Bioinspired Chemistry For Energy A Workshop Summa

Bioinspiration and Biomimicry in Chemistry
Green Nanomaterials
Biological Materials Science
Energy Transformation in Biological Systems
Functional Properties of Bio-inspired Surfaces
Bioinspired Chemistry for Energy
Chemical and Biochemical Catalysis for Next Generation Biofuels
Materials Research to Meet 21st-Century Defense Needs
Energy Transduction in Biological Membranes
Catalysis for Energy
Bioinspired Catechol-Based Systems: Chemistry and Applications
Bio-inspired Materials and Sensing Systems
Foundations of Bioenergetics
Research Frontiers in Bioinspired Energy
The Biological Chemistry of the Elements
Bioinspired Structures and Design
Alkane Functionalization
Emerging Research on Bioinspired Materials Engineering
Bioinspired Chemistry for Energy
Bioinspired Chemistry
Bioinspired Chemistry: From Enzymes To Synthetic Models
Inspired by Biology
Bio-Inspired Nanotechnology
Bio-Inspired Wettability Surfaces
Research Frontiers in Bioinspired Energy
Bioinspired Inorganic Materials
Out-of-Equilibrium (Supra)molecular Systems and Materials
Bioinspired and Green Synthesis of Nanostructures
Self-Healing Smart Materials
Advances in Bioelectrochemistry Volume 4
Introducing Biological Energetics
Bioinspired Nanomaterials
Bioinspired Engineering of Thermal Materials
Energy Transformation in Biological Systems
Research Frontiers in Bioinspired Energy
Redox-Active Ligands
The Biological Chemistry of the Elements
A Special Issue on Bio-energy Research: Chemical and Biological Approaches
Energy Transduction in Biological Membranes
Bioinspiration and Biomimicry in Chemistry

RACHAEL CAMERON

Bioinspiration and Biomimicry in Chemistry National Academies Press
The Novartis Foundation Series is a popular collection of the proceedings from Novartis Foundation Symposia, in which groups of leading scientists from a range of topics across biology, chemistry and medicine assembled to present papers and discuss results. The Novartis Foundation, originally known as the Ciba Foundation, is well known to scientists and clinicians around the world.
Green Nanomaterials Springer Science & Business Media
This book covers emerging bioinspired green methods for preparing inorganic nanomaterials. The book starts with an introduction to the principles of green chemistry and engineering, and highlights the special properties that nanomaterials possess, their applications and ways to characterise them. It describes conventional methods of synthesising and manufacturing inorganic nanomaterials, and introduces biological and biomimetic/bioinspired synthetic methods as a solution to precisely control nanomaterials and design sustainable manufacturing routes. The book elaborates on various mechanisms and examples of green nanomaterials, including the role of organic matrix and natural self-assembly, and advantages and opportunities with green nanomaterials. Two case studies of magnetic and silica materials are provided for advanced readers. The book is an insightful reference text for researchers focusing on synthetic biology and nanomaterials. It is an essential title for postgraduates and final-year undergraduates studying advanced materials, sustainable engineering or environmental chemistry.
Biological Materials Science National Academies Press
This title presents a general but substantial review of the most promising processes and the spectrum of biomass pretreatment, enzymes, chemical catalysts, and hybrid approaches of hydrolyzing biomass into fermentable sugars.
Energy Transformation in Biological Systems John Wiley & Sons
Takes a materials science approach, correlating structure-property relationships with function across a broad range of biological materials.
Functional Properties of Bio-inspired Surfaces OUP Oxford
Master simple to advanced biomaterials and structures with this essential text. Featuring topics ranging from bionanoengineered materials to bio-inspired structures for spacecraft and bio-inspired robots, and covering issues such as motility, sensing, control and morphology, this highly illustrated text walks the reader through key scientific and practical engineering principles, discussing properties, applications and design. Presenting case studies for the design of materials and structures at the nano, micro, meso and macro-scales, and written by some of the leading experts on the subject, this is the ideal introduction to this emerging field for students in engineering and science as well as researchers.
Bioinspired Chemistry for Energy National Academies Press
This book is a printed edition of the Special Issue "Bioinspired Catechol-Based Systems: Chemistry and Applications" that was published in Biomimetics

