Metal Matrix Composites

This work focuses on the fundamentals of MMCs for engineers and designers. The new edition addresses new issues and developments in the areas of automotive, aerospace, electronics and consumer applications. These include continuous fiber reinforced MMCs for cables in power transmission, high temperature superconducting wires, particulate MMCs in civilian aircraft and automotive applications, and high volume fraction, high thermal conductivity substrates for electronic packaging. The coverage is thorough and cohesive, and emphasizes the synergistic relationships among processing, structure and properties of metal matrix composites.

Features

- Introduces up-to-date developments of metal matrix composites, particularly in 3D characterization and nano-composites
- Focuses on the synergistic relationships among processing, microstructure, and properties of metal matrix composites
- Describes the latest in applications of common matrix materials

Contents


Nanoscale Sensors

Features

- Surveys novel technologies for nanoscale sensors
- Provides the keys to understanding the principles underlying nanoscale sensors
- Written by leading experts in the corresponding research areas
- Describes enabling technologies for critical health, environmental science, and security applications

Contents


Mechanics of Composites

This book starts with a review of composite mechanics and basic behavior of composite materials. The fundamentals of finite element analysis for composite modeling are presented in the following chapter. The applications of NDT techniques in composite inspection, in particular wave propagation, are scientifically discussed. Then, composites mechanics and NDT inspection are introduced in a question–answer format. In the last chapters, the editors introduce MATLAB codes and simulation results related to wave propagation in composite materials and vibrothermography technique, very useful for aerospace applications.

Features

- Vibrothermography Book is divided in short sections with problems and answers
- Written in a simple language, ideal for students
- Presents composite properties data to help perform calculations easily

Contents

Mechanics of composite materials. - Finite element analysis of composite. - Non-destructive inspection of composite materials. - Problems and solutions. - Sample modeling (including wave propagation and composite testing).

Fields of interest

Ceramics, Glass, Composites, Natural Materials; Structural Materials; Continuum Mechanics and Mechanics of Materials

Target groups

Research

Product category

Monograph

Due December 2013

2nd ed. 2014. XII, 324 p. 263 illus., 89 in color. Hardcover

* € (D) 139,09 | € (A) 142,99 | sFr 173,50
* € 129,99 | £117.00

Due January 2014


* approx. * € (D) 106,95 | € (A) 109,95 | sFr 133,50
* approx. € 99,95 | £90.00
ISBN 978-3-642-41325-4
Practical Materials Characterization

Practical Materials Characterization covers the most common materials analysis techniques in a single volume. It stands as a quick reference for experienced users, as a learning tool for students, and as a guide for the understanding of typical data interpretation for anyone looking at results from a range of analytical techniques. The book includes analytical methods covering microstructural, surface, morphological, and optical characterization of materials with emphasis on microscopic structural, electronic, biological, and mechanical properties. Many examples in this volume cover cutting-edge technologies such as nanomaterials and life sciences.

Features
- Presents cross-comparison between materials characterization techniques
- Includes clear specifications of strengths and limitations of each technique for specific materials characterization problem
- Focuses on applications and clear data interpretation without extensive mathematics

Contents

Fields of interest
Characterization and Evaluation of Materials; Spectroscopy and Microscopy; Mass Spectrometry

Target groups
Professional/practitioner

Product category
Professional book

Due November 2014

2014. 300 p. 150 illus. Hardcover
► approx. *€ (D) 106,95 | € (A) 109,95 | sFr 137,00
► approx. € 99,95 | £86.50

Fiber Fuse

Light-Induced Continuous Breakdown of Silica Glass Optical Fiber

This book describes the fiber fuse phenomenon that causes a serious problem for the present optical communication systems. High-power light often brings about catastrophic damage to optical devices. Silica glass optical fibers with ultra-low transmission loss are not the exception. A fiber fuse appears in a heated region of the fiber cable delivering a few watts of light and runs toward the light source destroying its core region. Understanding this phenomenon is a first necessary step in the development of future optical communication systems. This book provides supplementary videos and photographs to help understand what occurs in the fiber, including the classification of its propagation mode and self-pumping effect. These findings are good references for other optical devices exposed to ultra-high power light such as laser emitters.

