

Handbook Of Solid State Lasers Materials Systems And Applications Woodhead Publishing Series In Electronic And Optical Materials

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Waste Electrical and Electronic Equipment (WEEE) Handbook - Vanessa Goodship 2012-08-30

Electrical and electronic waste is a growing problem as volumes are increasing fast. Rapid product innovation and replacement, especially in information and communication technologies (ICT), combined with the migration from analog to digital technologies and to flat-screen televisions and monitors has resulted in some electronic products quickly reaching the end of their life. The EU directive on waste electrical and electronic equipment (WEEE) aims to minimise WEEE by putting organizational and financial responsibility on producers and distributors for collection, treatment, recycling and recovery of WEEE. Therefore all stakeholders need to be well-informed about their WEEE responsibilities and options. While focussing on the EU, this book draws lessons for policy and practice from all over the world. Part one introduces the reader to

legislation and initiatives to manage WEEE. Part two discusses technologies for the refurbishment, treatment and recycling of waste electronics. Part three focuses on electronic products that present particular challenges for recyclers. Part four explores sustainable design of electronics and supply chains. Part five discusses national and regional WEEE management schemes and part six looks at corporate WEEE management strategies. With an authoritative collection of chapters from an international team of authors, Waste electrical and electronic equipment (WEEE) handbook is designed to be used as a reference by policy-makers, producers and treatment operators in both the developed and developing world. Draws lessons for waste electrical and electronic equipment (WEEE) policy and practice from around the world Discusses legislation and initiatives to manage WEEE, including global e-waste initiatives, EU legislation relating to electronic waste, and eco-

efficiency evaluation of WEEE take-back systems Sections cover technologies for refurbishment, treatment and recycling of waste, sustainable design of electronics and supply chains, national and regional waste management schemes, and corporate WEEE management strategies

Organic Light-Emitting Diodes (OLEDs) - Alastair Buckley 2013-08-31

Organic light-emitting diodes (OLEDs) are opening up exciting new applications in the area of lighting and displays. OLEDs are self emissive and by careful materials and device design can generate colours across the visible spectrum. Together with simple monolithic fabrication on a range of different substrates, these diverse material properties give OLEDs key advantages over existing display and lighting technology. This important book summarises key research on materials, engineering and the range of applications of these versatile materials. Part one covers materials for OLEDs. Chapters review conjugated polymers, transparent conducting thin films, iridium complexes and phosphorescent materials. Part two discusses the operation and engineering of OLED devices. Chapters discuss topics such as highly efficient pin-type OLEDs, amorphous organic semiconductors, nanostructuring techniques, light extraction, colour tuning, printing techniques, fluorenone defects and disruptive characteristics as well as durability issues. Part three explores the applications of OLEDs in displays and solid-state lighting. Applications discussed include displays, microdisplays and transparent OLEDs, sensors and large-area OLED lighting panels. Organic light-emitting diodes (OLEDs) is a standard reference for engineers working in lighting, display technology and the consumer electronics sectors, as well as those researching OLEDs. Summarises key research on the materials, engineering and applications of OLEDs Reviews conjugated polymers, transparent conducting thin films Considers nanostructuring OLEDs for increasing levels of efficiency

Handbook of Flexible Organic Electronics - Stergios Logothetidis 2014-12-15

Organic flexible electronics represent a highly promising technology that will provide increased functionality and the potential to meet future challenges of scalability, flexibility, low power consumption, light weight, and reduced cost. They will find new applications because they can be used with curved surfaces and incorporated in to a number of products that could not support traditional electronics. The book covers device physics, processing and manufacturing technologies, circuits and packaging, metrology and diagnostic tools, architectures, and systems engineering. Part one covers the production, properties and characterisation of flexible organic materials and part two looks at applications for flexible organic devices. Reviews the properties and production of various flexible organic materials. Describes the integration technologies of flexible organic electronics and their manufacturing methods. Looks at the application of flexible organic materials in smart integrated systems and circuits, chemical sensors, microfluidic devices, organic non-volatile memory devices, and printed batteries and other power storage devices.

Handbook of Solid-State Lasers - B Denker 2013-02-20

Solid-state lasers which offer multiple desirable qualities, including enhanced reliability, robustness, efficiency and wavelength diversity, are absolutely indispensable for many applications. The Handbook of solid-state lasers reviews the key materials, processes and applications of solid-state lasers across a wide range of fields. Part one begins by reviewing solid-state laser materials. Fluoride laser crystals, oxide laser ceramics, crystals and fluoride laser ceramics doped by rare earth and transition metal ions are discussed alongside neodymium, erbium and ytterbium laser glasses, and nonlinear crystals for solid-state lasers. Part two then goes on to explore solid-state laser systems and their applications, beginning with a

discussion of the principles, powering and operation regimes for solid-state lasers. The use of neodymium-doped materials is considered, followed by system sizing issues with diode-pumped quasi-three level materials, erbium glass lasers, and microchip, fiber, Raman and cryogenic lasers. Laser mid-infrared systems, laser induced breakdown spectroscopy and the clinical applications of surgical solid-state lasers are also explored. The use of solid-state lasers in defense programs is then reviewed, before the book concludes by presenting some environmental applications of solid-state lasers. With its distinguished editors and international team of expert contributors, the Handbook of solid-state lasers is an authoritative guide for all those involved in the design and application of this technology, including laser and materials scientists and engineers, medical and military professionals, environmental researchers, and academics working in this field. Reviews the materials used in solid-state lasers Explores the principles of solid-state laser systems and their applications Considers defence and environmental applications

Carbon Nanotubes and Graphene for Photonic Applications
- Shinji Yamashita 2013-08-31

