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KEY=TEXTILE - NATALIE MATTHEWS

PROGRESS IN POLYMER RESEARCH FOR BIOMEDICAL, ENERGY AND SPECIALTY APPLICATIONS

CRC Press With the rapid advancements in polymer research, polymers are finding newer applications such as scaffolds for tissue engineering, wound healing, flexible displays, and energy devices. In the same spirit, this book covers the key features of recent advancements in polymeric materials and their specialty applications. Divided into two sections – Polymeric Biomaterials and Polymers from Sustainable Resources, and Polymers for Energy and Specialty Applications – this book covers biopolymers, polymer-based biomaterials, polymer-based nanohybrids, polymer nanocomposites, polymer-supported regenerative medicines, and advanced polymer device fabrication techniques. **FEATURES** Provides a comprehensive review of all different polymers for applications in tissue engineering, biomedical implants, energy storage or conversion, and so forth Discusses advanced strategies in development of scaffolds for tissue engineering Elaborates various advanced fabrication techniques for polymeric devices Explores the nuances in polymer-based batteries and energy harvesting Reviews advanced polymeric membranes for fuel cells and polymers for printed electronics applications Throws light on some new polymers and polymer nanocomposites for optoelectronics, next generation tires, smart sensors and stealth technology applications This book is aimed at academic researchers, industry personnel, and graduate students in the interdisciplinary fields of polymer and materials technology, composite engineering, biomedical engineering, applied chemistry, chemical engineering, and advanced polymer manufacturing.

BIODEGRADABLE POLYMERS IN THE CIRCULAR PLASTICS ECONOMY

John Wiley & Sons Biodegradable Polymers in the Circular Plastics Economy A comprehensive overview of the burgeoning field of biodegradable plastics As the lasting impact of humanity's reliance on plastics comes into focus, scholars have begun to seek out solutions to plastic litter. In Biodegradable Polymers in the Circular Plastics Economy, an accomplished team of researchers delivers a focused guide (1) to understand plastic degradation and its role in waste hierarchy besides recycling, and (2) to create and use biodegradable plastics where appropriate. Created preferably from renewable resources, these eco-friendly polymers provide an opportunity to create sustainable and lasting solutions to the growing plastic-driven pollution problem. The broad approach to this handbook allows the authors to cover all aspects of these emerging materials, ranging from the problems present in the current plastics cycle, to the differences in type, production, and chemistry available within these systems, to end-of-life via recycling or degradation, and to life-cycle assessments. It also delves into potential commercial and policy issues to be addressed to successfully deploy this technology. Readers will also find: A thorough introduction to biodegradable polymers, focusing not only on the scientific aspects, but also addressing the larger political, commercial, and consumer concerns Mechanisms of biodegradation and the environmental impact of persistent polymers An in-depth discussion of degradable/hydrolysable polyesters, polysaccharides, lignin-based polymers, and vitrimers Management of plastic waste and life cycle assessment of bio-based plastics Biodegradable Polymers in the Circular Plastics Economy is the perfect overview of this complicated but essential research field and will appeal to polymer chemists, environmental chemists, chemical engineers, and bioengineers in academia and industry. The book is intended as a step towards a circular plastics economy that relies heavily on degradable plastics to sustain it.

TEXTILE FIBER MICROSCOPY

A PRACTICAL APPROACH

Wiley A groundbreaking text to the study of textile fibers that bridges the knowledge gap between fiber shape and end uses Textile Fiber Microscopy offers an important and comprehensive guide to the

study of textile fibers and contains a unique text that prioritizes a review of fibers' microstructure, macrostructure and chemical composition. The author - a noted expert in the field - details many fiber types and includes all the possible fiber shapes with a number of illustrative micrographs. The author explores a wealth of topics such as fiber end uses, fiber source and production, a history of each fiber and the sustainability of the various fibers. The text includes a review of environmentally friendly fibers and contains information on the most current fiber science by putting the focus on fibers that have been mechanically or chemically recycled, for use in textile production. The author also offers an exploration of issues of textile waste and the lack of textile recycling that can help public policymakers with ways to inform and regulate post-industrial and post-consumer textile waste issues. This vital guide: Contains an accompanied micrograph for many fibers presented Includes information on how fiber microstructure is connected to fabric properties and how it affects the end use of fabrics Offers a review of the sophistication of textile fibers from a scientific point of view Presents a comparative textile fiber review that is appropriate for both for students, textile experts and forensic scientists Written for students and professionals of apparel design and merchandising, and forensic scientists, Textile Fiber Microscopy presents an important review of textile fibers from a unique perspective that explores fibers' microstructure, macrostructure and chemical composition.

