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ANNA CASSANDRA

Official Gazette of the United States Patent and Trademark Office Tata McGraw-Hill Education
This is an easily-accessible two-volume encyclopedia summarizing all the articles in the main volumes Kirk-Othmer Encyclopedia of Chemical Technology, Fifth Edition organized alphabetically. Written by prominent scholars from industry, academia, and research institutions, the Encyclopedia presents a wide scope of articles on chemical substances, properties, manufacturing, and uses; on industrial processes, unit operations in chemical engineering; and on fundamentals and scientific subjects related to the field.

Crosstalk and EMI on Microwave Circuit Boards Springer
The goal of Interface Science and Composites is to facilitate the manufacture of technological materials with optimized properties on the basis of a comprehensive understanding of the molecular structure of interfaces and their resulting influence on composite materials processes. From the early development of composites of various natures, the optimization of the interface has been of major importance. While there are many reference books available on composites, few deal specifically with the science and mechanics of the interface of materials and composites. Further, many recent advances in composite interfaces are scattered across the literature and are here assembled in a readily accessible form, bringing together recent developments in the field, both from the materials science and mechanics perspective, in a single convenient volume. The central theme of the book is tailoring the interface science of composites to optimize the basic physical principles rather than on the use of materials and the mechanical performance and structural integrity of composites with enhanced strength/stiffness and fracture toughness (or specific fracture resistance). It also deals mainly with interfaces in advanced composites made from high-performance fibers, such as glass, carbon, aramid, and some inorganic fibers, and matrix materials encompassing polymers, carbon, metals/alloys, and ceramics. Includes chapter on the development of a nanolevel dispersion of graphene particles in a polymer matrix Focus on tailoring the interface science of composites to optimize the basic physical principles Covers mainly interfaces in advanced

composites made from high performance fibers

Chemistry and Applications Springer Science & Business Media

This book discusses the methods synthesizing various carbon materials, like graphite, carbon blacks, carbon fibers, carbon nanotubes, and graphene. It also details different functionalization and modification processes used to improve the properties of these materials and composites. From a geometrical–structural point of view, it examines different properties of the composites, such as mechanical, electrical, dielectric, thermal, rheological, morphological, spectroscopic, electronic, optical, and toxic, and describes the effects of carbon types and their geometrical structure on the properties and applications of composites.

Spinoff John Wiley & Sons

Introduction to Fluoropolymers, Second Edition, provides a comprehensive overview of the history, principles, properties, processing and applications of fluoropolymers, supporting their development and utilization in high-performance applications, components, and products. This second edition has been updated and expanded to include new in-depth chapters on manufacturing and applications of PTFE and melt processible fluoropolymers. The book begins by demonstrating the role of fluoropolymers in everyday life, before introducing the history and basic principles of fluoropolymers. This is followed by detailed coverage of the main fluoropolymer types. Properties and applications are illustrated by real-world examples as diverse as waterproof clothing, vascular grafts and coatings for aircraft interiors. The different applications of fluoropolymers show the benefits of a group of materials that are highly water-repellant and flame-retardant, with unrivalled lubrication properties and a high level of biocompatibility. Health and safety and environmental aspects are also covered throughout the book, with a final chapter examining safety, disposal, and recycling in detail. This book is an essential resource for anyone looking to understand or use fluoropolymer materials in their products. This includes engineers, product designers, manufacturers, scientists, researchers, and other professionals, across industries such as automotive, aerospace, medical devices, food and beverages, high performance apparel, oil and gas, renewable energy, solar photovoltaics, electronics and semiconductors, pharmaceuticals, and chemical processing. This is also a valuable introductory guide for academic researchers and advanced students in plastics engineering, polymer science, and materials science. Introduces and demystifies fluoropolymers for a wide audience of engineers, designers, professionals, and researchers, across industries and disciplines Covers a broad range of materials, including polytetrafluoroethylene (PTFE), polyvinyl fluoride (PVF), vinylidene fluoride polymers, fluoroelastomers, and more Focuses on properties, processing methods and advanced industrial applications of fluoropolymers

