Polymers

*Theory and Computational Modeling*

*Jorgen S Bergstrom* Principal Engineer, Veryst Engineering LLC, Needham Heights, MA, USA



**An essential reference work on solid polymer mechanics, experimental characterization, and behaviour prediction in different load environments**

### KEY FEATURES

- Helps professionals deploy the latest experimental polymer testing methods to assess suitability for applications
- Discusses material models for different polymer types
- Shows how to best make use of available finite element software to model polymer behaviour, and includes case studies and example code to help engineers and researchers apply it to their work

### DESCRIPTION

Very few polymer mechanics problems are solved with only pen and paper today, and virtually all academic research and industrial work relies heavily on finite element simulations and specialized computer software. Introducing and demonstrating the utility of computational tools and simulations, *Mechanics of Solid Polymers* provides a modern view of how solid polymers behave, how they can be experimentally characterized, and how to predict their behavior in different load environments.

Reflecting the significant progress made in the understanding of polymer behaviour over the last two decades, this book will discuss recent developments and compare them to classical theories. The book shows how best to make use of commercially available finite element software to solve polymer mechanics problems, introducing readers to the current state of the art in predicting failure using a combination of experiment and computational techniques. Case studies and example Matlab code are also included.

As industry and academia are increasingly reliant on advanced computational mechanics software to implement sophisticated constitutive models – and authoritative information is hard to find in one place - this book provides engineers with what they need to know to make best use of the technology available.

**ISBN:** 978-0-323-31150-2

**PUB DATE:** June 2015

**FORMAT:** Hardback

**PAGES:** c. 508

### AUDIENCE

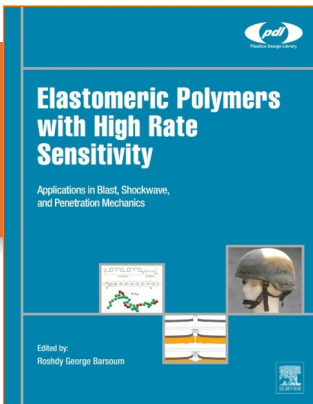
Professional polymer engineers. Advanced undergraduate and graduate students in mechanical engineering, materials science, and bioengineering.

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MATERIALS**

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**ISBN:** 978-0-323-35400-4

**PUB DATE:** June 2015

**FORMAT:** Hardback

**PAGES:** c. 412

**AUDIENCE**

Engineers, designers, architects, polymer developers and manufacturers.

## Elastomeric Polymers with High Rate Sensitivity

*Applications in Blast, Shockwave, and Penetration Mechanics*  
**Roshdy George S Barsoum** Manager of Explosion Resistant Coating JEERCE ACTD, Ships and Engineering Systems Division at the Office of Naval Research, USA

**William Andrew**  
Applied Science Publishers

**The state-of-the-art in the application of elastomeric polymers to mitigate against shock and extreme loading conditions**

### KEY FEATURES

- Material properties and design data included to enable engineers to successfully deploy this technology
- Cheaper, quicker, and more easily implemented than traditional methods of increasing blast and ballistic performance
- A how-to guide to the engineering of high strain rate elastomeric polymers to achieve other useful properties, such as fireproofing

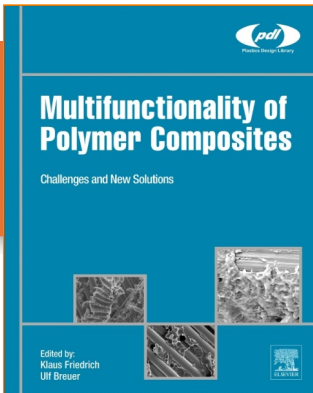
### DESCRIPTION

Recent investigations into blast-resistant properties of polyureas and other multi-phase polymeric elastomers indicate that they can dissipate broad bands of frequencies such as those encountered in blast events. In this unique book, *Elastomeric Polymers with High Rate Sensitivity*, Dr. Roshdy Barsoum and expert contributors bring together the cutting-edge testing methodologies, material properties, and critical design data for engineers seeking to deploy this technology.

Where conventional methods of resisting blast, shockwave, and penetration are expensive, time-consuming and impractical, high-strain rate elastomeric polymers (HSREP) can be cheaper, quicker, and more easily applied to new and old materials alike. This book aids both military and civilian engineers in a range of applications, from buildings and tunnels to lightweight armor, ships, and aircraft.

The book features constitutive models for software developers designing with these advanced polymers, as well as a discussion of the mechanisms of interaction between high-strain rate polymers and other materials. It also thoroughly covers HSREP engineering methods to achieve other unique properties, such as fireproofing.





ISBN: 978-0-323-26434-1

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 964

**AUDIENCE**

Scientists and Engineers in a wide variety of industrial sectors – aero/astronautics, automotive, mechanical engineering, sports and recreation, construction, energy, electrical and chemical industry, shipbuilding, security, medical engineering. Composite Materials/Materials Design courses in academia, for postgraduate students.

## Multifunctionality of Polymer Composites

### *Challenges and New Solutions*

**Klaus Friedrich** Research Consultant, Institute for Composite Materials, Technical University of Kaiserslautern, Germany

**Ulf Breuer** Professor of Composite Technology, Technische Universität Kaiserslautern, and Managing Director of the Institute of Composite Materials

**William Andrew**  
Applied Science Publishers

**Comprehensive tactics on increasing capability and performance while reducing mass, volume, and costs relating to the functionality of reinforced polymers and composites**

#### KEY FEATURES

- Provides information on composites and their inherent engineering advantages over traditional materials.
- Presents state-of-the-art information on this exciting and rapidly developing field, enabling engineers and materials scientists to achieve multi-functionality in their own products.
- Includes the latest developments in a wide range of applications, including automotive/aerospace, electronics, construction, and medical engineering.
- An essential reference for any researcher or engineer hoping to stay ahead of the curve in this high-potential area.

#### DESCRIPTION

*Multi-Functionality of Polymer Composites: Challenges and New Solutions* brings together contributions from experts in the field of multifunctionality, presenting state-of-the-art discussion of this exciting and rapidly developing field, thus key enabling technologies for future applications.

The text will enable engineers and materials scientists to achieve multifunctionality in their own products using different types of polymer matrices and various nano- and micro-sized fillers and reinforcements, including, but not limited to, carbon nanotubes and graphene. In addition, technologies for the integration of active materials such as shape memory alloys are discussed.

The latest developments in a wide range of applications, including automotive/aerospace, electronics, construction, medical engineering, and future trends are discussed, making this book an essential reference for any researcher or engineer hoping to stay ahead of the curve in this high-potential area.

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# Hollow Glass Microspheres for Plastics, Elastomers, and Adhesives Compounds

Edited by:  
Stephen E. Amos  
Baris Yalcin



**ISBN:** 978-1-4557-7443-2

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 280

## AUDIENCE

Engineers, Processors, Compounders, and R&D Scientists dealing with processing of plastics, elastomers and composites. Students of polymer engineering, mechanical engineering, material science, automotive engineering, aerospace engineering; End users of products made of plastics and elastomers with Glass Bubble fillers

## Hollow Glass Microspheres for Plastics, Elastomers, and Adhesives Compounds

*Steve E Amos* Senior Product Development Specialist, 3M Energy and Advanced Materials, USA

*Baris Yalcin* Product Development Specialist, 3M Energy and Advanced Materials, USA

**William Andrew**  
Applied Science Publishers

**A one-stop reference for polymer and rubber glass bubble technologies and applications that enables engineers, designers, and processors to improve product performance and sustainability**

A Volume in the Plastics Design Library Series.

### KEY FEATURES

- Provides best practices for plastics and rubber processing with glass bubbles
- Synthesizes all of the practical and theoretical aspects of glass bubble manufacturing, including its properties, applications, and more
- Describes different end-use applications and how glass bubbles influence various properties, including mechanical, structural, thermal, and optical properties in these applications
- A one-stop reference book that also covers the regulatory and environmental aspects of this important additive

### DESCRIPTION

*Hollow Glass Microspheres for Plastics, Elastomers, and Adhesives Compounds* brings together, for the first time, all of the practical and theoretical aspects of glass bubble manufacturing, including its properties, processing, and applications, as well as regulatory, environmental, and health and safety aspects.

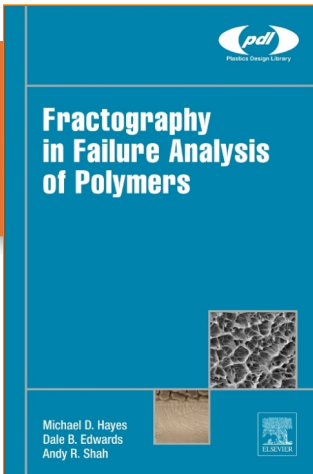
The book enables the reader to evaluate the applicability of glass bubbles to various applications involving polymers in thermoplastics, elastomers, liquid thermosets, and adhesives. It is an indispensable guide for material selection and improving sustainability of products.

Related data sets and case studies complement the book, making it a reference book for plastics processors, product designers, and engineers working with plastics and elastomers, and anyone who wants to improve functionality and performance, make their products lighter, longer lasting, and stronger, all while reducing costs and material needs.

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## Fractography in Failure Analysis of Polymers

*Michael Hayes* Engineering Systems Inc. (ESI), USA

*Dale Edwards* Engineering Systems Inc. (ESI), USA

*Andy Shah* Engineering Systems Inc. (ESI), USA

**William  
Andrew**  
Applied Science Publishers

**A practical guide to the science of fractography and its practical application in the failure analysis of plastic components**

A Volume in the Plastics Design Library Series.

### KEY FEATURES

- Presents a comprehensive guide to applied fractography, enabling improved reliability and longevity of plastic parts and products
- Includes case studies that demonstrate material selection decisions and how to reduce failure rates
- Provides best practices on how to analyze the cause of material failures, along with guidelines on improving design and manufacturing decisions

### DESCRIPTION

*Fractography in Failure Analysis of Polymers* provides a practical guide to the science of fractography and its application in the failure analysis of plastic components. In addition to a brief background on the theory of fractography, the authors discuss the various fractographic tools and techniques used to identify key fracture characteristics.

Case studies are included for a wide range of polymer types, applications, and failure modes, as well as best practice guidelines enabling engineers to apply these lessons to their own work. Detailed images and their appropriate context are presented for reference in failure investigations.

This text is vital for engineers who must determine the root causes of failure when it occurs, helping them further study the ramifications of product liability claims, environmental concerns, and brand image.

**ISBN:** 978-0-323-24272-1

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 236

### AUDIENCE

Plastics Professionals, including manufacturers, product designers, and consultants.

Forensic investigators, either plastics experts or mechanical engineers examining failed parts.  
Educators in materials science.

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# Handbook of Specialty Fluorinated Polymers

Preparation, Properties, and Applications

Susanta Banerjee



## Handbook of Specialty Fluorinated Polymers

*Preparation, Properties, and Applications*

*Susanta Banerjee* Professor of Materials Science at the Indian Institute of Technology, Kharagpur, India

**William Andrew**  
Applied Science Publishers

**ISBN:** 978-0-323-35792-0

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 330

### AUDIENCE

Materials development researchers, academics and practitioners, material engineers/scientists, plastic part designers, process designers and fabricators and large polymer manufacturers

**A unique reference for specialty fluoropolymers, including a thorough review of the latest research, processing properties, and application development for these high performance materials**

### KEY FEATURES

- Thorough coverage of modern applications for specialty fluorinated polymers, including membranes and coatings – giving insight into recent research and the future direction of this technology
- Brings researchers and engineers up to date with the latest developments in specialty fluoropolymers, to assist in future materials research and part design
- Includes detailed assessment of the advantages and shortcomings of specialty fluorinated polymers, for ease of comparison with alternative materials

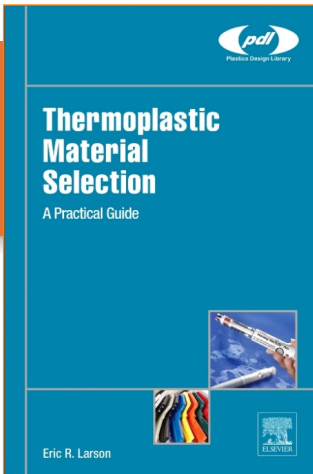
### DESCRIPTION

Fluoropolymers are used in applications demanding service at enhanced temperature while maintaining their structural integrity and have excellent combination of chemical, physical and mechanical properties. Advancements in materials and processing technology mean that a huge amount of research is currently taking place into new, high performance applications for specialty fluorinated polymers.

This book is a complete review of the current research in synthesizing new fluorinated high performance polymers and their application in the field of low dielectric constant materials, membrane based separation (gas and liquid) and proton exchange membranes. Special emphasis is given to the preparation of soluble high performance polymers by incorporating fluorine and different structural elements so as to use these classes of polymers in different membrane based applications, including low dielectric constant materials, gas separation, pervaporation, proton exchange membranes in fuel cells, and more.

The coverage of processing properties and commercial aspects - as well as a practical assessment of the advantages and disadvantages of specialty fluoropolymers compared to other materials - enables engineers and product designers to apply the latest scientific developments in this area in a practical setting.





## Thermoplastic Material Selection

### A Practical Guide

Eric R. Larson Chief Engineer, Art of Mass Production, USA

**William Andrew**  
Applied Science Publishers

**A practical guide to thermoplastic material selection, grounding users in various families, types, and grades and providing the tools to select the most effective formulation**

#### KEY FEATURES

- Presents current information on how proper thermoplastics material selection is a critical component of any manufactured product
- A practical guide to a difficult process, giving the reader a fundamental grounding in thermoplastics material selection and providing the tools they need to save time, money, and frustration
- Delivers insights on the traditional methods of material selection based on performance and cost, and introduces nontraditional methods based on size, form, appearance, and feel

#### DESCRIPTION

*Thermoplastic Material Selection: A Practical Guide* presents current information on how proper material selection is a critical component of any manufactured product. The text is a practical guide to a difficult process, giving the reader a fundamental grounding in thermoplastic materials and providing the tools they need to save time, money, and frustration.

The book provides an overview of the most commonly used thermoplastic materials, including discussions of the different chemical families, plastics categories, and material grades - and the implications of these differences on the material selection process. It provides fresh insights on the traditional methods of material selection based on performance and cost, and also discusses the use of non-traditional methods based on subjective evaluation.

Subsequent sections include references on tools that can be used to conduct further exploration, how to accurately select the most suitable material, writing an effective material specification, and working with material suppliers and distributors.

**ISBN:** 978-0-323-31299-8

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 348

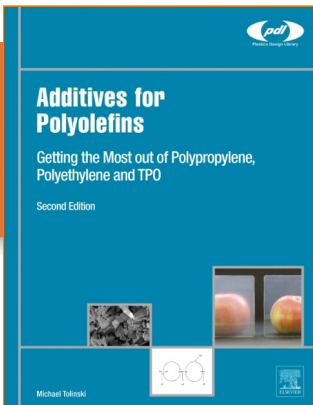
#### AUDIENCE

Designers and engineers engaged in the design and development of new products. Technical professionals responsible for the design and/or production of plastic components.

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**ISBN:** 978-0-323-35884-2

**PREVIOUS EDITION ISBN:**  
978-0-8155-2051-1

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 228

**AUDIENCE**

Early- or mid-career plastics engineers and middle (engineering) managers requiring a basic overview of polyolefin additives. Most likely working in compounding, converting, design, or manufacturing areas of plastics – in sectors including packaging, automotive, consumer products, and construction. Secondary academic audience – such as students or polymer chemists unfamiliar with polyolefin applications.

## Additives for Polyolefins, 2e

*Getting the Most out of Polypropylene, Polyethylene and TPO*

Michael Tolinski Managing Editor, Plastics Engineering magazine (SPE)

**William Andrew**  
Applied Science Publishers

**A practical guide to increasing productivity, enhancing plastics properties, and easing additive selection for those working with polypropylene and polyethylene**

### KEY FEATURES

- Assesses capabilities and costs of a range of additives to enable engineers and scientists to make the correct selection for their property requirements
- Provides concise, practical information about the purpose and use of specific additives, fillers, and reinforcements – demystifying the world of additives by providing clear, engineering explanations, and including real-world application case stories
- Updated to include additional material on nanofillers, blending and handling, and sustainability

### DESCRIPTION

Additives for Polyolefins is a unique quick-reference resource for those who create or use polyethylene and polypropylene compounds—the most commercially important family of plastic materials, making up close to half of the volume all plastics produced and used. These polymers would be useless without various additives.

The book focuses on polyolefin additives that are currently important in the plastics industry, alongside new additives of increasing interest, such as nanofillers and environmentally sustainable materials. As much as possible, each chapter emphasises the performance of the additives in the polymer, and the value each relevant additive brings to polypropylene or polyethylene. Where possible, similar additives are compared by capability and relative cost.

In this new edition, product tables have been updated with the most current product and company names, new case studies have been added, the role of nanofillers is discussed in greater detail, and the book concludes with a discussion on blending and handling additives, along with an entirely new chapter on how engineers can approach the issue of sustainability when choosing an additive.

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## Boron Nitride Nanotubes in Nanomedicine

Edited by: *Gianni Ciofani* Center for Micro-BioRobotics, Italian Institute of Technology  
*Virgilio MATTOLI* Center for Micro-BioRobotics, Italian Institute of Technology



**This reference captures the crucial information on boron nitride nanotubes (BNNTs) needed by biomedicine researchers, with evidence for how BNNTs can be useful in applications such as therapy, tissue regeneration, drug delivery nanovectors and intracellular nanotransducers**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-38945-7

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 192

### AUDIENCE

Academics, industry researchers, and PhD students in materials science, life sciences/biology, molecular biology, pharmacology, chemical-, material- and biomedical engineering, physical and biophysical sciences, radiology, and neuroscience.

### KEY FEATURES

- Covers a range of promising biomedical BNNT applications
- Provides great value not just to academics but also industry researchers in fields such as materials science, molecular biology, pharmacology, biomedical engineering, and biophysical sciences
- Offers evidence for how BNNTs can be useful in biomedical and nanomedicine applications such as therapy, tissue regeneration, nanovectors for drug delivery, and intracellular nanotransducers
- Incorporates, for the first time in a single volume, all the information needed by researchers interested in this promising type of smart nanoparticles and their applications in biomedicine

### DESCRIPTION

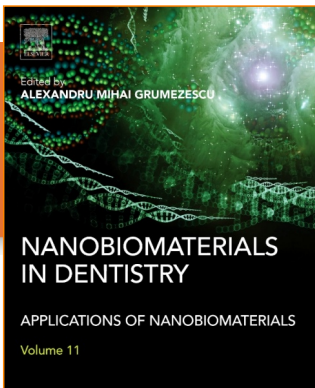
*Boron Nitride Nanotubes in Nanomedicine* compiles, for the first time in a single volume, all the information needed by researchers interested in this promising type of smart nanoparticles and their applications in biomedicine. Boron nitride nanotubes (BNNTs) represent an innovative and extremely intriguing class of nanomaterials.

After introducing BNNTs and explaining their preparation and evaluation, the book shows how the physical, chemical, piezoelectric and biocompatibility properties of these nanotubes give rise to their potential uses in biomedicine. Evidence is offered (from both in vitro and in vivo investigations) for how BNNTs can be useful in biomedical and nanomedicine applications such as therapeutic applications, tissue regeneration, nanovectors for drug delivery, and intracellular nanotransducers.

