Coating Materials For Electronic Applications Polymers Processing Reliability Testing Materials And Processes For Electronic Applications

Technology and Applications
Proceedings of the Technical Conference
From Materials to Applications
Polymers, Processes, Reliability, Testing
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Traditional and Evolving Technologies
Proceedings of the NATO Advanced Research Workshop on Innovative Superhard Materials and Sustainable Coating, Kiev, Ukraine,12 - 15 May 2004.
Science, Applications and Technology
Coatings for High-Temperature Structural Materials
Energy Saving Coating Materials
Properties, Manufacturing Methods, and Applications
Based on a Symposium Sponsored by the Division of Organic Coatings and Plastics Chemistry at the Second Chemical Congress of the North American Continent (180th ACS National Meeting), Las Vegas, Nevada, August 26-27, 1980
Polymer Nanocomposite Materials
Metallic Films for Electronic, Optical and Magnetic Applications

FARLEY KERR

Technology and Applications William Andrew
Smart coatings can produce coatings that offer above and beyond the normal functions of a coating, these range from improving the performance of fabrics, producing new forms of materials to providing decoration. This book reviews a variety of topics about textile coatings and laminates and aims to provide a stimulus for developing new and improved textile products. The first part of the book introduces the fundamentals of textile coatings and laminates, addressing general areas such as coating and laminating processes and techniques, as well as base fabrics and their interaction in coated fabrics. Part two discusses different types of smart and intelligent coatings and laminates for textiles. Topics include microencapsulation technology, conductive coatings, breathable coatings and phase change materials and their application in textiles. With its highly distinguished editor and array of international contributors, Smart textile coatings and laminates is a valuable reference book for chemists, textile technologists, fibre scientists, textile engineers and all those wishing to improve and understand the developments in textile coating and laminating technology. It will also be suitable for researchers in industry or academia. Reviews a number of issues surrounding textile coatings and laminates Discusses the fundamentals of textile coatings and laminates addressing processes and techniques Examines types of smart and intelligent coatings and laminates for textiles, including microencapsulation technology, conductive and breathable coatings
Proceedings of the Technical Conference John Wiley & Sons
Coating Materials for Electronic ApplicationsPolymers, Processing, Reliability, TestingWilliam Andrew
From Materials to Applications Springer Science & Business Media
Polymer Nanocomposite Materials Discover an authoritative overview of zero-, one-, and two-dimensional polymer nanomaterials Polymer Nanocomposite Materials: Applications in Integrated Electronic Devices delivers an original and insightful treatment of polymer nanocomposite applications in energy, information, and biotechnology. The book systematically reviews the preparation and characterization of polymer nanocomposites from zero-, one-, and two-dimensional nanomaterials. The two distinguished editors have selected resources that thoroughly explore the applications of polymer nanocomposites in energy, information, and biotechnology devices like sensors, solar cells, data storage devices, and artificial synapses. Academic researchers and professional developers alike will enjoy one of the first books on the subject of this environmentally friendly and versatile new technology. Polymer Nanocomposite Materials discusses challenges associated with the devices and materials, possible strategies for future directions of the technology, and the possible commercial applications of electronic devices built on these materials. Readers will also benefit from the inclusion of: A thorough introduction to the fabrication of conductive polymer composites and their applications in sensors An exploration of biodegradable polymer nanocomposites for electronics and polymer nanocomposites for photodetectors Practical discussions of polymer nanocomposites for pressure sensors and the application of polymer nanocomposites in energy storage devices An examination of functional polymer nanocomposites for triboelectric nanogenerators and resistive switching memory Perfect for materials scientists and polymer chemists, Polymer Nanocomposite Materials: Applications in Integrated Electronic Devices will also earn a place in the libraries of sensor developers, electrical engineers, and other professionals working in the sensor industry seeking an authoritative one-stop reference for nanocomposite applications.
Polymers, Processes, Reliability, Testing Elsevier
This book covers the recent advances in coating materials and their novel applications at the cross-section of advanced materials both current and next-generation. Advanced Coatings Materials contains chapters covering the latest research on polymers, carbon resins, and high-temperature materials used for coatings, adhesives, and varnishes today. Concise chapters describe the development, chemical and physical properties, synthesis and polymerization, commercial uses, and other characteristics for each raw material and coating detailed. A comprehensive, yet practical source of reference, this book provides an excellent foundation for comparing the properties and performance of coatings and selecting the most suitable materials based on specific service needs and environmental factors.
Materials Functionalization and Device Fabrication William Andrew
Smart textiles are materials and structures that sense and react to environmental conditions or stimuli, and their integration into protective clothing has led to the development of products with greatly enhanced protective capabilities in hazardous situations. Smart textiles for protection provides a comprehensive analysis of smart materials used in producing protective textiles, and explores a wide range of end-use protective applications. Part one reviews smart materials and technologies. Beginning with an overview of smart textiles for protection, this section goes on to discuss types of materials, surface treatments and the use of nanofibres and smart barrier membranes. The application of sensors, actuators and computer systems in smart protective textiles is explored, followed by a review of biomimetic approaches to design. Part two investigates specific applications of smart textiles for protection. Smart technology for personal protective equipment and clothing, smart protective textiles for older people and smart high-performance textiles for protection in construction and geotechnical applications are all discussed in depth, as is the use of smart textiles in the protection of armoured vehicles and in protective clothing for fire fighters and first responders. The final chapter describes recent advances in chemical and biological protective clothing. With its distinguished editor and international team of expert contributors, Smart textiles for protection is an essential guide for all those involved in the design, development and application of protective smart textiles. Provides a comprehensive analysis of smart materials used in producing protective textiles, and explores a wide range of end-use protective applications Discusses types of materials, surface treatments and the use of nanofibres and smart barrier membranes as well as the application of sensors, actuators and computer systems in smart protective textiles Investigates specific applications of smart textiles for protection, including smart high-performance textiles for protection in construction and geotechnical applications
Smart Textiles for Protection William Andrew
Encapsulation Technologies for Electronic Applications, Second Edition, offers an updated, comprehensive discussion of encapsulants in electronic applications, with a primary emphasis on the encapsulation of microelectronic devices and connectors and transformers. It includes sections on 2-D and 3-D packaging and encapsulation, encapsulation materials, including environmentally friendly 'green' encapsulants, and the properties and characterization of encapsulants. Furthermore, this book provides an extensive discussion on the defects and failures related to encapsulation, how to analyze such defects and failures, and how to apply quality assurance and qualification processes for encapsulated packages. In addition, users will find information on the trends and challenges of encapsulation and microelectronic packages, including the application of nanotechnology. Increasing functionality of semiconductor devices and higher end used expectations in the last 5 to 10 years