IONIC LIQUID-BASED TECHNOLOGIES FOR ENVIRONMENTAL SUSTAINABILITY

Elsevier Ionic Liquid-based Technologies for Environmental Sustainability explores the range of sustainable and green applications of IL materials achieved in recent years, such as gas solubility, biomass pre-treatment, bio-catalysis, energy storage, gas separation and purification technologies. The book also provides a reference material for future research in IL-based technologies for environmental and energy applications, which are much in-demand due to sustainable, reusable and eco-friendly methods for highly innovative and applied materials. Written by eminent scholars and leading experts from around the world, the book aims to cover the synthesis and characterization of broad range of ionic liquids and their sustainable applications. Chapters provide cutting-edge research with state-of-the-art developments, including the use of IL-based materials for the removal of pharmaceuticals, dyes and value-added metals. Describes the fundamentals and major applications of ionic liquid materials Covers up-to-date developments in novel applications of IL materials Provides practical tips to aid researchers who work on ionic liquid applications

ELECTROCHEMICAL ENERGY

ADVANCED MATERIALS AND TECHNOLOGIES

CRC Press Electrochemical Energy: Advanced Materials and Technologies covers the development of advanced materials and technologies for electrochemical energy conversion and storage. The book was created by participants of the International Conference on Electrochemical Materials and Technologies for Clean Sustainable Energy (ICES-2013) held in Guangzhou, China, and incorporates select papers presented at the conference. More than 300 attendees from across the globe participated in ICES-2013 and gave presentations in six major themes: Fuel cells and hydrogen energy Lithium batteries and advanced secondary batteries Green energy for a clean environment Photo-Electrocatalysis Supercapacitors Electrochemical clean energy applications and markets Comprised of eight sections, this book includes 25 chapters featuring highlights from the conference and covering every facet of synthesis, characterization, and performance evaluation of the advanced materials for electrochemical energy. It thoroughly describes electrochemical energy conversion and storage technologies such as batteries, fuel cells, supercapacitors, hydrogen generation, and their associated materials. The book contains a number of topics that include electrochemical processes, materials, components, assembly and manufacturing, and degradation mechanisms. It also addresses challenges related to cost and performance, provides varying perspectives, and emphasizes existing and emerging solutions. The result of a conference encouraging enhanced research collaboration among members of the electrochemical energy community, *Electrochemical Energy: Advanced Materials and Technologies* is dedicated to the development of advanced materials and technologies for electrochemical energy conversion and storage and details the technologies, current achievements, and future directions in the field.

CELLULOSE SOLVENTS: FOR ANALYSIS, SHAPING AND CHEMICAL MODIFICATION

OUP USA This book will give an overview of the current state-of-the-art concerning the activation and dissolution of cellulose in a broad variety of solvents. Research on this topic can lead to new pathways for the utilization of the most abundant terrestrial biomolecule and may therefore be the basis for new green strategies towards advanced materials.

FOREST BIOECONOMY AND CLIMATE CHANGE

Springer Nature This edited open access volume explores the role of forest bioeconomy in addressing climate change. The authors put a particular focus on planetary boundaries and how the linear, growth-oriented economy, is coupled with climate change and environmental degradation. Biobased products and sustainable production paths have been developed, but how can they be scaled in order to lead to an economic paradigm shift? This and other questions are discussed throughout the volume. Since science indicates that climate change will continue this century, the authors also analyse how forests can be adapted to increasing forest disturbances that changing climate are expected to cause. The authors propose climate-smart forestry as useful approach for climate mitigation and adaptation

of forests to climate change, as well as sustainable increase of economic well-being based on forestry. The book illustrates the application of climate-smart forestry in the Czech Republic, Finland, Germany and Spain, i.e., in EU countries with quite different forests and forest sectors. This proactive and inspiring volume is an essential resource for Forest Management professionals, decision makers, scientists, and forestry students.

CELLULOSE

FUNDAMENTAL ASPECTS AND CURRENT TRENDS

BoD - Books on Demand Cellulose - Fundamental Aspects and Current Trends consists of 10 chapters written by international subject matter experts investigating the characteristics and current applications of this fascinating material. This book will help the reader to develop a deeper understanding about the concepts related to cellulose and the nanocellulose structure, modification, production, dissolution, and application. Biosynthesis mechanisms and medical applications of microbial cellulose are also discussed. This book will serve as the starting point for materials science researchers, engineers, and technologists from diverse backgrounds in physics, chemistry, biology, materials science, and engineering who want to know and better understand the unique characteristics of the most abundant biopolymer on earth.