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NANOTECHNOLOGY**

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**ISBN:** 978-0-323-42867-5

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 380

**AUDIENCE**

Academic: Materials science, biotechnology, applied chemistry - professors, PhD, MsC, postdocs, upper level undergraduates  
Industry: pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers, advanced dental clinicians.

## Nanobiomaterials in Dentistry

### *Applications of Nanobiomaterials*

Edited by: *Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania

 William Andrew  
Applied Science Publishers

**This unique reference explores current synthesis methods and novel technologies involving nanostructured bio-active materials with applications in dentistry, including the advantages and disadvantages of each**

#### KEY FEATURES

- Offers an updated and highly structured reference material for students, researchers, and practitioners working in biomedical, biotechnological, and engineering fields
- Serves as a valuable resource of recent scientific progress, along with most known applications of nanomaterials in the biomedical field
- Features novel opportunities and ideas for developing or improving technologies in nanomedicine and dentistry

#### DESCRIPTION

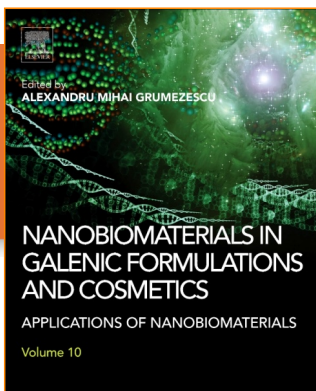
*Nanobiomaterials in Dentistry: Applications of Nanobiomaterials* discusses synthesis methods and novel technologies involving nanostructured bio-active materials with applications in dentistry. This book provides current research results for those working in an applied setting. The advantage of having all this information in one coherent text will be the focused nature of the chapters and the ease of which this information can be accessed.

This collection of titles brings together many of the novel applications these materials have in biology and discusses the advantages and disadvantages of each application and the perspectives of the technologies based on these findings. At the moment there is no other comparable book series covering all the subjects approached in this set of titles.

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NANOTECHNOLOGY

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**ISBN:** 978-0-323-42868-2

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 380

**AUDIENCE**

Academic: Materials science, biotechnology, applied chemistry - professors, PhD, MsC, postdocs, upper level undergraduates

Industry: pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers, advanced clinicians (e.g. in dentistry).

## Nanobiomaterials in Galenic Formulations and Cosmetics

### *Applications of Nanobiomaterials*

Edited by: *Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania



**This unique reference explores the application of nanotechnology in galenic formulations and cosmetics and brings together many of the novel applications these materials have in biology, including their advantages and disadvantages**

#### KEY FEATURES

- Offers an updated and highly structured reference material for students, researchers, and practitioners working in biomedical, biotechnological, and engineering fields
- Serves as a valuable resource of recent scientific progress, along with most known applications of nanomaterials in the biomedical field
- Features novel opportunities and ideas for developing or improving technologies in nanomedicine and nanobiology

#### DESCRIPTION

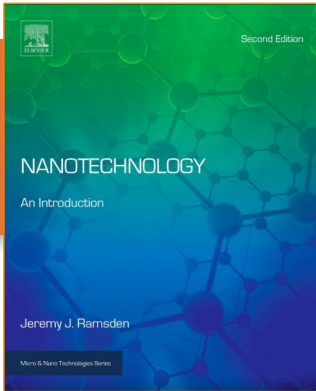
*Nanobiomaterials in Galenic Formulations and Cosmetics: Applications of Nanobiomaterials* is one of the first books on the market related to the application of nanotechnology in galenic formulations and cosmetics. This book provides the results of current research for those working in an applied setting. The advantage of having all this information in one coherent text is the focused nature of the chapters and the ease of which this information can be accessed.

This collection of titles brings together many of the novel applications these materials have in biology, and discusses the advantages and disadvantages of each application and the perspectives of the technologies based on these findings. At the moment there is no other comparable book series covering all the subjects approached in this set of titles.

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## Nanotechnology, 2e

### An Introduction

Jeremy Ramsden Chair of Nanotechnology, Cranfield University, UK

**William  
Andrew**  
Applied Science Publishers

**This book provides an overview of the rapidly growing and developing field of nanotechnology, focusing on key essentials that are structured around a robust anatomy of the subject to give a broad, authoritative introduction to its possibilities and limitations**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-39311-9

**PREVIOUS EDITION ISBN:**

978-0-08-096447-8

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 336

#### AUDIENCE

Engineers, scientists, and developers in biotechnology, micro- and nanotechnology, and MEMS; Students following interdisciplinary nanotechnology programs.

#### KEY FEATURES

- Provides an overview of the rapidly growing and developing field of nanotechnology
- Focuses on key essentials, and structured around a robust anatomy of the subject
- Brings together the principles, theory, and practice of nanotechnology, giving a broad, yet authoritative, introduction to the possibilities and limitations of this exciting and rapidly developing field

#### DESCRIPTION

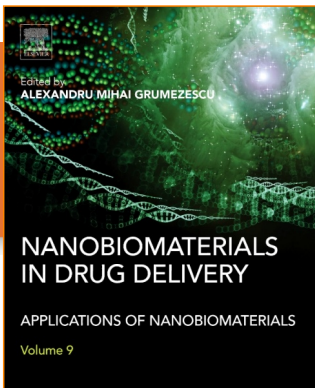
*Nanotechnology: An Introduction, Second Edition*, is ideal for the newcomer to nanotechnology, someone who also brings a strong background in one of the traditional disciplines, such as physics, mechanical or electrical engineering, or chemistry or biology, or someone who has experience working in microelectromechanical systems (MEMS) technology.

This book brings together the principles, theory, and practice of nanotechnology, giving a broad, yet authoritative, introduction to the possibilities and limitations of this exciting and rapidly developing field. The book's author, Prof Ramsden, also discusses design, manufacture, and applications and their impact on a wide range of nanotechnology areas.

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## Nanobiomaterials in Drug Delivery

### *Applications of Nanobiomaterials*

Edited by: *Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania

**William  
Andrew**  
Applied Science Publishers

**This title brings together a wide, disparate field from the perspective of nanomaterial drug therapies, providing readers with an easy-to-grasp overview of its many applications, also discussing the advantages and disadvantages of each application and the perspectives of the technologies based on these findings**

**ISBN:** 978-0-323-42866-8

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 590

#### **AUDIENCE**

Academic: Materials science, biotechnology and applied chemistry professors, PhD, MsC, postdocs, upper level undergraduate. Industry: pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers, advanced clinicians (e.g. in dentistry).

#### **KEY FEATURES**

- Provides up-to-date and well-structured reference material for students, researchers, and practitioners working in the biomedical, biotechnological, and engineering fields
- Presents a valuable guide to recent scientific progress, along with most known applications of nanomaterials in the biomedical area
- Proposes novel opportunities and ideas for developing or improving technologies in nanomedicine/nanobiology

#### **DESCRIPTION**

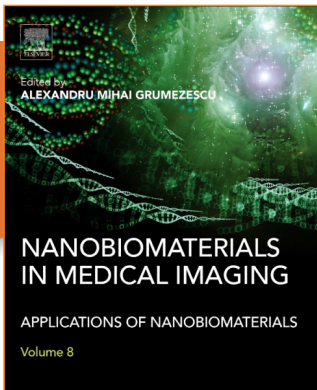
*Nanobiomaterials in Drug Delivery: Applications of Nanobiomaterials* presents novel approaches regarding nanostructured drug delivery systems, revealing the most investigated materials for the development of particular nanobioshuttles. This book brings the results of current research to reach those who wish to use this knowledge in an applied setting, providing one coherent text, with focused chapters and easily accessible information.

At its core, it is a collection of titles, bringing together many of the novel applications these materials have in biology, also discussing the advantages and disadvantages of each application and the perspectives of the technologies based on these findings. At the moment, there is no other comparable book series covering all the subjects approached in this set of titles.

**ENGINEERING  
NANOTECHNOLOGY**

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**ISBN:** 978-0-323-41736-5

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 460

#### **AUDIENCE**

Academic: Materials science, biotechnology and applied chemistry professors, PhD, MSc, postdocs, upper level undergraduate students.

Industry: Pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers, advanced clinicians.

## **Nanobiomaterials in Medical Imaging**

### ***Applications of Nanobiomaterials***

Edited by: *Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania

**William  
Andrew**  
Applied Science Publishers

**A comprehensive overview of the latest advances in the use of nanomaterials in the medical imaging industry, with a particular focus on recent applications of research.**

#### **KEY FEATURES**

- A valuable resource for researchers, practitioners and students working in biomedical, biotechnological and engineering fields.
- A detailed guide to recent scientific progress, along with the latest application methods.
- Presents innovative opportunities and ideas for developing or improving technologies in nanomedicine and medical imaging.

#### **DESCRIPTION**

*Nanobiomaterials in Medical Imaging* presents the latest developments in medical exploratory approaches using nanotechnology. Leading researchers from around the world discuss recent progress and state-of-the-art techniques.

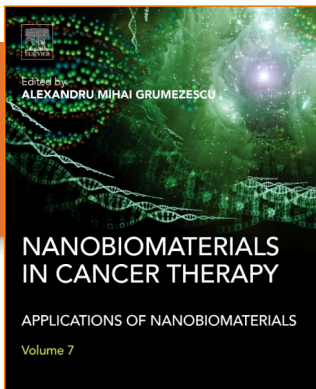
The book covers synthesis and surface modification of multimodal imaging agents, popular examples of nanoparticles and their applications in different imaging techniques, and combinatorial therapy for the development of multifunctional nanocarriers. The advantages and potential of current techniques are also considered.

This book will be of interest to postdoctoral researchers, professors and students engaged in the fields of materials science, biotechnology and applied chemistry. It will also be highly valuable to those working in industry, including pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers and advanced clinicians.

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NANOTECHNOLOGY**

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## Nanobiomaterials in Cancer Therapy

### *Applications of Nanobiomaterials*

Edited by: *Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania

 William  
Andrew  
Applied Science Publishers

**This comprehensive series explores the current emerging therapeutic, diagnostic, and drug delivery applications of nanobiomaterials in the fields of cancer research and oncology, including coverage of current technologies used for the development of future anti-tumor drugs, with an emphasis on applied settings**

ISBN: 978-0-323-42863-7

PUB DATE: May 2016

FORMAT: Hardback

PAGES: c. 380

#### AUDIENCE

Academic: Materials science, biotechnology and applied chemistry professors, PhD, MsC, postdocs, upper level undergraduate students.

Industry: Pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers, advanced clinicians.

#### KEY FEATURES

- A comprehensive resource for researchers, practitioners and students working in biomedical, biotechnological and engineering fields.
- A valuable guide to recent scientific progress and the latest application methods.
- Discusses novel opportunities and ideas for developing or improving technologies in nanomedicine and nanobiology.

#### DESCRIPTION

*Nanobiomaterials in Cancer Therapy* presents the major applications of nanobiomaterials in oncology, offering an up-to-date overview of the latest research in this field. Utilizing nanobiomaterials, novel therapeutic approaches enable significant improvements in drug-loading capacity, formulation stability and drug efficiency.

In this book, leading researchers from around the world share their expertise and unique insights. The book covers the fabrication methods of platforms for multimodal and combinatorial therapeutic options, along with simultaneous and real-time cancer imaging, and innovative approaches for oncology by passive or active pathways of multifunctional nanocarriers. The work also classifies and discusses engineered nanobiosystems for cancer therapy, prevention, and low cancer recurrence or relapse.

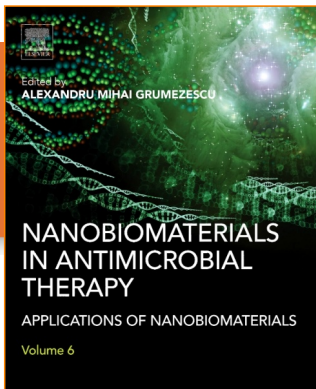
This book will be of interest to postdoctoral researchers, professors and students engaged in the fields of materials science, biotechnology and applied chemistry. It will also be highly valuable to those working in industry, including pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers and advanced clinicians.

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**ISBN:** 978-0-323-42864-4

**PUB DATE:** April 2016

**FORMAT:** Hardback

**PAGES:** c. 380

**AUDIENCE**

Materials science, biotechnology, applied chemistry - professors, PhD, MsC, postdocs, upper level undergraduates

Industry: pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers.

## Nanobiomaterials in Antimicrobial Therapy

### *Applications of Nanobiomaterials*

Edited by: *Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania



**A comprehensive guide to how nanomaterial technology is used to stop and treat infection, based on the latest research and current application methods.**

**KEY FEATURES**

- A methodical approach to this highly relevant subject for researchers, practitioners and students working in biomedical, biotechnological and engineering fields.
- A valuable guide to recent scientific progress and the latest application methods.
- Proposes novel opportunities and ideas for developing or improving technologies in nanomedicine and nanobiology.

**DESCRIPTION**

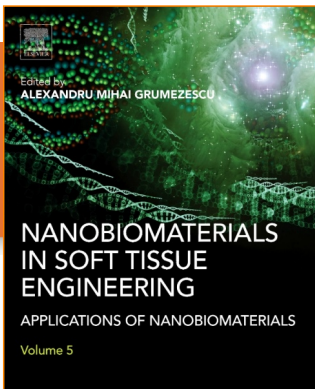
*Nanobiomaterials in Antimicrobial Therapy* presents novel antimicrobial approaches that enable nanotechnology to be used effectively in the treatment of infections. This field has gained a large amount of interest over the last decade, in response to the high resistance of pathogens to antibiotics.

Leading researchers from around the world discuss the synthesis routes of nanobiomaterials, characterization, and their applications as antimicrobial agents. The book covers various aspects: mechanisms of toxicity for inorganic nanoparticles against bacteria; the development of excellent carriers for the transport of a high variety of antimicrobials; the use of nanomaterials to facilitate both diagnosis and therapeutic approaches against infectious agents; strategies to control biofilms based on enzymes, biosurfactants, or magnetotactic bacteria; bacterial adhesion onto polymeric surfaces and novel materials; and antimicrobial photodynamic inactivation.

This book will be of interest to postdoctoral researchers, professors and students engaged in the fields of materials science, biotechnology and applied chemistry. It will also be highly valuable to those working in industry, including pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers and advanced clinicians.







**ISBN:** 978-0-323-42865-1

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 496

**AUDIENCE**

Academic: Materials science, biotechnology and applied chemistry professors, PhD, MsC, postdocs, upper level undergraduate students.

Industry: Pharmaceutics and biotechnology companies, medical researchers, biomedical engineers, advanced clinicians.

## Nanobiomaterials in Soft Tissue Engineering

### *Applications of Nanobiomaterials*

Edited by: *Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania



**An exceptional reference source focused specifically on the use of nanomaterials in soft tissue therapies, covering a comprehensive selection of methods and applications based on the latest research.**

#### KEY FEATURES

- An informative handbook for researchers, practitioners and students working in biomedical, biotechnological and engineering fields.
- A detailed and invaluable overview of soft tissue engineering, including the most recent scientific developments.
- Proposes novel opportunities and ideas for developing or improving technologies in nanomedicine and nanobiology.

#### DESCRIPTION

*Nanobiomaterials in Soft Tissue Engineering* brings together recent developments and the latest approaches in the field of soft tissue engineering at the nanoscale, offering a new perspective on the evolution of current and future applications. Leading researchers from around the world present the latest research and share new insights.

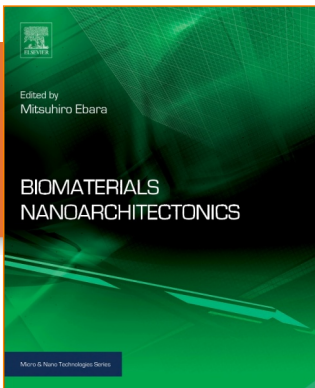
This book covers the major conventional and unconventional fabrication methods of typical three-dimensional scaffolds used in regenerative medicine. Surface modification and spatial properties are included in an up-to-date overview, with the latest in vivo applications of engineered 3D scaffolds discussed. The book also considers the impact, advantages and future scope of the various methods.

This book will be of interest to postdoctoral researchers, professors and students engaged in the fields of materials science, biotechnology and applied chemistry. It will also be highly valuable to those working in industry, including pharmaceutics and biotechnology companies, medical researchers, biomedical engineers and advanced clinicians.

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## Biomaterials Nanoarchitectonics

Edited by: *Mitsuhiro Ebara* National Institute for Materials Science (NIMS), Tsukuba-city, Ibaraki, Japan

**William  
Andrew**  
Applied Science Publishers

**This all-encompassing book on biomaterials nanoarchitectonics provides useful information on the most practical materials design approaches for smart polymer-based materials in regenerative medicine, drug delivery, and their related biomedical applications**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-37127-8

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 348

### AUDIENCE

Scientists and engineers involved in materials design and biomedical applications of nanomaterials, materials scientists, polymer chemists, biomedical scientists, biotechnologists

### KEY FEATURES

- Authored by the team that coined the term nanoarchitectonics, who explain their approach to the design of smart/functional nanomaterials and their applications in the biomedical arena
- Explores how materials designed and produced with nanoarchitectonics methods can be used to enhance the natural regenerative power of the human body
- Enables scientists and researchers to gain a deeper understanding of the specific challenges of materials design at the nanoscale

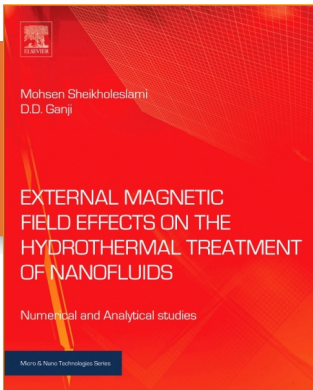
### DESCRIPTION

*Biomaterials Nanoarchitectonics*, written from the perspectives of authors from NIMS and other researchers worldwide, provides readers with an explanation of the theory and techniques of nanoarchitectonics, exploring its applications in biomedical fields, including regenerative medicine, drug delivery, and diagnostic and treatment systems based on pathogenic mechanisms. The book also explains the use of nanomaterials that enable 'materials therapy', in which the materials themselves elicit a sustainable, curative effect from living tissue.

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## External Magnetic Field Effects on Hydrothermal Treatment of Nanofluid

### *Numerical and Analytical Studies*

*Mohsen Sheikholeslami* Department of Mechanical Engineering, Babol Noshirvani University of Technology, Babol, Iran  
*Davood Domairry Ganji* Department of Mechanical Engineering, Babol Noshirvani University of Technology, Babol, Iran

**William Andrew**  
Applied Science Publishers

**A detailed look at the mathematical simulation and modelling of nanofluid flow and heat transfer in the presence of magnetic fields**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-43138-5

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 332

#### **AUDIENCE**

Materials scientists, chemical engineers, chemists and physicists seeking to understand the effects of external magnetic fields on the hydrothermal behavior of nanofluids.

