Advance Book Information

Fundamentals of Inorganic and Organometallic Polymer Science

Christian Agatemor University of Miami, USA
Kajal Ghosal Jadavpur University, India
Sam Fura University of Miami, USA
Peter J S Foot Kingston University, London, UK

Synopsis

Inorganic and organometallic polymers feature many attractive properties that are useful for the design of diverse functional materials. Emphasising concepts that inform polymer design, synthesis and applications, readers of this book will gain a complete understanding of the introduction to inorganic and organometallic polymer science that will further their studies in materials science, chemistry and engineering.

Brief Contents

- Concepts in Polymer Chemistry
- Step Polymerisation
- Chain Polymerisation
- Polymer Characterisation
- Polymer Properties and Behaviours
- Examples of Inorganic and Organometallic Polymers
- Applications of Inorganic and Organometallic Polymers

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Advances in Superhydrophobic Coatings

Viswanathan S Saji King Fahd University of Petroleum and Minerals, Saudi Arabia

Synopsis

Superhydrophobic coatings have attracted substantial scientific research in recent years due to their real-world applications in a variety of fields including anti-corrosion, anti-icing, oil separation and seal-healing materials. This book guides readers through their fabrication and application, representing the latest significant advances in this important topic. It will serve as a valuable reference for graduate students, researchers and industrial practitioners in multiple industries working on surface wettability, materials chemistry and coatings related technologies.

Brief Contents

- Surface Wettability and Superhydrophobicity
- Superhydrophobic Coatings: Fabrication and Applications
- Eco-friendly and Sustainable Materials/Processes for Superhydrophobicity
- Wax-based Superhydrophobic Coatings
- Carbon Nanostructures-based Superhydrophobic Coatings
- Superhydrophobic Polymer and Composite Coatings
- Superhydrophobic Metallic, Ceramic and Composite Coatings
- Laser-assisted Superhydrophobic Coatings
- Superhydrophobic Coatings on Metallic Substrates: I (Iron-based)
- Superhydrophobic Coatings on Metallic Substrates: II (Magnesium-based)
- Superhydrophobic Coatings on Metallic Substrates: III (Aluminium/Titanium)
- Superhydrophobic Polymers and Plastics
- Superhydrophobic Coatings on Food Industry-relevant Materials
- Superhydrophobic Coatings for Wood Industry
- Superhydrophobic Coatings on Paper/Textile Materials
- Anti-corrosion and Anti-fouling Superhydrophobic Coatings
- Anti-icing and Anti-fogging Superhydrophobic Coatings
- Superhydrophobic Coatings for Oil Separation and Other Applications
- Superhydrophobic Coatings for Drag Reduction and Heat Transfer
- Self-healing Superhydrophobic Coatings
Advance Book Information

Future Developments in Explosives and Energetics
1st International Explosives Conference

Jacqueline Akhavan Cranfield University, UK

Synopsis
The International Explosives Conference (IEC) champions cutting-edge, deep-science research conducted internationally in the energetic materials sector. Designed for professionals, academics and researchers, it is involved in the fundamental science of explosives and other energetic materials. IEC-2022 took place in London from 22-24 June 2022 and this publication provides a record of the proceedings for the oral presentations and display posters that were showcased at the event.

Brief Contents
- Energetic Nitrobis(Pyrazolyl)Benzenes
- Energetic Materials Based on Nanoporous Carbon
- Crystal Structure and Characterization of Ethylene Glycol Dinitrate, Diethylene Glycol Dinitrate and Triethylene Glycol Dinitrate
- Impact and Friction Sensitivities of PETN During Manufacture
- Chemistry of Aminated 5-Azidotetrazoles
- New Inert and Energetic Polymeric Binders
- Urea Hydrogen Peroxide Explosive Performance
- Additively Manufactured Energy Absorbing Structures
- Spatially Resolved Detonation Pressure Data From Rate Sticks
- Cookoff Reaction Violence
- Continuous Velocity of Detonation Diagnostics in PE4 Cylinder Tests
- Detonation Properties of Additively Manufactured RDX
- Detonating Compositions Prepared from Submicron KClO4 and TiH2
- Investigating XDT in Rocket Propellants
- Estimating an Enclosure Temperature During Solid Propellant Fires
- Assessment of the Constant Shock-velocity Assumption
- Observation and Modelling of Contained Detonations of PE4
- Implementation of HVRB in LS-Dyna and Application to Detonation
- Pinching of a Confined Hollow Explosive Cylinder Containing Air
- Pressure-dependent Viscoplasticity and Volumetric Dilatation
- Maximum Likelihood Analysis of Critical Energy Initiation Criterion