COMMERCIAL APPLICATIONS OF IONIC LIQUIDS

Springer Nature This book provides an overview of the current and emerging industrial applications of ionic liquids, covering the core processes, the practical implementation and technical challenges involved, and exploring potential future directions for research and development. The introductory chapter describes the unique physical and chemical properties of ionic liquids, and illustrates the vast potential for application of these materials across the industrial landscape. Following this, individual chapters written by leading figures from industry and academia address specific processes and products, such as the development of a new chloroaluminate ionic liquid as an alkylation catalyst and a new class of capillary gas chromatography (GC) columns with stationary phases based on ionic liquids. Over the past twenty years, ionic liquids have moved from being considered as mere academic curiosities to having genuine applications in fields as wide-ranging as biotechnology, biorefineries, catalysis, pharmaceuticals, renewable fuels, and sustainable energy. This book highlights several commercial products and processes that use or will soon be using ionic liquids.

JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS

NANOTECHNOLOGY TO AID CHEMICAL AND BIOLOGICAL DEFENSE

Springer This book presents research into chemical, biological, radiological and nuclear (CBRN) defense and environmental security, exploring practical implications of the research. Contributions from a diverse group of international civilian researchers present the latest work on nanotechnology problems in this area, looking at detection, protective technologies, decontamination and threats to environmental security due to bacteriophages and nanomaterials. Highlights include the potential of Atomic Force Microscopy (AFM) to characterize the nanoscale properties of microbial pathogens, the development of bacteriophage-based therapeutics, prophylactic and diagnostic preparations and their uses in different fields, such as medicine, veterinary, agriculture, food and water safety, amongst others. Readers may also consider an inexpensive bioassay suited for assessing chemical poisoning in the environment such as the presence of pesticides, sensors to detect ultra-trace quantities of the explosive Pentaerythritol tetranitrate (PETN) using nanotubes and electrochemical sensors to simultaneously detect and reduce the explosive trinitrotoluene (TNT) to 2,4,6-triaminotoluene (TAT) in solution. This book shows how cooperative research among NATO countries and NATO partners can make a critical contribution to meeting the opportunities and challenges of nanotechnology problems relevant to chemical and biological defense needs. The papers presented here are representative of contributions made to the Advanced Research Workshop (ARW) on September 22-26, 2014 in Antalya, Turkey, to address the NATO SPS Key Priority of Defense against CBRN Agents and Environmental Security.

IONIC LIQUIDS IN CHEMICAL ANALYSIS

CRC Press An Overview of a Rapidly Expanding Area in Chemistry Exploring the future in chemical analysis research, Ionic Liquids in Chemical Analysis focuses on materials that promise entirely new ways to perform solution chemistry. It provides a broad overview of the applications of ionic liquids in various areas of analytical chemistry, in

NA-ION BATTERIES

John Wiley & Sons This book covers both the fundamental and applied aspects of advanced Na-ion batteries (NIB) which have proven to be a potential challenger to Li-ion batteries. Both the chemistry and

design of positive and negative electrode materials are examined. In NIB, the electrolyte is also a crucial part of the batteries and the recent research, showing a possible alternative to classical electrolytes – with the development of ionic liquid-based electrolytes – is also explored. Cycling performance in NIB is also strongly associated with the quality of the electrode-electrolyte interface, where electrolyte degradation takes place; thus, Na-ion Batteries details the recent achievements in furthering knowledge of this interface. Finally, as the ultimate goal is commercialization of this new electrical storage technology, the last chapters are dedicated to the industrial point of view, given by two startup companies, who developed two different NIB chemistries for complementary applications and markets.

LITHIUM-ION BATTERIES HAZARD AND USE ASSESSMENT

Springer Science & Business Media Lithium-Ion Batteries Hazard and Use Assessment examines the usage of lithium-ion batteries and cells within consumer, industrial and transportation products, and analyzes the potential hazards associated with their prolonged use. This book also surveys the applicable codes and standards for lithium-ion technology. Lithium-Ion Batteries Hazard and Use Assessment is designed for practitioners as a reference guide for lithium-ion batteries and cells. Researchers working in a related field will also find the book valuable.

