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Critical Materials: Underlying Causes And Sustainable Mitigation Strategies Hybrid Materials for Piezoelectric Energy Harvesting and Conversion Frontiers in Materials Processing, Applications, Research and Technology Designing Bioactive Polymeric Materials For Restorative Dentistry Advanced Materials Brydson's Plastics Materials Packaging Materials and Processing for Food, Pharmaceuticals and Cosmetics Conversion of Lignin into Bio-Based Chemicals and Materials Minerals Yearbook Information Materials Handbook of Composites from Renewable Materials, Physico-Chemical and Mechanical Characterization The Complete Guide to the Theory and Practice of Materials Development for Language Learning Designing with Natural Materials Fifty Materials That Make the World ESD Products and Materials Encyclopedia of Renewable and Sustainable Materials Smart Materials: Integrated Design, Engineering Approaches, and Potential Applications Modern Production: Materials Synthesis, Processing and Application Ten Materials That Shaped Our World Frontiers of Composite Materials III The Lightest Metals International Disputes and Cultural Ideas in the Canadian Arctic Bioceramic Coatings for Medical Implants Raw Materials Substitution Sustainability Advanced Materials Innovation Industry 4.0 Vision for the Supply of Energy and Materials Lightweight and Sustainable Materials for Automotive Applications Nano and Biotech Based Materials for Energy Building Efficiency Electrode Materials for Energy Storage and Conversion Tin Oxide Materials Materials Selection for Natural Fiber Composites Handbook of Silicon Based MEMS Materials and Technologies Waste and Byproducts in Cement-Based Materials Materials for Medical Applications Lightweight Polymer Composite Structures Solid Waste Recycling and Processing Handbook of Composites from Renewable Materials, Structure and Chemistry Materials for Energy Storage Voids in Materials The Role of Nanoparticles in Plant Nutrition under Soil Pollution

Critical Materials: Underlying Causes And Sustainable Mitigation Strategies

2019-02-27

THIS BOOK COVERS A NEW FRONTIER OF RESEARCH IN CRITICAL MATERIALS THAT PROVIDES INSIGHT IN TERMS OF THE POSSIBLE SUSTAINABLE MITIGATION STRATEGIES THE COMPLEXITY BROADNESS AND MULTI DISCIPLINARITY OF THE SUBJECT BY EXPLORING IN BOTH SYSTEMS VIEW AND IN DEPTH MATERIALS VIEW IN LIGHT OF THE CIRCULAR ECONOMY THIS BOOK TACKLES THE PROBLEM OF SUSTAINABLE USAGE OF MATERIALS THAT IS CLOSELY INTERTWINED WITH THE ENERGY ISSUE AND CLIMATE CHANGE TOPICS COVERED INCLUDE GEOPOLITICS OF MATERIALS THE ENERGY MATERIALS NEXUS DEFINITIONS OF THE CRITICALITY OF MATERIALS CIRCULAR PRODUCT DESIGN THE DEVELOPMENT OF ALTERNATIVE MATERIALS SUBSTITUTION SUSTAINABLE MINING AND RECYCLING

Hybrid Materials for Piezoelectric Energy Harvesting and Conversion

2024-04-25

HYBRID MATERIALS FOR PIEZOELECTRIC ENERGY HARVESTING AND CONVERSION POWER SMALL DEVICES MORE EFFICIENTLY AND PRACTICALLY WITH THESE ESSENTIAL MATERIALS PIEZOELECTRIC ENERGY HARVESTING IS AN INCREASINGLY WIDELY DEPLOYED TECHNIQUE TO GENERATE ELECTRICITY FROM MECHANICAL ENERGY RELIABILITY EASE OF USE AND CLEANLINESS MAKE PIEZOELECTRIC ENERGY HARVESTING IN SMALL ELECTRONIC DEVICES A POTENTIALLY VALUABLE ALTERNATIVE TO THE PRACTICAL CHALLENGES AND WASTE PRODUCTION OF DISPOSABLE OR EVEN REUSABLE BATTERIES HOWEVER PIEZOELECTRIC MATERIALS HAVE THEIR OWN CHALLENGES ADVANTAGES AND LIMITATIONS AND CHOOSING BETWEEN THEM IS A DIFFICULT ENGINEERING PROBLEM IN ITSELF HYBRID PIEZOELECTRIC MATERIALS WHICH CAN BE USED TO COMPENSATE THE WEAKNESSES OF INDIVIDUAL PIEZOELECTRIC MATERIALS LIKE CERAMIC OR POLYMER ARE THE EMERGING SOLUTION HYBRID MATERIALS FOR PIEZOELECTRIC ENERGY HARVESTING AND CONVERSION OFFERS A SYSTEMATIC ANALYSIS OF THESE HYBRID PIEZOELECTRIC MATERIALS AND THEIR APPLICATIONS EACH HYBRID PIEZOELECTRIC MATERIAL IS ANALYZED FOR ITS FUNDAMENTALS STRUCTURAL REQUIREMENTS AND APPLICATIONS AND THE RESULT IS A SIGNIFICANT CONTRIBUTION TO MATERIALS SCIENCE AND ELECTRONIC ENGINEERING HYBRID MATERIALS FOR PIEZOELECTRIC ENERGY HARVESTING AND CONVERSION READERS WILL ALSO FIND COMPREHENSIVE COVERAGE OF PIEZOELECTRIC MATERIALS TO PROVIDE THE BEST FIT FOR ANY SET OF ENGINEERING NEEDS DETAILED DISCUSSION OF INORGANIC ORGANIC AND HYBRID PIEZOELECTRIC MATERIALS SURFACE MODIFICATION OF PIEZOELECTRIC FILLER IN COMPOSITE BASED PIEZOELECTRIC MATERIALS IMPORTANCE OF SEMICONDUCTIVE AND CONDUCTIVE MATERIALS IN ENHANCING PIEZOELECTRIC RESPONSE OF HYBRID PIEZOELECTRIC MATERIALS IN DEPTH ANALYSIS OF BIO BASED HYBRID PIEZOELECTRIC MATERIALS HYBRID MATERIALS FOR PIEZOELECTRIC ENERGY HARVESTING AND CONVERSION IS IDEAL FOR RESEARCHERS IN MATERIALS SCIENCES POLYMERS TEXTILES GREEN AND RENEWABLE ENERGY AND ALL RELATED FIELDS

Frontiers in Materials Processing, Applications, Research and Technology

2017-11-13

THIS VOLUME COMPRISES THE SELECT PROCEEDINGS OF FIMPART 2015 THE VOLUME COVERS ADVANCES IN MAJOR AREAS OF MATERIALS RESEARCH UNDER ONE UMBRELLA THIS VOLUME COVERS ALL ASPECTS OF MATERIALS RESEARCH PROCESSING FABRICATION STRUCTURE PROPERTY EVALUATION APPLICATIONS OF FERROUS NON FERROUS CERAMIC POLYMERIC MATERIALS AND COMPOSITES INCLUDING BIOMATERIALS MATERIALS FOR ENERGY FUEL CELLS HYDROGEN STORAGE TECHNOLOGIES BATTERIES SUPER CAPACITORS NANO MATERIALS FOR ENERGY AND STRUCTURAL APPLICATIONS AEROSPACE STRUCTURAL METALLIC MATERIALS BULK METALLIC GLASSES AND OTHER ADVANCED MATERIALS THE BOOK WILL BE USEFUL TO RESEARCHERS STUDENTS AND PROFESSIONAL WORKING IN AREAS RELATED TO MATERIALS INNOVATION AND APPLICATIONS

Designing Bioactive Polymeric Materials For Restorative Dentistry

2020-11-26

RESTORATIVE BIOMATERIALS IN DENTISTRY ARE DESIGNED TO RESTORE THE SHAPE AND FUNCTION OF TEETH THEIR APPLICABILITY IS RELATED TO RESTORATIVE PROCEDURES SUCH AS DENTAL RESTORATIONS DENTURES DENTAL IMPLANTS AND ENDODONTIC MATERIALS DESIGNING BIOACTIVE POLYMERIC MATERIALS FOR RESTORATIVE DENTISTRY REVIEWS THE CURRENT STATE OF THE ART FOR RESTORATIVE BIOMATERIALS AND DISCUSSES THE NEAR FUTURE TRENDS IN THIS FIELD THE BOOK EXAMINES THE BIOMATERIALS UTILIZED IN RESTORATIVE DENTAL APPLICATIONS BONDING COMPOSITES CEMENTS AND CERAMICS

and assesses the design for these materials and the role of nanotechnology all of the contributors are active clinical dentists and researchers in this field features overviews the major ongoing research efforts on developing bioactive bonding systems and composites in dental biomaterials focuses on emerging trends in restorative dental biomaterials incorporates evidence based data on new restorative dental materials throughout the book features extensive references at the end of each chapter to enhance further study mary anne s melo dds msc phd fadm is an associate professor and division director of operative dentistry at the school of dentistry university of maryland baltimore maryland