The optical properties of carbon nanotubes and graphene make them potentially suitable for a variety of photonic applications. Carbon nanotubes and graphene for photonic applications explores the properties of these exciting materials and their use across a variety of applications. Part one introduces the fundamental optical properties of carbon nanotubes and graphene before exploring how carbon nanotubes and graphene are synthesised. A further chapter focusses on nonlinearity enhancement and novel preparation approaches for carbon nanotube and graphene photonic devices. Chapters in part two discuss carbon nanotubes and graphene for laser applications and highlight optical gain and lasing in carbon nanotubes, carbon nanotube and graphene-based fiber lasers, carbon-nanotube-based bulk solid-state lasers, electromagnetic nonlinearities in graphene, and

carbon nanotube-based nonlinear photonic devices. Finally, part three focusses on carbon-based optoelectronics and includes chapters on carbon nanotube solar cells, a carbon nanotube-based optical platform for biomolecular detection, hybrid carbon nanotube-liquid crystal nanophotonic devices, and quantum light sources based on individual carbon nanotubes. Carbon nanotubes and graphene for photonic applications is a technical resource for materials scientists, electrical engineers working in the photonics and optoelectronics industry and academics and researchers interested in the field. Covers the properties and fabrication of carbon nanotubes and graphene for photonic applications Considers the uses of carbon nanotubes and graphene for laser applications Explores numerous carbon-based light emitters and detectors

Ultrasonic Transducers - K Nakamura 2012-08-23

Ultrasonic transducers are key components in sensors for distance, flow and level measurement as well as in power, biomedical and other applications of ultrasound. Ultrasonic transducers reviews recent research in the design and application of this important technology. Part one provides an overview of materials and design of ultrasonic transducers. Piezoelectricity and basic configurations are explored in depth, along with electromagnetic acoustic transducers, and the use of ceramics, thin film and single crystals in ultrasonic transducers. Part two goes on to investigate modelling and characterisation, with performance modelling, electrical evaluation, laser Doppler vibrometry and optical visualisation all considered in detail. Applications of ultrasonic transducers are the focus of part three, beginning with a review of surface acoustic wave devices and air-borne ultrasound transducers, and going on to consider ultrasonic transducers for use at high temperature and in flaw detection systems, power, biomedical and micro-scale ultrasonics, therapeutic ultrasound devices, piezoelectric and fibre optic hydrophones, and ultrasonic motors are also described. With its distinguished editor and expert team of

international contributors, Ultrasonic transducers is an authoritative review of key developments for engineers and materials scientists involved in this area of technology as well as in its applications in sectors as diverse as electronics, wireless communication and medical diagnostics. Reviews recent research in the design and application of ultrasonic transducers Provides an overview of the materials and design of ultrasonic transducers, with an in-depth exploration of piezoelectricity and basic configurations Investigates modelling and characterisation, applications of ultrasonic transducers, and ultrasonic transducers for use at high temperature and in flaw detection systems
Polymer Optical Fibres - Christian-Alexander Bunge
2016-08-25

Polymer Optical Fibres: Fibre Types, Materials, Fabrication, Characterization, and Applications explores polymer optical fibers, specifically their materials, fabrication, characterization, measurement techniques, and applications. Optical effects, including light propagation, degrading effects of attenuation, scattering, and dispersion, are explained. Other important parameters like mechanical strength, operating temperatures, and processability are also described. Polymer optical fibers (POF) have a number of advantages over glass fibers, such as low cost, flexibility, low weight, electromagnetic immunity, good bandwidth, simple installation, and mechanical stability. Provides systematic and comprehensive coverage of materials, fabrication, properties, measurement techniques, and applications of POF Focuses on industry needs in communication, illumination and sensors, the automotive industry, and medical and biotechnology Features input from leading experts in POF technology, with experience spanning optoelectronics, polymer, and textiles Explains optical effects, including light propagation, degrading effects of attenuation, scattering, and dispersion

Semiconductor Gas Sensors - Raivo Jaaniso 2013-08-31
Semiconductor gas sensors have a wide range of applications in safety, process control, environmental

monitoring, indoor or cabin air quality and medical diagnosis. This important book summarises recent research on basic principles, new materials and emerging technologies in this essential field. The first part of the book reviews the underlying principles and sensing mechanisms for n- and p-type oxide semiconductors, introduces the theory for nanosize materials and describes the role of electrode-semiconductor interfaces. The second part of the book describes recent developments in silicon carbide- and graphene-based gas sensors, wide bandgap semiconductor gas sensors and micromachined and direct thermoelectric gas sensors. Part 3 discusses the use of nanomaterials for gas sensing, including metal oxide nanostructures, quantum dots, single-walled carbon nanotubes and porous silicon. The final part of the book surveys key applications in environmental monitoring, detecting chemical warfare agents and monitoring gases such as carbon dioxide. Semiconductor gas sensors is a valuable reference work for all those involved in gas monitoring, including those in the building industry, environmental engineers, defence and security specialists and researchers in this field. Provides an overview of resistor and non-resistor sensors Reviews developments in gas sensors and sensing methods, including graphene based sensors and direct thermoelectric sensors Discusses the use of nanomaterials in gas sensing

Mems for Automotive and Aerospace Applications - Michael Kraft 2013-01-02

MEMS for automotive and aerospace applications reviews the use of Micro-Electro-Mechanical-Systems (MEMS) in developing solutions to the unique challenges presented by the automotive and aerospace industries. Part one explores MEMS for a variety of automotive applications. The role of MEMS in passenger safety and comfort, sensors for automotive vehicle stability control applications and automotive tire pressure monitoring systems are considered, along with pressure and flow sensors for engine management, and RF MEMS for automotive radar sensors. Part two then goes on to

explore MEMS for aerospace applications, including devices for active drag reduction in aerospace applications, inertial navigation and structural health monitoring systems, and thrusters for nano- and pico-satellites. A selection of case studies are used to explore MEMS for harsh environment sensors in aerospace applications, before the book concludes by considering the use of MEMS in space exploration and exploitation. With its distinguished editors and international team of expert contributors, MEMS for automotive and aerospace applications is a key tool for MEMS manufacturers and all scientists, engineers and academics working on MEMS and intelligent systems for transportation. Chapters consider the role of MEMS in a number of automotive applications, including passenger safety and comfort, vehicle stability and control MEMS for aerospace applications are also discussed, including active drag reduction, inertial navigation and structural health monitoring systems Presents a number of case studies exploring MEMS for harsh environment sensors in aerospace