Modern EMC Analysis Techniques Volume II CRC Press

With electromagnetic compliance (EMC) now a major factor in the design of all electronic products, it is crucial to understand how electromagnetic interference (EMI) shielding products are used in various industries. Focusing on the practicalities of this area, Advanced Materials and Design for Electromagnetic Interference Shielding comprehensively introduces the design guidelines, materials selection, characterization methodology, manufacturing technology, and future potential of EMI shielding. After an overview of EMI shielding theory and product design guidelines, the book extensively reviews the characterization methodology of EMI materials. Subsequent chapters focus on particular EMI shielding materials and component designs, including enclosures, metal-formed gaskets, conductive elastomer and flexible graphite components, conductive foam and ventilation structures, board-level shielding materials, composite materials and hybrid structures, absorber materials, grounding and cable-level shielding materials, and aerospace and nuclear shielding materials. The last chapter presents a perspective on future trends in EMI shielding materials and design. Offering detailed coverage on many important topics, this indispensable book illustrates the efficiency and reliability of a range of materials and design solutions for EMI shielding.

Springer

This thesis introduces a new modeling approach for efficient and accurate Electromagnetic Interference/Compatibility (EMI/EMC) analysis of electronic systems. Printed Circuit Boards' (PCB) radiated emissions were investigated by varying the number of apertures on a shield, changing the locations of partially shielded PCB traces, changing the locations of PCB interconnects, and moving EMI sources within a shielding enclosure. The issue with EMC modeling is that given the complexity of solving Maxwell's equations for a given PCB configuration, the best course for many engineers is to broadly follow design guidelines that are only true for a specific geometry for a specific solution frequency instead of solving Maxwell's equations for a given problem. There are cases where the complexity of the PCB design and integrated circuits (IC) is so extensive, that it is impractical to have an exact solution of Maxwell's equations (i.e., modeling a functioning populated server motherboard within a cavity). Typically, EMC revisions are made to PCB designs if the Device Under Test (DUT) does not pass regulation certification, which can be very costly and time consuming. This is one of many reasons why PCB designs are infrequently changed, or if they are changed, only small variations are made. In this thesis, it will be shown that Artificial Neural Networks (ANN) are capable of providing accurate, fast, and computationally light estimates for radiated emissions. One case study employs this computational tool to find an optimized location on a PCB for a trace interconnect. The significance of utilizing ANNs for optimization is that ANNs provide a fast and accurate tool for design as well as for estimating radiated emissions. However, given that ANNs are highly variable, many approaches to ANN creation are examined and evaluated for specific EMC examples. Since ANN models do not require detailed geometrical configurations of the PCB and cable structures under consideration, computational overhead requirements are significantly reduced as compared to electromagnetic and circuit tools. The robustness, efficiency, accuracy, and versatility of ANN models, as demonstrated in this thesis, are particularly useful in the electronics industry since most manufacturers prefer reusing circuits and PCB layouts in new products with minor modifications to the existing time-tested designs.

MXenes and their Composites John Wiley & Sons

This handbook is a comprehensive guide to the selection and applications of copper and copper alloys, which constitute one of the largest and most diverse families of engineering materials. The handbook includes all of the essential information contained in the ASM Handbook series, as well as important reference information and data from a wide variety of ASM publications and industry sources.

Carbon-Containing Polymer Composites William Andrew

The need for advanced thermal management materials in electronic packaging has been widely recognized as

thermal challenges become barriers to the electronic industry’s ability to provide continued improvements in device and system performance. With increased performance requirements for smaller, more capable, and more efficient electronic power devices, systems ranging from active electronically scanned radar arrays to web servers all require components that can dissipate heat efficiently. This requires that the materials have high capability of dissipating heat and maintaining compatibility with the die and electronic packaging. In response to critical needs, there have been revolutionary advances in thermal management materials and technologies for active and passive cooling that promise integrable and cost-effective thermal management solutions. This book meets the need for a comprehensive approach to advanced thermal management in electronic packaging, with coverage of the fundamentals of heat transfer, component design guidelines, materials selection and assessment, air, liquid, and thermoelectric cooling, characterization techniques and methodology, processing and manufacturing technology, balance between cost and performance, and application niches. The final chapter presents a roadmap and future perspective on developments in advanced thermal management materials for electronic packaging.