#### **KEY FEATURES**

- Readers will gain a full understanding of the fundamentals in new numerical and analytical methods in MHD (Magnetohydrodynamics)
- Includes complete coverage of governing equations in which nanofluid is used as working fluid, and where magnetic fields are applied to nanofluids
- A single-source reference covering recent progress in computational fluid dynamics and nonlinear science, and its applications to MHD and FHD nanofluid flow and heat transfer

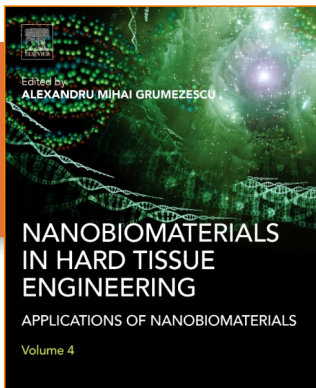
#### **DESCRIPTION**

This book seeks to comprehensively cover recent progress in computational fluid dynamics and nonlinear science and its applications to MHD and FHD nanofluid flow and heat transfer. The book will be a valuable reference source to researchers in various fields, including materials science, nanotechnology, mathematics, physics, information science, engineering and medicine, seeing to understand the impact of external magnetic fields on the hydrothermal behavior of nanofluids in order to solve a wide variety of theoretical and practical problems.

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## Nanobiomaterials in Hard Tissue Engineering

### *Applications of Nanobiomaterials*

Edited by: **Alexandru Grumezescu** Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania

**William Andrew**  
Applied Science Publishers

**A unique reference source focused specifically on the use of nanomaterials in hard tissue therapies, covering a comprehensive selection of methods and applications based on the latest research.**

#### KEY FEATURES

- An up-to-date and highly structured guide for researchers, practitioners and students working in biomedical, biotechnological and engineering fields.
- A detailed and invaluable overview of hard tissue engineering, an increasingly important field.
- Proposes novel opportunities and ideas for developing or improving technologies in nanomedicine and nanobiology.

#### DESCRIPTION

*Nanobiomaterials in Hard Tissue Engineering* covers the latest developments in the field of hard tissue engineering at the nanoscale. Leading researchers from around the world discuss the latest research and offer new insights.

This book presents data about the fabrication and characterization of nanobiomaterials involved in hard tissue reconstruction, describing recent progress and the advantages of both conventional and computer-aided methods. Recent applications of different classes of nanobiomaterials are discussed, with in vitro and in vivo applications also explained in detail. Special attention is paid to the applications of nanobiomaterials in bone regeneration and in the development of functional coatings for tailored implants to improve osseointegration. Finally, the book considers future challenges and perspectives.

This book will be of interest to postdoctoral researchers, professors and students engaged in the fields of materials science, biotechnology and applied chemistry. It will also be highly valuable to those working in industry, including pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers and advanced clinicians.

**ISBN:** 978-0-323-42862-0

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 480

#### AUDIENCE

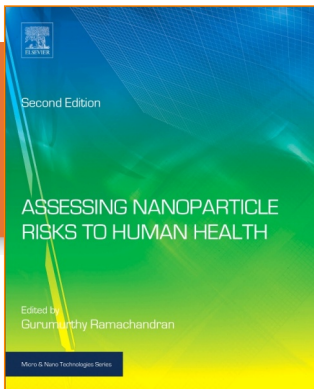
Academic: Materials science, biotechnology and applied chemistry professors, PhD, MsC, postdocs, upper level undergraduate students.

Industry: Pharmaceuticals and biotechnology companies, medical researchers, biomedical engineers, advanced clinicians.

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## Assessing Nanoparticle Risks to Human Health, 2e

Edited by: **Gurumurthy Ramachandran** Division of Environmental Health Sciences, University of Minnesota, USA

**William Andrew**  
Applied Science Publishers

**A systematic look at the risks and uncertainties of nanoparticles with suggestions on new methods for assessing and managing them**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-35323-6

**PREVIOUS EDITION ISBN:**  
978-1-4377-7863-2

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 264

### AUDIENCE

Practitioners of risk assessment in corporate and regulatory sectors who are in the position of making decisions about nanoparticle risks in the absence of definitive evidence of their health risks.

### KEY FEATURES

- Makes essential reading for risk assessment professionals, companies working with nanoparticles, nanotechnology research groups and regulators
- Explores the use of risk assessment methodologies in an occupational health setting, and their limitations
- Provides a framework for evidence-based decision making in a context with many uncertainties

### DESCRIPTION

*Assessing Nanoparticle Risks to Human Health* provides a systematic overview of nanoparticle risks and considers the limitations of this paradigm in a context where extreme uncertainties prevail. As well as exploring conventional risk assessment methodology, the contributing authors investigate several alternate approaches. The adequacy of current frameworks for risk management and regulatory oversights, including corporate approaches in the US and EU, are explored, and suggestions are made as to how these frameworks can be modified to make them more efficient and effective.

Presenting a coherent framework for analysis of the available information, this book presents the latest scientific understanding of the toxicity and health effects of nanoparticles, the technical issues relating to exposure assessment and management, and the ways in which the current risk paradigm can be used/modified to deal with the challenges of nanoparticle risks.

All chapters of this new edition have been thoroughly updated to reflect the many changes in the field since the first edition. Additions and updates in the second edition of the book include:

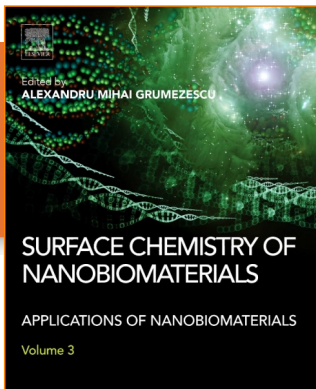
- New exposure assessment strategies for nanomaterials including life cycle exposure assessment approaches and detailed information on nanoparticle exposure control and protection in the workplace.
- A state-of-the-art scientific update on the hazard and risk assessment of nanomaterials: discussion of key additional publications on the toxicology and biokinetics of nanomaterials; available data and methods to characterize the health hazard and risk of exposure to nanomaterials in the workplace; additional examples of the use of such data and methods to develop occupational safety and health guidance; and discussion of progress to date, ongoing efforts, and remaining challenges in nanomaterials hazard and risk characterization.
- New studies on the use of expert judgment in nanotechnology.
- Quantitative data from Lawrence Berkeley National Laboratory's 4-phase study.
- A description and evaluation of new CB tools and new ISO technical specifications.
- A comprehensive update of the legal frameworks in the US and the EU.

With the second edition of *Assessing Nanoparticle Risks to Human Health* Prof. Ramachandran provides researchers and practitioners producing or using nanoparticles, or those involved in nanomaterials risk assessments, technology, health science, policy, safety, environment and regulatory aspects an invaluable reference to adopt the right technologies and strategies and to comply to legal frameworks and regulations. For policy makers and advisory firms it provides the knowledge needed to advise on compliance with or development of new regulations on nanomaterials.

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**ISBN:** 978-0-323-42861-3

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 500

**AUDIENCE**

Academic: Materials science, biotechnology and applied chemistry professors, PhD, MSc, postdocs, upper level undergraduate students.

Industry: Pharmaceutics and biotechnology companies, medical researchers, biomedical engineers, advanced clinicians.

## Surface Chemistry of Nanobiomaterials

### *Applications of Nanobiomaterials*

Edited by: *Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania

**William  
Andrew**  
Applied Science Publishers

**A cutting-edge guide to the chemical aspects of nanomaterials in the biomedical field, covering a comprehensive selection of methods and applications based on the latest research.**

**KEY FEATURES**

- An up-to-date and highly structured reference source for researchers, practitioners and students working in biomedical, biotechnological and engineering fields.
- A valuable guide to recent scientific developments, covering major and emerging applications of nanomaterials in the biomedical field.
- Proposes novel opportunities and ideas for developing or improving technologies in nanomedicine and nanobiology.

**DESCRIPTION**

*Surface Chemistry of Nanobiomaterials* brings together the most recent findings regarding the surface modification of currently used nanomaterials, which is a field that has become increasingly important during the last decade. This book enables the results of current research to reach those who wish to use this knowledge in an applied setting.

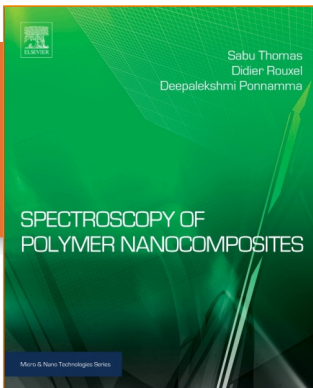
Leading researchers from around the world present various types of nanobiomaterials, such as quantum dots (QDs), carbon nanotubes, silver nanoparticles, copper oxide, zinc oxide, magnesium oxide, magnetite, hydroxyapatite and graphene, and discuss their related functionalization strategies.

This book will be of interest to postdoctoral researchers, professors and students engaged in the fields of materials science, biotechnology and applied chemistry. It will also be highly valuable to those working in industry, including pharmaceutics and biotechnology companies, medical researchers, biomedical engineers and advanced clinicians.

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Sabu Thomas  
Didier Rouxel  
Deepalekshmi Ponnamma

## SPECTROSCOPY OF POLYMER NANOCOMPOSITES

Micro & Nano Technologies Series

**ISBN:** 978-0-323-40183-8

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 478

### AUDIENCE

Scientists, engineers and PhD students in the fields of Polymer Nanocomposites (Materials Science, Polymer Science, Polymer Chemistry, Polymer Physics). Engineers in industries producing and processing polymers.

## Spectroscopy of Polymer Nanocomposites

Edited by: *Sabu Thomas* Mahatma Gandhi University, Kerala, India

*Didier Rouxel* Université de Lorraine, France

*Deepalekshmi Ponnamma* Qatar University, Qatar

**William  
Andrew**  
Applied Science Publishers

**A fundamental review of current knowledge about spectroscopy characterization techniques for polymer nanocomposites – a one-stop reference source for engineers and researchers.**

A Volume in the Micro and Nano Technologies Series.

### KEY FEATURES

- Provides comprehensive coverage of spectroscopy techniques for analyzing polymer nanocomposites.
- Enables researchers and engineers to choose the right technique and make better materials decisions in research and a range of industries.
- Presents the fundamentals, information on structure-property relations, and all other aspects relevant for understanding spectroscopic analyses of nanoreinforced polymers and their applications.

### DESCRIPTION

*Spectroscopy of Polymer Nanocomposites* covers all aspects of the spectroscopic characterization of polymer nanocomposites. More than 25 spectroscopy characterization techniques – almost all used in materials science – are treated in the book, with discussion of their potentialities and limitations. By comparing the techniques with each other and presenting the techniques together with their specific application areas, the book provides scientists and engineers the information needed for solving specific problems and choosing the right technique for analyzing the material structure. From this, the dispersion structure of fillers, property relations and filler-polymer interactions can be determined, and, ultimately, the right materials can be chosen for the right applications.

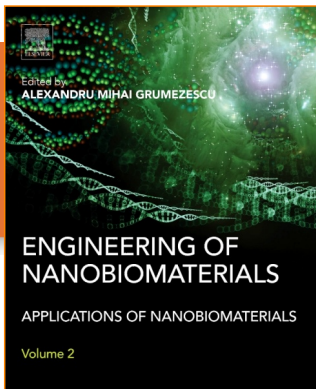
Besides the techniques and structure-property relations, aspects covered include: phase segregation of filler particles, filler agglomeration and deagglomeration, filler dispersion, filler-polymer interactions, surfaces and interfaces. The book also examines recent developments, as well as unresolved issues and new challenges, in the characterization of surfaces and interfaces in polymer nanocomposites. This handpicked selection of topics, and the combined expertise of contributors from industry, academia, government and private research organizations across the globe, make this survey an outstanding reference source for anyone involved in the field of polymer nanocomposites in academia or industry.

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ISBN: 978-0-323-41532-3

PUB DATE: January 2016

FORMAT: Hardback

PAGES: c. 536

#### AUDIENCE

Academic: Materials science, biotechnology and applied chemistry professors, PhD, MsC, postdocs, upper level undergraduate students.

Industry: Pharmaceutics and biotechnology companies, medical researchers, biomedical engineers, advanced clinicians.

## Engineering of Nanobiomaterials

### *Applications of Nanobiomaterials*

Edited by: *Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania

 William  
Andrew  
Applied Science Publishers

**A comprehensive guide to the engineering and specific applications of nanobiomaterials, presenting novel approaches based on the latest research.**

#### KEY FEATURES

- An up-to-date and highly structured reference source for students, researchers and practitioners working in biomedical, biotechnological and engineering fields.
- A valuable guide to recent scientific progress, covering major and emerging applications of nanomaterials in the biomedical field.
- Proposes novel opportunities and ideas for developing or improving engineering technologies in nanomedicine/nanobiology.

#### DESCRIPTION

*Engineering of Nanobiomaterials* presents the most recent information regarding the specific modifications of nanomaterials and of their synthesis methods, in order to obtain particular structures for different biomedical purposes. This book enables the results of current research to reach those who wish to use this knowledge in an applied setting.

Engineered nanobiomaterials, designed from organic or inorganic raw materials, offer promising alternatives in many biomedical applications. In this book, eminent researchers from around the world discuss the various applications, including antibacterial therapy, biosensors, cancer therapy, stimuli-responsive drug release, drug delivery, gene therapy and visual prostheses. In each case, advantages, drawbacks and future potential are outlined.

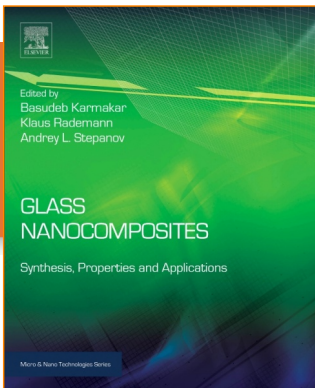
This book will be of interest to students, postdoctoral researchers and professors engaged in the fields of materials science, biotechnology and applied chemistry. It will also be highly valuable to those working in industry, including pharmaceutics and biotechnology companies, medical researchers, biomedical engineers and advanced clinicians.

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Edited by  
Basudeb Karmakar  
Klaus Rademann  
Andrey L. Stepanov

## GLASS NANOCOMPOSITES

Synthesis, Properties and Applications

Micro & Nano Technologies Series

**ISBN:** 978-0-323-39309-6

**PUB DATE:** January 2016

**FORMAT:** Hardback

**PAGES:** c. 388

### AUDIENCE

Researchers (physicists, chemists, materials scientists), Engineers specializing in nanophotonics, plasmonics/optical engineering, solid state lasers, semiconductors, nanoglass ceramics/glass nanocomposites/ceramic engineering, metamaterials and spectroscopy, as well as Practitioners and Students.

## Glass Nanocomposites

### *Synthesis, Properties and Applications*

Edited by: **BASUDEB Karmakar** Glass Science & Technology Section, CSIR-Central Glass and Ceramic Research Institute, Kolkata, India

**Klaus Rademann** Humboldt-Universität zu Berlin, Institut für Chemie, Berlin, Germany

**ANDREY Stepanov** Kazan Physical-Technical Institute, Russian Academy of Sciences, Kazan, Russian Federation

**William  
Andrew**  
Applied Science Publishers

**Researchers and engineers in a range of academic fields and industries, such as optoelectronics, semiconductors, photonics, plasmonics and energy harvesting will find this book to be a one-stop reference source that covers all aspects of glass nanocomposite materials**

A Volume in the Micro and Nano Technologies Series.

### KEY FEATURES

- Provides comprehensive and up-to-date knowledge and literature review for both the oxide and non-oxide glass nanocomposites (i.e., practically all types of glass nanocomposites)
- Reviews a wide range of synthesis types, properties, characterization, and applications of diverse types of glass nanocomposites
- Presents future directions of glass nanocomposites for researchers and engineers, as well as question sets for use in university courses

### DESCRIPTION

*Glass Nanocomposites: Synthesis, Properties and Applications* provides the latest information on a rapidly growing field of specialized materials, bringing light to new research findings that include a growing number of technologies and applications. With this growth, a new need for deep understanding of the synthesis methods, composite structure, processing and application of glass nanocomposites has emerged.

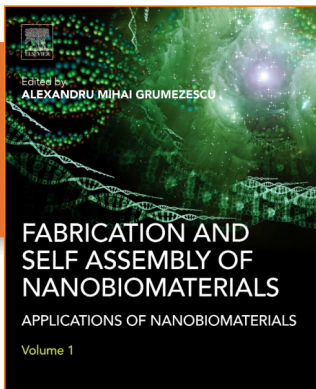
In the book, world renowned experts in the field, Professors Karmakar, Rademann, and Stepanov, fill the knowledge gap, building a bridge between the areas of nanoscience, photonics, and glass technology. The book covers the fundamentals, synthesis, processing, material properties, structure property correlation, interpretation thereof, characterization, and a wide range of applications of glass nanocomposites in many different devices and branches of technology.

Recent developments and future directions of all types of glass nanocomposites, such as metal-glasses (e.g., metal nanowire composites, nanoglass-mesoporous silica composites), semiconductor-glass and ceramic-glass nanocomposites, as well as oxide and non-oxide glasses, are also covered in great depth. Each chapter is logically structured in order to increase coherence, with each including question sets as exercises for a deeper understanding of the text.

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**ISBN:** 978-0-323-41533-0

**PUB DATE:** January 2016

**FORMAT:** Hardback

**PAGES:** c. 500

**AUDIENCE**

Academic: Materials science, biotechnology and applied chemistry professors, PhD, MsC, postdocs, upper level undergraduate students.

Industry: Pharmaceutics and biotechnology companies, medical researchers, biomedical engineers, advanced clinicians.

## Fabrication and Self-Assembly of Nanobiomaterials

### *Applications of Nanobiomaterials*

*Alexandru Grumezescu* Assistant Professor, Department of Science and Engineering of Oxide Materials and Nanomaterials, Faculty of Applied Chemistry and Materials Science and Faculty of Medical Engineering, Politehnica University of Bucharest, Romania



**A unique overview of current knowledge regarding the fabrication and self-assembly of nanobiomaterials for biomedical applications, offering an ideal resource for industry professionals, researchers and students.**

#### KEY FEATURES

- An up-to-date and highly structured reference source for practitioners, researchers and students working in biomedical, biotechnological and engineering fields.
- A valuable guide to recent scientific progress, covering major and emerging applications of nanomaterials in the biomedical field.
- Proposes novel opportunities and ideas for developing or improving technologies in fabrication and self-assembly.

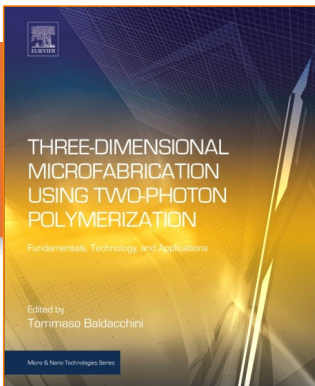
#### DESCRIPTION

*Fabrication and Self-Assembly of Nanobiomaterials* presents the most recent findings regarding the fabrication and self-assembly of nanomaterials for different biomedical applications. Respected authors from around the world offer a comprehensive look at how nanobiomaterials are made, enabling knowledge from current research to be used in an applied setting.

Recent applications of nanotechnology in the biomedical field have developed in response to an increased demand for innovative approaches to diagnosis, exploratory procedures and therapy. The book provides the reader with a strong grounding in emerging biomedical nanofabrication technologies, covering numerous fabrication routes for specific applications are described in detail and discussing synthesis, characterization and current or potential future use.

This book will be of interest to professors, postdoctoral researchers and students engaged in the fields of materials science, biotechnology and applied chemistry. It will also be highly valuable to those working in industry, including pharmaceutics and biotechnology companies, medical researchers, biomedical engineers and advanced clinicians.