has driven development in packaging and interconnected technologies. The demands for higher miniaturization, higher integration of functions, higher clock rates and data, and higher reliability influence almost all materials used for advanced electronics packaging, hence this book provides a timely release on the topic. Provides guidance on the selection and use of encapsulants in the electronics industry, with a particular focus on microelectronics Includes coverage of environmentally friendly 'green encapsulants' Presents coverage of faults and defects, and how to analyze and avoid them

Fuel Cell Electronics Packaging Elsevier

Contamination problems have become a major factor in determining the manufacturability, quality, and reliability of electronic assemblies. Understanding the mechanics and chemistry of contamination has become necessary for improving quality and reliability and reducing costs of electronic assemblies. Designed as a practical guide, Contamination of Electronic Assemblies presents a generalized overview of contamination problems and serves as a problem-solving reference point. It takes a step-by-step approach to identifying contaminants and their effects on electronic products at each level of manufacture. The text is divided into four sections: Laminate Manufacturing, Substrate Fabrication, Printed Wiring Board Assembly, and Conformal Coatings. These sections discuss all aspects of contamination of electronic assemblies, from the manufacture of glass fibers used in the laminates to the complete assembly of the finished product. The authors present detection and control methods that can help you reduce defects during the manufacturing process. With tables, figures, and fishbone diagrams serving as a quick reference, Contamination of Electronic Assemblies will help you familiarize yourself with the origination, detection, measurement, control, and prevention of contamination in electronic assemblies.

Graduate Programs in Engineering & Applied Sciences 2011 (Grad 5) John Wiley & Sons

Polyimide is one of the most efficient polymers in many industries for its excellent thermal, electrical, mechanical, and chemical properties as well as its easy processability. In the electronic and electrical engineering industries, polyimide has widely been used for decades thanks to its very good dielectric and insulating properties at the high electric field and at high temperatures of around 200°C in long term-service. Moreover, polyimide appears essential for the development of new electronic devices where further considerations such as high power density, integration, higher temperature, thermal conduction management, energy storage, reliability, or flexibility are required in order to sustain the growing global electrical energy consumption. This book gathers interdisciplinary chapters on polyimide in various topics through state-of-the-art and original ongoing research.