Advanced Materials

2021-11-21

this book provides a thorough introduction to the essential topics in modern materials science it brings together the spectrum of materials science topics spanning inorganic and organic materials nanomaterials biomaterials and alloys within a single cohesive and comprehensive resource synthesis and processing techniques structural and crystallographic configurations properties classifications process mechanisms applications and related numerical problems are discussed in each chapter end of chapter summaries and problems are included to deepen and reinforce the reader s comprehension provides a cohesive and comprehensive reference on a wide range of materials and processes in modern materials science presents material in an engaging manner to encourage innovative practices and perspectives includes chapter summaries and problems at the end of every chapter for reinforcement of concepts

Brydson's Plastics Materials

2016-09-27

brydson s plastics materials eighth edition provides a comprehensive overview of the commercially available plastics materials that bridge the gap between theory and practice the book enables scientists to understand the commercial implications of their work and provides engineers with essential theory since the previous edition many developments have taken place in plastics materials such as the growth in the commercial use of sustainable bioplastics so this book brings the user fully up to date with the latest materials references units and figures that have all been thoroughly updated the book remains the authoritiative resource for engineers suppliers researchers materials scientists and academics in the field of polymers including current best practice processing and material selection information and health and safety guidance along with discussions of sustainability and the commercial importance of various plastics and additives including nanofillers and graphene as property modifiers with a 50 year history as the principal reference in the field of plastics material and fully updated by an expert team of polymer scientists and engineers this book is essential reading for researchers and practitioners in this field presents a one stop shop for easily accessible information on plastics materials now updated to include the latest biopolymers high temperature engineering plastics thermoplastic elastomers and more includes thoroughly revised and reorganised material as contributed by an expert team who make the book relevant to all plastics engineers materials scientists and students of polymers includes the latest guidance on health safety and sustainability including materials safety data sheets local regulations and a discussion of recycling issues

Packaging Materials and Processing for Food, Pharmaceuticals and Cosmetics

2021-03-31

this book provides valuable information on a range of food packaging topics it serves as a source for students professionals and packaging engineers who need to know more about the characteristics applications and consequences of different packaging materials in food packaging interactions this book is divided into 13 chapters and focuses on the agro food cosmetics and pharmaceutical sectors the first four chapters cover traditional packaging materials wood paper and cardboard glass and metal the next two deal respectively with plastics and laminates biobased materials are then covered followed by a presentation of active and smart packaging some chapters are also dedicated to providing information on caps and closures as well as auxiliary materials different food packaging methods are presented followed by an investigation into the design and labelling of packaging the book ends with a chapter presenting information on how the choice of packaging material is dependent on the characteristics of the food products to be packaged

Conversion of Lignin into Bio-Based Chemicals and Materials

2017-06-05

this book presents an overview of various types of lignin and their unique structures and properties as well as utilizations of crude or modified technical lignin for high value bioproducts such as lignin based pf resins adhesives epoxy resins pf foams pu foams rubber reinforcement and carbon fibers and as dispersants in drilling fluids in the oil and gas industry it subsequently discusses various thermal chemical modification techniques pyrolysis direct liquefaction and de polymerization for converting lignin into oils and chemical feedstocks and the utilization of crude lignin lignin derived oils or depolymerized lignins dls of reduced molecular weights and improved reactivity to produce lignin based pf resins adhesives pf pu foams and epoxy resins the book will interest and benefit a broad readership graduate students academic researchers industrial researchers and practitioners in various fields of science and technology chemical engineering biotechnology chemistry material science forestry etc chunbao charles xu phd is currently a professor of chemical engineering and nserc fpinnovations industrial research chair in forest biorefinery at the university of western ontario canada fatemeh ferdosian phd is currently a postdoctoral fellow at the university of waterloo canada

Minerals Yearbook

2019-02-15

this volume covering metals and minerals contains chapters on approximately 90 commodities in addition this volume has chapters on mining and quarrying trends and on statistical surveying methods used by minerals information plus a statistical summary

Information Materials

2016-11-03

this book considers the potential of new smart materials and their use in architecture it begins with an overview of current global tendencies technological demographic and socio anthropological and their relevance for architectural design expanding upon approaches for flexible design solutions to address change and uncertainty dr kretzer begins by exploring adaptive architecture and proceeds to introduce the topic of information materials which encompasses smart and functional materials their current usage and their potential for the creation of future spaces the second chapter provides a comprehensive overview of architectural materials past and present split into the topics natural industrial synthetic digital and information materials chapter three introduces an educational approach for the mediation of information material usage in design courses and student workshops the final section provides detailed information on a range of emerging material phenomena including aerogels bioluminescence bio plastics dye sensitized solar cells electroluminescent displays electroactive polymers soft robotics and thermochromics each section explains its respective history working principles fabrication and potential usage in architecture and design and provides hands on tutorials on how to self produce these materials and displays class tested experimental installations the book concludes with an outlook into the domain of synthetic biology and the prospects of a living architecture it is ideal for students of structural materials engineering architecture and urban planning professionals working these in areas as well as materials science engineering and architecture educators

Handbook of Composites from Renewable Materials, Physico-Chemical and Mechanical Characterization

2017-01-26

the handbook of composites from renewable materials comprises a set of 8 individual volumes that brings an interdisciplinary perspective to accomplish a more detailed understanding of the interplay between the synthesis structure characterization processing applications and performance of these advanced materials the handbook covers a multitude of natural polymers reinforcement fillers and biodegradable materials together the 8 volumes total at least 5000 pages and offers a unique publication this 3rd volume of the handbook is

SOLELY FOCUSED ON THE PHYSICO CHEMICAL AND MECHANICAL CHARACTERIZATION OF RENEWABLE MATERIALS SOME OF THE IMPORTANT TOPICS INCLUDE BUT NOT LIMITED TO STRUCTURAL AND BIODEGRADATION CHARACTERIZATION OF SUPRAMOLECULAR PCL HAP NANO COMPOSITES DIFFERENT CHARACTERIZATION OF SOLID BIO FILLERS BASED AGRICULTURAL WASTE MATERIAL POLY ETHYLENE TEREPHTHALATE REINFORCED WITH HEMP FIBERS POLY LACTIC ACID THERMOPLASTIC COMPOSITES FROM RENEWABLE MATERIALS CHITOSAN BASED COMPOSITE MATERIALS FABRICATION AND CHARACTERIZATION THE USE OF FLAX FIBER REINFORCED POLYMER FFRP COMPOSITES IN THE EXTERNALLY REINFORCED STRUCTURES FOR SEISMIC RETROFITTING MONITORED BY TRANSIENT THERMOGRAPHY AND OPTICAL TECHNIQUES RECYCLING AND REUSE OF FIBER REINFORCED POLYMER WASTES IN CONCRETE COMPOSITE MATERIALS ANALYSIS OF DAMAGE IN HYBRID COMPOSITES SUBJECTED TO BALLISTIC IMPACTS BIOFIBER REINFORCED ACRYLATED EPOXIDIZED SOYBEAN OIL AESO BIOCOMPOSITES BIOPOLYAMIDES AND HIGH PERFORMANCE NATURAL FIBER REINFORCED BIOCOMPOSITES IMPACT OF RECYCLING ON THE MECHANICAL AND THERMO MECHANICAL PROPERTIES OF WOOD FIBER BASED HDPE AND PLA COMPOSITES LIGNOCELLULOSIC FIBERS COMPOSITES AN OVERVIEW BIODIESEL DERIVED RAW GLYCEROL TO VALUE ADDED PRODUCTS THERMO MECHANICAL CHARACTERIZATION OF SUSTAINABLE STRUCTURAL COMPOSITES NOVEL PH SENSITIVE COMPOSITE HYDROGEL BASED ON FUNCTIONALIZED STARCH CLAY FOR THE CONTROLLED RELEASE OF AMOXICILLIN PREPARATION AND CHARACTERIZATION OF BIOBASED THERMOSET POLYMERS FROM RENEWABLE RESOURCES INFLUENCE OF NATURAL FILLERS SIZE AND SHAPE INTO MECHANICAL AND BARRIER PROPERTIES OF BIOCOMPOSITES COMPOSITE OF BIODEGRADABLE POLYMER BLENDS OF PCL PLLA AND COCONUT FIBER THE EFFECTS OF IONIZING RADIATION PACKAGING COMPOSITE MATERIALS FROM RENEWABLE RESOURCES PHYSICOCHEMICAL PROPERTIES OF ASH BASED GEOPOLYMER CONCRETE A BIOPOLYMER DERIVED FROM CASTOR OIL POLYURETHANE NATURAL POLYMER BASED BIOMATERIALS PHYSICAL AND MECHANICAL PROPERTIES OF POLYMER MEMBRANES FROM RENEWABLE RESOURCES