## Three-Dimensional Microfabrication Using Two-Photon Polymerization

### *Fundamentals, Technology, and Applications*

Edited by: *Tommaso Baldacchini* Technology and Applications Center, Newport Corporation, Irvine, CA, USA

**William Andrew**  
Applied Science Publishers

**The first comprehensive guide to TPP microfabrication—essential reading for researchers and engineers in areas where miniaturization of complex structures is key**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-35321-2

**PUB DATE:** October 2015

**FORMAT:** Hardback

**PAGES:** c. 486

#### **AUDIENCE**

Scientists involved in microfabrication/ generation of micro- and nano-patterns, in courses such as micromachining, advanced manufacturing and nanotechnology, and in departments of Mechanical and Manufacturing Engineering, Materials Science, Applied Physics, Biomedical Engineering and Physical and Polymer Chemistry

#### **KEY FEATURES**

- Comprehensive account of TPP microfabrication, including both photophysical and photochemical aspects of the fabrication process
- Comparison of TPP microfabrication with conventional and unconventional micromanufacturing techniques
- Covering applications of TPP microfabrication in industries such as microelectronics, optics and medical devices industries, and includes case studies and potential future directions
- Illustrates the freeform capability of TPP using numerous scanning electron microscopy images

#### **DESCRIPTION**

*Three-Dimensional Microfabrication Using Two-Photon Polymerization* (TPP) is the first comprehensive guide to TPP microfabrication—essential reading for researchers and engineers in areas where miniaturization of complex structures is key, such as in the optics, microelectronics, and medical device industries.

TPP stands out among microfabrication techniques because of its versatility, low costs, and straightforward chemistry. TPP microfabrication attracts increasing attention among researchers and is increasingly employed in a range of industries where miniaturization of complex structures is crucial: metamaterials, plasmonics, tissue engineering, and microfluidics, for example.

Despite its increasing importance and potential for many more applications, no single book to date is dedicated to the subject. This comprehensive guide, edited by Professor Baldacchini and written by internationally renowned experts, fills this gap and includes a unified description of TPP microfabrication across disciplines.

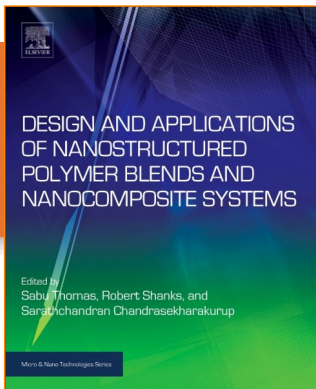
The guide covers all aspects of TPP, including the pros and cons of TPP microfabrication compared to other techniques, as well as practical information on material selection, equipment, processes, and characterization.

Current and future applications are covered and case studies provided as well as challenges for adoption of TPP microfabrication techniques in other areas are outlined. The freeform capability of TPP is illustrated with numerous scanning electron microscopy images.

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## Design and Applications of Nanostructured Polymer Blends and Nanocomposite Systems

Edited by: **Sabu Thomas** Mahatma Gandhi University, Kerala, India  
**Robert Shanks** RMIT University, Melbourne, Australia  
**Sarathchandran Chandrasekharakurup** Mahatma Gandhi University, Kerala, India

**William Andrew**  
Applied Science Publishers

**Provides all the relevant information for developing products based on nanostructured polymer systems—key knowledge for researchers and engineers in a range of industries: electronics, coatings, energy, transport, and medicine.**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-39408-6

**PUB DATE:** September 2015

**FORMAT:** Hardback

**PAGES:** c. 426

### AUDIENCE

Polymer engineers, product designers, researchers and materials scientists within universities, independent research organizations, and government and R&D/industry master, graduate, PhD and post-doc students of polymer science, materials science and nanotechnology.

### KEY FEATURES

- Covers all important information for designing and selecting the right nanostructured polymer system
- Provides specialized knowledge on self-repairing, nanofibre and nanostructured multiphase materials, as well as evaluation and testing of nanostructured polymer systems
- Serves as a reference guide for development of new products in industries ranging from electronics, coatings, and energy, to transport and medical applications
- Describes the design, morphology, and structure of nanostructured polymer composites and blends to achieve specific properties

### DESCRIPTION

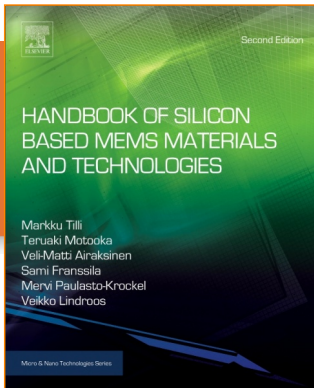
*Design and Applications of Nanostructured Polymer Blend and Nanocomposite Systems* offers readers an intelligent, thorough introduction to the design and applications of this new generation of designer polymers with customized properties. The book assembles and covers, in a unified way, the state-of-the-art developments of this less explored type of material.

With a focus on nanostructured polymer blends, the book discusses the science of nanostructure formation and the potential performance benefits of nanostructured polymer blends and composites for applications across many sectors: electronics, coatings, adhesives, energy (photovoltaics), aerospace, automotive, and medical devices (biocompatible polymers). The book also describes the design, morphology, and structure of nanostructured polymer composites and blends to achieve specific properties.

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## Handbook of Silicon Based MEMS Materials and Technologies, 2e

Edited by: **Markku Tilli** Director & Senior VP of Research at Okmetic, Finland; **Teruaki Motooka** Professor, Department of Materials Science and Engineering, Kyushu University, Japan; **Veli-Matti Airaksinen** Director, Aalto University at Micronova; **Sami Franssila** Department of Materials Science and Engineering, School of Chemical Technology, Aalto University, Finland; **Mervi Paulasto-Kroekel** Aalto University, School of Electrical Engineering, Finland; **Veikko Lindroos** Professor Emeritus, Department of Materials Science and Engineering, School of Science and Technology, Aalto University, Finland

**William Andrew**  
Applied Science Publishers

**A comprehensive, well-proven reference work on state-of-the-art MEMS materials, technologies and manufacturing, emphasizing current and future applications**

A Volume in the Micro and Nano Technologies Series.

ISBN: 978-0-323-29965-7

**PREVIOUS EDITION ISBN:**  
9780815515944

**PUB DATE:** October 2015

**FORMAT:** Hardback

**PAGES:** c. 794

### AUDIENCE

Engineers, researchers, research labs and companies working in the fields of MEMS, precision engineering and microfabrication; Research students in the area of MEMS

### KEY FEATURES

- Provides vital packaging technologies and process knowledge for silicon direct bonding, anodic bonding, glass frit bonding, and related techniques
- Shows how to protect devices from the environment and decrease package size for a dramatic reduction in packaging costs
- Discusses properties, preparation, and growth of silicon crystals and wafers
- Explains the many properties (mechanical, electrostatic, optical, etc.), manufacturing, processing, measuring (including focused beam techniques), and multiscale modeling methods of MEMS structures
- Geared towards practical applications rather than theory

### DESCRIPTION

*The Handbook of Silicon Based MEMS Materials and Technologies, Second Edition*, is a comprehensive guide to MEMS materials, technologies, and manufacturing that examines the state-of-the-art with a particular emphasis on silicon as the most important starting material used in MEMS.

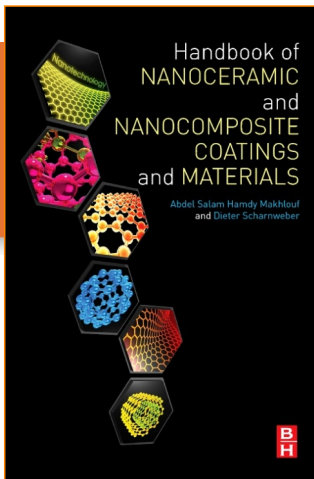
The book explains the fundamentals, properties (mechanical, electrostatic, optical, etc.), materials selection, preparation, manufacturing, processing, system integration, measurement, and materials characterization techniques, sensors, and multi-scale modeling methods of MEMS structures, silicon crystals, and wafers, also covering micromachining technologies in MEMS and encapsulation of MEMS components.

Furthermore, it provides vital packaging technologies and process knowledge for silicon direct bonding, anodic bonding, glass frit bonding, and related techniques, shows how to protect devices from the environment, and provides tactics to decrease package size for a dramatic reduction in costs.

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**ISBN:** 978-0-12-799947-0

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 594

**AUDIENCE**

Engineers, chemists, research scientists and grad students working in coatings and surface engineering-related industries ranging from transportation to the biomedical device industry.

## Handbook of Nanoceramic and Nanocomposite Coatings and Materials

Edited by: *Abdel Salam Hamdy Makhlouf* RGV STAR Professor, Dept. of Manufacturing Engineering, Faculty of Engineering and Computer Science, University of Texas Pan-American, Edinburg, TX, USA

*Dieter Scharnweber* Head of Biomaterials Development, Max Bergmann Center, Technische Universität Dresden, Germany



**An essential resource for engineers and scientists in the coatings field, providing an in-depth examination of current and advanced technologies for industrially oriented nanoceramic and nanocomposite coatings**

### KEY FEATURES

- Focuses on the most advanced technologies for industry-oriented nano-ceramic and nanocomposite coatings, including recent challenges for scaling up nano-based coatings in industry
- Covers the latest evaluation methods for measuring coatings performance
- Discusses novel approaches for improving the performance of ceramic and composite coatings and materials via nanotechnology
- Provides the most recent and advanced techniques for surface characterization

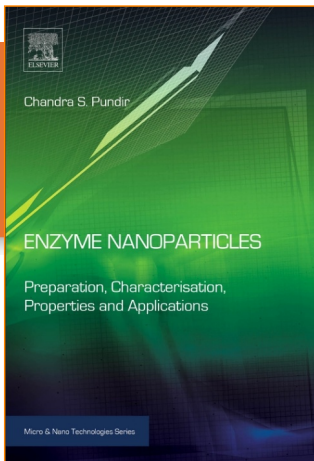
### DESCRIPTION

In this new handbook, top researchers from around the world discuss recent academic and industrial advances in designing ceramic coatings and materials. They describe the role of nanotechnology in designing high performance nanoceramic coatings and materials in terms of the unique advantages that can be gained from the nano scale, including the latest techniques for the synthesis and processing of ceramic and composite coatings for different applications.

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**ISBN:** 978-0-323-38913-6

**PUB DATE:** May 2015

**FORMAT:** Paperback

**PAGES:** c. 70

**AUDIENCE**

Researchers in industry and academia, in the fields of Nanoscience and Nanotechnology, Advanced Materials research, Biomedical Engineering, Biotechnology, Bio-Nanotechnology, Biosensor Technology, Nano-Medicine, Pharmacy, Dentistry, Veterinary Medicine, Life Sciences, Enzyme Catalysis and Biochemistry; Graduate and post-graduate students in Biochemistry, Biotechnology, Nanoscience and Nanotechnology, Materials Science, Biosensor Technology and Nano-Medicine courses

## Enzyme Nanoparticles

*Preparation, Characterisation, Properties and Applications*

*Chandra S. Pundir* Dept. of Biochemistry, Maharshi Dayanand University, Rohtak, Haryana, India

**William  
Andrew**  
Applied Science Publishers

**The first book in English on nanotechnology and nanomaterials to integrate enzymatic systems, with a focus on nanoparticles and biological applications**

A Volume in the Micro and Nano Technologies Series.

### KEY FEATURES

- Focus on enzyme nanotechnology, given the wide appeal of enzymes for diagnostics, therapy and biocatalysis
- Provision of a general background to the topic, but also a detailed description of synthesis, preparation and applications

### DESCRIPTION

This book is the first book in English on nanotechnology and nanomaterials integrating with enzymatic systems, with a focus on nanoparticles and biological applications. It covers comprehensively the relevant topics to understand the development of enzyme nanoparticles as it relates to the complicated structures of enzyme nanoparticles and their functionalization and immobilization on to various supports. The preparation of enzyme nanoparticles, their kinetic properties and applications after immobilization of the immobilized enzyme nanoparticles is described. The use of colour images in all formats of the book will improve the understanding of the topics covered. The book offers an integration of Enzymology and Nanotechnology and provides the latest information on preparation of enzyme nanoparticles, their characterization, their functionalization and immobilization on to various supports and thereafter their kinetic properties and applications in various industries with special reference to Biosensor Technology.

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## Micromanufacturing Engineering and Technology, 2e

Edited by: *Yi Qin* Professor in Manufacturing Technology and Systems, University of Strathclyde, UK

**William Andrew**  
Applied Science Publishers

**Engineering practice, cost-saving and application-oriented coverage of all key topics of micromanufacturing – edited by one of the few world-experts in this rapidly expanding area**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-31149-6

**PREVIOUS EDITION ISBN:**  
978-0-8155-1545-6

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 814

### **AUDIENCE**

Engineers, Academics, Researchers, and Senior students in Mechanical/ Manufacturing/ Materials/ Design Engineering

### **KEY FEATURES**

- Covers key micro-manufacturing technologies, processes and equipment with high-volume production capabilities, enabling large companies as well as SMEs to introduce those technologies in production and business and reduce production costs
- Outlines micro-manufacturing system engineering and practical issues pertaining to material, design, handling, metrology, inspection, testing, sensors, control, system integration and software, and micro-factories
- Enables manufacturing practitioners to choose the right technology suitable for a particular product-manufacture

### **DESCRIPTION**

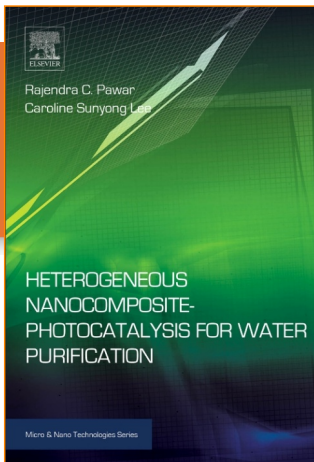
*Micromanufacturing Engineering and Technology, Second Edition*, covers the major topics of micro-manufacturing. The book not only covers theory and manufacturing processes, but it uniquely focuses on a broader range of practical aspects of micro-manufacturing engineering and utilization by also covering materials, tools and equipment, manufacturing system issues, control aspects and case studies. By explaining material selection, design considerations and economic aspects, the book empowers engineers in choosing among competing technologies. With a focus on low-cost and high-volume micro-manufacturing processes, the updated title covers technologies such as micro-mechanical-cutting, laser-machining, micro-forming, micro-EDM, micro-ECM, hot-embossing, micro-injection molding, laser micro-sintering, thin film fabrication, inkjet technology, micro-joining, multiple processes machines, and more. Edited by one of the few world-experts in this relatively new, but rapidly-expanding area and presenting chapters written by a 40-strong team of leading industry specialists, this book is an invaluable source of information for engineers, R&D researchers and academics.

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Rajendra C. Pawar  
Caroline Sunyong Lee

## HETEROGENEOUS NANOCOMPOSITE- PHOTOCATALYSIS FOR WATER PURIFICATION

Micro & Nano Technologies Series

**ISBN:** 978-0-323-39310-2

**PUB DATE:** April 2015

**FORMAT:** Paperback

**PAGES:** c. 100

### AUDIENCE

R&D/Industry researchers and academic researchers in environmental engineering, materials science, nanotechnology and environmental chemistry; Masters and Ph.D. students in those areas.

## Heterogeneous Nanocomposite- Photocatalysis for Water Purification

**Rajendra Pawar** Department of Materials Engineering, Hanyang University, Seoul, South Korea

**Caroline Sunyong Lee** Department of Materials Engineering, Hanyang University, Seoul, South Korea

**William  
Andrew**  
Applied Science Publishers

**As environmental pressures lead to a growing need for efficient, cost-effective, wastewater recycling applications, heterogeneous nanocomposite-photocatalysis is a promising new technology to meet that need**

### KEY FEATURES

- Introductory portion of the book includes a brief survey of all different kinds of heterogeneous photocatalysts
- Discusses the possible photocatalysis mechanism occurring during the degradation of different toxic pollutants
- Provides the photoelectrochemical measurement for synthesized catalysts, supporting the effective transportation of photoelectrons resulting into better catalytic properties

### DESCRIPTION

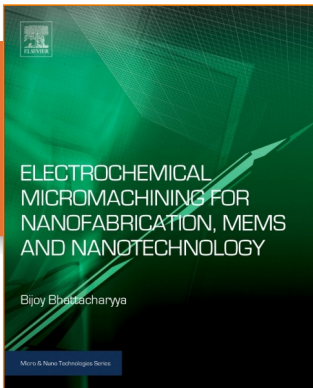
In *Heterogeneous Nanocomposite-Photocatalysis for Water Purification*, the authors introduce various heterogeneous photocatalysts based on novel nanostructures of metal oxide semiconductors and graphene used for water purification, including TiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, SnO<sub>2</sub>, WO<sub>3</sub> and g-C<sub>3</sub>N<sub>4</sub>, and outlines their advantages and drawbacks. The nanocomposite-photocatalysts ZnO and CdS are compared with reduced graphene oxide (rGO), a rapidly growing materials system. The authors describe how the photocatalytic activity of known nanomaterials can be improved by modifying the structural and optical properties (i.e., phase composition).

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## Electrochemical Micromachining for Nanofabrication, MEMS and Nanotechnology

*Bijoy Bhattacharyya* Professor, Production Engineering Department, Jadavpur University, Kolkata, India

**William Andrew**  
Applied Science Publishers

**Written by a world-renowned expert, this first book solely dedicated to electrochemical micromachining (EMM) focuses on applications in the semiconductor industry and on future directions of increasingly important EMM technology**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-32737-4

**PUB DATE:** April 2015

**FORMAT:** Hardback

**PAGES:** c. 270

### AUDIENCE

Engineers and Design researchers involved in micromachining, micro-manufacturing, nanofabrication; Academics and post-graduates specializing in mechanical engineering, manufacturing engineering, machining processes or nanotechnology

### KEY FEATURES

- Covers the generation of micro features used for advanced engineering of materials for fabrication of MEMS, microsystems and other micro-engineering applications
- Explores the trend of decreasing size of fabricated devices, reflected in coverage of generation of high-precision nano-features on metal and semiconductors utilizing SPM, STM, and AFM, and nanotechnology aspects of EMM
- Describes nanofabrication utilizing anodic dissolutions for mass manufacturing by overcoming obstacles utilizing electrochemical microsystem technology (EMST) and electrochemical nanotechnology (ENT)

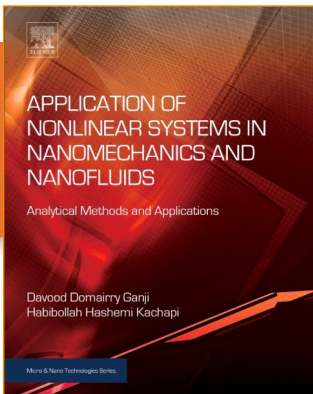
### DESCRIPTION

*Electrochemical Micromachining for Nanofabrication, MEMS and Nanotechnology* is the first book solely dedicated to electrochemical micromachining (EMM). It begins with fundamentals, techniques, processes, and conditions, continuing with in-depth discussions of mechanisms of material removal, including an empirical model on the material removal rate for EMM (supported by experimental validation). The book moves next to construction-related features of EMM setup suitable for industrial micromachining applications, varying types of EMM, and the latest developments in the improvement of EMM setup. Further, it covers power supply, roll of electrolyte, and other major factors influencing EMM processes, and reports research findings concerning the improvement of machining accuracy and efficiency. Finally, the book devotes a chapter to the design and development of micro-tools, one of the most vital components in EMM.