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High-energy Combustion Agents of Organic Borohydrides
Synthesis, Characterization and Applications

XiaoHong Zhang Xi’an Modern Chemistry Research Institute, China
WeiQiang Pang Xi’an Modern Chemistry Research Institute, China
Luigi T DeLuca Politecnico di Milano, Italy
Yu Zhao Xi’an Modern Chemistry Research Institute, China

Synopsis
Combustion agents for solid fuel propellants and explosives have gained widespread interest in recent years. High-energy Combustion Agents of Borohydrides covers the most recent developments in the advanced combustion agents of borohydrides. This book will appeal to researchers in academia and industry seeking a better understanding of how to improve the ignition and combustion performance of propellants and explosives.

Brief Contents
- Comprehensive Survey of Combustion Agents
- Synthesis and Characterization of Organic Combustion Agents
- Interactions of B_{10}H_{10}[(C_{2}H_{5})_{4}N]_{2} with Energetic Components and Inert Materials
- Performance of Solid Propellants Containing B_{10}H_{10}[(C_{2}H_{5})_{2}N]_{2} and B_{12}H_{2}[C_{2}H_{5}]_{2}N_{2}
- Solid Propellants Containing Organic Borohydride Metal Additives
- Energetic Composites Containing Carborane Derivatives
- High-energy Combustion Agents in Propellant and Explosives

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Electrochemistry
Volume 17

Craig Banks Manchester Metropolitan University, UK

Synopsis
Providing the reader with an up-to-date digest of the most important research currently carried out in the field, this volume is compiled and written by leading experts from across the globe. It reviews the trends in electrochemical sensing and its applications and touches on research areas from a diverse range. Coverage is extensive and will appeal to a broad readership from chemists and biochemists to engineers and materials scientists. The reviews of established and current interests in the field make this book a key reference for researchers in this exciting and developing area.

Brief Contents
- 3D printing electrodes for energy conversion
- Microbial fuel cells: exploring electrochemical, biological and applied aspects
- Anodic and cathodic stripping voltammetry for metals sensing
- Multiplexed electrochemical detection of biomarkers in biological samples
- Immobilization strategies for carbon electrode materials
- The usage of transition metal complexes on electrochemical sensor and biosensor applications
- New class of pseudocapacitive electrode materials for electrochemical energy storage in rechargeable batteries
- Electrospun nanofibers: promising nanomaterials for biomedical applications
- MXenes based 2D nanostructures for supercapacitors
- Electrochemiluminescence of carbon-based quantum dots
- Electropolymerized organic thin films: synthesis, characterization, and application
- CRISPR/Cas-based electrochemical diagnostics
- Conducting polymer-based electrochemical biosensors for biomedical application
- Electrochemistry of anode materials in lithium- and sodium-ion batteries
- An electroanalytical overview of metal-organic frameworks (MOFs)
- Electrochemistry at additively manufactured electrodes
- Electropolymerized organic thin films: synthesis, characterization and application
- Electrochemical biosensors based on graphene and its allied derivatives for lifestyle disease diagnosis

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Quantum Dots in Bioanalytical Chemistry and Medicine

Michael Thompson University of Toronto, Canada
Zahra Ramezani Ahvaz Jundishapur University of Medical Sciences, Iran

Synopsis

Quantum dots are proven powerful probes for fluorescence imaging and are being developed for a range of additional applications including the detection of disease, fluorescent assays for drug discovery, single protein tracking, and intracellular reporting. This book introduces the reader to the field of quantum dots and provides enough information in the text and the references to encourage a new quantum dot user to get started. Including an overview of the significant advancement in the field and discussing applications, it emphasises how the properties of quantum dots are employed in bioanalytical chemistry. Closing with a prospectus of the future for quantum dots, any researchers and students in bioanalytical chemistry, medicine and clinical biochemistry will find this title useful supplementary reading.