Features
- Provides a concise introduction into the fiber fuse phenomenon
- Supplementary high-quality photographs and video clips available on extras.

Contents
Impact of Fiber Fuse on Optical Communication.- Fiber Fuse Propagation Modes.- In Situ Observation of Fiber Fuse Propagation.- Self-Pumping Effect During Fiber Fuse Propagation.

Fields of interest
Optical and Electronic Materials; Optics, Optoelectronics, Plasmonics and Optical Devices; Communications Engineering, Networks

Target groups
Research

Product category
Monograph

Due May 2014

2014. 60 p. 17 illus., 5 in color. (NIMS Monographs) Softcover
► approx. *€ (D) 64,15 | € (A) 65,95 | sFr 80,00
► approx. € 59,95 | £53.99
ISBN 978-4-314-54576-7

FIB Nanostructures

Contents
Preface.- Chapter 1: Focused Ion Beam (FIB) technology for micro and nanoscale fabrications.- Chapter 2: Epitaxial ferroelectric nanostructures fabricated by FIB milling.- Chapter 3: Low current focused-ion-beam milling for freestanding nanomaterial characterization.- Chapter 4: Focused ion beam milling of carbon nanotube yarns and Bucky-papers: Correlating their internal structure with their macro-properties.- Chapter 5: Nanoscale electrical contacts grown by Focused-Ion-Beam (FIB) Induced Deposition.- Chapter 6: Metal induced crystallization of focused ion beam induced deposition for functional patterned ultrathin nanocarbon.- Chapter 7: Deterministic Fabrication of Micro- and Nano-Structures by Focused Ion Beam.- Chapter 8: Application of ion beam processes to scanning probe microscopy.- Chapter 9: Fabrication of needle-shaped specimens containing sub-surface nanostructures for Electron Tomography.- Chapter 10: Fabrication technique of deformation carriers (gratings and speckle patterns) with FIB for micro/nanoscale deformation measurement.- Chapter 11: Controlled Quantum Dot Formation on Focused Ion Beam patterned GaAs Substrates.- Chapter 12: Development of Functional Metallic Glassy Materials by FIB and Nano-imprint Technologies.- Chapter 13: Nanostructured Materials Driven by Dielectrophoresis on Nanoelectrodes Patterned by Focused Ion Beam.- Chapter 14: Focused Ion Beam Assisted Nano-Scale Processing and Thermo-electrical Characterization.- Chapter 15: FIB design for Nanofluidic applications. [...]
MoS2
Materials, Physics, and Devices

Features
- Offers comprehensive coverage of novel MoS2 monolayer films and MoS2 nanomaterials
- Provides the keys to understanding the emerging area of MoS2 devices
- Written by leading experts in each research area

Contents

Fields of interest
Optical and Electronic Materials; Nanoscale Science and Technology; Nanotechnology and Microengineering

Target groups
Research

Product category
Monograph

Due November 2013
2014. IX, 366 p. 171 illus., 152 in color. (Lecture Notes in Nanoscale Science and Technology, Volume 21) Hardcover
- € (D) 106,99 | € (A) 109,99 | sFr 133,50
- € 99,99 | £90.00
ISBN 978-3-319-02849-1

Z. M. Wang, University of Electronic Science and Technology, Chengdu, People's Republic of China (Ed)

Nanodroplets

Contents

Fields of interest
Nanotechnology; Nanoscale Science and Technology; Nanochemistry

Target groups
Research

Product category
Monograph

Due December 2013
2014. XII, 428 p. 197 illus., 124 in color. (Lecture Notes in Nanoscale Science and Technology, Volume 18) Hardcover
- € (D) 139,09 | € (A) 142,99 | sFr 173,50
- € 129,99 | £117.00