The Complete Guide to the Theory and Practice of Materials Development for Language Learning

2017-07-17

THE COMPLETE GUIDE TO THE THEORY AND PRACTICE OF MATERIALS DEVELOPMENT FOR LANGUAGE LEARNING PROVIDES UNDERGRADUATE AND GRADUATE LEVEL STUDENTS IN APPLIED LINGUISTICS AND TESOL RESEARCHERS MATERIALS DEVELOPERS AND TEACHERS WITH EVERYTHING THEY NEED TO KNOW ABOUT THE LATEST THEORY AND PRACTICE OF LANGUAGE LEARNING MATERIALS DEVELOPMENT FOR ALL MEDIA THE PAST TWO DECADES HAVE SEEN HISTORIC CHANGE IN THE FIELD OF LANGUAGE LEARNING MATERIALS DEVELOPMENT THE FOUR MAIN DRIVERS OF THAT CHANGE INCLUDE A SHIFT IN EMPHASIS FROM MATERIALS FOR LANGUAGE TEACHING TO LANGUAGE LEARNING EVIDENCED BASED DEVELOPMENT THE HUGE INCREASE IN DIGITAL DELIVERY TECHNOLOGIES AND THE WEDDING OF MATERIALS DEVELOPED FOR THE LEARNING OF ENGLISH WITH THOSE FOR OTHER SECOND OR FOREIGN LANGUAGES TIMELY AUTHORITATIVE AND GLOBAL IN SCOPE THIS TEXT REPRESENTS THE IDEAL RESOURCE FOR ALL THOSE STUDYING AND WORKING IN THE FIELD OF LANGUAGE LEARNING

Designing with Natural Materials

2018-09-03

IN A WORLD NOW FORCED TO ADDRESS THE ISSUES OF SUSTAINABILITY ENVIRONMENTAL IMPACT AND THE WIDESPREAD POLLUTION OF LAND AND OCEANS WITH MANMADE MATERIALS ALTERNATIVE RESOURCES MUST BE CONSIDERED FOR THE FUTURE OF THE PLANET A VAST ARRAY OF NATURAL MATERIALS IS AVAILABLE THROUGHOUT THE WORLD WITH PROPERTIES THAT ARE OFTEN SUPERIOR TO THE MAN MADE ALTERNATIVES DESIGNING WITH NATURAL MATERIALS FILLS THE GAP BETWEEN THE CURRENT SCIENTIFIC KNOWLEDGE OF THE USE OF NATURAL MATERIALS AND PRODUCT DESIGN AND ACTS AS A BRIDGE BETWEEN THE TWO DISCIPLINES THE BOOK SERVES AS AN INTRODUCTION TO NATURAL MATERIALS WITHIN THE CONTEXT OF DESIGN THE CHAPTERS INCLUDE CASE STUDIES RESEARCH AND A HISTORICAL PERSPECTIVE IT DEVELOPS IDEAS OF DESIGNING WITH NATURAL MATERIALS IN SPECIFIC AREAS AND LOOKS TO THE FUTURE OF NEW BIOBASED MATERIALS AND HOW THESE WILL INFLUENCE DESIGN THE WORK OFFERS INSIGHT TO DESIGNERS OF BIOBASED MATERIALS ACROSS A RANGE OF DIFFERENT DESIGN DISCIPLINES WHILE ALSO PROVIDING INSIGHTS TO SCIENTISTS ON THE PROCESS OF DESIGN PRODUCTION AND THE NEEDS OF A MATERIAL BEYOND THOSE TRADITIONALLY ANALYZED IN THE LABORATORY THE FINAL CHAPTERS TOUCH ON THE USE OF BIOINSPIRATION AND BIOMIMICRY IN THE DEVELOPMENT AND USE OF BIOBASED MATERIALS AND HOW NATURAL DESIGN WILL INFLUENCE BOTH MATERIAL DESIGN AND PRODUCTS IN THE FUTURE THE BOOK WILL BE OF INTEREST TO ENGINEERS SCIENTIFIC RESEARCHERS PROFESSIONAL DESIGNERS STUDENTS THOSE WORKING IN INDUSTRY WHO ARE CONSIDERING USING NATURAL MATERIALS AS AN ALTERNATIVE TO CURRENT UNSUSTAINABLE OPTIONS AND ANYONE WHO HAS AN INTEREST IN THE SUBJECT

Fifty Materials That Make the World

2018-06-21

THIS BOOK INTRODUCES MATERIALS AND HOW ADVANCES IN MATERIALS RESULT IN ADVANCES IN TECHNOLOGY AND OUR DAILY LIVES EACH CHAPTER COVERS A PARTICULAR MATERIAL HOW THE MATERIAL WAS DISCOVERED OR INVENTED WHEN IT WAS FIRST USED HOW THIS MATERIAL HAS IMPACTED THE WORLD WHAT MAKES THE MATERIAL IMPORTANT HOW IT IS USED TODAY AND FUTURE APPLICATIONS THE LIST OF MATERIALS COVERED IN THIS BOOK INCLUDES STONE WOOD NATURAL FIBERS METALS CLAY LEAD IRON STEEL SILICON GLASS RUBBER COMPOSITES POLYETHYLENE RARE EARTH MAGNET AND ALLOYS

ESD Products and Materials

2010-03-18

MATERIALS AND PRODUCTS DESIGNED TO LESSEN THE IMPACT OF STATIC ELECTRICITY REPRESENT A RELATIVELY MATURE MARKET BUT ONE IN WHICH NEW OPPORTUNITIES ARE BEGINNING TO EMERGE ON THE DEMAND SIDE INCREASED MINIATURIZATION OF PCBS AND HARD DRIVES COUPLED WITH EVER SMALLER DEVICES ON COMPUTER CHIPS WILL INCREASE THE THREATS OF DAMAGE AND COSTS CAUSED BY STATIC ELECTRICITY WE BELIEVE THAT THIS WILL PROVIDE THE ESD PRODUCTS AND COATINGS MARKET WITH GROWTH FOR YEARS TO COME ANTISTATIC CONCERNS ARE ALSO GROWING AT BOTH THE MANUFACTURING AND PACKAGING LEVELS AT THE SAME TIME TECHNOLOGICAL IMPROVEMENTS IN ESD COATINGS ARE TO BE EXPECTED ESPECIALLY IN THE VIBRANT AREAS OF NANOMATERIALS AND CONDUCTIVE POLYMERS IN THIS REPORT NANOMARKETS WILL IDENTIFY AND QUANTIFY THE NEW OPPORTUNITIES IN ESD PRODUCTS AND MATERIALS THAT ARE EMERGING AS A RESULT OF THE INCREASED ANTISTATIC CONCERNS DISCUSSED ABOVE THIS REPORT IS A FOLLOW ON REPORT FROM THE WELL RECEIVED INDUSTRY ANALYSIS ON ANTISTATIC COATINGS THAT NANOMARKETS CARRIED OUT FOR ITS CONDUCTIVE COATINGS MARKET STUDY PUBLISHED LAST YEAR IN THIS REPORT WE EXTEND THE COVERAGE ACROSS THE ENTIRE ESD ANTISTATIC PRODUCT AND MATERIAL VALUE CHAIN TO INCLUDE NOT JUST BASIC MATERIALS BUT ALSO LAMINATES FILMS AND OTHER MATERIALS AS WELL HIGHER VALUE PRODUCTS SUCH AS BAGS GARMENTS AND FLOORING

Encyclopedia of Renewable and Sustainable Materials

2020-01-09

ENCYCLOPEDIA OF RENEWABLE AND SUSTAINABLE MATERIALS FIVE VOLUME SET PROVIDES A COMPREHENSIVE OVERVIEW COVERING RESEARCH AND DEVELOPMENT ON ALL ASPECTS OF RENEWABLE RECYCLABLE AND SUSTAINABLE MATERIALS THE USE OF RENEWABLE AND SUSTAINABLE MATERIALS IN BUILDING CONSTRUCTION THE AUTOMOTIVE SECTOR ENERGY TEXTILES AND OTHERS CAN CREATE MARKETS FOR AGRICULTURAL PRODUCTS AND ADDITIONAL REVENUE STREAMS FOR FARMERS AS WELL AS SIGNIFICANTLY REDUCE CARBON DIOXIDE CO2 EMISSIONS MANUFACTURING ENERGY REQUIREMENTS MANUFACTURING COSTS AND WASTE THIS BOOK PROVIDES RESEARCHERS STUDENTS AND PROFESSIONALS IN MATERIALS SCIENCE AND ENGINEERING WITH TACTICS AND INFORMATION AS THEY FACE INCREASINGLY COMPLEX CHALLENGES AROUND THE DEVELOPMENT SELECTION AND USE OF CONSTRUCTION AND MANUFACTURING MATERIALS COVERS A BROAD RANGE OF TOPICS NOT AVAILABLE ELSEWHERE IN ONE RESOURCE ARRANGED THEMATICALLY FOR EASE OF NAVIGATION DISCUSSES KEY FEATURES ON PROCESSING USE APPLICATION AND THE ENVIRONMENTAL BENEFITS OF RENEWABLE AND SUSTAINABLE MATERIALS CONTAINS A SPECIAL FOCUS ON SUSTAINABILITY THAT WILL LEAD TO THE REDUCTION OF CARBON EMISSIONS AND ENHANCE PROTECTION OF THE NATURAL ENVIRONMENT WITH REGARD TO SUSTAINABLE MATERIALS