GREEN INDUSTRIAL APPLICATIONS OF IONIC LIQUIDS

Springer Science & Business Media This book contains the lecture notes for the NATO Advanced Research Workshop on the Green Industrial Applications of Ionic Liquids held April 12th-16, 2000 in Heraklion, Crete, Greece. This was the first international meeting devoted to research in the area of ionic liquids (salts with melting points below 100 °C), and was intended to explore the promise of ionic liquids as well as to set a research agenda for the field. It was the first international meeting dedicated to the study and application of ionic liquids as solvents, and forty-one scientists and engineers from academia, industry, and government research laboratories (as well as six industry observers and four student assistants) met to discuss the current and future status of the application of ionic liquids to new green industrial technologies. It was immediately clear that the number of organic chemists and engineers working in the field needed to be increased. It was also clear that the declining interest in high temperature molten salts and subsequent increase in low melting ionic liquid solvents had not yet taken hold in Eastern Europe. Participants from NATO Partner Countries contributed significant expertise in high temperature molten salts and were able to take back a new awareness and interest in ionic liquid solvents.

SLOT DIE COATING OF LITHIUM-ION BATTERY ELECTRODES

KIT Scientific Publishing

HANDBOOK OF CLEAN ENERGY SYSTEMS, 6 VOLUME SET

John Wiley & Sons The Handbook of Clean Energy Systems brings together an international team of experts to present a comprehensive overview of the latest research, developments and practical applications throughout all areas of clean energy systems. Consolidating information which is currently scattered across a wide variety of literature sources, the handbook covers a broad range of topics in this interdisciplinary research field including both fossil and renewable energy systems. The development of intelligent energy systems for efficient energy processes and mitigation technologies for the reduction of environmental pollutants is explored in depth, and environmental, social and economic impacts are also addressed. Topics covered include: Volume 1 - Renewable Energy: Biomass resources and biofuel production; Bioenergy Utilization; Solar Energy; Wind Energy; Geothermal Energy; Tidal Energy. Volume 2 - Clean Energy Conversion Technologies: Steam/Vapor Power Generation; Gas Turbines Power Generation; Reciprocating Engines; Fuel Cells; Cogeneration and Polygeneration. Volume 3 - Mitigation Technologies: Carbon Capture; Negative Emissions System; Carbon Transportation; Carbon Storage; Emission Mitigation Technologies; Efficiency Improvements and Waste Management; Waste to Energy. Volume 4 - Intelligent Energy Systems: Future Electricity Markets; Diagnostic and Control of Energy Systems; New Electric Transmission Systems; Smart Grid and Modern Electrical Systems; Energy Efficiency of Municipal Energy Systems; Energy Efficiency of Industrial Energy Systems; Consumer Behaviors; Load Control and Management; Electric Car and Hybrid Car; Energy Efficiency Improvement. Volume 5 - Energy Storage: Thermal Energy Storage; Chemical Storage; Mechanical Storage; Electrochemical Storage; Integrated Storage Systems. Volume 6 - Sustainability of Energy Systems: Sustainability Indicators, Evaluation Criteria, and Reporting; Regulation and Policy; Finance and Investment; Emission Trading; Modeling and Analysis of Energy Systems; Energy vs. Development; Low Carbon Economy; Energy Efficiencies and Emission Reduction. Key features: Comprising over 3,500 pages in 6 volumes, HCES presents a comprehensive overview of the latest research, developments and practical applications throughout all areas of clean energy systems, consolidating a wealth of information which is currently scattered across a wide variety of literature sources. In addition to renewable energy systems, HCES also covers processes for the efficient and clean conversion of traditional fuels such as coal, oil and gas, energy storage systems, mitigation technologies for the reduction of environmental pollutants, and the development of intelligent energy systems. Environmental, social and economic impacts of energy systems are also addressed in depth. Published in full colour throughout. Fully indexed with cross referencing within and between all six volumes. Edited by leading researchers

from academia and industry who are internationally renowned and active in their respective fields. Published in print and online. The online version is a single publication (i.e. no updates), available for one-time purchase or through annual subscription.