Magnetic Nano- and Microwires - Manuel Vázquez
2015-05-27

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. 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

Lasers for Medical Applications - Helena Jelínková
2013-09-30

Lasers have a wide and growing range of applications in medicine. Lasers for Medical Applications summarises the wealth of recent research on the principles, technologies and application of lasers in diagnostics, therapy and surgery. Part one gives an overview of the use of lasers in medicine, key principles of lasers and radiation interactions with tissue. To understand the wide diversity and therefore the large possible choice of these devices for a specific diagnosis or treatment, the respective types of the laser (solid state, gas, dye, and semiconductor) are reviewed in part two. Part three describes diagnostic laser methods, for example optical coherence tomography, spectroscopy, optical biopsy, and time-resolved fluorescence polarization spectroscopy. Those methods help doctors to refine the scope of involvement of the particular body part or, for example, to specify the extent of a tumor. Part four concentrates on the therapeutic applications of laser radiation in particular branches of medicine, including ophthalmology, dermatology, cardiology, urology, gynecology, otorhinolaryngology (ORL), neurology, dentistry, orthopaedic surgery and cancer therapy, as well as laser coatings of implants. The final chapter includes the safety precautions with which the staff working with laser instruments must be familiar. With its distinguished editor and international team of contributors, this important book summarizes

international achievements in the field of laser applications in medicine in the past 50 years. It provides a valuable contribution to laser medicine by outstanding experts in medicine and engineering. Describes the interaction of laser light with tissue Reviews every type of laser used in medicine: solid state, gas, dye and semiconductor Describes the use of lasers for diagnostics

Semiconductor Lasers - Alexei Baranov 2013-04-23

Semiconductor lasers have important applications in numerous fields, including engineering, biology, chemistry and medicine. They form the backbone of the optical telecommunications infrastructure supporting the internet, and are used in information storage devices, bar-code scanners, laser printers and many other everyday products. Semiconductor lasers: Fundamentals and applications is a comprehensive review of this vital technology. Part one introduces the fundamentals of semiconductor lasers, beginning with key principles before going on to discuss photonic crystal lasers, high power semiconductor lasers and laser beams, and the use of semiconductor lasers in ultrafast pulse generation. Part two then reviews applications of visible and near-infrared emitting lasers. Nonpolar and semipolar GaN-based lasers, advanced self-assembled InAs quantum dot lasers and vertical cavity surface emitting lasers are all considered, in addition to semiconductor disk and hybrid silicon lasers. Finally, applications of mid- and far-infrared emitting lasers are the focus of part three. Topics covered include GaSb-based type I quantum well diode lasers, interband cascade and terahertz quantum cascade lasers, whispering gallery mode lasers and tunable mid-infrared laser absorption spectroscopy. With its distinguished editors and international team of expert contributors, Semiconductor lasers is a valuable guide for all those involved in the design, operation and application of these important lasers, including laser and telecommunications engineers, scientists working in biology and chemistry, medical practitioners, and academics working in this field. Provides a

comprehensive review of semiconductor lasers and their applications in engineering, biology, chemistry and medicine Discusses photonic crystal lasers, high power semiconductor lasers and laser beams, and the use of semiconductor lasers in ultrafast pulse generation Reviews applications of visible and near-infrared emitting lasers and mid- and far-infrared emitting lasers

Optical Biomimetics - Maryanne Large 2012-09-24

Optical biomimetics, the study of natural systems to inspire novel solutions to problems in optical technologies, has attracted growing interest. Optical biomimetics reviews key research in this area, focusing on the techniques and approaches used to characterise and mimic naturally occurring optical effects. Beginning with an overview of natural photonic structures, Optical biomimetics goes on to discuss optical applications of biomolecules, such as retinylidene and bacteriorhodopsin, polarisation effects in natural photonic structures and their applications, and biomimetic nanostructures for anti-reflection (AR) devices. Control of iridescence in natural photonic structures is explored through the case of butterfly scales, alongside a consideration of nanostructure fabrication using natural synthesis. The investigation into silk optical materials is followed by a final discussion of the control of fluorescence in natural photonic structures. With its distinguished editor and international team of expert contributors, Optical biomimetics is a valuable guide for scientists and engineers in both academia and industry who are already studying biomimetics, and a fascinating introduction for those who wish to move into this interesting new field. Reviews key research in optical biomimetics, focusing on the techniques and approaches used to characterise and mimic naturally-occurring optical effects Discusses optical applications of biomolecules, such as retinylidene and bacteriorhodopsin Explores the control of iridescence in natural photonic structures through the case of butterfly scales

Laser Additive Manufacturing - Milan Brandt 2016-09-01
Laser Additive Manufacturing: Materials, Design, Technologies, and Applications provides the latest information on this highly efficient method of layer-based manufacturing using metals, plastics, or composite materials. The technology is particularly suitable for the production of complex components with high precision for a range of industries, including aerospace, automotive, and medical engineering. This book provides a comprehensive review of the technology and its range of applications. Part One looks at materials suitable for laser AM processes, with Part Two discussing design strategies for AM. Parts Three and Four review the most widely-used AM technique, powder bed fusion (PBF) and discuss other AM techniques, such as directed energy deposition, sheet lamination, jetting techniques, extrusion techniques, and vat photopolymerization. The final section explores the range of applications of laser AM. Provides a comprehensive one-volume overview of advances in laser additive manufacturing Presents detailed coverage of the latest techniques used for laser additive manufacturing Reviews both established and emerging areas of application