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## Application of Nonlinear Systems in Nanomechanics and Nanofluids

### *Analytical Methods and Applications*

*Davood Domairry Ganji* Department of Mechanical Engineering, Babol Noshirvani University of Technology, Babol, Iran

*Sayyid Habibollah Hashemi Kachapi* Department of Mechanical Engineering, Babol Noshirvani University of Technology, Babol, Iran

**William Andrew**  
Applied Science Publishers

**Explains nonlinear nanotechnology systems – from the foundations and modeling techniques to applications and case studies – while addressing shortcomings of existing solutions and introducing new ones**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-35237-6

**PUB DATE:** March 2015

**FORMAT:** Hardback

**PAGES:** c. 396

#### **AUDIENCE**

Scientists developing analytical methods for dynamic nanoparticle and nanofluidics systems; Engineers and Research and Development researchers developing and using dynamic nanoparticle and nanofluidics systems; Scientists, Professionals and Research and Development researchers in related areas such as Materials Science, Engineering and Applied Physics where complex physical phenomena need to be modelled

#### **KEY FEATURES**

- Provides comprehensive coverage of nano-dynamical systems and their specialized processes and applications in the context of nonlinear differential equations and analytical methods
- Enables researchers and engineers to better model, interpret and control nanofluidics and other nano-dynamical systems and their application processes
- Explains nano-dynamical systems by means of describing 'real-life' application case studies

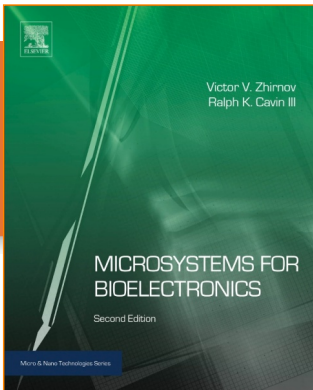
#### **DESCRIPTION**

With *Application of Nonlinear Systems in Nanomechanics and Nanofluids* the reader gains a deep and practice-oriented understanding of nonlinear systems within areas of nanotechnology application as well as the necessary knowledge enabling the handling of such systems. The book helps readers understand relevant methods and techniques for solving nonlinear problems, and is an invaluable reference for researchers, professionals and PhD students interested in research areas and industries where nanofluidics and dynamic nano-mechanical systems are studied or applied. The book is useful in areas such as nanoelectronics and bionanotechnology, and the underlying framework can also be applied to other problems in various fields of engineering and applied sciences.

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## Microsystems for Bioelectronics, 2e

### Scaling and Performance Limits

**Victor V. Zhirnov** Research Associate Professor, North Carolina State University and Research Scientist, Semiconductor Research Corporation  
**Ralph K. Cavin III** Vice President for Research Operations, Semiconductor Research Corporation

**William Andrew**  
Applied Science Publishers

**Groundbreaking interdisciplinary approach clarifying the scaling and performance limits of microsystems and introducing new concepts inspired by the living cell**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-31302-5

**PREVIOUS EDITION ISBN:**  
9781437778403

**PUB DATE:** February 2015

**FORMAT:** Hardback

**PAGES:** c. 288

#### **AUDIENCE**

Practicing engineers and scientists who are involved in research, development and use of electronic nano and micro-systems, particularly in biotech and biomedicine contexts. Graduate and PhD students in bioengineering and bioelectronics

#### **DESCRIPTION**

The advances in microsystems offer new opportunities and capabilities to develop systems for biomedical applications, such as diagnostics and therapy. There is a need for a comprehensive treatment of microsystems and in particular for an understanding of performance limits associated with the shrinking scale of microsystems. The new edition of *Microsystems for Bioelectronics* addresses those needs and represents a major revision, expansion and advancement of the previous edition.

This book considers physical principles and trends in extremely scaled autonomous microsystems such as integrated intelligent sensor systems, with a focus on energy minimization. It explores the implications of energy minimization on device and system architecture. It further details behavior of electronic components and its implications on system-level scaling and performance limits. In particular, fundamental scaling limits for energy sourcing, sensing, memory, computation and communication subsystems are developed and new applications such as optical, magnetic and mechanical sensors are presented.

The new edition of this well-proven book with its unique focus and interdisciplinary approach shows the complexities of the next generation of nanoelectronic microsystems in a simple and illuminating view, and is aimed for a broad audience within the engineering and biomedical community.

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Sekhar Chandra Ray

## APPLICATIONS OF GRAPHENE AND GRAPHENE-OXIDE BASED NANOMATERIALS

Micro & Nano Technologies Series

**ISBN:** 978-0-323-37521-4

**PUB DATE:** February 2015

**FORMAT:** Paperback

**PAGES:** c. 84

### AUDIENCE

researchers and engineers working on carbon and related nano-structure materials and their applications, in such disciplines and industries as water filtration, energy storage, biofuels, clean energy devices, photovoltaics, other electronics applications and semiconductors, displays, sensors and biological and medical applications

## Applications of Graphene and Graphene-Oxide based Nanomaterials

**Sekhar Ray** Department of Physics, College of Science Engineering and Technology, University of South Africa, Johannesburg, South Africa

**William  
Andrew**  
Applied Science Publishers

**In this short book Prof. Ray gives an overview of graphene and graphene-oxide with a strong focus on applications**

A Volume in the Micro and Nano Technologies Series.

### KEY FEATURES

- Written by an expert in the field who, during his last 17 years of research, has published more than 80 peer reviewed articles in recognized international journals
- Gives full-chapter overviews on Graphene, Graphene-Oxide, and Graphene based nanoparticles
- Focusses on applications

### DESCRIPTION

Carbon nanomaterials have a unique place in Nanoscience owing to their exceptional electrical, thermal, chemical and mechanical properties and have found application in areas as diverse as composite materials, energy storage and conversion, sensors, drug delivery, field emission devices and nano-scale electronic components. Conjugated carbon nanomaterial covers the areas of carbon nanotubes, fullerenes and graphene. Graphene is the newest of the carbon nanomaterials and promises to be a very active field. Already since its isolation in 2004 it has grabbed the attention of the chemistry, materials and physics communities. It promises to rival carbon nanotubes in terms of properties and potential applications with the number of publications rising from ca. 130 in 2005 to ca. 2,800 in 2010. In this short book Sekhar Ray gives an overview on graphene and graphene-oxide with a strong focus on applications. Structured in three chapters, one on graphene, one on graphene-oxide and one on graphene based nanoparticles his resource describes in each chapter the preparation (including synthesis and functionalization) and material properties before detailing a whole range of applications. Ray finishes each chapter with information on remaining challenges and perspectives.

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Celestino Padeste  
Sonja Neuhaus

## POLYMER MICRO- AND NANOGRAFTING

Micro & Nano Technologies Series

**ISBN:** 978-0-323-35322-9

**PUB DATE:** February 2015

**FORMAT:** Paperback

**PAGES:** c. 106

**AUDIENCE**

research community in both academic environments and in research departments of the industry, where there is a need for novel approaches in polymer functionalization such as in biomedical fields and electronics sectors

## Polymer Micro- and Nanografting

*Celestino Padeste* Paul Scherrer Institut, Switzerland

*Sonja Neuhaus* Fachhochschule Nordwestschweiz, Hochschule für Technik, Institut für Nanotechnische Kunststoffanwendungen, Switzerland

**William  
Andrew**  
Applied Science Publishers

**The book concentrates on the combination of structuring methods and chemical functionalization of polymers, a novel combination revealing new opportunities and manufacturing challenges.**

A Volume in the Micro and Nano Technologies Series.

### KEY FEATURES

- Provides a comprehensive survey on polymer-on-polymer grafting, covering the latest developments and future applications
- Focuses on grafting techniques, characterization and applications for the particular combination of polymer layers on polymer substrates
- Concentrates on the combination of structuring methods and chemical functionalization of polymers
- Addresses the possibility for the formation of chemical patterns and structures on or in polymeric substrates

### DESCRIPTION

Polymers have proven to be very suitable materials for topographic structuring, in particular in nanoreplication processes. Micro- and Nanografting strategies address the possibility for the formation of chemical patterns and structures on or in polymeric substrates using relatively simple processes. *Polymer Micro- and Nanografting* focuses on grafting techniques characterization and applications for the particular combination of polymer layers on polymer substrates. The authors, leaders in this area of research, provide a comprehensive survey on polymer-on-polymer grafting, covering the latest developments and future applications.

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## Implantable Biomedical Microsystems

### *Design Principles and Applications*

Edited by: **Swarup Bhunia** Department of Electrical Engineering and Computer Science, Case Western Reserve University, Cleveland, OH, USA  
**Steve Majerus** Biomedical Engineer, Advanced Platform Technology Center, Louis Stokes Cleveland VA Medical Center, Cleveland, OH, USA  
**Mohamad Sawan** Professor, Department of Electrical and Computer Engineering, Ecole Polytechnique, Montreal, QC, Canada

 William  
Andrew  
Applied Science Publishers

**First comprehensive coverage of fundamental design principles for implantable microsystems, including several major application areas and key case studies**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-26208-8

**PUB DATE:** January 2015

**FORMAT:** Hardback

**PAGES:** c. 322

#### **AUDIENCE**

Academics, clinical researchers and practitioners in Biomedical, Electrical, Computer, Systems, and Mechanical Engineering. Engineers in the medical device industry involved in design and development of implantable electronic systems (incl. software and computer engineers).

#### **KEY FEATURES**

- First time comprehensive coverage of system-level and component-level design and engineering aspects for implantable microsystems.
- Provides insight into a wide range of proven applications and application specific design trade-offs of bioimplantable systems, including several major case studies
- Enables Engineers involved in development of implantable electronic systems to optimize applications for specific design objectives.

#### **DESCRIPTION**

Research and innovation in areas such as circuits, microsystems, packaging, biocompatibility, miniaturization, power supplies, remote control, reliability, and lifespan are leading to a rapid increase in the range of devices and corresponding applications in the field of wearable and implantable biomedical microsystems, which are used for monitoring, diagnosing, and controlling the health conditions of the human body.

This book provides comprehensive coverage of the fundamental design principles and validation for implantable microsystems, as well as several major application areas. Each component in an implantable device is described in details, and major case studies demonstrate how these systems can be optimized for specific design objectives.

The case studies include applications of implantable neural signal processors, brain-machine interface (BMI) systems intended for both data recording and treatment, neural prosthesis, bladder pressure monitoring for treating urinary incontinence, implantable imaging devices for early detection and diagnosis of diseases as well as electrical conduction block of peripheral nerve for chronic pain management.

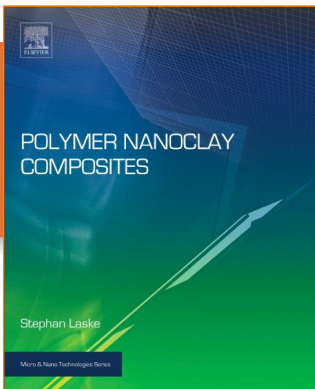
Implantable Biomedical Microsystems is the first comprehensive coverage of bioimplantable system design providing an invaluable information source for researchers in Biomedical, Electrical, Computer, Systems, and Mechanical Engineering as well as engineers involved in design and development of wearable and implantable bioelectronic devices and, more generally, teams working on low-power microsystems and their corresponding wireless energy and data links.

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## Polymer Nanoclay Composites

Edited by: *Stephan Laske* Montanuniversitat Leoben, Leoben, Austria

**William  
Andrew**  
Applied Science Publishers

**First lab-scale to industry-scale, end-to-end coverage of polymer clay nanocomposites processing**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-29962-6

**PUB DATE:** February 2015

**FORMAT:** Hardback

**PAGES:** c. 182

### AUDIENCE

Academics as well as engineers and industrial readers working in the field of polymer nanocomposites and their industrial realization; material processor and application engineers utilizing nanocomposites; Students in courses such as 'Compounding of Polymers', 'Nanotechnology in Plastics Engineering', and advanced materials processing

### KEY FEATURES

- Covers the whole processing route with all aspects of the nanocomposites industry with particular focus on the processing of polymer clay nanocomposites
- Includes quality control and nanosafety
- Multidisciplinary approach from an industrial perspective

### DESCRIPTION

There is a major lack of fundamental knowledge and understanding on the interaction between a filler and the polymer matrix. When it comes to nanoscale fillers, such as layered silicates, carbon nanotubes, graphene or cellulose nanofibers it is even more important to know accurate structure-property relationships as well as identifying the parameters influencing material behavior.

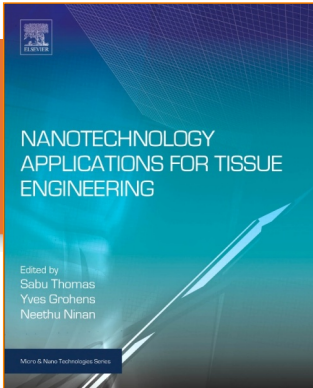
The reason for the lack of knowledge on how to process nanocomposites and why there are so few applications is that several scientific fields are affected and a joint effort of those scientific communities involved is necessary – starting from the filler manufacturing or pre-processing over polymer chemistry to the polymer processing.

In *Polymer Nanoclay Composites*, all involved scientific areas are viewed together for the first time, providing an all-embracing coverage of all stages of polymer clay nanocomposites processing from lab-scale to industrial scale – stages from the raw material over manufacturing of polymer clay nanocomposites to characterization and the final products.

Readers will gain insight in the physical/chemical pre-processing of layered silicates and their incorporation into a polymer matrix using sophisticated technologies (such as advanced compounding) as well as in real-time quality control of the nanocomposite production and future prospects. The book also describes nanotoxicological and nanosafety aspects.







## Nanotechnology Applications for Tissue Engineering

Edited by: *Sabu Thomas* Mahatma Gandhi University, Kerala, India  
*Yves Grohens* LIMATB Laboratory, Université de Bretagne Sud, France  
*Neethu Ninan* LIMATB Laboratory, Université de Bretagne Sud, France

**William Andrew**  
Applied Science Publishers

**A reference to all nanotechnology aspects in tissue engineering and regenerative medicine – including fabrication techniques for tissue-specific applications – helping scientists and lab engineers building tissue substitutes in more efficient ways.**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-32889-0

**PUB DATE:** January 2015

**FORMAT:** Hardback

**PAGES:** c. 316

### AUDIENCE

Scientists, engineers, lecturers and PhD students engaged in the fields of tissue engineering, regenerative medicine, nanomedicine, nanofabrication, biofabrication and biomedical engineering. Physicians and medical students/researchers

### KEY FEATURES

- Provides state-of-the-art knowledge on how nanotechnology can help tackling known problems in tissue engineering
- Covers materials design, fabrication techniques for tissue-specific applications as well as immunology and toxicology aspects
- Helps scientists and lab engineers building tissue substitutes in a more efficient way

### DESCRIPTION

Tissue engineering involves seeding of cells on bio-mimicked scaffolds providing adhesive surfaces. Researchers though face a range of problems in generating tissue which can be circumvented by employing nanotechnology. It provides substrates for cell adhesion and proliferation and agents for cell growth and can be used to create nanostructures and nanoparticles to aid the engineering of different types of tissue.

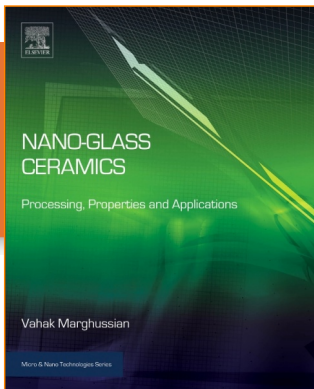
Written by renowned scientists from academia and industry, this book covers the recent developments, trends and innovations in the application of nanotechnologies in tissue engineering and regenerative medicine. It provides information on methodologies for designing and using biomaterials to regenerate tissue, on novel nano-textured surface features of materials (nano-structured polymers and metals e.g.) as well as on theranostics, immunology and nano-toxicology aspects. In the book also explained are fabrication techniques for production of scaffolds to a series of tissue-specific applications of scaffolds in tissue engineering for specific biomaterials and several types of tissue (such as skin bone, cartilage, vascular, cardiac, bladder and brain tissue). Furthermore, developments in nano drug delivery, gene therapy and cancer nanotechnology are described.

The book helps readers to gain a working knowledge about the nanotechnology aspects of tissue engineering and will be of great use to those involved in building specific tissue substitutes in reaching their objective in a more efficient way. It is aimed for R&D and academic scientists, lab engineers, lecturers and PhD students engaged in the fields of tissue engineering or more generally regenerative medicine, nanomedicine, medical devices, nanofabrication, biofabrication, nano- and biomaterials and biomedical engineering.

**ENGINEERING  
NANOTECHNOLOGY**

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## Nano-Glass Ceramics

### *Processing, Properties and Applications*

Vahak Marghussian School of Metallurgy & Materials Engineering, Iran  
University of Science and Technology (IUST), Narmak, Tehran, Iran

**William  
Andrew**  
Applied Science Publishers

**First book covering all aspects of nano-crystalline glass ceramics – one-stop reference source for researchers and engineers in industries ranging from Biomedical devices to Optoelectronics**

A Volume in the Micro and Nano Technologies Series.

**ISBN:** 978-0-323-35386-1

**PUB DATE:** January 2015

**FORMAT:** Hardback

**PAGES:** c. 282

#### **AUDIENCE**

scientists and postgraduate students of materials science and engineering and ceramics engineering courses; engineers and scientists doing research, development and production in nanoscience and nanofabrication

#### **KEY FEATURES**

- Comprehensive coverage of nanostructured glass ceramics with a materials science approach. The first book of this kind
- Applications-oriented approach, covering current and future applications in numerous fields such as Biomedicine and Electronics
- Explains the correlations between synthesis parameters, properties and applications guiding R&D researchers and engineers to choose the right material and increase cost-effectiveness

#### **DESCRIPTION**

*Nano-Glass Ceramics: Processing, Properties and Applications* provides comprehensive coverage of synthesis and processing methods, properties and applications of the most important types of nano-glass ceramics, from a unique material science perspective. Emphasis is placed on the experimental and practical aspects of the subject while covering the theoretical and practical aspects and presenting, numerous examples and details of experimental methods. In the discussing the many varied applications of nano-glass ceramics, consideration is given to both, the fields of applications in which the materials are firmly established and the fields where great promise exists for their future exploitation. The methods of investigation adopted by researchers in the various stages of synthesis, nucleation, processing and characterization of glass ceramics are discussed with a focus on the more novel methods and the state of the art in developing nanostructured glass ceramics.

**ENGINEERING  
NANOTECHNOLOGY**

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## Oral Communication Skills for Scientific Presentations

*William B. Krantz* President's Teaching Scholar and Professor Emeritus, University of Colorado, Boulder, CO, USA; Rieveschl Ohio Eminent Scholar and Professor Emeritus, University of Cincinnati, Cincinnati, OH, USA



A practical, compact guidebook covering the 'nuts and bolts' of effective public speaking

### KEY FEATURES

- Discusses best practices in putting together an effective talk
- Focuses on leveraging the speaker's existing skill sets to develop the delivery style that works best for that individual
- Features one-page quick reference guides for giving formal oral and informal poster presentations
- Addresses cross-cultural communication as well as particular concerns for non-native English speakers
- Includes a companion site with tools and video examples of formal and informal presentations for further self-guidance

### DESCRIPTION

*Oral Communication Skills for Scientific Presentations* is intended for inexperienced speakers as well as those aspiring to improve their communication skills in making either formal or informal presentations on a technical subject. A complement to having good organization for a technical presentation is to have an effective delivery style. This book provides a template for organizing a technical talk that will include a discussion of various ways to effectively develop each part of a technical presentation.