CELLULOSIC MATERIALS

FIBERS, NETWORKS AND COMPOSITES

Springer Science & Business Media The objectives of this book are twofold: 1. To provide a thorough examination of the materials science of cellulosic fibers with emphasis on the characterization of structure-property relations, and 2. To advance knowledge of how to best analyze cellulosic fibrous networks and composites, and, ultimately, engineer "novel" cellulose-based systems of superior performance and functionality. The design of new materials through the study of living systems, or bio-imitation, is burgeoning to become an established field, generally referred to as biomimetics. The latter, as with materials science, in general, prominently features multi-disciplinarity where new developments in mathematics, physics, chemistry and engineering continue to inspire novel areas of research and development. The book is structured in five chapters which provide a sequential treatment of the running theme: deformation mechanics and the physical, morphological and mechanical characterization of native cellulose fibers networks and composites. The heart of the book is Chapter 3, Damage Accumulation in Fibers, which treats the experimental methodology for fatigue testing of single fibers and the engendered results. In-depth examinations of the morphology, structure and chemical composition of native cellulose fibers, and the mechanics of deformation in these natural composite fibers are proffered in Chapters 1 and 2, respectively. The fourth chapter, Fractal Simulation of Crack Propagation, presents a fractal-based approach to modeling damage accumulation in materials. Fractals lend themselves well to modeling such randomly-oriented phenomena as crack propagation and fracture. The last chapter, Fibrous Structures: Networks and Composites, comprises analytical approaches for handling networks and composites.

FUNDAMENTALS OF SPUN YARN TECHNOLOGY

CRC Press Existing textbooks covering the subject of yarn manufacture largely concentrate on describing the workings of machines. Fundamentals of Spun Yarn Technology presents complete coverage of yarn manufacture and technology and current research findings on the structure and properties of spun yarns. Written by a well-known and respected authority on textile technology, it not only introduces the subject, but it provides students with an advanced understanding of the various process stages. The book introduces the rudiments of staple yarn technology, covering the manufacturing process, the raw materials, and processes including short staple, worsted, semiworsted and woollen spinning, doubling, and specialty yarn processes. It also covers the more advanced studies in staple yarn technology, including new developments in fiber preparation technology, carding technology, roller drafting, gilling, ring spinning, open-end rotor spinning, air jet spinning and new research on unconventional spinning systems. This extensive range of topics, along with hundreds of tables and illustrations presented in Fundamentals of Spun Yarn Technology make it a comprehensive and up-to-date treatment of the field.

ESTERIFICATION OF POLYSACCHARIDES

Springer Science & Business Media This book provides a first comprehensive summary of acylation methods in a very practical manner. The coverage includes new developments not yet summarized in book form, and reviews spectroscopic methods, in particular FTIR- and NMR spectroscopy including two dimensional methods.

IONIC LIQUIDS II

Springer The series Topics in Current Chemistry Collections presents critical reviews from the journal Topics in Current Chemistry organized in topical volumes. The scope of coverage is all areas of chemical science including the interfaces with related disciplines such as biology, medicine and materials science. The goal of each thematic volume is to give the non-specialist reader, whether in academia or industry, a comprehensive insight into an area where new research is emerging which is of interest to a larger scientific audience. Each review within the volume critically surveys one aspect of that topic and places it within the context of the volume as a whole. The most significant developments of the last 5 to 10 years are presented using selected examples to illustrate the principles discussed. The coverage is not intended to be an exhaustive summary of the field or include large quantities of data, but should rather be conceptual, concentrating on the methodological thinking that will allow the non-specialist reader to understand the information presented. Contributions also offer an outlook on potential future developments in the field. The chapters "Ionic Liquid-Liquid Chromatography: A New General Purpose Separation Methodology", "Proteins in Ionic Liquids: Current Status of Experiments and Simulations", "Lewis Acidic Ionic Liquids" and "Quantum Chemical Modeling of Hydrogen Bonding in Ionic Liquids" are available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

ENCYCLOPEDIA OF ELECTROCHEMICAL POWER SOURCES

Newnes The Encyclopedia of Electrochemical Power Sources is a truly interdisciplinary reference for those working with batteries, fuel cells, electrolyzers, supercapacitors, and photo-electrochemical cells. With a focus on the environmental and economic impact of electrochemical power sources, this five-volume work consolidates coverage of the field and serves as an entry point to the literature for professionals and students alike. Covers the main types of power sources, including their operating principles, systems, materials, and applications Serves as a primary source of information for electrochemists, materials scientists, energy technologists, and engineers Incorporates nearly 350 articles, with timely coverage of such topics as environmental and sustainability considerations