Laser Growth and Processing of Photonic Devices -

Nikolaos A Vainos 2012-07-10

The use of lasers in the processing of electronic and photonic material is becoming increasingly widespread, with technological advances reducing costs and increasing both the quality and range of novel devices which can be produced. Laser growth and processing of photonic devices is the first book to review this increasingly important field. Part one investigates laser-induced growth of materials and surface structures, with pulsed laser deposition techniques, the formation of nanocones and the fabrication of periodic photonic microstructures explored in detail. Laser-induced three-dimensional micro- and nano-structuring are the focus of part two. Exploration of multiphoton lithography, processing and fabrication is followed by consideration of laser-based micro- and nano-

fabrication, laser-induced soft matter organization and microstructuring, and laser-assisted polymer joining methods. The book concludes in part three with an investigation into laser fabrication and manipulation of photonic structures and devices. Laser seeding and thermal processing of glass with nanoscale resolution, laser-induced refractive index manipulation, and the thermal writing of photonic devices in glass and polymers are all considered. With its distinguished editor and international team of expert contributors, Laser growth and processing of photonic devices is an essential tool for all materials scientists, engineers and researchers in the microelectronics industry. The first book to review the increasingly important field of laser growth and processing of photonic devices Investigates laser-induced growth of materials and surface structures, pulsed laser deposition techniques, the formation of nanocones and the fabrication of periodic photonic microstructures Examines laser-induced three-dimensional micro- and nano-structuring and concludes with an investigation into laser fabrication and manipulation of photonic structures and devices
Reliability Characterisation of Electrical and Electronic Systems - Jonathan Swingler 2014-12-24
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. 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

Smart Sensors and MEMS - S Nihtianov 2014-03-24

Smart sensors and MEMS can include a variety of devices and systems that have a high level of functionality. They do this either by integrating multiple sensing and actuating modes into one device, or else by integrating sensing and actuating with information processing, analog-to-digital conversion and memory functions. Part one outlines the industrial applications for smart sensors, covering direct interface circuits for sensors, capacitive sensors for displacement measurement in the sub-nanometer range, integrated inductive displacement sensors for harsh industrial environments, advanced silicon radiation detectors in the vacuum ultraviolet (VUV) and extreme ultraviolet (EUV) spectral range, and advanced optical incremental sensors (encoders and interferometers), among other topics. The second part of the book describes the industrial applications of smart micro-electro-mechanical systems (MEMS). Some of the topics covered in this section include microfabrication technologies used for creating smart devices for industrial applications, microactuators, dynamic behaviour of smart MEMS in industrial applications, MEMS integrating motion and displacement sensors, MEMS print heads for industrial printing, Photovoltaic and fuel cells in power MEMS for smart energy management, and radio frequency (RF)-MEMS for smart communication microsystems. Smart sensors and MEMS is invaluable reference for academics, materials scientists and electrical engineers working in the microelectronics, sensors and micromechanics industry, and engineers looking for industrial sensing, monitoring and automation solutions. Outlines industrial applications for smart sensors and smart MEMS Covers smart sensors including capacitive, inductive, resistive and magnetic

sensors and sensors to detect radiation and measure temperature Covers smart MEMS including power MEMS, radio frequency MEMS, optical MEMS, inertial MEMS, and microreaction chambers

Nitride Semiconductor Light-Emitting Diodes (LEDs) - Jian-Jang Huang 2014-02-14

The development of nitride-based light-emitting diodes (LEDs) has led to advancements in high-brightness LED technology for solid-state lighting, handheld electronics, and advanced bioengineering applications. Nitride Semiconductor Light-Emitting Diodes (LEDs) reviews the fabrication, performance, and applications of this technology that encompass the state-of-the-art material and device development, and practical nitride-based LED design considerations. Part one reviews the fabrication of nitride semiconductor LEDs. Chapters cover molecular beam epitaxy (MBE) growth of nitride semiconductors, modern metalorganic chemical vapor deposition (MOCVD) techniques and the growth of nitride-based materials, and gallium nitride (GaN)-on-sapphire and GaN-on-silicon technologies for LEDs. Nanostructured, non-polar and semi-polar nitride-based LEDs, as well as phosphor-coated nitride LEDs, are also discussed. Part two covers the performance of nitride LEDs, including photonic crystal LEDs, surface plasmon enhanced LEDs, color tuneable LEDs, and LEDs based on quantum wells and quantum dots. Further chapters discuss the development of LED encapsulation technology and the fundamental efficiency droop issues in gallium indium nitride (GaInN) LEDs. Finally, part three highlights applications of nitride LEDs, including liquid crystal display (LCD) backlighting, infrared emitters, and automotive lighting. Nitride Semiconductor Light-Emitting Diodes (LEDs) is a technical resource for academics, physicists, materials scientists, electrical engineers, and those working in the lighting, consumer electronics, automotive, aviation, and communications sectors. Reviews fabrication, performance, and applications of this technology that encompass the state-of-the-art material and device development, and

practical nitride-based LED design considerations Covers the performance of nitride LEDs, including photonic crystal LEDs, surface plasmon enhanced LEDs, color tuneable LEDs, and LEDs based on quantum wells and quantum dots Highlights applications of nitride LEDs, including liquid crystal display (LCD) backlighting, infra-red emitters, and automotive lighting

Power Ultrasonics - Juan A Gallego-Juárez 2014-11-14

The industrial interest in ultrasonic processing has revived during recent years because ultrasonic technology may represent a flexible "green alternative for more energy efficient processes. A challenge in the application of high-intensity ultrasound to industrial processing is the design and development of specific power ultrasonic systems for large scale operation. In the area of ultrasonic processing in fluid and multiphase media the development of a new family of power generators with extensive radiating surfaces has significantly contributed to the implementation at industrial scale of several applications in sectors such as the food industry, environment, and manufacturing. Part one covers fundamentals of nonlinear propagation of ultrasonic waves in fluids and solids. It also discusses the materials and designs of power ultrasonic transducers and devices. Part two looks at applications of high power ultrasound in materials engineering and mechanical engineering, food processing technology, environmental monitoring and remediation and industrial and chemical processing (including pharmaceuticals), medicine and biotechnology. Covers the fundamentals of nonlinear propagation of ultrasonic waves in fluids and solids. Discusses the materials and designs of power ultrasonic transducers and devices. Considers state-of-the-art power sonic applications across a wide range of industries.