A special feature of *Oral Communication Skills for Scientific Presentations* is the focus on making presentations to a cross-cultural audience. This relates to relatively minor considerations such as how to list the names of the co-authors on your presentation as well as to more substantive considerations such as how to handle eye contact and use humor, both of which can differ across the global spectrum of cultures. The cross-cultural focus of this book relates not only to the audience, but also to the speaker. This book also includes helpful tips for non-native English speakers.

**ISBN:** 978-0-12-805418-5

**PUB DATE:** April 2016

**FORMAT:** Paperback

**PAGES:** c. 160

### AUDIENCE

Students and researchers across the sciences interested in improving their oral communication skills; in particular non-native English speakers

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## Graduate Research, 4e

### *A Guide for Students in the Sciences*

*Robert V. Smith* Collaborative Brain Trust University Consulting (CBT UC),  
Sacramento, CA, USA

*Llewellyn D. Densmore* Department of Biological Sciences, Texas Tech  
University, Lubbock, TX, USA

*Edward F. Lener* University Libraries, Virginia Tech, Blacksburg, VA, USA



This newly revised go-to resource is for graduate researchers at all stages of study and covers a range of topics including writing and preparation of research proposals, developing and refining teaching skills, and ethics and compliance areas such as research involving human subjects and animals

**ISBN:** 978-0-12-803749-2

**PREVIOUS EDITION ISBN:**  
9780295977058

**PUB DATE:** February 2016

**FORMAT:** Paperback

**PAGES:** c. 288

#### **AUDIENCE**

Graduate student, graduate advisors, and mentors across the Sciences

#### **KEY FEATURES**

- Discusses a broad range of topics including time management, library and literature work, and grant support
- Includes a new chapter on career planning and development with advice on careers in academia, government, and the private sector
- Contains chapters that promote the development of a varied set of communication skills
- Greatly expanded treatment of graduate study and research in international settings

#### **DESCRIPTION**

*Graduate Research* is an all-in-one resource for prospective and matriculated graduate students in the sciences. The newly revised edition includes updates to every chapter. *Graduate Research* covers a range of topics including writing and preparation of research proposals, developing and refining teaching skills, and ethics and compliance areas such as research involving human subjects and animals.

*Graduate Research* helps readers navigate the multidimensional and interdisciplinary world of scientific research and it is an invaluable resource for graduate researchers as well as those in advising or mentoring roles.

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# ORAL EXAMS

PREPARING FOR AND PASSING CANDIDACY,  
QUALIFYING, AND GRADUATE DEFENSES



A. LEE FOOTE



**ISBN:** 978-0-12-802578-9

**PUB DATE:** September 2015

**FORMAT:** Paperback

**PAGES:** c. 192

## AUDIENCE

Graduate students, postdoctoral fellows and faculty in every discipline

## Oral Exams

### *Preparing For and Passing Candidacy, Qualifying, and Graduate Defenses*

*Lee A Foote* Professor and Director, Devonian Botanic Garden, University of Alberta, Edmonton, AB, Canada



**This book provides students with a great resource to help them prepare for oral comprehensive and viva voca exams, and is also valuable for faculty as they prepare new questions.**

#### KEY FEATURES

- Describes in detail the general format of oral comprehensive exams, viva voce examinations and defenses, what to expect, and what the requirements are that students need to fulfill to pass.
- Includes appendices with numerous practice questions sourced from a range of disciplines and countries for individual or group learning
- Useful for Early Career academics that are supervising, supporting, and examining PhD students

#### DESCRIPTION

*Oral Exams: Preparing For and Passing Candidacy, Qualifying, and Graduate Defenses* provides guidance on how to prepare for oral comprehensive and viva voce exams.

Topics discussed include the supervisory committee, preparing the seminar, arranging content, mental preparation, question framing, and the types of questions to expect.

At its core, the book prepares students to be the best they can be by offering insights into how to interpret and appropriately respond to explicit and implied oral comps questions.

This book benefits faculty by helping them prepare new questions, also providing tips on how to mentor their students in preparation for exams.

The training included can be used to prepare for intensive qualifying or certification exams, job interviews, and presentations.

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COMMUNICATE SCIENCE  
PAPERS, PRESENTATIONS,  
AND POSTERS EFFECTIVELY



GREGORY S. PATIENCE  
DARIA C. BOFFITO  
PAUL A. PATIENCE



**ISBN:** 978-0-12-801500-1

**PUB DATE:** August 2015

**FORMAT:** Paperback

**PAGES:** c. 264

**AUDIENCE**

Graduate students, research fellows, post-docs, professors, scientists and researchers in STEM fields.

## Communicate Science Papers, Presentations, and Posters Effectively

*Gregory S. Patience* Department of Chemical Engineering, Ecole Polytechnique de Montreal, Canada

*Daria C. Boffito* Department of Chemical Engineering, Ecole Polytechnique de Montreal, Canada

*Paul Patience* Ecole Polytechnique de Montreal, Canada



The tools readers need to become better writers, presenters, and communicators

### KEY FEATURES

- Covers how to accurately and clearly exhibit results, ideas, and conclusions
- Identifies phrases common in scientific literature that should never be used
- Discusses the theory of presentation, including “before and after” examples highlighting best practices
- Provides concrete, step-by-step examples on how to make camera ready graphs and tables

### DESCRIPTION

*Communicate Science Papers, Presentations, and Posters Effectively* is a guidebook on science writing and communication that professors, students, and professionals in the STEM fields can use in a practical way. This book advocates a clear and concise writing and presenting style, enabling users to concentrate on content.

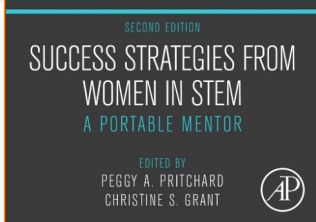
The text is useful to both native and non-native English speakers, identifying best practices for preparing graphs and tables, and offering practical guidance for writing equations. It includes content on significant figures and error bars, and provides the reader with extensive practice material consisting of both exercises and solutions.

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**ISBN:** 978-0-12-397181-4

**PREVIOUS EDITION ISBN:**

978-0-12-088411-7

**PUB DATE:** June 2015

**FORMAT:** Paperback

**PAGES:** c. 460

**AUDIENCE**

Women pursuing careers or involved in careers in science, technology, engineering and mathematics

## Success Strategies From Women in STEM, 2e A Portable Mentor

Edited by: **Peggy A. Pritchard** Associate Librarian, Learning and Curriculum Support Team, University of Guelph, Guelph, ON, Canada  
**Christine Grant** PhD, Full Professor of Chemical and Biomolecular Engineering and Associate Dean of Faculty Advancement, North Carolina State University, College of Engineering, Raleigh, NC, USA



**A comprehensive and accessible manual that provides valuable strategies, tools, and success tips for women pursuing and involved in STEM careers**

"...we need women to fully participate in this industry...morally and ethically, it's simply the right thing to do. This book will undoubtedly help."--**Network Security, *Success Strategies from Women in STEM, Second Edition***

### KEY FEATURES

- Preserves the style and tone of the first edition by bringing together mentors, trainees and early-career professionals in a series of conversations about important topics related to careers in STEM fields, such as leadership, time stress, negotiation, networking, social media and more
- Identifies strategies that can improve career success along with stories that elucidate, engage, and inspire
- Companion website provides authoritative information from successful women engaged in STEM careers, including annotated links to key organizations, associations, granting agencies, teaching support materials, and more

### DESCRIPTION

*Success Strategies from Women in Stem: A Portable Mentor, Second Edition*, is a comprehensive and accessible manual containing career advice, mentoring support, and professional development strategies for female scientists in the STEM fields.

This updated text contains new and essential chapters on leadership and negotiation, important coverage of career management, networking, social media, communication skills, and more. The work is accompanied by a companion website that contains annotated links, a list of print and electronic resources, self-directed learning objects, frequently asked questions, and more.

With an increased focus on international relevance, this comprehensive text contains shared stories and vignettes that will help women pursuing or involved in STEM careers develop the necessary professional and personal skills to overcome obstacles to advancement.

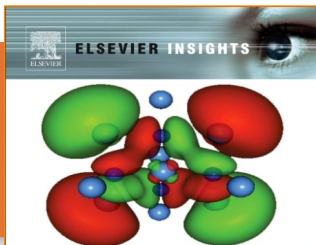
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## VIRTUAL SYNTHESIS OF NANOSYSTEMS BY DESIGN

FROM FIRST PRINCIPLES TO APPLICATIONS

LIUDMILA POZHAR

**ISBN:** 978-0-12-396984-2

**PUB DATE:** February 2015

**FORMAT:** Hardback

**PAGES:** c. 370

### AUDIENCE

Computational materials scientists and engineers

## Virtual Synthesis of Nanosystems by Design

*From First Principles to Applications*

*Liudmila Pozhar* PermaNature, LLC, Birmingham, Alabama



This book has been written with a goal to help readers familiar with foundations of quantum theory to link their theoretical background to the state of the art in the field of virtual (that is, quantum many-body theory-based, computational) synthesis of materials and media by design, its numerical methods and its software, to be able to apply their theoretical knowledge to solve practical problems.

### KEY FEATURES

- The only publication on quantum many body theoretical approach to synthesis of nano- and sub-nanoscale systems by design.
- Novel and existing many-body field theoretical, computational methods are developed and used to realize the theoretical predictions for materials for IR sensors, light sources, information storage and processing, electronics, light harvesting, etc. Novel algorithms for EMD and NEMD molecular simulations of the materials' synthesis processes and charge-spin transport in synthesized systems are developed and described.
- Includes the first ever models of Ni-O quantum wires supported by existing experimental data.
- All-inclusive analysis of existing experimental data versus the obtained theoretical predictions and nanomaterials templates.

### DESCRIPTION

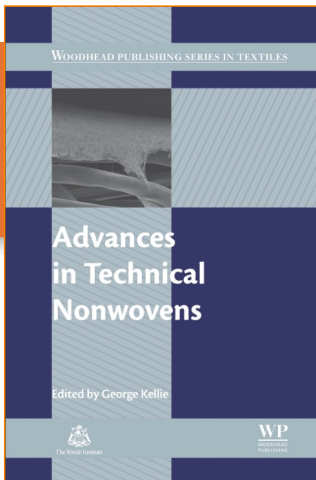
This is the only book on a novel fundamental method that uses quantum many body theoretical approach to synthesis of nanomaterials by design. This approach allows the first-principle prediction of transport properties of strongly spatially non-uniform systems, such as small QDs and molecules, where currently used DFT-based methods either fail, or have to use empirical parameters. The book discusses modified algorithms that allow mimicking experimental synthesis of novel nanomaterials--to compare the results with the theoretical predictions--and provides already developed electronic templates of sub-nanoscale systems and molecules that can be used as components of larger materials/fluidic systems.

PHYSICAL SCIENCES

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## Advances in Technical Nonwovens

Edited by: *George Kellie* Kellie Solutions Ltd., UK



**This comprehensive book reviews key developments in technical nonwoven manufacturing, specialist materials, and applications, with topics of special interest highlighted and explained, including fibers for technical nonwovens, the use of green recycled and biopolymer materials, and the application of nanofibres**

### KEY FEATURES

- Provides systematic coverage of trends, developments, and new technology in the field of technical nonwovens
- Focuses on the needs of the nonwovens industry with a clear emphasis on applied technology
- Contains contributions from an international team of authors edited by an expert in the field
- Offers a detailed and wide-ranging overview of the many applications of technical nonwovens that includes chapters on automotive textiles, filtration, energy applications, geo- and agrotextiles, and more

### DESCRIPTION

*Advances in Technical Nonwovens* presents the latest information on the nonwovens industry, a dynamic and fast-growing industry with recent technological innovations that are leading to the development of novel end-use applications.

The book reviews key developments in technical nonwoven manufacturing, specialist materials, and applications, with Part One covering important developments in materials and manufacturing technologies, including chapters devoted to fibers for technical nonwovens, the use of green recycled and biopolymer materials, and the application of nanofibres.

The testing of nonwoven properties and the specialist area of composite nonwovens are also reviewed, with Part Two offering a detailed and wide-ranging overview of the many applications of technical nonwovens that includes chapters on automotive textiles, filtration, energy applications, geo- and agrotextiles, construction, furnishing, packaging and medical and hygiene products.

**ISBN:** 978-0-08-100575-0

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 500

### AUDIENCE

Industry professionals, academic researchers and postgraduate students working in the field of nonwoven science and technology.

**ENGINEERING  
TEXTILE TECHNOLOGY**

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## Start-Up Creation

### The Smart Eco-efficient Built Environment

Edited by Fernando Pacheco-Torgal, Erik Rasmussen,  
Claes-Göran Granqvist, Volodymyr Ivanov,  
Arturas Kaklauskas and Stephen Makonin



**ISBN:** 978-0-08-100546-0

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 580

#### AUDIENCE

Academic researchers and industrial professionals working in the civil engineering and construction industry, as well as architects, designers and IT engineers wishing to keep up-to-date with the latest developments in the design of energy-efficient buildings.

## Start-Up Creation

### *The Smart Eco-efficient Built Environment*

Edited by: **Fernando Pacheco-Torgal** University of Minho, Portugal  
**Erik Stavnsager Rasmussen** Department of Marketing and Management, International Business & Entrepreneurship, University of Southern Denmark, Denmark  
**Claes G. Granqvist** Senior Professor, Uppsala University, Sweden  
**Volodymyr Ivanov** Nanyang Technological University, Singapore  
**Habil Arturas Kaklauskas** Vilnius Gediminas Technical University, Lithuania.  
**Stephen Makonin** Simon Fraser University, Canada



**This state-of-the-art review on advanced technologies and their application for use in the energy-efficiency of the built environment demonstrates, with case studies and comprehensive discussions, how they can be applied in the creation of start-up companies that begin with university research**

#### KEY FEATURES

- Presents a definitive guide for startups that arise from college and university research, and how the application of advanced technologies can be applied to the built environment
- Includes case studies on new advanced technologies and apps development
- Links startup creation to the eco-efficient built environment through software applications

#### DESCRIPTION

*Start-Up Creation: The Smart Eco-efficient Built Environment* provides a state-of-the-art review on high-technology applications and explains how these can be applied to improve the eco-efficiency of the built environment. Divided into four main parts, the book explains the key factors behind successful startup companies that grow from university research, including the development of a business plan, the importance of intellectual property, necessary entrepreneurial skills, and innovative thinking.

Part Two presents the latest research findings on nano and bio-based technologies and their application and use to the energy efficiency of the built environment. Part Three focuses on the use of genetic algorithms, Big Data, and the Internet of Things applications. Finally, the book ends with an entire section dedicated to App development using selected case studies that illustrate their application and use for monitoring building energy-efficiency.





## Forensic Polymer Engineering

Why Polymer Products Fail in Service  
Second Edition

Peter Rhys Lewis



**ISBN:** 978-0-08-101055-6

**PREVIOUS EDITION ISBN:**  
9781845691851

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 530

### AUDIENCE

Product and process engineers, managers, lawyers involved in product liability, IP actions. Failure investigators at independent testing and engineering firms.

Company managers exposed to liability litigation.

Academics researching/teaching in the area of product/materials failure.

## Forensic Polymer Engineering, 2e

### *Why Polymer Products Fail in Service*

*Peter Rhys Lewis* Senior Research Fellow in Forensic Engineering, Open University; Chartered Engineer, Fellow of the Institute of Materials, Mining and Mineral Extraction, and member, Forensic Science Society



**Including a large number of detailed case studies, this book is an integrated approach to polymer failures that covers everything from basic materials properties to the experimental techniques required to study them**

A Volume in the Woodhead Publishing in Materials Series.

### KEY FEATURES

- Demonstrates the latest forensic engineering techniques used in the investigation of failed polymer components.
- Detailed case studies illustrate different types of failure in polymer components, fittings and medical devices.
- Examines the role of manufacturing in product failure with an overview of faults recognized in methods, design, and material selection.

### DESCRIPTION

Given the huge number of applications of polymeric materials in everyday life, especially applications where a failure in service may lead to economic loss, injury or death, the ability to determine the cause of failure using forensic engineering techniques is essential. *Forensic Polymer Engineering: Why Polymer Materials Fail in Service* presents and explains the latest forensic engineering techniques used in the investigation of failed polymer materials.

It presents very large number of detailed case studies which illustrate the different types of failure and the forensic engineering techniques used in their investigation. In this new edition, new case studies have been added to include patent disputes, failed products such as spiral wound wall storage tanks, lithium battery explosions and water bottle failures, as well as breast implant failures (such as the PIP scandal). New images demonstrating failure have been included, and images from the previous edition are reproduced in colour and enhanced with additional explanatory detail.

With a dedicated focus on polymeric materials, the book includes details on the experimental techniques that are used to characterise the materials, particularly in cases of failure. Finally, the book has information on the fabrication of polymer devices, as manufacturing flaws often play a role in leading to failure.

The book provides an integrated approach to polymer failures that covers everything from basic materials properties, through to the experimental techniques required to study them; it is an essential resource for anyone studying, teaching, or investigating polymer failures.





## Recent Trends in Cold-Formed Steel Construction

Edited by Cheng Yu



**ISBN:** 978-0-08-100960-4

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 584

### AUDIENCE

Structural and civil engineers,  
architects and materials scientists  
working in the design and  
development of cold-formed steel  
structures

## Recent Trends in Cold-Formed Steel Construction

Edited by: **Cheng Yu** University of North Texas, Denton, TX, USA



**This book reviews cutting-edge technologies and design methods using cold-formed steel as the main structural material in buildings evaluating such structural characteristics as thermal and acoustic performance, fire protection, floor vibrations, and blast resistance**

### KEY FEATURES

- Addresses building sciences issues and provides performance solutions for cold-formed buildings
- Provides guidance for using the next generation design method, computational tools, and technologies
- Edited by an experienced researcher and educator with significant knowledge on new developments in cold-formed steel construction

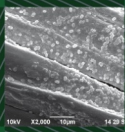
### DESCRIPTION

*Recent Trends in Cold-Formed Steel Construction* discusses advancements in an area that has become an important construction material for buildings. The book addresses cutting-edge new technologies and design methods using cold-formed steel as a main structural material, and provides technical guidance on how to design and build sustainable and energy-efficient cold-formed steel buildings.

Part One of the book introduces the codes, specifications, and design methods for cold-formed steel structures, while Part Two provides computational analysis of cold-formed steel structures. Part Three examines the structural performance of cold-formed steel buildings and reviews the thermal performance, acoustic performance, fire protection, floor vibrations, and blast resistance of these buildings, with a final section reviewing innovation and sustainability in cold-formed steel construction.



WOODHEAD PUBLISHING SERIES IN TEXTILES



## Antimicrobial Textiles

Edited by Gang Sun



## Antimicrobial Textiles

Edited by: *Gang Sun* University of California, Davis, USA



**Systematic coverage of the technologies and materials required for developing textiles with antimicrobial functions**

### KEY FEATURES

- Reviews key issues and technologies in the creation of antimicrobial textile products
- Offered a detailed overview of by antimicrobial agents and a wide range of important applications
- Produced by an experienced editor and a distinguished and international team of contributors

### DESCRIPTION

Antimicrobial textiles have attracted a great deal of interest in recent years due to their potential for reducing the transmission of infection in medical and healthcare environments. Antimicrobial properties can also improve the performance and lifespan of consumer products, and so these fabrics are increasingly finding applications in the wider textile and apparel industry. This book provides systematic coverage of the technologies and materials required for developing these important textiles.