Smart Materials: Integrated Design, Engineering Approaches, and Potential Applications

2018-07-18

POLYMER BASED SMART MATERIALS HAVE BECOME ATTRACTIVE IN RECENT YEARS DUE TO THE FACT THAT POLYMERS ARE FLEXIBLE AND PROVIDE MANY ADVANTAGES COMPARED TO INORGANIC SMART MATERIALS THEY ARE LOW COST THEY ARE EASY TO PROCESS AND THEY EXHIBIT GOOD PERFORMANCE AT NANO AND MICROSCALE LEVELS THIS VOLUME FOCUSES ON A DIFFERENT CLASS OF POLYMERS THAT ARE USED AS SMART MATERIALS IN THE AREAS OF BIOTECHNOLOGY MEDICINE AND ENGINEERING THE VOLUME AIMS TO ANSWER THESE QUESTIONS HOW DO WE DISTINGUISH SMART MATERIALS AND HOW DO THEY WORK THE CHAPTERS LAY THE GROUNDWORK FOR ASSIMILATION AND EXPLOITATION OF THIS TECHNOLOGICAL ADVANCEMENT FOUR OF THE KEY ASPECTS OF THE APPROACH THAT THE AUTHORS HAVE DEVELOPED THROUGHOUT THIS BOOK ARE HIGHLIGHTED NAMELY THE MULTIDISCIPLINARY EXCHANGE OF KNOWLEDGE EXPLORATION OF THE RELATIONSHIPS BETWEEN MULTIPLE SCALES AND THEIR DIFFERENT BEHAVIORS UNDERSTANDING THAT MATERIAL PROPERTIES ARE DICTATED AT THE SMALLEST SCALE AND THEREFORE THE RECOGNITION THAT MACROSCALE BEHAVIOR CAN BE CONTROLLED BY NANOSCALE DESIGN

Modern Production: Materials Synthesis, Processing and Application

2022-12-15

SPECIAL TOPIC VOLUME WITH INVITED PEER REVIEWED PAPERS ONLY

Ten Materials That Shaped Our World

2021-06-30

THIS BOOK EXAMINES TEN MATERIALS FLINT CLAY IRON GOLD GLASS CEMENT RUBBER POLYETHYLENE ALUMINUM AND SILICON EXPLAINING HOW THEY FORMED HOW WE DISCOVERED THEM WHY THEY HAVE THE PROPERTIES THEY DO AND HOW THEY HAVE TRANSFORMED OUR LIVES SINCE THE DAWN OF THE STONE AGE WE HAVE SHAPED MATERIALS TO MEET OUR NEEDS AND IN TURN THOSE MATERIALS HAVE SHAPED US THE FRACTURING OF FLINT CREATED SHARP CURVED SURFACES THAT GAVE OUR ANCESTORS AN EVOLUTIONARY EDGE MOLDING CLAY AND THEN BAKING IT IN THE SUN PRODUCED A MEANS OF RECORDING THE WRITTEN WORD AND EXEMPLIFIED HUMAN ARTISTIC IMAGINATION AS OUR ABILITY TO CONTROL HEAT IMPROVED EARTHENWARE BECAME STONEWARE AND EVENTUALLY PORCELAIN THE MOST PRIZED CERAMIC OF ALL IRON CAST AT HIGH TEMPERATURES FORMED THE COMPONENTS NEEDED FOR STEAM ENGINES LOCOMOTIVES AND POWER LOOMS THE TOOLS OF THE INDUSTRIAL REVOLUTION GOLD HAS CAPTIVATED HUMANS FOR THOUSANDS OF YEARS AND HAS RECENTLY FOUND IMPORTANT USES IN BIOLOGY MEDICINE AND NANOTECHNOLOGY GLASS SHAPED INTO EARLY AND IMPERFECT LENSES NOT ONLY REVEALED THE MICROSCOPIC WORLD OF CELLS AND CRYSTALS BUT ALSO ALLOWED US TO DISCOVER STARS AND PLANETS BEYOND THOSE VISIBLE WITH THE NAKED EYE SILICON REVOLUTIONIZED THE COMPUTER PROPELLING US INTO THE INFORMATION AGE AND WITH IT OUR INTERCONNECTED SOCIAL NETWORKS THE INTERNET OF THINGS AND ARTIFICIAL INTELLIGENCE WRITTEN BY A MATERIALS SCIENTIST THIS BOOK EXPLORES NOT JUST WHY BUT ALSO HOW CERTAIN MATERIALS CAME TO BE SO FUNDAMENTAL TO HUMAN SOCIETY THIS ENLIGHTENING STUDY CAPTIVATES ANYONE INTERESTED IN LEARNING MORE ABOUT THE HISTORY OF HUMANKIND OUR INGENUITY AND THE MATERIALS THAT HAVE SHAPED OUR WORLD

Frontiers of Composite Materials III

2019-04-15

3RD INTERNATIONAL CONFERENCE ON FRONTIERS OF COMPOSITE MATERIALS 3RD ICFCM 2018 SELECTED PEER REVIEWED PAPERS FROM THE 3RD INTERNATIONAL CONFERENCE ON FRONTIERS OF COMPOSITE MATERIALS ICFCM 2018 NOVEMBER 16 18 2018 SYDNEY AUSTRALIA

The Lightest Metals

2015-11-16

THE FIRST SEVEN METALS IN THE PERIODIC TABLE ARE LITHIUM BERYLLIUM SODIUM MAGNESIUM ALUMINIUM POTASSIUM AND CALCIUM KNOWN COLLECTIVELY AS THE LIGHTEST METALS THE GROWING USES OF THESE SEVEN ELEMENTS ARE ENMESHING THEM EVER MORE FIRMLY INTO CRITICAL AREAS OF 21ST CENTURY TECHNOLOGY INCLUDING ENERGY STORAGE CATALYSIS AND VARIOUS APPLICATIONS OF NANOSCIENCE THIS VOLUME PROVIDES COMPREHENSIVE COVERAGE OF THE FUNDAMENTALS AND RECENT ADVANCES IN THE SCIENCE AND TECHNOLOGY OF THE LIGHTEST METALS OPENING CHAPTERS OF THE BOOK DESCRIBE MAJOR PHYSICAL AND CHEMICAL PROPERTIES OF THE METALS THEIR OCCURRENCE AND ISSUES OF LONG TERM AVAILABILITY THE BOOK GOES ON TO DISUCSS A BROAD RANGE OF CHEMICAL FEATURES INCLUDING LOW OXIDATION STATE CHEMISTRY ORGANOMETALLICS METAL CENTERED NMR SPECTROSCOPY AND CATION Π INTERACTIONS CURRENT AND EMERGING APPLICATIONS OF THE METALS ARE PRESENTED INCLUDING LITHIUM ION BATTERY TECHNOLOGY HYDROGEN STORAGE CHEMISTRY SUPERCONDUCTOR MATERIALS TRANSPARENT CERAMICS NANO ENHANCED CATALYSIS AND RESEARCH INTO PHOTOSYNTHESIS AND PHOTOELECTROCHEMICAL CELLS THE CONTENT FROM THIS BOOK WILL BE ADDED ONLINE TO THE ENCYCLOPEDIA OF INORGANIC AND BIOINORGANIC CHEMISTRY WILEYONLINELIBRARY COM REF EIBC

International Disputes and Cultural Ideas in the Canadian Arctic

2017-08-22

this book explores the canadian relationship with its portion of the arctic region which revolves around the dramatic split between the appearance of absent minded governance bordering on indifference toward the region and the raging nationalism during moments of actual and perceived challenge toward the sovereignty of the imagined canadian arctic region canada s nationalistic relationship with the arctic region is often discussed as a reactionary phenomenon to the americanization of canada and the product of government propaganda as this book illustrates however the complexity and evolution of the canadian relationship with the arctic region and its implication for canada s approach toward international relations requires a more in depth exploration please be aware than an error has been noted for table 1 1 on page 71 in this table the sub category inuit is mislabelled it should read native indians and inuit as the data presented represents this canadian census sub category which calculated all indigenous peoples and inuit peoples together