Quantum Information Processing with Diamond - Steven Praver 2014-05-12

Diamond nitrogen vacancy (NV) color centers can transform quantum information science into practical quantum information technology, including fast, safe

computing. Quantum Information Processing with Diamond looks at the principles of quantum information science, diamond materials, and their applications. Part one provides an introduction to quantum information processing using diamond, as well as its principles and fabrication techniques. Part two outlines experimental demonstrations of quantum information processing using diamond, and the emerging applications of diamond for quantum information science. It contains chapters on quantum key distribution, quantum microscopy, the hybridization of quantum systems, and building quantum optical devices. Part three outlines promising directions and future trends in diamond technologies for quantum information processing and sensing. Quantum Information Processing with Diamond is a key reference for R&D managers in industrial sectors such as conventional electronics, communication engineering, computer science, biotechnology, quantum optics, quantum mechanics, quantum computing, quantum cryptology, and nanotechnology, as well as academics in physics, chemistry, biology, and engineering. Brings together the topics of diamond and quantum information processing Looks at applications such as quantum computing, neural circuits, and in vivo monitoring of processes at the molecular scale

Handbook of Laser Welding Technologies - S Katayama 2013-06-30

Laser welding is a rapidly developing and versatile technology which has found increasing applications in industry and manufacturing. It allows the precision welding of small and hard-to-reach areas, and is particularly suitable for operation under computer or robotic control. The Handbook of laser welding technologies reviews the latest developments in the field and how they can be used across a variety of applications. Part one provides an introduction to the fundamentals of laser welding before moving on to explore developments in established technologies including CO2 laser welding, disk laser welding and laser micro welding technology. Part two highlights

laser welding technologies for various materials including aluminium and titanium alloys, plastics and glass. Part three focuses on developments in emerging laser welding technologies with chapters on the applications of robotics in laser welding and developments in the modelling and simulation of laser and hybrid laser welding. Finally, part four explores the applications of laser welding in the automotive, railway and shipbuilding industries. The Handbook of laser welding technologies is a technical resource for researchers and engineers using laser welding technologies, professionals requiring an understanding of laser welding techniques and academics interested in the field. Provides an introduction to the fundamentals of laser welding including characteristics, welding defects and evolution of laser welding Discusses developments in a number of techniques including disk, conduction and laser micro welding Focusses on technologies for particular materials such as light metal alloys, plastics and glass

Advances in Delay-tolerant Networks (DTNs) - J Rodrigues
2014-11-20

Part one looks at delay-tolerant network architectures and platforms including DTN for satellite communications and deep-space communications, underwater networks, networks in developing countries, vehicular networks and emergency communications. Part two covers delay-tolerant network routing, including issues such as congestion control, naming, addressing and interoperability. Part three explores services and applications in delay-tolerant networks, such as web browsing, social networking and data streaming. Part four discusses enhancing the performance, reliability, privacy and security of delay-tolerant networks. Chapters cover resource sharing, simulation and modeling and testbeds. Reviews the different types of DTN and shows how they can be applied in satellite and deep-space communications, vehicular and underwater communications, and during large-scale disasters Considers the potential for rapid selection and dissemination of urgent messages

is considered Reviews the breadth of areas in which DTN is already providing solutions and the prospects for its wider adoption

Handbook of Mems for Wireless and Mobile Applications -
Deepak Uttamchandani 2013-08-31

The increasing demand for mobile and wireless sensing necessitates the use of highly integrated technology featuring small size, low weight, high performance and low cost: micro-electro-mechanical systems (MEMS) can meet this need. The Handbook of MEMS for wireless and mobile applications provides a comprehensive overview of radio frequency (RF) MEMS technologies and explores the use of these technologies over a wide range of application areas. Part one provides an introduction to the use of RF MEMS as an enabling technology for wireless applications. Chapters review RF MEMS technology and applications as a whole before moving on to describe specific technologies for wireless applications including passive components, phase shifters and antennas. Packaging and reliability of RF MEMS is also discussed. Chapters in part two focus on wireless techniques and applications of wireless MEMS including biomedical applications, such as implantable MEMS, intraocular pressure sensors and wireless drug delivery. Further chapters highlight the use of RF MEMS for automotive radar, the monitoring of telecommunications reliability using wireless MEMS and the use of optical MEMS displays in portable electronics. With its distinguished editor and international team of expert authors, the Handbook of MEMS for wireless and mobile applications is a technical resource for MEMS manufacturers, the electronics industry, and scientists, engineers and academics working on MEMS and wireless systems. Reviews the use of radio frequency (RF) MEMS as an enabling technology for wireless applications Discusses wireless techniques and applications of wireless MEMS, including biomedical applications Describes monitoring structures and the environment with wireless MEMS
Nanostructured Semiconductor Oxides for the Next