In Part One, chapters address key issues and technologies in the creation of antimicrobial textile products. Topics covered include testing and regulation, microencapsulation, sol-gel coating and plasma technologies, nanotechnology and life cycle assessment. Part Two then reviews key antimicrobial agents, such as N-halamines, plant based compounds and photo-active chemicals. Finally, the chapters of Part Three offer detailed reviews of antimicrobial textiles for particular important applications, including medical devices, protective clothing and products with improved durability and longevity.

**ISBN:** 978-0-08-100576-7

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 500

### AUDIENCE

R&D managers in the textile industry, postgraduate students and academic researchers in textile science

**ENGINEERING  
TEXTILE TECHNOLOGY**

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COVER IMAGE  
FORTHCOMING

## Clothing for children and teenagers

*Anthropometry, sizing and fit*

Norsaadah Zakaria Universiti Teknologi Mara (UiTM), Malaysia



**A state-of-the art treatise on the subject of anthropometry, sizing and fit and their applications to the design of clothing for children and teenagers.**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

Systematic and comprehensive coverage of the complexities associated with clothing for children and teenagers

Reviews techniques in analysis and classification of children and teenagers' body shapes and sizes

Covers the development, designation and validation of an apparel sizing system for children and teenagers

### DESCRIPTION

Children and teenagers experience rapid physical growth and alterations in body shape as they develop; changes that pose significant challenges in creating apparel sizing systems. *Clothing for children and teenagers* addresses the complexities of developing size specifications for clothing aimed at seven to seventeen year olds.

The book begins by introducing the principles of apparel fit and sizing systems. Drawing on the author's own fieldwork, it goes on to discuss methods of conducting anthropometric surveys in children and teenagers, and techniques for analysing the resulting data in order to produce successful sizing systems.

**ISBN:** 978-0-08-100226-1

**PUB DATE:** June 2016

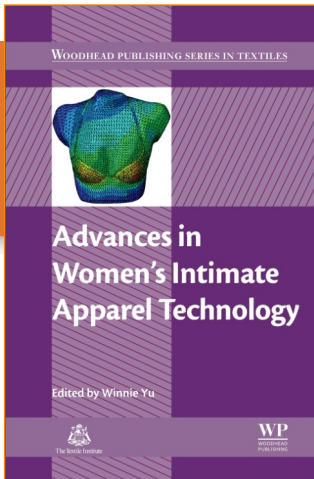
**FORMAT:** Hardback

**PAGES:** c. 270

### AUDIENCE

Manufacturers, marketers and retailers of children's apparel, as well as postgraduate students and academic researchers in textile science.





**ISBN:** 978-1-78242-369-0

**PUB DATE:** June 2016

**FORMAT:** Hardback

**PAGES:** c. 290

**AUDIENCE**

R&D managers in the apparel industry; postgraduate students and academic researchers in apparel design and technology.

## Advances in Women's Intimate Apparel Technology

Edited by: **Winnie Yu** Professor Winnie Yu, Hong Kong Polytechnic University, Hong Kong, China



**This book provides a comprehensive review of advanced materials, new manufacturing techniques, performance and fit, and key trends in intimate apparel technology, including discussions of fabrics, dyes and finishes, lamination, moulding, and seamless knitting**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Provides systematic and comprehensive coverage on key trends in intimate apparel technology
- Presents chapters that follow a coherent sequence, beginning with advanced materials, then discussing new manufacturing techniques, and finishing with coverage of performance and fit
- Focuses on the needs of the apparel industry, covering materials, manufacturing, and design aspects
- Written by distinguished author and professor Winnie Yu who is the Director of the ACE Style Institute of Intimate Apparel at Hong Kong Polytechnic University

### DESCRIPTION

*Advances in Women's Intimate Apparel Technology* discusses the design and manufacture of intimate apparel and how the industry is increasingly embracing novel materials, new technologies, and innovations in sizing and fit.

The book reviews the ways in which new materials and methods are improving the range, function, and quality of intimate apparel, with particular focus on brassiere design. Part One introduces the advanced materials used for intimate apparel, including novel fabrics and dyes and finishes, along with materials for wiring and embellishments. Part Two discusses the role of seamless technology in intimate apparel production, covering lamination, moulding, and seamless knitting. Finally, Part Three reviews advances in design, fit, and performance.

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## Active Coatings for Smart Textiles

Jinlian Hu Hong Kong Polytechnic University, Hong Kong



**This detailed book presents the latest information on active materials and their application to textiles in the form of coatings and finishes for the purpose of improving performance and creating active functional effects, covering smart coating types and emerging processes**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Introduces various types of smart and active coatings for textiles
- Covers technologies and application processes for the coating and finishing of textiles
- Reviews commercial applications of such coatings, including in sportswear, protective clothing, medical textiles and architecture

### DESCRIPTION

*Active Coatings for Smart Textiles* presents the latest information on active materials and their application to textiles in the form of coatings and finishes for the purpose of improving performance and creating active functional effects. This important book provides detailed coverage of smart coating types, processes, and applications.

After an introduction to the topic, Part One introduces various types of smart and active coatings, including memory polymer coatings, durable and self-cleaning coatings, and breathable coatings. Technologies and related processes for the application of coatings to textiles is the focus of Part Two, with chapters devoted to microencapsulation technology, plasma surface treatments, and nanotechnology-based treatments.

The book ends with a section on applications of smart textiles with responsive coatings, which are increasingly finding commercial niches in sportswear, protective clothing, medical textiles, and architecture.

**ISBN:** 978-0-08-100263-6

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 554

### AUDIENCE

R&D managers in the textile industry and postgraduate students and academic researchers in textile science.

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**ISBN:** 978-0-08-100574-3

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 900

**AUDIENCE**

R&D managers, academic researchers and postgraduate students working in the field of textile science and technology

## Smart Textiles and Their Applications

Edited by: *Vladan Koncar* Head of research, ENSAIT and director, GEMTEX research laboratory



**This comprehensive book outlines the fundamental principles of applied smart textiles, also reporting on recent trends and research developments in a rigorous and constructive way that fully presents the various results, prototypes, and case-studies obtained from academic and industrial laboratories worldwide**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Scientific issues and proposed solutions are presented in a rigorous and constructive way regarding various results, prototypes, and case-studies obtained from academic and industrial laboratories worldwide
- Useful for researchers and postgraduate students, and also for existing companies and start-ups that are developing products involving smart textiles
- Authored and edited by an international team who are experts in the field ensure comprehensive coverage and global relevance

### DESCRIPTION

*Smart Textiles and Their Applications* outlines the fundamental principles of applied smart textiles, also reporting on recent trends and research developments. Scientific issues and proposed solutions are presented in a rigorous and constructive way that fully presents the various results, prototypes, and case-studies obtained from academic and industrial laboratories worldwide.

After an introduction to smart textiles and their applications from the editor, Part One reviews smart textiles for medical purposes, including their use in health monitoring, treatment delivery, and assistive technologies. Part Two covers smart textiles for transportation and energy, with chapters covering smart textiles for the monitoring of structures and processes, as well as smart textiles for energy generation.

The final section considers smart textiles for protection, security, and communication, and includes chapters covering electrochromic textile displays, textile antennas, and smart materials for personal protective equipment.

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WOODHEAD PUBLISHING SERIES IN TEXTILES



## Information Systems for the Fashion and Apparel Industry

Edited by Tsan-Ming Choi



**ISBN:** 978-0-08-100571-2

**PUB DATE:** May 2016

**FORMAT:** Hardback

**PAGES:** c. 384

### AUDIENCE

industry professionals, academic researchers and postgraduate students in fashion and apparel, as well as professionals and academics interested in information systems and supply chains

## Information Systems for the Fashion and Apparel Industry

Edited by *Tsan-Ming Jason Choi* Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hong Kong SAR, China.



**Brings together trends and developments in fashion information systems, industrial case-studies, and insights from an international team of authors.**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Provides systematic and comprehensive coverage of information systems for the fashion and apparel industry.
- Combines recent developments and industrial best-practice in apparel supply chain management in order to meet the needs of the fashion and apparel industry professionals and academics.
- Written by a team of highly knowledgeable authors with a range of professional and academic experience, overseen by an editor who is a leading expert in the field.

### DESCRIPTION

The fashion and apparel industry is fast-growing and highly influential. Computerized information systems are essential to support fashion business operations and recent developments in social media, mobile commerce models, radio frequency identification (RFID) technologies, and ERP systems are all driving innovative business measures in the industry. This book brings together trends and developments in fashion information systems, industrial case-studies, and insights from an international team of authors.

After an introductory chapter outlining key decision points and information requirements in fast fashion supply chains, Part One focuses on the principles of fashion information systems, with chapters covering how decision making in the apparel supply chains can be improved through the use of fuzzy logic, RFID technologies, evolutionary optimization techniques and artificial neural networks. Part Two then reviews the range of applications for information systems in the fashion and apparel industry to improve customer choice, aid design, implement intelligent forecasting and procurement systems and manage inventory and returns.

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WOODHEAD PUBLISHING SERIES IN TEXTILES



## Advances in Braiding Technology

Specialized Techniques  
and Applications

Edited by Yordan Kyosev



**ISBN:** 978-0-08-100926-0

**PUB DATE:** April 2016

**FORMAT:** Hardback

**PAGES:** c. 674

### AUDIENCE

R&D engineers and managers in the textile, composites, ropes, medical and other industries; postgraduate students and academic researchers in textile and materials science

## Advances in Braiding Technology

*Specialized Techniques and Applications*

Edited by: *Y Kyosev* Niederrhein University of Applied Sciences, Germany



**Builds on *Braiding Technology for Textiles*, providing coverage of advanced technologies and new developments for the manufacture, applications and modelling of braided products**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Covers advanced braiding techniques, technical applications, and modelling and simulation of braided textiles.
- Focused on the needs of the textile industry by offering suitable breadth and depth of coverage of a range of braiding manufacturing technology, applications and modelling techniques in a single volume.
- Written by an eminent team of authors, composed of leading scientists and developers in the field who have a wealth of relevant, first-hand experience in braiding, and edited by a high-profile editor who is an expert in his field.

### DESCRIPTION

Braiding is the process of interlacing three or more threads or yarns in a diagonal direction to the product axis in order to obtain thicker, wider or stronger textiles or, in the case of overbraiding, in order to cover a profile. Braids are becoming the reinforcement of choice in composite manufacturing, and have found a range of technical applications in fields including medicine, candles, transport and aerospace. Building on the information provided in Prof. Kyosev's previous book, *Braiding Technology for Textiles*, this important title covers advanced technologies and new developments for the manufacture, applications and modelling of braided products.

Part One covers the braiding of three-dimensional profiles, and includes a detailed overview of three-dimensional braiding technologies as well as chapters devoted to specific kinds of 3D braiding. Part Two addresses specialist braiding techniques and applications, and includes chapters reviewing the use of braids for medical textiles and candles. Part Three focuses on braiding techniques for ropes and Part Four reviews braiding for composites. The final part of the book considers modelling and simulation, and covers topics including overbraiding simulation, Finite Element Method (FEM) modelling and geometrical modelling.

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## Geotextiles

From Design to Applications

Edited by Robert M. Koerner, Ph.D., P.E. NAE



## Geotextiles

### *From Design to Applications*

*Robert Koerner* Professor Emeritus, Drexel University, Philadelphia, Pennsylvania, USA and Director Emeritus, Geosynthetic Institute, Folsom, Pennsylvania, USA



**As a comprehensive review of the manufacture, functions, properties, designs, and applications of geotextiles, this book presents valuable information on the high performance fabrics used in soil separation, drainage, filtration, reinforcement, and cushioning, also covering their use as solutions for geoenvironmental and other civil engineering specialties due to their advanced physical, mechanical, hydraulic, and endurance properties**

A Volume in the Woodhead Publishing Series in Textiles.

#### KEY FEATURES

- Reviews the types of fabrics used for geotextiles and their manufacturing processes
- Covers the properties, behavior, and testing of geotextiles
- Contains detailed discussions of the primary functions of geotextiles and their wide range of applications

#### DESCRIPTION

*Geotextiles: From Design to Applications* presents valuable information on the high performance fabrics used in soil separation, drainage, filtration, reinforcement, and cushioning. These polymeric materials offer solutions for geoenvironmental and other civil engineering specialties due to their advanced physical, mechanical, hydraulic, and endurance properties.

This important book offers comprehensive coverage of the manufacture, functions, properties, designs, and applications of geotextiles. Part One begins with a chapter on the history of geotextiles, followed by chapters giving detailed reviews of the types of fabrics and their manufacturing processes, from resin type, to fiber extrusion, to textile fabrication. Part Two covers the properties, behavior, and testing of geotextiles, with Part Three focusing on applications dealing with the specific primary functions of geotextiles. In Part Four, chapters offer numerous general applications of geotextiles, including those in waste containment, marine engineering, walls/slopes, agriculture, and erosion control. Finally, the chapters of Part Five address quality control and assurance for geotextiles, and the increasingly important topic of sustainability.

**ISBN:** 978-0-08-100221-6

**PUB DATE:** March 2016

**FORMAT:** Hardback

**PAGES:** c. 504

#### AUDIENCE

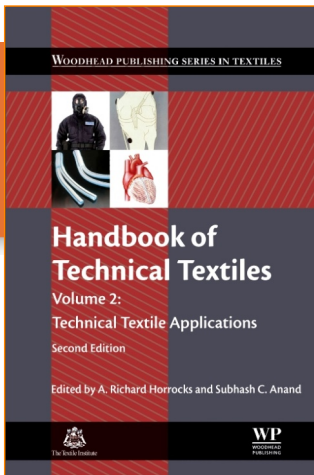
R&D managers in the textile and geotextile industries; academic researchers developing geotextile materials; geo- and civil engineers.

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**ISBN:** 978-1-78242-465-9

**PREVIOUS EDITION ISBN:**

978-1-85573-385-5

**PUB DATE:** February 2016

**FORMAT:** Hardback

**PAGES:** c. 600

**AUDIENCE**

R&D managers in the technical textile industry; postgraduate students and academic researchers in textile science and technology

## Handbook of Technical Textiles, 2e

### *Technical Textile Applications*

Edited by: *A R Horrocks* University of Bolton, UK

*Subhash C. Anand* University of Bolton, UK



**A comprehensive, all-encompassing update to this essential book on technical textiles**

A Volume in the Woodhead Publishing Series in Textiles.

#### KEY FEATURES

- Comprehensive handbook for all aspects of technical textiles
- Provides updated, detailed coverage of processes, fabric structure, and applications
- Ideal resource for those interested in high-performance textiles, textile processes, textile processing, and textile applications
- Many of the original, recognized experts from the first edition update their respective chapters

#### DESCRIPTION

The first edition of *Handbook of Technical Textiles* has been an essential purchase for professionals and researchers in this area since its publication in 2000. With revised and updated coverage, including several new chapters, this revised two volume second edition reviews recent developments and new technologies across the field of technical textiles.

*Volume 2 – Technical Textile Applications* offers an indispensable guide to established and developing areas in the use of technical textiles. The areas covered include textiles for personal protection and welfare, such as those designed for ballistic protection, personal thermal and fire protection, and medical applications; textiles for industrial, transport and engineering applications, including composite reinforcement and filtration; and the growing area of smart textiles.

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WOODHEAD PUBLISHING SERIES IN TEXTILES

## Advances in Smart Medical Textiles

Treatments and Health Monitoring

Edited by Lieva van Langenhove



**ISBN:** 978-1-78242-379-9

**PUB DATE:** December 2015

**FORMAT:** Hardback

**PAGES:** c. 280

### AUDIENCE

R&D managers in the textile industry, professionals within the medical sector, and postgraduate students and academic researchers in textile science.

## Advances in Smart Medical Textiles

### *Treatments and Health Monitoring*

Edited by: *Lieva van Langenhove* Professor, Department of Textiles, Ghent University, Belgium



**This book provides an exploration into the range of smart textiles available for use in medicine and the transfer of these innovative technologies into medical applications, including discussions of the role of smart textiles in wound care and rehabilitation, and the use of textile-based sensors and wearable electronics for monitoring patient health**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

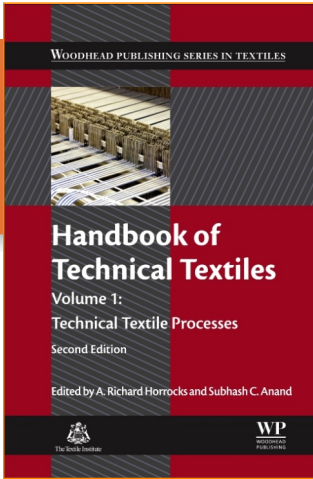
- Provides a comprehensive review of the materials used in smart medical textiles
- Analyzes the application of these textiles in medical treatments and sensors for health monitoring
- Covers the range of international research in the field and keeps focus on the needs of the textile industry

### DESCRIPTION

*Advances in Smart Medical Textiles: Treatments and Health Monitoring* provides comprehensive coverage on smart textiles, the emerging and important materials that are finding applications in the fields of medicine and healthcare.

The book explores the range of smart textiles available for use in medicine and the transfer of these innovative technologies into medical applications. Early chapters survey various smart fibers, fabrics, and finishes, while subsequent sections focus on the role of smart textiles in treating patients, from wound care to rehabilitation, and the use of textile-based sensors and wearable electronics for monitoring patient health.





**ISBN:** 978-1-78242-458-1

**PREVIOUS EDITION ISBN:**

978-1-85573-385-5

**PUB DATE:** November 2015

**FORMAT:** Hardback

**PAGES:** c. 390

**AUDIENCE**

R&D managers in the technical textile industry; postgraduate students and academic researchers in textile science and technology

## Handbook of Technical Textiles, 2e

### *Technical Textile Processes*

Edited by: *A R Horrocks* University of Bolton, UK

*Subhash C. Anand* University of Bolton, UK



**This comprehensive, all-encompassing update to an essential book on technical textiles provides an understanding of the latest advancements in technical textiles, including new chapters that review recent developments and technologies**

A Volume in the Woodhead Publishing Series in Textiles.

#### KEY FEATURES

- Provides a comprehensive handbook for all aspects of technical textiles
- Presents updated, detailed coverage of processes, fabric structure, and applications
- An ideal resource for those interested in high-performance textiles, textile processes, textile processing, and textile applications
- Contains contributions from many of the original, recognized experts from the first edition who update their respective chapters

#### DESCRIPTION

The second edition of *Handbook of Technical Textiles, Volume 1: Technical Textile Processes* provides readers with a comprehensive understanding of the latest advancements in technical textiles. With revised and updated coverage, including several new chapters, this volume reviews recent developments and technologies in the field, beginning with an overview of the technical textiles industry that includes coverage of technical fibers and yarns, weaving, spinning, knitting, and nonwoven production. Subsequent sections include discussions on finishing, coating, and the coloration of technical textiles.