Fabrication Methods and Functional Properties Elsevier

This 3e, edited by Peter M. Martin, PNNL 2005 Inventor of the Year, is an extensive update of the many improvements in deposition technologies, mechanisms, and applications. This long-awaited revision includes updated and new chapters on atomic layer deposition, cathodic arc deposition, sculpted thin films, polymer thin films and emerging technologies. Extensive material was added throughout the book, especially in the areas concerned with plasma-assisted vapor deposition processes and metallurgical coating applications. * Explains in depth the many recent i

Optical Thin Films and Coatings IGI Global

Solution Processed Metal Oxide Thin Films for Electronic Applications discusses the fundamentals of solution processing materials chemistry techniques as they are applied to metal oxide materials systems for key device applications. The book introduces basic information (materials properties, materials synthesis, barriers), discusses ink formulation and solution processing methods, including sol-gel processing, surface functionalization aspects, and presents a comprehensive accounting on the electronic applications of solution processed metal oxide films, including thin film transistors, photovoltaic cells and other electronics devices and circuits. This is an important reference for those interested in oxide electronics, printed electronics, flexible electronics and large-area electronics. Provides in-depth information on solution processing fundamentals, techniques, considerations and barriers combined with key device applications Reviews important device applications, including transistors, light-emitting diodes, and photovoltaic cells Includes an overview of metal oxide materials systems (semiconductors, nanomaterials and thin films), addressing materials synthesis, properties, limitations and surface aspects

Coatings Materials and Surface Coatings Woodhead Publishing

Energy Saving Coating Materials: Design, Process, Implementation and Developments provides comprehensive information regarding recent materials advancements and design aspects and integration for infra-red radiation regulators, along with future developments of zero emission buildings. The key opportunities and challenges for the usage of existing heat regulation materials and their implementation for commercial aspects are explored. The fundamental interaction between electromagnetic waves and materials are discussed, along with materials synthesis, design and integration of coatings for smart window applications. This book presents recent developments of innovative technologies comprising energy saving materials and coatings which are key considerations for achieving vital energy saving milestones. Provides knowledge-based information on the optical properties of materials and their utility for solar energy harvesting and energy saving applications Discusses innovative coatings for smart windows applications, including the progressive development of radiative cooling and cool paint Previews future developments for the synthesis, design and integration of heat regulative materials

Polymers for Electronic Applications Peterson's

This book provides comprehensive coverage of shape-memory polymers (SMPs), a growing area within "smart materials" research. After offering an introduction to the topic and the nature of shape-memory effects and superelasticity, the author offers an in-depth look at the properties, mechanics, and characterization of SMPs and thermoplastic elastomers. Information on the wide range of applications for these materials follows, including: bioplastics and biomedical devices; textiles and fabrics; optical, electronic, and mechanical parts for control systems; cosmetics and beauty products; automotive (or other novel) materials.

Nanomaterials, Polymers and Devices Elsevier

Adhesives are widely used in the manufacture and assembly of electronic circuits and products. Generally, electronics design engineers and manufacturing engineers are not well versed in adhesives, while adhesion chemists have a limited knowledge of electronics. This book bridges these knowledge gaps and is useful to both groups. The book includes chapters covering types of adhesive, the chemistry on which they are based, and their properties, applications, processes, specifications, and reliability. Coverage of toxicity, environmental impacts and the regulatory framework make this book particularly important for engineers and managers alike. The third edition has been updated throughout and includes new sections on nanomaterials, environmental impacts and new environmentally friendly ‘green’ adhesives. Information about regulations and compliance has been brought fully up-to-date. As well as providing full coverage of standard adhesive types, Licari explores the most recent developments in fields such as: • Tamper-proof adhesives for electronic security devices. • Bio-compatible adhesives for implantable medical devices. • Electrically conductive adhesives to replace toxic tin-lead solders in printed circuit assembly – as required by regulatory regimes, e.g. the EU’s Restriction of Hazardous Substances Directive or RoHS (compliance is required for all products placed on the European market). • Nano-fillers in adhesives, used to increase the thermal conductivity of current adhesives for cooling electronic devices. A complete guide for the electronics industry to adhesive types, their properties and applications – this book is an essential reference for a wide range of specialists including electrical engineers, adhesion chemists and other engineering professionals Provides specifications of adhesives for particular uses and outlines the processes for application and curing – coverage that is of particular benefit to design engineers, who are charged with creating the interface between the adhesive material and the microelectronic device Discusses the respective advantages and limitations of different adhesives for a varying applications, thereby addressing reliability issues before they occur and offering useful information to both design engineers and Quality Assurance personnel

Solution Processed Metal Oxide Thin Films for Electronic Applications Micro and Nano Technologies

Implantable sensor systems offer great potential for enhanced medical care and improved quality of life, consequently leading to major investment in this exciting field. Implantable sensor systems for medical applications provides a wide-ranging overview of the core technologies, key challenges and main issues related to the development and use of these devices in a diverse range of medical applications. Part one reviews the fundamentals of implantable systems, including materials and material-tissue interfaces, packaging and coatings, microassembly, electrode array design and fabrication, and the use of biofuel cells as sustainable power sources. Part two goes on to consider the challenges associated with implantable systems. Biocompatibility, sterilization considerations and the development of active implantable medical devices in a regulated environment are discussed, along with issues regarding data protection and patient privacy in medical sensor networks. Applications of implantable systems are then discussed in part three, beginning with Microelectromechanical systems (MEMS) for in-vivo applications before further exploration of tripolar interfaces for neural recording, sensors for motor neuroprostheses, implantable wireless body area networks and retina implants. With its distinguished editors and international team of expert contributors, Implantable sensor systems for medical applications is a comprehensive guide for all those involved in the design, development and application of these life-changing technologies. Provides a wide-ranging overview of the core technologies, key challenges and main issues related to the development and use of implantable sensor systems in a range of medical applications Reviews the fundamentals of implantable systems, including materials and material-tissue interfaces, packaging and coatings, and microassembly Considers the challenges associated with implantable systems, including biocompatibility and sterilization