Generation of Electronics and Functional Devices - Serge Zhuiykov 2014-02-14

Nanostructured Semiconductor Oxides for the Next Generation of Electronics and Functional Devices focuses on the development of semiconductor nanocrystals, their technologies and applications, including energy harvesting, solar cells, solid oxide fuel cells, and chemical sensors. Semiconductor oxides are used in electronics, optics, catalysts, sensors, and other functional devices. In their 2D form, the reduction in size confers exceptional properties, useful for creating faster electronics and more efficient catalysts. After explaining the physics affecting the conductivity and electron arrangement of nanostructured semiconductors, the book addresses the structural and chemical modification of semiconductor nanocrystals during material growth. It then covers their use in nanoscale functional devices, particularly in electronic devices and carbon nanotubes. It explores the impact of 2D nanocrystals, such as graphene, chalcogenides, and oxide nanostructures, on research and technology, leading to a discussion of incorporating graphene and semiconductor nanostructures into composites for use in energy storage. The final three chapters focus on the applications of these functional materials in photovoltaic cells, solid oxide fuel cells, and in environmental sensors including pH, dissolved oxygen, dissolved organic carbon, and dissolved metal ion sensors. Nanostructured Semiconductor Oxides for the Next Generation of Electronics and Functional Devices is a crucial resource for scientists, applied researchers, and production engineers working in the fabrication, design, testing, characterization, and analysis of new semiconductor materials. This book is a valuable reference for those working in the analysis and characterization of new nanomaterials, and for those who develop technologies for practical devices fabrication. Focuses on the development of semiconductor nanocrystals, their technologies and applications, including energy harvesting, solar cells, solid oxide

fuel cells, and chemical sensors Reviews fundamental physics of conductivity and electron arrangement before proceeding to practical applications A vital resource for applied researchers and production engineers working with new semiconductor materials

Subsea Optics and Imaging - John Watson 2013-10-31
The use of optical methodology, instrumentation and photonics devices for imaging, vision and optical sensing is of increasing importance in understanding our marine environment. Subsea optics can make an important contribution to the protection and sustainable management of ocean resources and contribute to monitoring the response of marine systems to climate change. This important book provides an authoritative review of key principles, technologies and their applications. The book is divided into three parts. The first part provides a general introduction to the key concepts in subsea optics and imaging, imaging technologies and the development of ocean optics and colour analysis. Part two reviews the use of subsea optics in environmental analysis. An introduction to the concepts of underwater light fields is followed by an overview of coloured dissolved organic matter (CDOM) and an assessment of nutrients in the water column. This section concludes with discussions of the properties of subsea bioluminescence, harmful algal blooms and their impact and finally an outline of optical techniques for studying suspended sediments, turbulence and mixing in the marine environment. Part three reviews subsea optical systems technologies. A general overview of imaging and visualisation using conventional photography and video leads onto advanced techniques like digital holography, laser line-scanning and range-gated imaging as well as their use in controlled observation platforms or global observation networks. This section also outlines techniques like Raman spectroscopy, hyperspectral sensing and imaging, laser Doppler anemometry (LDA) and particle image velocimetry (PIV), optical fibre sensing and LIDAR systems. Finally, a chapter on fluorescence methodologies brings the volume

to a close. With its distinguished editor and international team of contributors, Subsea optics and imaging is a standard reference for those researching, developing and using subsea optical technologies as well as environmental scientists and agencies concerned with monitoring the marine environment. Provides an authoritative review of key principles, technologies and their applications Outlines the key concepts in subsea optics and imaging, imaging technologies and the development of ocean optics and colour analysis Reviews the properties of subsea bioluminescence, harmful algal blooms and their impact

Nanolithography - M Feldman 2014-02-13

Integrated circuits, and devices fabricated using the techniques developed for integrated circuits, have steadily gotten smaller, more complex, and more powerful. The rate of shrinking is astonishing - some components are now just a few dozen atoms wide. This book attempts to answer the questions, "What comes next?" and "How do we get there?" Nanolithography outlines the present state of the art in lithographic techniques, including optical projection in both deep and extreme ultraviolet, electron and ion beams, and imprinting. Special attention is paid to related issues, such as the resists used in lithography, the masks (or lack thereof), the metrology needed for nano-features, modeling, and the limitations caused by feature edge roughness. In addition emerging technologies are described, including the directed assembly of wafer features, nanostructures and devices, nano-photonics, and nano-fluidics. This book is intended as a guide to the researcher new to this field, reading related journals or facing the complexities of a technical conference. Its goal is to give enough background information to enable such a researcher to understand, and appreciate, new developments in nanolithography, and to go on to make advances of his/her own. Outlines the current state of the art in alternative nanolithography technologies in order to cope with the future reduction in size of semiconductor chips to nanoscale dimensions

Covers lithographic techniques, including optical projection, extreme ultraviolet (EUV), nanoimprint, electron beam and ion beam lithography Describes the emerging applications of nanolithography in nanoelectronics, nanophotonics and microfluidics
Modeling, Characterization and Production of Nanomaterials - V Tewary 2015-03-17

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. 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

Printed Films - Maria Prudenziati 2012-08-30

Whilst printed films are currently used in varied devices across a wide range of fields, research into their development and properties is increasingly uncovering even greater potential. Printed films provides comprehensive coverage of the most significant recent developments in printed films and their applications. Materials and properties of printed films are the focus of part one, beginning with a review of

the concepts, technologies and materials involved in their production and use. Printed films as electrical components and silicon metallization for solar cells are discussed, as are conduction mechanisms in printed film resistors, and thick films in packaging and microelectronics. Part two goes on to review the varied applications of printed films in devices. Printed resistive sensors are considered, as is the role of printed films in capacitive, piezoelectric and pyroelectric sensors, mechanical micro-systems and gas sensors. The applications of printed films in biosensors, actuators, heater elements, varistors and polymer solar cells are then explored, followed by a review of screen printing for the fabrication of solid oxide fuel cells and laser printed micro- and meso-scale power generating devices. With its distinguished editors and international team of expert contributors, Printed films is a key text for anyone working in such fields as microelectronics, fuel cell and sensor technology in both industry and academia. Provides a comprehensive analysis of the most significant recent developments in printed films and their applications Reviews the concepts, properties, technologies and materials involved in the production and use of printed films Analyses the varied applications of printed films in devices, including printed restrictive sensors for physical quantities and printed thick film mechanical micro-systems (MEMS), among others