MOLTEN SALTS AND IONIC LIQUIDS

NEVER THE TWAIN

John Wiley & Sons For many years, the related fields of molten salts and ionic liquids have drifted apart, to their mutual detriment. Both molten salts and ionic liquids are liquid salts containing only ions - all that is different is the temperature! Both fields involve the study of Coulombic fluids for academic and industrial purposes; both employ the same principles; both require skilled practitioners; both speak the same language; all then that is truly different is their semantics, and how superficial is that? The editors of this book, recognising that there was so much knowledge, both empirical and theoretical, which can be passed from the molten salt community to the ionic liquid community, and vice versa, organised a landmark meeting in Tunisia, designed to bridge the gap and heal the rift. Leaders from both communities met for a week for a mutual exchange, with a high tutorial content intermixed with cutting edge findings. This volume is a condensate of the principal offerings of that week, and emphasises the success which was achieved. Indeed, four future biannual meetings, under the title of "EUCHEM Conferences on Molten Salts and Ionic Liquids", have now been planned as a direct result of this meeting of minds. Topics discussed in this volume include structure, dynamics, electrochemistry, interfacial and thermodynamic properties, spectroscopy, synthesis, and theoretical studies. Experimental and theoretical methods for investigating these data are elaborated, as are techniques for data collection and analysis. This book represents the first serious discussion on the transfer of these methods and techniques between the differing temperature regimes, and is a major contribution to the future of both fields.

ADVANCES IN BATTERY TECHNOLOGIES FOR ELECTRIC VEHICLES

Woodhead Publishing Advances in Battery Technologies for Electric Vehicles provides an in-depth look into the research being conducted on the development of more efficient batteries capable of long distance travel. The text contains an introductory section on the market for battery and hybrid electric vehicles, then thoroughly presents the latest on lithium-ion battery technology. Readers will find sections on battery pack design and management, a discussion of the infrastructure required for the creation of a battery powered transport network, and coverage of the issues involved with end-of-life management for these types of batteries. Provides an in-depth look into new research on the development of more efficient, long distance travel batteries Contains an introductory section on the market for battery and hybrid electric vehicles Discusses battery pack design and management and the issues involved with end-of-life management for these types of batteries

BIOPOLYMER ELECTROLYTES

FUNDAMENTALS AND APPLICATIONS IN ENERGY STORAGE

Elsevier Biopolymer Electrolytes: Fundamentals and Applications in Energy Storage provides the core fundamentals and applications for polyelectrolytes and their properties with a focus on biopolymer electrolytes. Increasing global energy and environmental challenges demand clean and sustainable energy sources to support the modern society. One of the feasible technologies is to use green energy and green materials in devices. Biopolymer electrolytes are one such green material and, hence, have enormous application potential in devices such as electrochemical cells and fuel cells. Features a stable of case studies throughout the book that underscore key concepts and applications Provides the core fundamentals and applications for polyelectrolytes and their properties Weaves the subject of biopolymer electrolytes across a broad range of disciplines, including chemistry, chemical engineering, materials science, environmental science, and pharmaceutical science

ELECTROLYTES FOR LITHIUM AND LITHIUM-ION BATTERIES

Springer Electrolytes for Lithium and Lithium-ion Batteries provides a comprehensive overview of the scientific understanding and technological development of electrolyte materials in the last several years. This book covers key electrolytes such as LiPF₆ salt in mixed-carbonate solvents with additives for the state-of-the-art Li-ion batteries as well as new electrolyte materials developed recently that lay the foundation for future advances. This book also reviews the characterization of electrolyte materials for their transport properties, structures, phase relationships, stabilities, and impurities. The book discusses in-depth the electrode-electrolyte interactions and interphasial chemistries that are key for the successful use of the electrolyte in practical devices. The Quantum Mechanical and Molecular

Dynamical calculations that has proved to be so powerful in understanding and predicating behavior and properties of materials is also reviewed in this book. Electrolytes for Lithium and Lithium-ion Batteries is ideal for electrochemists, engineers, researchers interested in energy science and technology, material scientists, and physicists working on energy.

GREEN SOLVENTS II

PROPERTIES AND APPLICATIONS OF IONIC LIQUIDS

Springer Science & Business Media The conventional solvents used in chemical, pharmaceutical, biomedical and separation processes represent a great challenge to green chemistry because of their toxicity and flammability. Since the beginning of "the 12 Principles of Green Chemistry" in 1998, a general effort has been made to replace conventional solvents with environmentally benign substitutes. Water has been the most popular choice so far, followed by ionic liquids, surfactant, supercritical fluids, fluorous solvents, liquid polymers, bio-solvents and switchable solvent systems. Green Solvents Volume I and II provides a throughout overview of the different types of solvents and discusses their extensive applications in fields such as extraction, organic synthesis, biocatalytic processes, production of fine chemicals, removal of hydrogen sulphide, biochemical transformations, composite material, energy storage devices and polymers. These volumes are written by leading international experts and cover all possible aspects of green solvents' properties and applications available in today's literature. Green Solvents Volume I and II is an invaluable guide to scientists, R&D industrial specialists, researchers, upper-level undergraduates and graduate students, Ph.D. scholars, college and university professors working in the field of chemistry and biochemistry.