Chemical and Biochemical Catalysis for Next Generation Biofuels National Academies Press
In May 2007, the National Academies Chemical Sciences Roundtable held a public workshop on the topic of Bioinspired Chemistry for Energy, where government, academic, and industry representatives discussed promising research developments in solar-generated fuels, hydrogen-processing enzymes, artificial photosynthetic systems, and biological-based fuel cells. Workshop participants identified the need for a follow-up activity that would explore bioinspired energy processes in more depth and involve a wider array of disciplines as speakers and participants. Particularly, workshop participants stressed the importance of holding a workshop that would include more researchers from the biological sciences and engineering, as well as those involved in technological advances that enable progress in understanding these systems. Building upon the 2007 workshop, the National Academies Board on Chemical Sciences and Technology convened the Committee on Research Frontiers in Bioinspired Energy to organize a second workshop in 2011 which, according to the statement of task, would explore the molecular-level frontiers of energy processes in nature through an interactive, multidisciplinary, and public format. Specifically, the committee was charged to feature invited presentations and include discussion of key biological energy capture, storage, and transformation processes; gaps in knowledge and barriers to transitioning the current state of knowledge into applications; and underdeveloped research opportunities that might exist beyond disciplinary boundaries. Research Frontiers in Bioinspired Energy is an account of what occurred at the 2011 workshop, and does not attempt to present any consensus findings or recommendations of the workshop participants. It summarizes the views expressed by workshop participants, and while the committee is responsible for the overall quality and accuracy of the report as a record of what transpired at the workshop, the views contained in the report are not necessarily those of the committee.
Materials Research to Meet 21st-Century Defense Needs Springer Nature
In May 2007, the National Academies Chemical Sciences Roundtable held a public workshop on the topic of Bioinspired Chemistry for Energy, where government, academic, and industry representatives discussed promising research developments in solar-generated fuels, hydrogen-processing enzymes, artificial photosynthetic systems, and biological-based fuel cells. Workshop participants identified the need for a follow-up activity that would explore bioinspired energy processes in more depth and involve a wider array of disciplines as speakers and participants. Particularly, workshop participants stressed the importance of holding a workshop that would include more researchers from the biological sciences and engineering, as well as those involved in technological advances that enable progress in understanding these systems. Building upon the 2007 workshop, the National Academies Board on Chemical Sciences and Technology convened the Committee on Research Frontiers in Bioinspired Energy to organize a second workshop in 2011 which, according to the statement of task, would explore the molecular-level frontiers of energy processes in nature

through an interactive, multidisciplinary, and public format. Specifically, the committee was charged to feature invited presentations and include discussion of key biological energy capture, storage, and transformation processes; gaps in knowledge and barriers to transitioning the current state of knowledge into applications; and underdeveloped research opportunities that might exist beyond disciplinary boundaries. Research Frontiers in Bioinspired Energy is an account of what occurred at the 2011 workshop, and does not attempt to present any consensus findings or recommendations of the workshop participants. It summarizes the views expressed by workshop participants, and while the committee is responsible for the overall quality and accuracy of the report as a record of what transpired at the workshop, the views contained in the report are not necessarily those of the committee.