Implantable Sensor Systems for Medical Applications Springer

This book provides a fundamental discussion, latest research & developments, and the future of thin films and photoenergy materials, two developing areas that have the potential to spearhead the future of industry. Photoenergy materials are expected to be a next generation key material to provide secure, safe, sustainable and affordable energy. Photoenergy devices are known to convert the sunlight into electricity. This type of devices is very much simple in design with having a major advantage with their structure as stand-alone systems to provide outputs up to megawatts. They have been applied as a power source, solar home systems, remote buildings, water pumping, megawatt scale power plants, satellites, communications, and space vehicles. With such a list of enormous applications, the demand for photoenergy devices is growing every year. On the other hand, thin films coating, which can be defined as fusion of surface science, materials science, and applied physics, are progressing as a unified discipline of scientific industry. A thin film can be termed as a very fine or thin layer of material coated on a particular surface, that can be in the range of a nanometer in thickness to several micrometers in size. Thin films are being applied it a number of fields ranging from protection purposes to electronic semiconductor devices.

Soft Material-Enabled Electronics for Medicine, Healthcare, and Human-Machine Interfaces CRC Press

Coatings act as multifunctional and smart materials for products, as well as serving as physical barriers or decoration. Nanomaterials-enforced coatings are smarter, stronger and more durable. The barrier performance of organic coatings is enhanced by the incorporation of nanofillers, by decreasing the porosity and zigzagging the diffusion path for deleterious species. Coatings containing nanofillers, therefore have significant barrier properties for corrosion protection and reducing the trend for the coating to blister or delaminate. In addition, the functionalization of nanomaterials has led to advances in smart nanocomposite coatings, such as self-healing, anti-fouling, self-cleaning, antibacterial and cooling coatings. Nanomaterials-based Coatings emphasizes the fundamental concepts and promising applications of nanomaterial-based coatings in anticorrosion, antiwear, antibacterial, antifugal, self-leaning, superhydrophobic, superhard, super heat resistance, solar reflective, photocatalytic and radar absorbing coatings. It is an important information source for those seeking to understand the underlying phenomenal and fundamental mechanisms through which nanoparticles interact with polymeric and metallic matrices to create stronger coatings, and what their major applications are. Highlights the latest methods in design, preparation and characterization techniques for nanomaterials-based coatings Discusses emerging applications of nanomaterials-based coatings, including substrates protection, sustainable energy, environment and healthcare Assesses the major challenges in making nanomaterials-based coatings more reliable and cost-effective

Innovative Superhard Materials and Sustainable Coatings for Advanced Manufacturing National Academies

Drawing from the third edition of The Coatings Technology Handbook, this text provides a detailed analysis of the raw materials used in the coatings, adhesives, paints, and inks industries. Coatings Materials and Surface Coatings contains chapters covering the latest polymers, carbon resins, and high-temperature materials used for coatings, adhesiv

Structure, Processing and Properties Amer Chemical Society

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

Smart Textile Coatings and Laminates CRC Press

Scientific reference covers all surface coatings, paint types, components and formulationsSolvent-, water-based, polymeric, metallic, anti-corrosion, powder and advanced active coatingsChemical equations, molecular configurations and polymer chains linked to key structure/property

relationsTechnical details on specialized coatings for marine, automotive and aerospace This professional reference is a unified account of the chemistry and materials science of virtually all major resins, paints, polymeric and inorganic coatings. It offers uniform analyses of the chemical formulations and molecular structures of widely used solvent- and water-based paints and coatings, including discussions of binders, pigments and fillers. In the context of a scientific analysis of structure-property relations the book addresses adhesion, shelf-life, durability, volatility, hardness, mechanical, optical and other engineered qualities. Emerging active coatings such as conductive, self-cleaning, self-healing paints/coatings, plus eco-friendly powder coatings, are included.

Design, Process, Implementation and Recent Developments National Academies Press
The explores the cutting-edge technology of polymer coatings. It discusses fundamentals, fabrication strategies, characterization techniques, and allied applications in fields such as corrosion, food, pharmaceutical, biomedical systems and electronics. It also discusses a few new innovative self-healing, antimicrobial and superhydrophobic polymer coatings. Current industrial applications and possible potential activities are also discussed.