Bioceramic Coatings for Medical Implants

2015-05-26

reflecting the progress in recent years this book provides in depth information on the preparation chemistry and engineering of bioceramic coatings for medical implants it is authored by two renowned experts with over 30 years of experience in industry and academia who know the potentials and pitfalls of the techniques concerned following an introduction to the principles of biocompatibility they present the structures and properties of various bioceramics from alumina to zirconia the main part of the work focuses on coating technologies such as chemical vapor deposition sol gel deposition and thermal spraying there then follows a discussion of the major interactions of bioceramics with bone or tissue cells complemented by an overview of the in vitro testing methods of the biomineralization properties of bioceramics the text is rounded off by chapters on the functionalization of bioceramic coatings and a look at future trends as a result the authors bring together all aspects of the latest techniques for designing depositing testing and implementing improved and novel bioceramic coating compositions providing a full yet concise overview for beginners and professionals

Raw Materials Substitution Sustainability

2017-07-27

this book is the first to propose a simplified quantitative approach to evaluating raw materials substitution sustainability which takes into account their embodied energy and co2 footprint in addition to the new quantitative model it also presents qualitative concepts as well as a number of case studies and includes helpful illustrations to explain the concept and approach europe has launched several initiatives to promote research and innovation in raw materials and to find candidates for natural resources substitution however while there is a tremendous interest in raw material substitution the lack of a simplified approach to comparing the materials sustainability and effective legal frameworks make final market applications extremely challenging the market for new raw materials can only be established if industrial sectors are appropriately sensitized and stimulated addressing these and other issues the book offers a valuable resource not only for scientists researchers and politicians but also for industrial and business operators looking for a way to evaluate raw materials substitution sustainability

Advanced Materials Innovation

2016-09-01

through detailed case studies of the most important advanced material creations of the latter 20th and early 21st century the author explores the role of the field of advanced materials in the technological and economic activity today with implications to the innovation process in general a comprehensive study that encompasses the three major categories of advanced material technologies i e structural materials metals and polymers functional materials transistor microchip and semiconductor laser and hybrid and new forms of

MATTER LIQUID CRYSTALS AND NANOMATERIALS EXTENSIVE USE OF PRIMARY SOURCES INCLUDING UNPUBLISHED INTERVIEWS WITH THE SCIENTISTS ENGINEERS AND ENTREPRENEURS ON THE FRONT LINES OF ADVANCED MATERIALS CREATION ORIGINAL APPROACH TO CASE STUDY NARRATIVE EMPHASIZING INTERACTION BETWEEN THE ADVANCED MATERIAL PROCESS PERCEIVED RISK AND DIRECTING AND ACCELERATING BREAKTHROUGH TECHNOLOGY

Industry 4.0 Vision for the Supply of Energy and Materials

2022-05-11

INDUSTRY 4 0 VISION FOR THE SUPPLY OF ENERGY AND MATERIALS EXPLORE THE IMPACT OF INDUSTRY 4 0 TECHNOLOGIES ON THE SUPPLY CHAIN WITH THIS AUTHORITATIVE TEXT WRITTEN BY A LEADER IN HIS FIELD IN INDUSTRY 4 0 VISION FOR THE SUPPLY OF ENERGY AND MATERIALS DISTINGUISHED RESEARCHER AND EDITOR DR MAHDI SHARIFZADEH DELIVERS THEMATIC ANALYTIC AND APPLIED DISCUSSIONS OF THE INDUSTRY 4 0 VISION FOR SUPPLY CHAIN DESIGN AND OPERATION THE BOOK COMPILES ALL CURRENT ASPECTS AND EMERGING NOTIONS OF INDUSTRY 4 0 INTO CLUSTERS OF ENABLERS AND ANALYTICS OF SUPPLY CHAIN 4 0 THEIR MULTIFACETED AND HIGHLY INTERCONNECTED NATURE IS DISCUSSED AT LENGTH AS ARE THEIR DIVERSE RANGE OF APPLICATIONS YOU WILL DISCOVER USES OF THESE NEW TECHNOLOGIES RANGING FROM THE SUPPLY OF CONVENTIONAL ENERGY NETWORKS TO RENEWABLES PHARMACEUTICALS AND ADDITIVE MANUFACTURING YOU WILL ALSO LEARN ABOUT THEIR IMPLICATIONS FOR ECONOMIC PROSPERITY AND ENVIRONMENTAL SUSTAINABILITY FOR EACH SECTOR THIS BOOK SCRUTINIZES CURRENT INDUSTRIAL PRACTICE AND DISCUSSES DEVELOPING CONCEPTS FINALLY THE BOOK CONCLUDES WITH POTENTIAL FUTURE RESEARCH DIRECTIONS OF INTEREST TO INDUSTRY PRACTITIONERS AND ACADEMICS ALIKE READERS WILL ALSO BENEFIT FROM THE INCLUSION OF A THOROUGH INTRODUCTION TO CONNECTIVITY THROUGH WIRELESS COMMUNICATIONS AND REMOTE SENSORS AN EXPLORATION OF BLOCKCHAINS AND SMART CONTRACTS AS WELL AS ROBOTICS AND AUTOMATION AND CLOUD COMPUTING PRACTICAL DISCUSSIONS OF SUPPLY CHAIN ANALYTICS INCLUDING BIG DATA MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE AS WELL AS SUPPLY CHAIN MODELING OPTIMIZATION AND CONTROL A CONCISE TREATMENT OF INDUSTRY 4 0 APPLICATIONS IN SUPPLY CHAIN DESIGN AND OPERATION INCLUDING THE CIRCULAR ECONOMY AND THE POWER INDUSTRY AN ANALYSIS OF THE OIL GAS AND PETROCHEMICAL INDUSTRY THE PHARMACEUTICAL INDUSTRY AND ADDITIVE MANUFACTURING PERFECT FOR PHD LEVEL AND POSTDOCTORAL RESEARCHERS AND INDUSTRIAL RESEARCHERS INDUSTRY 4 0 VISION FOR THE SUPPLY OF ENERGY AND MATERIALS WILL ALSO EARN A PLACE IN THE LIBRARIES OF WORKING PROFESSIONALS WITH AN INTEREST IN THE QUANTITATIVE ANALYSIS OF SUPPLY CHAIN 4 0 CONCEPTS AND TECHNIQUES

Lightweight and Sustainable Materials for Automotive Applications

2017-06-01

AUTOMOTIVE MANUFACTURERS ARE REQUIRED TO DECREASE CO2 EMISSIONS AND INCREASE FUEL ECONOMY WHILE ASSURING DRIVER COMFORT AND SAFETY IN RECENT YEARS THERE HAS BEEN RAPID DEVELOPMENT IN THE APPLICATION OF LIGHTWEIGHT AND SUSTAINABLE MATERIALS IN THE AUTOMOTIVE INDUSTRY TO HELP MEET THESE CRITERIA THIS BOOK PROVIDES CRITICAL REVIEWS AND THE LATEST RESEARCH RESULTS OF VARIOUS LIGHTWEIGHT AND SUSTAINABLE MATERIALS IN AUTOMOTIVE APPLICATIONS IT DISCUSSES CURRENT APPLICATIONS AND FUTURE TRENDS OF LIGHTWEIGHT MATERIALS IN THE AUTOMOTIVE AREA WHILE THERE ARE A FEW BOOKS PUBLISHED MAINLY FOCUSING ON AUTOMOTIVE APPLICATIONS OF METALLIC LIGHTWEIGHT MATERIALS TO DATE THERE IS NO AVAILABLE BOOK FOCUSING ON A BROAD SPECTRUM OF LIGHTWEIGHT MATERIALS INCLUDING METAL PLASTIC COMPOSITES BIO FIBER BIO POLYMER CARBON FIBER GLASS FIBER NANOMATERIALS RUBBER MATERIALS AND FOAMING MATERIALS AS THIS WORK DOES THE BOOK ALSO INCLUDES CASE STUDIES OF COMMERCIAL LIGHTWEIGHT AUTOMOTIVE PARTS FROM SUSTAINABLE LIGHTWEIGHT MATERIALS PROVIDING AN INVALUABLE RESOURCE TO THOSE INVOLVED IN THIS IN DEMAND RESEARCH AND COMMERCIALIZATION AREA