Optical Thin Films and Coatings - Angela Piegari
2013-08-31

Optical coatings, including mirrors, anti-reflection coatings, beam splitters, and filters, are an integral part of most modern optical systems. Optical thin films and coatings provides an overview of thin film materials, the properties, design and manufacture of optical coatings and their use across a variety of application areas. Part one explores the design and manufacture of optical coatings. Part two highlights unconventional features of optical thin films including scattering properties of random structures in thin

films, optical properties of thin film materials at short wavelengths, thermal properties and colour effects. Part three focusses on novel materials for optical thin films and coatings and includes chapters on organic optical coatings, surface multiplasmonics and optical thin films containing quantum dots. Finally, applications of optical coatings, including laser components, solar cells, displays and lighting, and architectural and automotive glass, are reviewed in part four. Optical thin films and coatings is a technical resource for researchers and engineers working with optical thin films and coatings, professionals in the security, automotive, space and other industries requiring an understanding of these topics, and academics interested in the field. An overview of the materials, properties, design and manufacture of thin films Special attention is given to the unconventional features and novel materials of optical thin films Reviews applications of optical coatings including laser components, solar cells, glazing, displays and lighting
Laser Surface Engineering - Jonathan R. Lawrence
2014-10-02

Lasers can alter the surface composition and properties of materials in a highly controllable way, which makes them efficient and cost-effective tools for surface engineering. This book provides an overview of the different techniques, the laser-material interactions and the advantages and disadvantages for different applications. Part one looks at laser heat treatment, part two covers laser additive manufacturing such as laser-enhanced electroplating, and part three discusses laser micromachining, structuring and surface modification. Chemical and biological applications of laser surface engineering are explored in part four, including ways to improve the surface corrosion properties of metals. Provides an overview of thermal surface treatments using lasers, including the treatment of steels, light metal alloys, polycrystalline silicon and technical ceramics Addresses the development of new metallic materials, innovations in laser cladding and

direct metal deposition, and the fabrication of tuneable micro- and nano-scale surface structures Chapters also cover laser structuring, surface modification, and the chemical and biological applications of laser surface engineering

Handbook of Organic Materials for Optical and (Opto)Electronic Devices - Oksana Ostroverkhova
2013-08-31

Small molecules and conjugated polymers, the two main types of organic materials used for optoelectronic and photonic devices, can be used in a number of applications including organic light-emitting diodes, photovoltaic devices, photorefractive devices and waveguides. Organic materials are attractive due to their low cost, the possibility of their deposition from solution onto large-area substrates, and the ability to tailor their properties. The Handbook of organic materials for optical and (opto)electronic devices provides an overview of the properties of organic optoelectronic and nonlinear optical materials, and explains how these materials can be used across a range of applications. Parts one and two explore the materials used for organic optoelectronics and nonlinear optics, their properties, and methods of their characterization illustrated by physical studies. Part three moves on to discuss the applications of optoelectronic and nonlinear optical organic materials in devices and includes chapters on organic solar cells, electronic memory devices, and electronic chemical sensors, electro-optic devices. The Handbook of organic materials for optical and (opto)electronic devices is a technical resource for physicists, chemists, electrical engineers and materials scientists involved in research and development of organic semiconductor and nonlinear optical materials and devices. Comprehensively examines the properties of organic optoelectronic and nonlinear optical materials Discusses their applications in different devices including solar cells, LEDs and electronic memory devices An essential technical resource for physicists, chemists, electrical engineers and materials scientists

Optical Interconnects for Data Centers - Tolga Tekin
2016-11-01

Current data centre networks, based on electronic packet switches, are experiencing an exponential increase in network traffic due to developments such as cloud computing. Optical interconnects have emerged as a promising alternative offering high throughput and reduced power consumption. Optical Interconnects for Data Centers reviews key developments in the use of optical interconnects in data centres and the current state of the art in transforming this technology into a reality. The book discusses developments in optical materials and components (such as single and multi-mode waveguides), circuit boards and ways the technology can be deployed in data centres. Optical Interconnects for Data Centers is a key reference text for electronics designers, optical engineers, communications engineers and R&D managers working in the communications and electronics industries as well as postgraduate researchers. Summarizes the state-of-the-art in this emerging field Presents a comprehensive review of all the key aspects of deploying optical interconnects in data centers, from materials and components, to circuit boards and methods for integration Contains contributions that are drawn from leading international experts on the topic

Ecological Design of Smart Home Networks - N. Saito
2015-03-31

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. 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

Optofluidics, Sensors and Actuators in Microstructured Optical Fibers - Stavros Pissadakis 2015-05-19

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. 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