Brief Contents

- Classifications of Quantum Dots and Their Detection Principles in Sensing
- How Functionalization Affects the Detection Ability of Quantum Dots
- Quantum Dots in Medical Detection/Diagnosis
- Quantum Dots in Imaging, Diagnosis, and Targeted Drug Delivery to Cancer Cells
- Quantum Dots in Viral and Bacterial Detection
- Application of Quantum Dots to In Vitro and In Vivo pH Detection
- Environmental Application of Quantum Dots
- Quantum Dots for Toxin Detection in Foods and Beverages
- Carbon Quantum Dots from Food Waste: Synthesis to Application in Food Safety
Rechargeable Battery Electrolytes
Electrochemical Energy Storage from Liquids to Solids

Jianmin Ma University of Electronic Science and Technology, China

Synopsis
Finding and selecting an appropriate electrolyte system is a crucial factor that must be taken into account to make post-lithium ion batteries commercially viable. Until now, it has been challenging to develop a suitable electrolyte with a wide electrochemical stability window and stable anode interface. This book covers all the major ion battery groups and their electrolytes, examining their performance and suitability in different solvents; aqueous, non-aqueous, solid gel and polymer. It is suitable for all levels of students and researchers.

Brief Contents
- Introduction
- Aqueous and Non-aqueous Electrolytes for Li-ion Batteries
- Aqueous and Non-aqueous Electrolytes for Na-ion Batteries
- Electrolytes for K, Ca, Mg Batteries
- Aqueous and Non-aqueous Electrolytes for Zn-ion Batteries
- Solid Electrolytes for Lithium Batteries
- Na-ion Solid Electrolytes for Solid State Batteries
- Ionic liquid-based Electrolytes for Rechargeable Batteries
- Gel Polymer Electrolytes for Rechargeable Batteries
- Polymer Electrolytes for Rechargeable Batteries
- High-concentration Electrolytes for Rechargeable Batteries
Ammonia Oxidizing Bacteria
Applications in Industrial Wastewater Treatment

Maulin P Shah  Enviro Technology Limited, India

Synopsis
Ammonia oxidising bacteria (AOB) and archaea are ubiquitous microorganisms, but their abundance and diversity vary widely across environments but play a crucial role in many ecosystems and aquatic ecosystems in particular. However, characterization of AOB communities require genomic methods as they are difficult to isolate from samples. Although non-toxic to humans, in the short term, ammonia in water systems are harmful to aquatic life both directly and indirectly through the disruption of the ecosystem by promoting the proliferation of algae. Ideal for postgraduates and researchers in a variety of disciplines, this book covers the ecology, genomics, physiology and biochemistry of AOBs and their presence in wastewater and the challenges, opportunities and potential applications for nitrification and ammonia removal.

Brief Contents
- Environmental Omics: A New Era to Study Ammonia-oxidizing Bacteria and Its Application in Bioremediation in the 21st Century
- Nitrification in the Ocean: A Systematic Review
- Anammox Bacteria and Its Application in Waste Water Treatment Plants
- The Anaerobic Ammonium Oxidation Process: Inhibition, Challenges and Opportunities
- Ammonia Oxidizing Bacteria in Wastewater Treatment
- Heterotrophic Nitrification and Aerobic Denitrification (HN-AD) Process
- Ecophysiology and Genomics Of N-Cycling Microbes in Environment
- Cell Biology, Biochemistry and Metabolism of Unique Anammox Bacteria
- Microbial Nitrogen Transformation and Recovery in Wastewater: Current Strategies and Applications
- Cultivation, Growth Physiology, and Chemotaxonomy of Nitrite-oxidizing Bacteria
- Quantitative Methodologies for Determining the Amount and Structure of AOB at the Transcriptional Level in Wastewater Treatment Plants
Advance Book Information