CELLULOSE CHEMISTRY AND PROPERTIES: FIBERS, NANOCELLULOSES AND ADVANCED MATERIALS

Springer Vincent Bulone et al.: Cellulose sources and new understanding of synthesis in plants Thomas Heinze et al.:Cellulose structure and properties Thomas Rosenau, Antje Potthast, Ute Henniges et al.: Recent developments in cellulose aging (degradation / yellowing / chromophore formation) Sunkyu Park et al.:Cellulose crystallinity Lina Zhang et al.:Gelation and dissolution behavior of cellulose Yoshiyuki Nishio et al.:Cellulose and derivatives in liquid crystals Alessandro Gandini, Naceur Belgacem et al.:The surface and in-depth modification of cellulose fibers Emily D. Cranston et al.:Interfacial properties of cellulose Herbert Sixta, Michael Hummel et al.Cellulose Fibers Regenerated from Cellulose Solutions in Ionic Liquids Qi Zhou et al.:Cellulose-based biocomposites Orlando Rojas et al.:Films of cellulose nanocrystals and nanofibrils Pedro Fardim et al.:Functional cellulose particles Wadood Hamad et al.:Cellulose Composites

FUNDAMENTALS OF FIBRE FORMATION

THE SCIENCE OF FIBRE SPINNING AND DRAWING

John Wiley & Sons

ENERGY STORAGE AND CONVERSION MATERIALS

Royal Society of Chemistry Showcasing recent developments in inorganic materials in an area of societal interest and importance, this book provides an up-to-date introduction to the contemporary use of functional solids in emerging technologies. Energy Storage and Conversion Materials describes the application of inorganic materials in the storage and conversion of energy, with an emphasis on how solid-state chemistry allows development of new functional solids for energy applications. Dedicated chapters cover co-electrolysis, low temperature fuel cells, oxide thermoelectric devices for energy conversion, solid-state Li batteries and thermochemical energy conversion. Edited and written by world-renowned scientists, this book will provide a comprehensive introduction for advanced undergraduates, postgraduates and researchers wishing to learn about the topic.

LITHIUM-ION BATTERIES

A MACHINE-GENERATED SUMMARY OF CURRENT RESEARCH

"This is the first machine-generated scientific book in chemistry published by Springer Nature. Serving as an innovative prototype defining the current status of the technology, it also provides an overview about the latest trends of lithium-ion batteries research. This book explores future ways of informing researchers and professionals. State-of-the-art computer algorithms were applied to: select relevant sources from Springer Nature publications, arrange these in a topical order, and provide succinct summaries of these articles. The result is a cross-corpora auto-summarization of current texts, organized by means of a similarity-based clustering routine in coherent chapters and sections. This book summarizes more than 150 research articles published from 2016 to 2018 and provides an informative and concise overview of recent research into anode and cathode materials as well as further aspects such as separators, polymer electrolytes, thermal behavior and modelling. With this prototype, Springer

Nature has begun an innovative journey to explore the field of machine-generated content and to find answers to the manifold questions on this fascinating topic. Therefore it was intentionally decided not to manually polish or copy-edit any of the texts so as to highlight the current status and remaining boundaries of machine-generated content. Our goal is to initiate a broad discussion, together with the research community and domain experts, about the future opportunities, challenges and limitations of this technology."--Publisher's website.

NONAQUEOUS ELECTROCHEMISTRY

CRC Press An examination of applications of electrochemical techniques to many organic and inorganic compounds that are either unstable or insoluble in water. It focuses on the continuing drive toward miniaturization in electronics met by designs for high-energy density batteries (based on nonaqueous systems). It addresses applications to nonaqueous batteries, supercapacitors, highly sensitive reagents, and electroorganic and electroinorganic synthesis.

ASPEN PLUS

CHEMICAL ENGINEERING APPLICATIONS

John Wiley & Sons Facilitates the process of learning and later mastering Aspen Plus® with step by step examples and succinct explanations Step-by-step textbook for identifying solutions to various process engineering problems via screenshots of the Aspen Plus® platforms in parallel with the related text Includes end-of-chapter problems and term project problems Includes online exam and quiz problems for instructors that are parametrized (i.e., adjustable) so that each student will have a standalone version Includes extra online material for students such as Aspen Plus®-related files that are used in the working tutorials throughout the entire textbook

SOLUBILITY OF POLYSACCHARIDES

BoD - Books on Demand Sugars, with a scientific term as saccharides, are involved in various aspects in the lives of human beings, including the sense of taste, energy for daily life, etc. Recent development in polysaccharides, as well as the background knowledge in this field, further deepens insight into their roles as healthy supplements. In this book, the principles on polysaccharides' solubility and structure, methodologies and application of polysaccharides have been reviewed. The chapters in this book include the relationship between structure and solubility of polysaccharide, the experimental and computational researches on polysaccharide solubility and the common polysaccharide, which may further aid scholars and researchers in regard to solubility of polysaccharides, methodologies and modification.