Laser Spectroscopy for Sensing - Matthieu Baudalet
2014-02-15

Laser spectroscopy is a valuable tool for sensing and chemical analysis. Developments in lasers, detectors and mathematical analytical tools have led to improvements in the sensitivity and selectivity of spectroscopic techniques and extended their fields of application. Laser Spectroscopy for Sensing examines these advances and how laser spectroscopy can be used in a diverse range of industrial, medical, and environmental applications. Part one reviews basic concepts of atomic and molecular processes and presents the fundamentals of laser technology for controlling the spectral and temporal aspects of laser excitation. In addition, it explains the selectivity, sensitivity, and stability of the measurements, the construction of databases, and the automation of data analysis by machine learning. Part two explores laser spectroscopy techniques, including cavity-based absorption spectroscopy and the use of photo-acoustic spectroscopy to acquire absorption spectra of gases and condensed media. These chapters discuss imaging methods using laser-induced fluorescence and phosphorescence spectroscopies before focusing on light detection and ranging, photothermal spectroscopy and terahertz spectroscopy. Part three covers a variety of applications of these techniques, particularly the detection of chemical, biological, and explosive threats, as well as their use in medicine and forensic science. Finally, the book examines spectroscopic analysis of industrial materials and their applications in nuclear research and industry. The text provides readers with a broad overview of the techniques and applications of laser spectroscopy for sensing. It is of

great interest to laser scientists and engineers, as well as professionals using lasers for medical applications, environmental applications, military applications, and material processing. Presents the fundamentals of laser technology for controlling the spectral and temporal aspects of laser excitation Explores laser spectroscopy techniques, including cavity-based absorption spectroscopy and the use of photo-acoustic spectroscopy to acquire absorption spectra of gases and condensed media Considers spectroscopic analysis of industrial materials and their applications in nuclear research and industry

Directed Self-assembly of Block Co-polymers for Nano-manufacturing - Roel Gronheid 2015-07-17

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. 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

Handbook of Terahertz Technology for Imaging, Sensing and Communications - D Saeedkia 2013-01-16

The recent development of easy-to-use sources and detectors of terahertz radiation has enabled growth in applications of terahertz (Thz) imaging and sensing. This vastly adaptable technology offers great potential across a wide range of areas, and the Handbook of terahertz technology for imaging, sensing and communications explores the fundamental principles, important developments and key applications emerging in this exciting field. Part one provides an authoritative introduction to the fundamentals of terahertz technology for imaging, sensing and communications. The generation, detection and emission of waves are discussed alongside fundamental aspects of surface plasmon polaritons, terahertz near-field imaging and sensing, room temperature terahertz detectors and terahertz wireless communications. Part two goes on to discuss recent progress and such novel techniques in terahertz technology as terahertz bio-sensing, array imagers, and resonant field enhancement of terahertz waves. Fiber-coupled time-domain spectroscopy systems (THz-TDS), terahertz photomixer systems, terahertz nanotechnology, frequency metrology and semiconductor material development for terahertz applications are all reviewed. Finally, applications of terahertz technology are explored in part three, including applications in tomographic imaging and material spectroscopy, art conservation, and the aerospace, wood products, semiconductor and pharmaceutical industries. With its distinguished editor and international team of expert contributors, the Handbook of terahertz technology for imaging, sensing and communications is an authoritative guide to the field for laser engineers, manufacturers of sensing devices and imaging equipment, security companies, the military, professionals working in

process monitoring, and academics interested in this field. Examines techniques for the generation and detection of terahertz waves Discusses material development for terahertz applications Explores applications in tomographic imaging, art conservation and the pharmaceutical and aerospace industries
Machine-to-machine (M2M) Communications - Carles Anton-Haro 2014-12-23

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. 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

Applications of ATILA FEM Software to Smart Materials - Kenji Uchino 2012-11-27

ATILA Finite Element Method (FEM) software facilitates the modelling and analysis of applications using piezoelectric, magnetostrictor and shape memory materials. It allows entire designs to be constructed, refined and optimized before production begins. Through a range of instructive case studies, Applications of ATILA FEM software to smart materials provides an indispensable guide to the use of this software in the design of effective products. Part one provides an introduction to ATILA FEM software, beginning with an overview of the software code. New capabilities and loss integration are discussed, before part two goes on to present case studies of finite element modelling using

ATILA. The use of ATILA in finite element analysis, piezoelectric polarization, time domain analysis of piezoelectric devices and the design of ultrasonic motors is considered, before piezo-composite and photonic crystal applications are reviewed. The behaviour of piezoelectric single crystals for sonar and thermal analysis in piezoelectric and magnetostrictive materials is also discussed, before a final reflection on the use of ATILA in modelling the damping of piezoelectric structures and the behaviour of single crystal devices. With its distinguished editors and international team of expert contributors, Applications of ATILA FEM software to smart materials is a key reference work for all those involved in the research, design, development and application of smart materials, including electrical and mechanical engineers, academics and scientists working in piezoelectrics, magenetostrictors and shape memory materials. Provides an indispensable guide to the use of ATILA FEM software in the design of effective products Discusses new capabilities and loss integration of the software code, before presenting case studies of finite element modelling using ATILA Discusses the behaviour of piezoelectric single crystals for sonar and thermal analysis in piezoelectric and magnetostrictive materials, before a reflection on the use of ATILA in modelling the damping of piezoelectric structures

Metallic Films for Electronic, Optical and Magnetic Applications - Katayun Barmak 2014-02-13

Metallic films play an important role in modern technologies such as integrated circuits, information storage, displays, sensors, and coatings. Metallic Films for Electronic, Optical and Magnetic Applications reviews the structure, processing and properties of metallic films. Part one explores the structure of metallic films using characterization methods such as x-ray diffraction and transmission electron microscopy. This part also encompasses the processing of metallic films, including structure formation during deposition and post-deposition reactions and phase transformations.

Chapters in part two focus on the properties of metallic films, including mechanical, electrical, magnetic, optical, and thermal properties. *Metallic Films for Electronic, Optical and Magnetic Applications* is a technical resource for electronics components manufacturers, scientists, and engineers working in the semiconductor industry, product developers of sensors, displays, and other optoelectronic devices, and

academics working in the field. Explores the structure of metallic films using characterization methods such as x-ray diffraction and transmission electron microscopy. Discusses processing of metallic films, including structure formation during deposition and post-deposition reactions and phase transformations. Focuses on the properties of metallic films, including mechanical, electrical, magnetic, optical, and thermal properties.