Methane Conversion Routes
Status and Prospects

Vladimir Galvita Ghent University, Belgium
René Bos Ghent University, Belgium

Synopsis

Methane is an abundantly available carbon-based feedstock but historically it has been underutilised due to its low chemical reactivity. Highlighting the recent advances in methane activation and direct conversion processes, this book discusses the progress and current state of the art for a wide variety of alternative methane activation and subsequent conversion processes, including homogeneous and heterogeneous catalytic, electrocatalytic and pyrolytic systems. It is a useful resource for those working in green chemistry, catalysis and chemical engineering.

Brief Contents

- Methane Valorization Processes: Challenges and Achievements
- Turquoise Hydrogen: Methane Pyrolysis as a Low-CO2 Source of H2
- Syngas-free Methane-to-methanol: Catalytic and Oxygen Looping Concepts
- Conversion of Methane to Acetylene
- Homogeneously Catalysed Functionalization of Methane
- Methane Pyrolysis for CO2-free Hydrogen Production
- Biological Methane Conversion
- The Potential of Chemical Looping Solutions for Direct Methane Conversion
- Process Intensification Opportunities for Direct Methane Valorisation
- Separations in Processes for Methane Conversion
- Methane Direct Conversion: An Industrial View
- Concepts of Methane Activation

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Synopsis

This comprehensive guide to important fungal species is an ideal companion to researchers and postgraduates in fields including phytochemistry, mycology, medicinal chemistry, and natural product pharmacology.

Brief Contents

- Genus Agaricus Species Found in Himalayas
- Honey Fungus
- Amanita Species
- *Astraeus hygrometricus* (Pers.) Morgan
- *Craterellus cornucopioides* (L.)/*Craterellus odoratus* (Schwein.) Fr.
- *Enokitake* (*Flammulina velutipes*)
- *Fomes fomentarius* (L.) Fr.
- *Ganoderma lucidum* (Lingzhi Mushroom)
- *Lentinula edodes* (Berk.) Pegler
- *Leucopaxillus giganteus* (Sowerby) Singer (Giant Leucopax)
- *Macroøpiota procera*
- *Stropharia rugosoannulata* Farlow ex Murrill
- *Termitomyces clypeatus* and *Termitomyces heimii*
- *Volvariella bombycina* (Schaeff.) Singer (Silky Rosegill)
- Lesser Known Wild Medicinal and Edible Mushrooms

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Active Site-directed Enzyme Inhibitors
Design Concepts

Weiping Zheng  Jiangsu University, China

Synopsis
Natural enzyme inhibition is an important negative feedback control, particularly for managing intracellular concentrations of amino acids, vitamins, and other substances. This control can be effectively utilised and several clinically important interactions between pharmaceuticals result from enzyme inhibition and, as such, enzyme inhibitors are a valuable source of potential new antibiotics, chemotherapy agents and other pharmaceuticals. This handbook is an ideal introduction to up-to-date concepts in active site-directed enzyme inhibition, succinctly yet comprehensively covering currently known concepts in active site-directed enzyme inhibitor design. Each concept is discussed in turn with a delineation of its mode of working and its applications with different types of enzymatic reactions. Active Site-directed Enzyme Inhibitors will provide readers with a quick and efficient reference for obtaining effective active site-directed inhibitors for any of the enzymatic reactions under study without a need to resort to costly library screening- and biostructure-based techniques. This handbook is ideal as an immediate resource for researchers to consult, or for students to supplement their study in molecular biology, pharmacology, and medicinal chemistry.

Brief Contents

- Catalytic Mechanism-based Design
- Catalytic Intermediate-based Design
- Substrate-based Design
- Transition State-based Design
- (Photo)Affinity Label and Covalent Inhibitor Design
- Proteolysis Targeting Chimera (PROTAC) Design

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