FAST ION TRANSPORT IN SOLIDS

Springer Science & Business Media The main motivation for the organization of the Advanced Research Workshop in Belgirate was the promotion of discussions on the most recent issues and the future perspectives in the field of Solid State Ionics. The location was chosen on purpose since Belgirate was the place where twenty years ago, also then under the sponsorship of NATO, the very first international meeting on this important and interdisciplinary field took place. That meeting was named "Fast Ion Transport in Solids" and gathered virtually everybody at that time having been active in any aspect of motion of ions in solids. The original Belgirate Meeting made for the first time visible the technological potential related to the phenomenon of the fast ionic transport in solids and, accordingly, the field was given the name "Solid State Ionics". This field is now expanded to cover a wide range of technologies which includes chemical sensors for environmental and process control, electrochromic windows, mirrors and displays, fuel cells, high performance rechargeable batteries for stationary applications and electrotraction, chemotronics, semiconductor ionics, water electrolysis cells for hydrogen economy and other applications. The main idea for holding an anniversary meeting was that of discussing the most recent issues and the future perspectives of Solid State Ionics just twenty years after it has started at the same location on the lake Maggiore in North Italy.

INTRODUCTION TO MASS SPECTROMETRY

INSTRUMENTATION, APPLICATIONS, AND STRATEGIES FOR DATA INTERPRETATION

John Wiley & Sons Completely revised and updated, this text provides an easy-to-read guide to the concept of mass spectrometry and demonstrates its potential and limitations. Written by internationally recognised experts and utilising "real life" examples of analyses and applications, the book presents real cases of qualitative and quantitative applications of mass spectrometry. Unlike other mass spectrometry texts, this comprehensive reference provides systematic descriptions of the various types of mass analysers and ionisation, along with corresponding strategies for interpretation of data. The

book concludes with a comprehensive 3000 references. This multi-disciplined text covers the fundamentals as well as recent advance in this topic, providing need-to-know information for researchers in many disciplines including pharmaceutical, environmental and biomedical analysis who are utilizing mass spectrometry

THE LATTICE BOLTZMANN METHOD

PRINCIPLES AND PRACTICE

Springer This book is an introduction to the theory, practice, and implementation of the Lattice Boltzmann (LB) method, a powerful computational fluid dynamics method that is steadily gaining attention due to its simplicity, scalability, extensibility, and simple handling of complex geometries. The book contains chapters on the method's background, fundamental theory, advanced extensions, and implementation. To aid beginners, the most essential paragraphs in each chapter are highlighted, and the introductory chapters on various LB topics are front-loaded with special "in a nutshell" sections that condense the chapter's most important practical results. Together, these sections can be used to quickly get up and running with the method. Exercises are integrated throughout the text, and frequently asked questions about the method are dealt with in a special section at the beginning. In the book itself and through its web page, readers can find example codes showing how the LB method can be implemented efficiently on a variety of hardware platforms, including multi-core processors, clusters, and graphics processing units. Students and scientists learning and using the LB method will appreciate the wealth of clearly presented and structured information in this volume.

ELECTROCHEMICAL CAPACITORS: FUNDAMENTALS TO APPLICATIONS

The Electrochemical Society

INNOVATIVE BIOFIBERS FROM RENEWABLE RESOURCES

Springer This book will be a one-stop-shop for readers seeking information on biofibers that are sustainable and environmentally friendly and those that can replace the non-renewable synthetic polymer based fibers. Emphasis will be on fibers that are derived from agricultural byproducts and coproducts without the need for additional natural resources.

IONIC LIQUIDS

SYNTHESIS, PROPERTIES, TECHNOLOGIES AND APPLICATIONS

Walter de Gruyter GmbH & Co KG The current book brings together the latest developments in the area of ionic liquids, including synthesis, purity control, toxicity, and scaling-up technologies. In addition, the authors explore the applications of ionic liquids in organic synthesis and catalysis, separation techniques and nanomaterials engineering. Written by key experts in the field, this book is an invaluable material for organic and green chemists in academia and industry.