Nano and Biotech Based Materials for Energy Building Efficiency

2016-02-04

THIS BOOK PRESENTS THE CURRENT STATE OF KNOWLEDGE ON NANOMATERIALS AND THEIR USE IN BUILDINGS RANGING FROM GLAZING AND VACUUM INSULATION TO PCM COMPOSITES IT ALSO DISCUSSES RECENT APPLICATIONS IN ORGANIC PHOTOVOLTAICS PHOTO BIOREACTORS BIOPLASTICS AND FOAMS MAKING IT AN EXCITING READ WHILE ALSO PROVIDING COPIOUS REFERENCES TO CURRENT RESEARCH AND APPLICATIONS FOR THOSE WANTING TO PURSUE POSSIBLE FUTURE RESEARCH DIRECTIONS DEREK CLEMENTS CROOME EMERITUS PROFESSOR IN ARCHITECTURAL ENGINEERING UNIVERSITY OF READING FROM THE FOREWORD DEMONSTRATING HOW HIGHER ENERGY EFFICIENCY IN NEW AND EXISTING BUILDINGS CAN HELP REDUCE GLOBAL GREENHOUSE GAS EMISSIONS THIS BOOK DETAILS THE WAY IN WHICH NEW TECHNOLOGIES MANUFACTURING PROCESSES AND PRODUCTS CAN SERVE TO ABATE EMISSIONS FROM THE ENERGY SECTOR AND OFFER A COST EFFECTIVE MEANS OF IMPROVING COMPETITIVENESS AND DRIVE EMPLOYMENT

MAXIMIZING READER INSIGHTS INTO HOW NANO AND BIOTECH MATERIALS SUCH AS AEROGEL BASED PLASTERS THERMOCHROMIC GLAZINGS AND THERMAL ENERGY ADSORBING GLASS AMONGST OTHERS CAN PROVIDE HIGH ENERGY EFFICIENCY PERFORMANCE IN BUILDINGS IT PROVIDES PRACTITIONERS IN THE FIELD WITH AN IMPORTANT HIGH TECH TOOL TO TACKLE KEY CHALLENGES AND IS ESSENTIAL READING FOR CIVIL ENGINEERS ARCHITECTS MATERIALS SCIENTISTS AND RESEARCHERS IN THE AREA OF THE SUSTAINABILITY OF THE BUILT ENVIRONMENT

Electrode Materials for Energy Storage and Conversion

2021-11-17

THIS BOOK PROVIDES A COMPREHENSIVE OVERVIEW OF THE LATEST DEVELOPMENTS AND MATERIALS USED IN ELECTROCHEMICAL ENERGY STORAGE AND CONVERSION DEVICES INCLUDING LITHIUM ION BATTERIES SODIUM ION BATTERIES ZINC ION BATTERIES SUPERCAPACITORS AND CONVERSION MATERIALS FOR SOLAR AND FUEL CELLS CHAPTERS INTRODUCE THE TECHNOLOGIES BEHIND EACH MATERIAL IN ADDITION TO THE FUNDAMENTAL PRINCIPLES OF THE DEVICES AND THEIR WIDER IMPACT AND CONTRIBUTION TO THE FIELD THIS BOOK WILL BE AN IDEAL REFERENCE FOR RESEARCHERS AND INDIVIDUALS WORKING IN INDUSTRIES BASED ON ENERGY STORAGE AND CONVERSION TECHNOLOGIES ACROSS PHYSICS CHEMISTRY AND ENGINEERING FEATURES EDITED BY ESTABLISHED AUTHORITIES WITH CHAPTER CONTRIBUTIONS FROM SUBJECT AREA SPECIALISTS PROVIDES A COMPREHENSIVE REVIEW OF THE FIELD UP TO DATE WITH THE LATEST DEVELOPMENTS AND RESEARCH EDITORS DR MESFIN A KEBEDE OBTAINED HIS PHD IN METALLURGICAL ENGINEERING FROM INHA UNIVERSITY SOUTH KOREA HE IS NOW A PRINCIPAL RESEARCH SCIENTIST AT ENERGY CENTRE OF COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH CSIR SOUTH AFRICA HE WAS PREVIOUSLY AN ASSISTANT PROFESSOR IN THE DEPARTMENT OF APPLIED PHYSICS AND MATERIALS SCIENCE AT HAWASSA UNIVERSITY ETHIOPIA HIS EXTENSIVE RESEARCH EXPERIENCE COVERS THE USE OF ELECTRODE MATERIALS FOR ENERGY STORAGE AND ENERGY CONVERSION PROF FABIAN I EZEMA IS A PROFESSOR AT THE UNIVERSITY OF NIGERIA NSUKKA HE OBTAINED HIS PHD IN PHYSICS AND ASTRONOMY FROM UNIVERSITY OF NIGERIA NSUKKA HIS RESEARCH FOCUSES ON SEVERAL AREAS OF MATERIALS SCIENCE WITH AN EMPHASIS ON ENERGY APPLICATIONS SPECIFICALLY ELECTRODE MATERIALS FOR ENERGY CONVERSION AND STORAGE

Tin Oxide Materials

2019-10-05

TIN OXIDE MATERIALS SYNTHESIS PROPERTIES AND APPLICATIONS DISCUSSES THE LATEST IN METAL OXIDES AN EMERGING AREA IN ELECTRONIC MATERIALS AS MORE IS LEARNED ABOUT THIS IMPORTANT MATERIALS SYSTEM MORE FUNCTIONALITIES AND APPLICATIONS HAVE BEEN REVEALED THIS KEY REFERENCE ON THE TOPIC COVERS IMPORTANT MATERIAL THAT IS IDEAL FOR MATERIALS SCIENTISTS MATERIALS ENGINEERS AND MATERIALS CHEMISTS WHO HAVE BEEN INTRODUCED TO METAL OXIDES AS A GENERAL CATEGORY OF MATERIALS BUT WANT TO TAKE THE NEXT STEP AND LEARN MORE ABOUT A SPECIFIC MATERIAL PROVIDES A COMPLETE RESOURCE ON TIN OXIDE MATERIALS SYSTEMS INCLUDING IN DEPTH DISCUSSIONS OF PROPERTIES THEIR SYNTHESIS MODELLING METHODS AND APPLICATIONS PRESENTS INFORMATION ON THE WELL INVESTIGATED SNO2 BUT ALSO INCLUDES DISCUSSIONS ON ITS EMERGING STOICHIOMETRIES SUCH AS SNO AND SN3O4 INCLUDES THE MOST RELEVANT APPLICATIONS IN VARISTORS SENSING DEVICES FUEL CELLS TRANSISTORS BIOLOGICAL STUDIES AND MUCH MORE

Materials Selection for Natural Fiber Composites

2017-06-09

MATERIALS SELECTION FOR NATURAL FIBER COMPOSITES COVERS THE USE OF VARIOUS TOOLS AND TECHNIQUES THAT CAN BE APPLIED FOR NATURAL FIBER COMPOSITE SELECTION TO EXPAND THE SUSTAINABLE DESIGN POSSIBILITIES AND SUPPORT CLEANER PRODUCTION REQUIREMENTS THESE TECHNIQUES INCLUDE THE ANALYTICAL HIERARCHY PROCESS KNOWLEDGE BASED SYSTEM JAVA BASED MATERIALS SELECTION SYSTEM ARTIFICIAL NEURAL NETWORK PUGH SELECTION METHOD AND THE DIGITAL LOGIC TECHNIQUE INFORMATION ON RELATED TOPICS SUCH AS MATERIALS SELECTION AND DESIGN NATURAL FIBER COMPOSITES AND MATERIALS SELECTION FOR COMPOSITES ARE DISCUSSED TO PROVIDE BACKGROUND INFORMATION TO THE MAIN TOPIC CURRENT DEVELOPMENTS IN SELECTING THE NATURAL FIBER COMPOSITE MATERIAL SYSTEM INCLUDING THE NATURAL FIBER COMPOSITES AND THEIR CONSTITUENTS FIBERS AND POLYMERS IS THE MAIN CORE OF THE BOOK WITH IN DETAILED SECTIONS ON VARIOUS TECHNICAL ENVIRONMENTAL AND ECONOMIC ISSUES TO ENHANCE BOTH ENVIRONMENTAL INDICES AND THE INDUSTRIAL SUSTAINABILITY THEME RECENT DEVELOPMENTS ON THE ANALYTICAL HIERARCHY PROCESS IN NATURAL FIBER COMPOSITE MATERIALS SELECTION MATERIALS SELECTION FOR NATURAL FIBER COMPOSITES AND KNOWLEDGE BASED SYSTEM FOR NATURAL FIBER COMPOSITE MATERIALS SELECTION ARE ALSO DISCUSSED FOCUSES ON MATERIALS SELECTION FOR NATURAL FIBER COMPOSITES COVERS POTENTIAL TOOLS AND TECHNIQUES SUCH AS ANALYTICAL HIERARCHY PROCESS KNOWLEDGE BASED SYSTEMS JAVA BASED MATERIALS SELECTION SYSTEM ARTIFICIAL NEURAL NETWORK THE PUGH SELECTION METHOD AND DIGITAL LOGIC TECHNIQUE CONTAINS CONTRIBUTIONS FROM LEADING EXPERTS IN THE FIELD