Advanced Materials for Electromagnetic Shielding William Andrew

A comprehensive review of the field of materials that shield people and sensitive electronic devices from electromagnetic fields Advanced Materials for Electromagnetic Shielding offers a thorough review of the most recent advances in the processing and characterization of the electromagnetic shielding materials. In this groundbreaking book, the authors—noted experts in the field—discuss the fundamentals of shielding theory as well as the practice of electromagnetic field measuring techniques and systems. They also explore applications of shielding materials used as absorbers of electromagnetic radiation, or as magnetic shields and explore coverage of new advanced materials for EMI shielding in aerospace applications. In addition, the text contains methods of preparation and applicability of metal foams. This comprehensive text examines the influence of technology on the micro- and macrostructure of polymers enabling their use in screening technology, technologies of shielding materials based on textiles, and analyses of its effectiveness in screening. The book also details the method of producing nanowires and their applications in EM shielding. This important resource: Explores the burgeoning market of electromagnetic shielding materials as we create, depend upon, and are exposed to more electronic devices than ever Addresses the most comprehensive issues relating to electromagnetic fields Contains information on the manufacturing, characterization methods, and properties of materials used to protect against them Discusses the important characterization techniques compared with one another, thus allowing scientists to select the best approach to a problem Written for materials scientists, electrical and electronics engineers, physicists, and industrial researchers, Advanced Materials for Electromagnetic Shielding explores all aspects in the area of electromagnetic shielding materials and examines the current state-of-the-art and new challenges in this rapidly growing area.

Patents ASM International

Based on over twenty years of hands-on experience with electromagnetic interference (EMI), Digital Design for Interference Specifications provides circuit designers concrete rules that can be applied immediately to the design of new digital products. The authors' techniques emphasize EMI source suppression at the printed circuit board level and considers shielding only as a last resort. The material is written in a how-to format with brief qualitative explanations of why or how design recommendations suppress emissions or reduce susceptibility. The described approaches toward design and prevention of EMI will save manufacturers time, product cost, and enhance manufacturability. Best of all, designers will not have to be EMI gurus to implement these processes but they will definitely look like experts when the final outcome is assessed. Digital Design for Interference Specifications is a very well written book targeted directly toward circuit designers and EMI professionals. The authors built a consulting company out of the knowledge presented in the book working with a huge list of clients over the years. The material is written to directly apply to circuit designers' projects helping them save money and time on each design. The book is heavily and clearly illustrated. A practical, hands-on guide to EMI suppression and prevention. Written by circuit designers for use by circuit designers. Heavily illustrated and easy to read.

Expanded PTFE Applications Handbook John Wiley & Sons

Advanced Materials and Design for Electromagnetic Interference ShieldingCRC Press

Models and Applications Elsevier

This book describes best practices for successful FPGA design. It is the result of the author’s meetings with hundreds of customers on the challenges facing each of their FPGA design teams. By gaining an understanding into their design environments, processes, what works and what does not work, key areas of concern in implementing system designs have been identified and a recommended design methodology to overcome these challenges has been developed. This book’s content has a strong focus on design teams that are spread across sites. The goal being to increase the productivity of FPGA design teams by establishing a common methodology across design teams; enabling the exchange of design blocks across teams. Coverage includes the complete FPGA design flow, from the basics to advanced techniques. This new edition has been enhanced to include new sections on System modeling, embedded design and high level design. The original sections on Design Environment, RTL design and timing closure have all been expanded to include more up to date techniques as well as providing more extensive scripts and RTL code that can be reused by readers. Presents complete, field-tested methodology for FPGA design, focused on reuse across design teams; Offers best practices for FPGA timing closure, in-system debug, and board design; Details techniques to resolve common pitfalls in designing with FPGAs.

Official Gazette of the United States Patent and Trademark Office Elsevier

Advanced Spinel Ferrite Nanocomposites for Electromagnetic Interference Shielding Applications presents recent developments in advanced spinel ferrite nanocomposites for electromagnetic interference shielding, including microwave absorption applications. The book includes the basics of shielding mechanisms, synthesis of advanced nanocomposites, and characterization, as well as results analysis. It also discusses the relationship between nanocomposite structure and physical properties. The book systematically explores how spinel ferrite nanoparticle composites are utilized with polymer, carbon source materials (carbon nanotube, graphene, etc.), metal nanoparticles, metal oxide nanoparticles, hard ferrite nanoparticles, glass, rubber, wood, fabrics/textiles, and cement/concrete in the development of advanced spinel ferrite nanocomposites for electromagnetic interference shielding application. Academics, scientists,

engineers, students, and industrial researchers will find this book beneficial. Provides an overview of recent developments on advanced spinel ferrite nanocomposites for electromagnetic interference shielding Outlines fundamental concepts of electromagnetic shielding mechanisms in nanocomposites Explores the design of a variety of nanocomposites, discussion on their structure and physical properties, used for electromagnetic shielding applications