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## Medical Textile Materials

Edited by: *Yimin Qin* Jiaxing College, Jiaxing, China



**This book provides a systematic overview of the structures, properties and applications of medical textile materials, detailing the latest information on technical textiles and how they have found a wide range of medical applications, from wound dressings and sutures to implants and tissue scaffolds**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Provides systematic and comprehensive coverage of the manufacture, properties, and applications of medical textile materials
- Covers recent developments in medical textiles, including antimicrobial dressings, drug-releasing materials, and superabsorbent textiles
- Written by a highly knowledgeable author with extensive experience in industry and academia

### DESCRIPTION

*Medical Textile Materials* provides the latest information on technical textiles and how they have found a wide range of medical applications, from wound dressings and sutures, to implants and tissue scaffolds. This book offers a systematic review of the manufacture, properties, and applications of these technical textiles.

After a brief introduction to the human body, the book gives an overview of medical textile products and the processes used to manufacture them. Subsequent chapters cover superabsorbent textiles, functional wound dressings, bandages, sutures, implants, and other important medical textile technologies. Biocompatibility testing and regulatory control are then addressed, and the book finishes with a review of research and development strategy for medical textile products.

**ISBN:** 978-0-08-100618-4

**PUB DATE:** November 2015

**FORMAT:** Hardback

**PAGES:** c. 244

### AUDIENCE

Students and academic researchers textile engineering, light chemical engineering, biomedical engineering and polymeric materials; professionals in the textiles industry, and those engaged in developing biomedical products.





WOODHEAD PUBLISHING SERIES IN TEXTILES



## Sustainable Apparel

Production, Processing and Recycling

Edited by R. S. Blackburn



**ISBN:** 978-1-78242-339-3

**PUB DATE:** August 2015

**FORMAT:** Hardback

**PAGES:** c. 270

### AUDIENCE

R&D managers in the apparel industry, apparel designers and manufacturers, postgraduate students and academic researchers in textile science.

## Sustainable Apparel

*Production, Processing and Recycling*

Edited by: *Richard Blackburn* University of Leeds, UK



**A guide to recent advances and novel technologies for sustainability in the production, processing and recycling of apparel**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Reviews sustainable finishing and dyeing processes for textiles
- Addresses social attitudes towards and methods for measuring sustainability in the apparel industry and retail sectors
- Covers recycling of apparel

### DESCRIPTION

Sustainability is an issue that increasingly concerns all those involved in the apparel industry, including textile manufacturers, apparel designers, retailers and consumers. This important book covers recent advances and novel technologies in the key areas of production, processing and recycling of apparel.

Part One addresses sustainable finishing and dyeing processes for textiles. The first two chapters concentrate on the environmental impact of fabric finishing, including water consumption, emissions and waste management. Further chapters focus on plasma and enzymatic treatments for sustainable textile processing, and the potential for improving the sustainability of dyeing technologies. Part Two covers issues of design, retail and recycling, and includes discussions of public attitudes towards sustainability in fashion, methods of measuring apparel sustainability and social trends in the re-use of apparel.

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## Handbook of Life Cycle Assessment (LCA) of Textiles and Clothing

Edited by Dr Subramanian Senthilkannan Muthu



ISBN: 978-0-08-100169-1

PUB DATE: July 2015

FORMAT: Hardback

PAGES: c. 378

### AUDIENCE

R&D managers in the textile and clothing industries; postgraduate students and academic researchers in textile science; sustainability consultants.

## Handbook of Life Cycle Assessment (LCA) of Textiles and Clothing

Edited by: *Subramanian Senthilkannan Muthu* Global Sustainability Services, Hong Kong



**A comprehensive examination of the life cycle assessment process and its application in the textile and clothing industries**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Covers the LCA process and its key indicators, including carbon and ecological footprints, disposal, re-use and recycling
- Examines the key developments of LCA in the textile and clothing industries
- Provides a wide range of case studies and examples of LCA applications in the textile and clothing industries

### DESCRIPTION

Life cycle assessment (LCA) is used to evaluate the environmental impacts of textile products, from raw material extraction, through fibre processing, textile manufacture, distribution and use, to disposal or recycling. LCA is an important tool for the research and development process, product and process design, and labelling of textiles and clothing. *Handbook of Life Cycle Assessment (LCA) of Textiles and Clothing* systematically covers the LCA process with comprehensive examples and case studies.

Part one of the book covers key indicators and processes in LCA, from carbon and ecological footprints to disposal, re-use and recycling. Part two then discusses a broad range of LCA applications in the textiles and clothing industry.

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## Textiles for Sportswear

Edited by Roshan Shishoo



The British Institute



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## Textiles for Sportswear

Edited by: *R Shishoo* Shishoo Consulting, Sweden



**An in-depth review of technical developments and key trends in sportswear textiles, including design and materials and the use of novel and smart fabrics for specialized, high-performance sportswear**

A Volume in the Woodhead Publishing Series in Textiles.

"...covers key trends in sportswear design and materials, the use of novel and smart fabrics, and the range of applications of sportswear technology."--**Asian Technical Textiles, *Textiles for Sportswear***

### KEY FEATURES

- Reviews the principles of textile applications in sport, including design, materials and production technology
- Examines the uses of smart textiles in sportswear
- Discusses how recent advances in sportswear technology are being applied to particular sports

### DESCRIPTION

*Textiles for Sportswear* is an important book that systematically covers key trends in design and materials, the use of novel and smart fabrics, and a range of specific applications. The book begins by surveying the principles of textile applications in sport, including design, materials, and production technology.

The uses of smart textiles in sportswear are then examined, from intelligent materials to wearable technology. Final sections of the text explore comfort in sportswear, sportswear for protection, and recent advances in sportswear technology that are currently being applied to particular sports.

ISBN: 978-1-78242-229-7

PUB DATE: May 2015

FORMAT: Hardback

PAGES: c. 272

### AUDIENCE

Textile and clothing scientists and technologists, postgraduate students, designers, material buyers, research and development staff in the sportswear industry, biomedical researchers and sportspersons in general.

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WOODHEAD PUBLISHING SERIES IN TEXTILES



## Advances in 3D Textiles

Edited by Xiaogang Chen



The Woodhead Group



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## Advances in 3D Textiles

Edited by: *X Chen* University of Manchester, UK



**Presents the most recent advances in the production of three-dimensional fibrous structures and how their use has resulted in novel fabrics and applications**

A Volume in the Woodhead Publishing Series in Textiles.

"...covers a wide range of fabric types, including their structures, properties, and uses in the textiles industry...The chapter in Solid three dimensional woven textiles, addresses some historic aspects and recent advancements in one of the fastest growing areas of modern composite materials..."--*Asian Textile Journal, Advances in 3D Textiles*

### KEY FEATURES

- Presents the most recent advances in the production of three-dimensional fibrous structures and how their use has resulted in the creation of novel fabrics and applications
- Examines many types of 3-D textiles, including knitted, braided, and non-woven textiles, and the main uses of three-dimensional textiles
- Covers their structures, properties, and uses within the textiles industry

### DESCRIPTION

*Advances in 3D Textiles* presents the most recent advances in the production of three-dimensional fibrous structures and how their use has resulted in the creation of novel fabrics and applications. The text covers a wide range of fabric types, including their structures, properties, and uses in the textiles industry.

Beginning with the various types of woven three-dimensional fabrics, the text then examines 3-D knitted, braided, and non-woven textiles, and the main applications and uses of three-dimensional textiles.

**ISBN:** 978-1-78242-214-3

**PUB DATE:** May 2015

**FORMAT:** Hardback

**PAGES:** c. 386

### AUDIENCE

Research and development managers in the textile industry, and postgraduate students and academic researchers in textile science

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# Garment Manufacturing Technology

Edited by Rajkishore Nayak and Rajiv Padhye



ISBN: 978-1-78242-232-7

PUB DATE: May 2015

FORMAT: Hardback

PAGES: c. 480

#### AUDIENCE

R&D managers in the textile industry, postgraduate students and academic researchers in textile science.

## Garment Manufacturing Technology

Edited by: *Rajkishore Nayak* RMIT University, Australia

*R Padhye* RMIT University, Australia



An insiders look at garment manufacturing from design and production to finishing and quality control

A Volume in the Woodhead Publishing Series in Textiles.

"...provides a systematic overview of the multi-faceted process of garment manufacture, with a particular emphasis on the effective use of technology."--*Asian Textile Journal, Garment Manufacturing Technology*

#### KEY FEATURES

- Provides an insiders look at garment manufacturing from design and production to finishing and quality control
- Discusses necessary information on product development, production planning, and material selection
- Includes discussions of computer-aided design (CAD), advances in spreading, cutting and sewing, and new technologies, including alternative joining techniques and seamless garment construction
- Explores garment finishing, quality control, and care labelling

#### DESCRIPTION

*Garment Manufacturing Technology* provides an insiders' look at this multifaceted process, systematically going from design and production to finishing and quality control.

As technological improvements are transforming all aspects of garment manufacturing allowing manufacturers to meet the growing demand for greater productivity and flexibility, the text discusses necessary information on product development, production planning, and material selection. Subsequent chapters covers garment design, including computer-aided design (CAD), advances in spreading, cutting and sewing, and new technologies, including alternative joining techniques and seamless garment construction. Garment finishing, quality control, and care-labelling are also presented and explored.

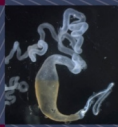
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WOODHEAD PUBLISHING SERIES IN TEXTILES



## Advances in Silk Science and Technology

Edited by Arindam Basu



The Royal Institute



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## Advances in Silk Science and Technology

Edited by: *Arindam Basu* Northern India Textile Research Association,  
Ghaziabad, Uttar Pradesh, India



**An authoritative overview of recent developments in silk processing, properties and applications**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Reviews the properties of silk from both silkworms and spiders
- Offers systematic coverage of the processing of silk from spinning through to finishing
- Cover a range of applications, including on the use of silk in polymer matrix composites and in different kinds of biomaterial

### DESCRIPTION

The remarkable properties of silk fibres have gained them a prominent place in the field of technical textiles. *Advances in Silk Science and Technology* explores recent developments in silk processing, properties and applications. Techniques for manufacturing spider silk are also discussed and the current and future applications of this fibre are reviewed.

Part One focuses on the properties and processing of silk from both silkworms and spiders. It addresses recent advances in our understanding of the properties of silk and offers systematic coverage of the processing of silk from spinning through to finishing, as well as an analysis of quality testing for silk fibres, yarns and fabrics. Part Two then addresses important applications of silk from silkworms and spiders, and includes chapters on the use of silk in polymer matrix composites and in different kinds of biomaterial. The book concludes with a chapter on developments in the use of silk waste.

**ISBN:** 978-1-78242-311-9

**PUB DATE:** April 2015

**FORMAT:** Hardback

**PAGES:** c. 278

### AUDIENCE

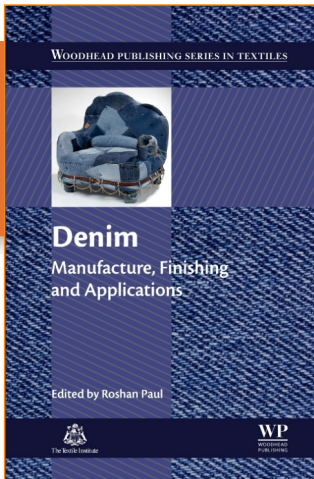
R&D managers in the textile industry, postgraduate students and academic researchers in textile science

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ISBN: 978-0-85709-843-6

PUB DATE: April 2015

FORMAT: Hardback

PAGES: c. 600

#### AUDIENCE

A complete resource for technical managers in the textile, denim, garment, fashion, dyestuffs, textile chemicals, biotechnology, industrial laundry and textile machinery industries, as well as academic researchers and designers working on different aspects of textile and fashion technology.

## Denim

### *Manufacture, Finishing and Applications*

Edited by: *Roshan Paul* Hohenstein Institut für Textilinnovation gGmbH, Germany



**This book provides a comprehensive review of denim fabric manufacture, manufacturing and finishing of jeans, novel applications, and environmental impacts.**

A Volume in the Woodhead Publishing Series in Textiles.

"...a valuable resource for R&D managers in the denim, chemical, biotechnology, machinery, laundry, garment and fashion industries, as well as academic researchers..."--*Asian Textile Journal*, **Denim**

"This go to denim guide and authentic reference book covers denim aspects from jean washing to environmental impacts. The history and social influence of denim are included..."--*Apparel Magazine*, **Denim**

"...provides a thorough review of denim technologies while maintaining a high level of technological content on spinning, dyeing, weaving, garments, washing, finishing and other applications."--*Asian Dyer*, **Denim**

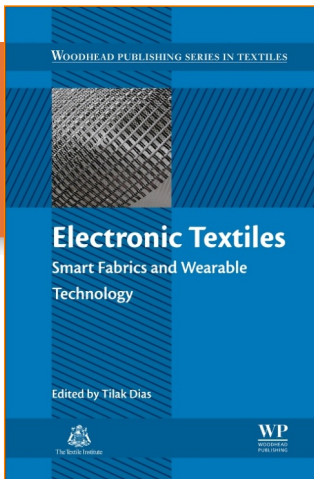
#### KEY FEATURES

- Provides a thorough review of denim manufacturing and jeans washing technologies
- Includes details relevant to the fashion and apparel industry while maintaining a high level of technological content on spinning, dyeing, weaving, garments, washing, finishing and other applications
- Includes several contributions from industry experts

#### DESCRIPTION

*Denim: Manufacture, Finishing and Applications* provides exhaustive coverage of denim manufacture, jeans washing, novel applications and environmental impacts. It also contains information on the history and social influence of denim, and includes the details relevant to the fashion and apparel industry. The topics covered are comprehensive with contributions from experts the world over, and the book is offered as an authentic reference book for any relevant information on denim.





**ISBN:** 978-0-08-100201-8

**PUB DATE:** April 2015

**FORMAT:** Hardback

**PAGES:** c. 146

**AUDIENCE**

R&D managers in the textile industry; postgraduate students and academic researchers in textile science

## Electronic Textiles

### *Smart Fabrics and Wearable Technology*

Edited by: **Tilak Dias** Nottingham Trent University, Nottingham, UK



**An authoritative guide to electronic textiles through integration and application**

A Volume in the Woodhead Publishing Series in Textiles.

"...gives developers in the textile industry and research in the near future an overview of all developed textile-based sensors in different application areas."--**Asian Technical Textiles, Electronic Textiles**

"A three part authoritative guide on electronic textiles this key reference title covers fibres, yarns and fabrics the create wearable sensors, embroidered antennas and more."--**Apparel Magazine, Electronic Textiles**

**KEY FEATURES**

- Comprehensive overview of conductive fibres, yarns and fabrics for electronic textiles
- Expert analysis of textile-based sensors design, integration of micro-electronics with yarns and photovoltaic energy harvesting for intelligent textiles
- Detailed coverage of applications in electronic textiles, including wearable sensors for athletes, embroidered antennas for communication and electronic textiles for military personnel

**DESCRIPTION**

The integration of electronics into textiles and clothing has opened up an array of functions beyond those of conventional textiles. These novel materials are beginning to find applications in commercial products, in fields such as communication, healthcare, protection and wearable technology. *Electronic Textiles: Smart Fabrics and Wearable Technology* opens with an initiation to the area from the editor, Tilak Dias. Part One introduces conductive fibres, carbon nano-tubes and polymer yarns. Part Two discusses techniques for integrating textiles and electronics, including the design of textile-based sensors and actuators, and energy harvesting methods. Finally, Part Three covers a range of electronic textile applications, from wearable electronics to technical textiles featuring expert chapters on embroidered antennas for communication systems and wearable sensors for athletes.







## Fabric Structures in Architecture

Edited by: *J Llorens* Polytechnic University of Catalonia, Spain



**Provides a comprehensive discussion on the varying characteristics of textiles, their properties, and their use in building construction, with particular focus paid to tensile structures**

A Volume in the Woodhead Publishing Series in Textiles.

### KEY FEATURES

- Offers key coverage of the fundamental principles, from the origins of fabric architecture to modern textile
- Provides analysis of relevant textile materials and their properties, including coatings and membranes
- Contains expert insights in to the applications of textiles in architecture, presenting a series of relevant case-studies from around the world

### DESCRIPTION

*Fabric Structures in Architecture* covers the varying ways textiles and their properties are used in building construction, with particular focus given to tensile structures. The text begins with the fundamental principles of textiles, including the origins of fabric architecture, then progressing to a discussion of the modern textiles of today. It covers relevant textile materials and their properties, including coatings and membranes. In addition, a range of design considerations are discussed, with detailed information on installation and failure modes. A series of case studies from around the world accompany the discussion, illustrating the applications of textiles in architecture.

**ISBN:** 978-1-78242-233-4

**PUB DATE:** April 2015

**FORMAT:** Hardback

**PAGES:** c. 836

### AUDIENCE

Textile manufacturers, architects, engineers, and postgraduate students and academic researchers in textile science.

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**PUB DATE:** February 2015

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**PAGES:** c. 184

**AUDIENCE**

Tertiary level students, educators seeking to update their knowledge, industry professionals and government opinion and policy makers researching new technologies.

## Ink Jet Textile Printing

*Christina Cie* Royal Melbourne Institute of Technology (RMIT University), Australia



**Covers the process of ink jet textile printing, how ink jet textile printing developed and how it has affected the textile industry.**

A Volume in the Woodhead Publishing Series in Textiles.

"...reviews the various steps of the textile ink jet printing process and then looks beyond this process to consider the impact of this emerging technology along the supply chain for printed textiles."--*Asian Textile Journal, Ink Jet Textile Printing*

### KEY FEATURES

- Covers the foundations and development of ink jet textile printing technology
- Discusses the steps of ink jet printing from colour management to fixing processes
- Analyses how ink jet printing has affected the textile industry

### DESCRIPTION

With the rapid expansion of ink jet printing, textile printing and allied industries need to understand the principles underpinning this technology and how it is currently being successfully implemented into textile products.

Considering the evolution of new print processes, technological development often involves a balance of research across different disciplines. Translating across the divide between scientific research and real-world engagement with this technology, this comprehensive publication covers the basic principles of ink jet printing and how it can be applied to textiles and textile products.

Each step of the ink jet printing process is covered, including textiles as a substrate, colour management, pre-treatments, print heads, inks and fixing processes. This book also considers the range of textile printing processes using ink jet technology, and discusses their subsequent impact on the textile designer, manufacturer, wholesaler, retailer and the environment.



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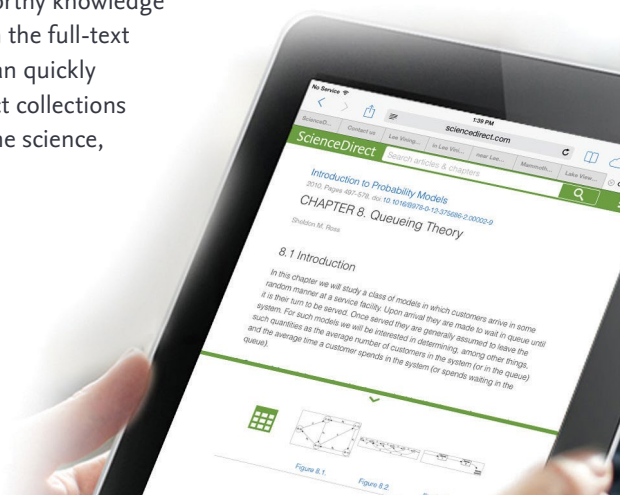
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