Handbook of Silicon Based MEMS Materials and Technologies

2020-04-17

HANDBOOK OF SILICON BASED MEMS MATERIALS AND TECHNOLOGIES THIRD EDITION IS A COMPREHENSIVE GUIDE TO MEMS MATERIALS TECHNOLOGIES AND MANUFACTURING WITH A PARTICULAR EMPHASIS ON SILICON AS THE MOST IMPORTANT STARTING MATERIAL USED IN MEMS THE BOOK EXPLAINS THE FUNDAMENTALS PROPERTIES MECHANICAL ELECTROSTATIC OPTICAL ETC MATERIALS SELECTION PREPARATION MODELING MANUFACTURING PROCESSING SYSTEM INTEGRATION MEASUREMENT AND MATERIALS CHARACTERIZATION TECHNIQUES OF MEMS STRUCTURES THE THIRD EDITION OF THIS BOOK PROVIDES AN IMPORTANT UP TO DATE OVERVIEW OF THE CURRENT AND EMERGING TECHNOLOGIES IN MEMS MAKING IT A KEY REFERENCE FOR MEMS PROFESSIONALS ENGINEERS AND RESEARCHERS ALIKE AND AT THE SAME TIME AN ESSENTIAL EDUCATION MATERIAL FOR UNDERGRADUATE AND GRADUATE STUDENTS PROVIDES COMPREHENSIVE OVERVIEW OF LEADING EDGE MEMS MANUFACTURING TECHNOLOGIES THROUGH THE SUPPLY CHAIN FROM SILICON INGOT GROWTH TO DEVICE FABRICATION AND INTEGRATION WITH SENSOR ACTUATOR CONTROLLING CIRCUITS EXPLAINS THE PROPERTIES MANUFACTURING PROCESSING MEASURING AND MODELING METHODS OF MEMS STRUCTURES REVIEWS THE CURRENT AND FUTURE OPTIONS FOR HERMETIC ENCAPSULATION AND INTRODUCES HOW TO UTILIZE WAFER LEVEL PACKAGING AND 3D INTEGRATION TECHNOLOGIES FOR PACKAGE COST REDUCTION AND PERFORMANCE IMPROVEMENTS GEARED TOWARDS PRACTICAL APPLICATIONS PRESENTING SEVERAL MODERN MEMS DEVICES INCLUDING INERTIAL SENSORS MICROPHONES PRESSURE SENSORS AND MICROMIRRORS

Waste and Byproducts in Cement-Based Materials

2021-06-03

WASTE AND BY PRODUCTS IN CEMENT BASED MATERIALS INNOVATIVE SUSTAINABLE MATERIALS FOR A CIRCULAR ECONOMY COVERS VARIOUS RECYCLED MATERIALS BY PRODUCTS AND WASTES THAT ARE SUITABLE FOR THE MANUFACTURE OF MATERIALS WITHIN THE SPECTRUM OF SO CALLED CEMENT BASED MATERIALS CBM SECTIONS COVER WASTES FOR REPLACEMENT OF AGGREGATES IN CBM FOCUS ON THE APPLICATION OF WASTES FOR THE REPLACEMENT OF CLINKER AND MINERAL ADDITIONS IN THE MANUFACTURE OF BINDERS DISCUSS THE OPTIMIZATION PROCESS SURROUNDING THE MANUFACTURE OF RECYCLED CONCRETE AND MORTARS MULTI RECYCLING ADVANCED RADIOLOGICAL STUDIES OPTIMIZATION OF SELF COMPACTING CONCRETE RHEOLOGY PROPERTIES CORROSION PREVENTION AND MORE FINAL SECTIONS INCLUDES A REVIEW OF REAL SCALE APPLICATIONS THAT HAVE BEEN MADE IN RECENT YEARS OF CEMENT BASED MATERIALS IN ROADS RAILWAY SUPERSTRUCTURES BUILDINGS AND CIVIL WORKS AMONG OTHERS AS WELL AS A PROPOSAL OF NEW REGULATIONS TO PROMOTE THE USE OF WASTE IN THE MANUFACTURE OF CBM FAVORS THE INSTITUTION OF THE CIRCULAR ECONOMY IN THE CONSTRUCTION INDUSTRY BY ELIMINATING THE BARRIERS THAT CURRENTLY PREVENT INDUSTRIAL WASTE FROM BEING VALORIZED BY ITS INCLUSION IN CBM DESIGN FEATURES AN IN DEPTH EXPLORATION OF THE STRENGTHS AND WEAKNESSES OF NEW RAW MATERIALS AND THEIR APPLICATION TO CBMS FEATURES REAL SCALE APPLICATIONS THAT HAVE BEEN MADE IN RECENT YEARS OF CEMENT BASED MATERIALS IN ROADS RAILWAY SUPERSTRUCTURES BUILDINGS AND CIVIL WORKS AMONG OTHERS PRESENTS CURRENT STATE OF THE ART AND FUTURE PROSPECTS FOR THE USE OF INDUSTRIAL WASTE IN CBMS

Materials for Medical Applications

2023-09-22

THIS BOOK DISCUSSES ADVANCED KNOWLEDGE ABOUT THE SYNTHESIS AND APPLICATION OF MATERIALS IN THE MEDICAL FIELD FOR DIAGNOSTIC AND THERAPEUTIC CONDITIONS THESE MATERIALS HAVE BEEN EXTENSIVELY USED IN VARIOUS BIOLOGICAL AND MEDICAL APPLICATIONS ESPECIALLY IN DRUG DELIVERY TUMOR SCREENING BIOIMAGING DIAGNOSIS AND THERAPIES MATERIALS FOR MEDICAL APPLICATIONS PROVIDES COMPREHENSIVE BUT CONCISE INFORMATION ABOUT MATERIALS AND THEIR MEDICAL APPLICATIONS THE READERS WILL GET INFORMATION ABOUT THE TRENDS IN MATERIALS AND THEIR MEDICAL APPLICATIONS AS WELL AS CURRENT MATERIAL BASED PRODUCTS THAT ARE USED IN THE MEDICAL FIELD THE BOOK HAS 11 CHAPTERS WHERE SHAPES SIZES AND STRUCTURAL DIFFERENCES OF MATERIALS AND METHODS OF SYNTHESIS HAVE BEEN DESCRIBED AND A FEW CHAPTERS ARE ALSO DEDICATED TO THE CHARACTERIZATION OF MATERIALS AND THEIR MEDICAL APPLICATIONS THE BOOK ALSO DISCUSSES HOW MATERIALS ARE TESTED IN RESEARCH LABORATORIES PRECLINICAL ANIMAL TRIALS AND CLINICAL HUMAN TRIALS AND HOW MATERIAL BASED PRODUCTS GO THROUGH VARIOUS REGULATORY AND SAFETY PHASES BEFORE REACHING PATIENTS IT ALSO DISCUSSES TOPICS SUCH AS MATERIALS DELIVERY IMAGING AND TREATMENTS FOR VARIOUS DISEASES IT INCLUDES A CHAPTER DEDICATED TO REGULATORY GUIDELINES AND POLICIES IN THE APPLICATION OF NANOMATERIALS AND WILL INCLUDE CURRENT CLINICAL TRIAL INFORMATION ON THE MATERIALS FINALLY THE BOOK HAS TOPICS SUCH AS HEALTH SAFETY TOXICITY DOSAGES AND LONG TERM IMPLICATIONS OF MATERIALS THIS BOOK IS INTENDED FOR RESEARCHERS MATERIAL SCIENTISTS AND STUDENTS IN BIOENGINEERING BIOMEDICAL ENGINEERING AND BIOPHARMACEUTICALS WORKING ON THE DEVELOPMENT OF BIOMATERIALS

Lightweight Polymer Composite Structures

2020-09-01

THIS BOOK PROVIDES A COMPREHENSIVE ACCOUNT OF DEVELOPMENTS IN THE AREA OF LIGHTWEIGHT POLYMER COMPOSITES IT ENCOMPASSES DESIGN AND MANUFACTURING METHODS FOR THE LIGHTWEIGHT POLYMER STRUCTURES VARIOUS TECHNIQUES AND A BROAD SPECTRUM OF APPLICATIONS THE BOOK HIGHLIGHTS FUNDAMENTAL RESEARCH IN LIGHTWEIGHT POLYMER STRUCTURES AND INTEGRATES VARIOUS ASPECTS FROM SYNTHESIS TO APPLICATIONS OF THESE MATERIALS FEATURES SERVES AS A ONE STOP REFERENCE WITH CONTRIBUTIONS FROM LEADING RESEARCHERS FROM INDUSTRY ACADEMY GOVERNMENT AND PRIVATE RESEARCH INSTITUTIONS ACROSS THE GLOBE EXPLORES ALL IMPORTANT ASPECTS OF LIGHTWEIGHT POLYMER COMPOSITE STRUCTURES OFFERS AN UPDATE OF CONCEPTS ADVANCEMENTS CHALLENGES AND APPLICATION OF LIGHTWEIGHT STRUCTURES CURRENT STATUS TRENDS FUTURE DIRECTIONS AND OPPORTUNITIES ARE DISCUSSED MAKING IT FRIENDLY FOR BOTH NEW AND EXPERIENCED RESEARCHERS