Army RD & A Magazine Elsevier

Crosstalk and electromagnetic interference (EMI) are constant problems in the design of RF circuits. There have been several studies to analyze and improve isolation of transmission lines, but the focus has been mainly on digital circuits or the isolation goals have been on the order of 40-60 dB. When the isolation goals are much more stringent, such as 80-100 dB, much of a designer's time is still spent ensuring that a circuit meets isolation and EMI constraints. This typically involves the use of extensive metal shielding over a circuit board. This thesis presents results from an isolation and EMI study to provide a simple reference that can be applied to typical substrates, provided proper scaling is used between substrates. The results in this thesis are reported from DC to 30 GHz using a low cost 4-layer FR4 process. The changes in isolation between various transmission lines types are investigated while varying line separation and length. It is shown that isolation between ground-backed coplanar waveguide (GBCPW) and stripline traces can reach 100dB through L-band and 60dB through Ku-band for 1.3in traces separated by 150mils. Due to the heavy usage of filters in RF design, the isolation between edge-coupled bandpass filters is also studied. It is seen that isolation levels of 100dB through L-band by enclosing the filters within stripline technology is possible, provided that signal launches and layer transitions are carefully designed. Within the passband of the 20 GHz filter tested, the isolation is less but is still significantly improved by use of enclosed stripline. Lastly, a preliminary assessment of EMI is presented which focuses on radiation levels as well as variables that can degrade isolation performance. The data illustrated in this thesis can provide guidance in the early stages of RF circuit design to determine appropriate structures to meet given design requirements. It also helps to assess the degree to which additional metal shielding can be avoided in PC board systems that use multi-layer technologies.

Digital Design for Interference Specifications CRC Press

The objective of this two-volume book is the systematic and comprehensive description of the most competitive time-domain computational methods for the efficient modeling and accurate solution of modern real-world EMC problems. Intended to be self-contained, it performs a detailed presentation of all well-known algorithms, elucidating on their merits or weaknesses, and accompanies the theoretical content with a variety of applications. Outlining the present volume, numerical investigations delve into printed circuit boards, monolithic microwave integrated circuits, radio frequency microelectromechanical systems as well as to the critical issues of electromagnetic interference, immunity, shielding, and signal integrity. Biomedical problems and EMC test facility characterizations are also thoroughly covered by means of diverse time-domain models and accurate implementations. Furthermore, the analysis covers the case of large-scale applications and electrostatic discharge problems, while special attention is drawn to the impact of contemporary materials in the EMC world, such as double negative metamaterials, bi-isotropic media, and several others. Table of Contents: Introduction / Printed Circuit Boards in EMC Structures / Electromagnetic Interference, Immunity, Shielding, and Signal Integrity / Bioelectromagnetic Problems: Human Exposure to Electromagnetic Fields / Time-Domain Characterization of EMC Test Facilities / Large-Scale EMC and Electrostatic Discharge Problems / Contemporary Material Modeling in EMC Applications

Computer Integrated Electronics Manufacturing and Testing Academic Press

In engineering, there are often situations in which the material of the main component is unable to sustain long life or protect itself from adverse operating environments. Moreover, in some cases, different material properties such as anti-friction and wear, anti-corrosive, thermal resistive, super hydrophobic, etc. are required as per the operating conditions. If those bulk components are made of such materials and possess those properties, the cost will be very high. In such cases, a practical solution is surface coating, which serves as a protective barrier to the bulk material from the adverse environment. In the last decade, with enormous effort, researchers and scientists have developed suitable materials to overcome those unfavorable operating conditions, and they have used advanced deposition techniques to enhance the adhesion and surface texturing of the coatings. Advanced Surface Coating Techniques for Modern Industrial Applications is a highly sought reference source that compiles the recent research trends in these new and emerging surface coating materials, deposition techniques, properties of coated materials, and their applications in various engineering and industrial fields. The book particularly focuses on 1) coating materials including anti-corrosive materials and nanomaterials, 2) coating methods including thermal spray and electroless disposition, and 3) applications such as surface engineering and thin film application. The book is ideal for engineers, scientists, researchers, academicians, and students working in fields like material science, mechanical engineering, tribology, chemical and corrosion science, bio-medical engineering, biomaterials, and aerospace engineering.

Technology, Manufacturing and Applications John Wiley & Sons

The definitive reference on electromagnetic shielding materials, configurations, approaches, and analyses This reference provides a comprehensive survey of options for the reduction of the electromagnetic field levels in prescribed areas. After an introduction and an overview of available materials, it discusses figures of merit for shielding configurations, the shielding effectiveness of stratified media, numerical methods for shielding analyses, apertures in planar metal screens, enclosures, and cable shielding. Up to date and comprehensive, Electromagnetic Shielding: Explores new and innovative techniques in electromagnetic shielding Presents a critical approach to electromagnetic shielding that highlights the limits of formulations based on plane-wave sources Analyzes aspects not normally considered in electromagnetic shielding, such as the effects of the content of the shielding enclosures Includes references at the end of each chapter to facilitate further study The last three chapters discuss frequency-selective shielding, shielding design procedures, and uncommon ways of shielding—areas ripe for further research. This is an authoritative, hands-on resource for practicing telecommunications and electrical engineers, as well as researchers in industry and academia who are involved in the design and analysis of electromagnetic shielding structures.

Introduction to Fluoropolymers Morgan & Claypool Publishers

Wireless transceivers and transmitters radiate intentional and unintentional electromagnetic (EM) signals. The

unintended emissions result from electric (E) and magnetic (H) fields surrounding the current carrying traces, wire and other conductors. To address the concern for cellular phone electromagnetic interference (EMI) to aircraft radios, a radiated emission measurement process for wireless handsets has been proposed. Spurious radiated emissions can be efficiently characterized from devices tested in either a semi-anechoic or reverberation chamber, in terms of effective isotropic radiated power. This report provides a detailed description of a proposal of the measurement process. Aircraft interference path loss (IPL) and navigation radio interference threshold data from numerous reference documents have been referred and proposed accordingly. Using this data, a preliminary risk assessment has been provided for wireless phone interference to aircraft localizer, Glideslope, VOR, and GPS radio receivers on typical transport airplanes. The report identifies where existing data for device emissions, IPL, and navigation radio interference thresholds needs to be extended for an accurate risk assessment for wireless transmitters in aircraft. In order to suppress these types of effects several techniques have been proposed. We hereby propose a new technique for suppression of radiated EMI which is very essential in present day context in the field of wireless communication. In our article we have proposed for board-level shielding and EMI gasketing for wireless communication system designs.

Nanostructured Materials for Electromagnetic Interference Shielding Springer

This book provides a new, more accurate and efficient way for design engineers to understand electromagnetic theory and practice as it relates to the shielding of electrical and electronic equipment. The author starts by defining an electromagnetic wave, and goes on to explain the shielding of electromagnetic waves using the basic laws of physics. This is a new approach for the understanding of EMI shielding of barriers, apertures and seams. It provides a reliable, systematic approach that is easily understood by design engineers for the purpose of packaging the electrical and electronic systems of the future. This book covers both theory and practical application, emphasizing the use of transfer impedance to explain fully the penetration of an electromagnetic wave through an EMI gasketed seam. Accurate methods of testing shielding components such as EMI gaskets, shielded cables and connectors, shielded air vent materials, conductive glass and conductive paint are also covered. Describes in detail why the currently accepted theory of shielding needs improvement. Discusses the penetration of an electromagnetic wave through shielding barrier materials and electromagnetic interference (EMI) gasketed seams. Emphasizes the use of transfer impedance to explain the penetration of an electromagnetic wave through an EMI gasketed seam. The definition of an electromagnetic wave and how it is generated is included. Chapter in the book are included that reinforce the presented theory.

Weapon Systems Newnes

Materials for Potential EMI Shielding Applications: Processing, Properties and Current Trends extensively and comprehensively reviews materials for EMI shielding applications, ranging from the principles to possible applications and various types of shielding materials. The book provides a thorough introduction to electromagnetic interference, its effect on both the environment and other electronic items, various materials that are used for electromagnetic interference shielding applications, and its properties. It explains the mechanism behind EMI shielding, the methods by which EMI SE of a given material is estimated, and the different fabrication methods currently employed for fabricating EMI shielding materials. Final sections focus on the theoretical background of EMI shielding and shielding mechanisms. This theoretical background is extended to the physics of EMI shielding, wherein the physics behind mechanism of shielding is explained. Focuses on the different types of available EMI shielding, their applications, processing, characterization, and the mechanism behind their shielding Discusses how to incorporate EMI shielding with low cost, low density and high strength Provides an understanding and clarifies both elementary and practical problems relating to EMI shielding materials