Solid Waste Recycling and Processing

2013-11-18

SOLID WASTE RECYCLING AND PROCESSING SECOND EDITION PROVIDES BEST PRACTICE GUIDANCE TO SOLID WASTE MANAGERS AND RECYCLING COORDINATORS THE BOOK COVERS ALL ASPECTS OF SOLID WASTE PROCESSING VOLUME REDUCTION AND RECYCLING ENCOMPASSING TYPICAL RECYCLABLE MATERIALS PAPER PLASTICS CANS AND ORGANICS CONSTRUCTION AND DEMOLITION DEBRIS ELECTRONICS AND MORE IT INCLUDES TECHNIQUES TECHNOLOGIES AND PROGRAMS TO HELP MAXIMIZE CUSTOMER PARTICIPATION RATES AND REVENUES AS WELL AS TO MINIMIZE OPERATING COSTS THE BOOK IS PACKED WITH LESSONS LEARNED BY THE AUTHOR DURING THE IMPLEMENTATION OF THE MOST SUCCESSFUL PROGRAMS WORLDWIDE AND INCLUDES NUMEROUS CASE STUDIES SHOWING HOW DIFFERENT SYSTEMS WORK IN DIFFERENT SETTINGS THIS BOOK ALSO TAKES ON INDUSTRY DEBATES SUCH AS THE MERITS OF CURBSIDE SORT VERSUS SINGLE STREAM RECYCLING AND THE USE OF ADVANCED TECHNOLOGY IN MATERIALS RECOVERY FACILITIES IT PROVIDES KEY FACTS AND FIGURES AND BRIEF SUMMARIES OF LEGISLATION IN THE UNITED STATES EUROPE AND ASIA AN EXTENSIVE GLOSSARY DEMYSTIFIES THE TERMINOLOGY AND ACRONYMS USED IN DIFFERENT SECTORS AND GEOGRAPHIES THE AUTHOR ALSO EXPLAINS EMERGING CONCEPTS IN RECYCLING SUCH AS ZERO WASTE SUSTAINABILITY LEED CERTIFICATION AND PAY AS YOU THROW AND PLACES WASTE MANAGEMENT AND RECYCLING IN WIDER ECONOMIC ENVIRONMENTAL SUSTAINABILITY POLITICAL AND SOCIETAL CONTEXTS COVERS SINGLE AND MIXED WASTE STREAMS EVALUATES THE TECHNOLOGIES AND TRADEOFFS OF RECYCLING OF MATERIALS VS INTEGRATED SOLUTIONS INCLUDING COMBUSTION AND OTHER TRANSFORMATIONAL OPTIONS COVERS RECYCLING AS PART OF THE BIGGER PICTURE OF SOLID WASTE MANAGEMENT PROCESSING AND DISPOSAL

Handbook of Composites from Renewable Materials, Structure and Chemistry

2016-12-30

THE HANDBOOK OF COMPOSITES FROM RENEWABLE MATERIALS COMPRISES A SET OF 8 INDIVIDUAL VOLUMES THAT BRINGS AN INTERDISCIPLINARY PERSPECTIVE TO ACCOMPLISH A MORE DETAILED UNDERSTANDING OF THE INTERPLAY BETWEEN THE SYNTHESIS STRUCTURE CHARACTERIZATION PROCESSING APPLICATIONS AND PERFORMANCE OF THESE ADVANCED MATERIALS THE HANDBOOK COVERS A MULTITUDE OF NATURAL POLYMERS REINFORCEMENT FILLERS AND BIODEGRADABLE MATERIALS TOGETHER THE 8 VOLUMES TOTAL AT LEAST 5000 PAGES AND OFFERS A UNIQUE PUBLICATION VOLUME 1 IS SOLELY FOCUSED ON THE STRUCTURE AND CHEMISTRY OF RENEWABLE MATERIALS SOME OF THE IMPORTANT TOPICS INCLUDE BUT NOT LIMITED TO CARBON FIBERS FROM SUSTAINABLE RESOURCES POLYLACTIC ACID COMPOSITES AND COMPOSITE FOAMS BASED ON NATURAL FIBRES COMPOSITES MATERIALS FROM OTHER THAN CELLULOSIC RESOURCES MICROCRYSTALLINE CELLULOSE AND RELATED POLYMER COMPOSITES TANNIN BASED FOAM RENEWABLE FEEDSTOCK VANILLIN DERIVED POLYMER AND COMPOSITES SILK BIOCOMPOSITES BIO DERIVED ADHESIVES AND MATRIX POLYMERS BIOMASS BASED FORMALDEHYDE FREE BIO RESIN ISOLATION AND CHARACTERIZATION OF WATER SOLUBLE POLYSACCHARIDE BIO BASED FILLERS KERATIN BASED MATERIALS IN BIOTECHNOLOGY STRUCTURE OF PROTEINS ADSORBED ONTO BIOACTIVE GLASSES FOR SUSTAINABLE COMPOSITE EFFECT OF FILLER PROPERTIES ON THE ANTIOXIDANT RESPONSE OF STARCH COMPOSITES COMPOSITE OF CHITOSAN AND ITS DERIVATE MAGNETIC BIOCHAR FROM DISCARDED AGRICULTURAL BIOMASS BIODEGRADABLE POLYMERS FOR PROTEIN AND PEPTIDE CONJUGATION POLYURETHANES AND POLYURETHANE COMPOSITES FROM BIO BASED RECYCLED COMPONENTS

Materials for Energy Storage

2024-07-26

Materials for Energy Storage offers a combinatorial understanding of materials science and electrochemistry in electrochemical energy storage devices with a holistic overview of the status research gaps and future opportunities rooted in a profound understanding of contemporary energy utilization aligned with the sustainable development goals This book delves deep into the several device chemistries impact of nanomaterials and critical factors related to the device performance It discusses electrode electrolyte interaction device fabrication and commercial aspects This book will offer value to the graduate and postgraduate students researchers and industry professionals related to materials science and energy technology

Voids in Materials

2020-11-30

All materials have voids in them at some scale Sometimes the voids are ignored sometimes they are taken into account and other times they are the focal point of the research Voids in Materials from unavoidable defects to designed cellular materials takes due notice of all these occurrences whether designed or unavoidable defects We define categorize and characterize the voids or empty spaces in materials and we analyze the effects they have on material properties This second edition is an updated and expanded central reference for voids in materials and covers all types of voids intrinsic and intentional and stochastic and nonstochastic and the processes and conditions that are needed to create them and is a valuable resource to students in the areas of mechanical engineering chemical engineering materials science and engineering physics and chemistry as well as scientists researchers and engineers in industry The effect of voids in materials from low volume fraction defects and free volume in polymer networks to high void volume fraction foams and aerogels How and why voids are introduced into materials across the length scales Biomaterial design used in vivo for soft hard and nerve tissue scaffolds metallic and geopolymeric foams additive manufacturing technologies used to tailor regularity R in the cell structure stochastic nonstochastic and Voronoi foams The latest techniques for characterizing voids New chapters covering the Kirkendall effect to create hollow and porous structures and nanometer scale voids nanotubes zeolites organic frameworks and nanoporous noble metals

The Role of Nanoparticles in Plant Nutrition under Soil Pollution

2022-06-01

Nanotechnology has shown great potential in all spheres of life with the increasing pressure to meet the food demands of rapidly increasing population thus novel innovation and research are required in agriculture The principles of nanotechnology can be implemented to meet the challenges faced by agricultural demands Major challenges include the loss of nutrients in the soil and nutrient deficient plants which result in a lower crop yield and quality subsequently consumption of such crops leads to malnourishment in humans especially in underprivileged and rural populations One convenient approach to tackle nutrient deficiency in plants is via the use of fertilizers however this method suffers from lower uptake efficiency in plants Another approach to combat nutrient deficiency in humans is via the use of supplements and diet modifications however these approaches are less affordably viable in economically challenged communities and in rural areas Therefore the use of nano fertilizers to combat this problem holds the greatest potential Additionally nanotechnology can be used to meet other challenges in agriculture including enhancing crop yield protection from insect pests and animals and by use of nano pesticides and nano biosensors to carry out the remediation of polluted soils The future use of nanomaterials in soil ecosystems will be influenced by their capability to interact with soil constituents and the route of nanoparticles into the environment includes both natural and anthropogenic sources The last decade has provided increasing research on the impact and use of nanoparticles in plants animals microbes and soils and yet these studies often lacked data involving the impact of nanoparticles on biotic and abiotic stress factors This book provides significant recent research on the use of nano fertilizers which can have a major impact on components of an ecosystem This work should provide a basis to further study these potential key areas in order to achieve sustainable and safe application of nanoparticles in agriculture

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