Energy Transduction in Biological Membranes CRC Press

Redox-Active Ligands Authoritative resource showcasing a new family of ligands that can lead to better catalysts and promising applications in organic synthesis Redox-Active Ligands gives a comprehensive overview of the unique features of redox-active ligands, describing their structure and synthesis, the characterization of their coordination complexes, and important applications in homogeneous catalysis. The work reflects the diversity of the subject by including ongoing research spanning coordination chemistry, organometallic chemistry, bioinspired catalysis, proton and electron transfer, and the ability of such ligands to interact with early and late transition metals, lanthanides, and actinides. The book is divided into three parts, devoted to introduction and concepts, applications, and case studies. After the introduction on key concepts related to the field, and the different types of ligands and complexes in which ligand-centered redox activity is commonly observed, mechanistic and computational studies are described. The second part focuses on catalytic applications of redox-active complexes, including examples from radical transformations, coordination chemistry and organic synthesis. Finally, case studies of redox-active guanidine ligands, and of lanthanides and actinides are presented. Other specific sample topics covered include: An overview of the electronic features of redox-active ligands, covering their historical perspective and biological background The versatility and mode of action of redox-active ligands, which sets them apart from more classic and tunable ligands such as phosphines or N-heterocyclic carbenes Preparation and catalytic applications of complexes of stable N-aryl radicals Metal complexes with redox-active ligands in H+/e- transfer transformations By providing up-to-date information on important concepts and applications, Redox-Active Ligands is an essential reading for researchers working in organometallic and coordination chemistry, catalysis, organic synthesis, and (bio)inorganic chemistry, as well as newcomers to the field.

Catalysis for Energy National Academies Press

Presents state-of-the-art information concerning the syntheses of valuable functionalized organic compounds from alkanes, with a focus on simple, mild, and green catalytic processes Alkane Functionalization offers a comprehensive review of the state-of-the-art of catalytic

functionalization of alkanes under mild and green conditions. Written by a team of leading experts on the topic, the book examines the latest research developments in the synthesis of valuable functionalized organic compounds from alkanes. The authors describe the various modes of interaction of alkanes with metal centres and examine theoxidative alkane functionalization upon C-O bond formation. They address the many types of mechanisms, discuss typical catalytic systems and highlight the strategies inspired by biological catalytic systems. The book also describes alkane functionalization upon C-heteroatom bond formation as well as oxidative and non-oxidative approaches. In addition, the book explores non-transition metal catalysts and metal-free catalytic systems and presents selected types of functionalization of sp3 C-H bonds pertaining to substrates other than alkanes. This important resource: Presents a guide to the most recent advances concerning the syntheses of valuable functionalized organic compounds from alkanes Contains information from leading experts on the topic Offers information on the catalytic functionalization of alkanes that allows for improved simplicity and sustainability compared to current multi-stage industrial processes Explores the challenges inherent with the application of alkanes as starting materials for syntheses of added value functionalized organic compounds Written for academic researchers and industrial scientists working in the fields of coordination chemistry, organometallic chemistry, catalysis, organic synthesis and green chemistry, Alkane Functionalization is an important resource for accessing the most up-to-date information available in the field of catalytic functionalization of alkanes.

Bioinspired Catechol-Based Systems: Chemistry and Applications John Wiley & Sons

Bioinspired materials can be defined as the organic or inorganic materials that mimic naturally occurring substances. With applications in a number of fields such as biomedical, chemical, mechanical, and civil engineering, research on the development of biologically-inspired materials is essential to further advancement. Emerging Research on Bioinspired Materials Engineering provides insight on fabrication strategies for bioinspired materials as well as a collective review of their current and prospective applications. Highlighting essential research on bioinspired processes and the nano-structural, physical, chemical, thermal, and mechanical aspects of biologically-inspired materials, this timely publication is an ideal reference source for engineers, researchers, scholars, and graduate students in the fields of materials science and engineering, nanotechnology, biotechnology, and biomedical materials science.

Bio-inspired Materials and Sensing Systems John Wiley & Sons

This review volume explores how the current knowledge of the biological structures occuring on the surface of moth eyes, leaves, sharkskin, and the feet of reptiles can be transferred to functional technological materials.

Foundations of Bioenergetics National Academies Press

The observation of Nature is an inexhaustible source of inspiration to promote innovations in chemistry. The bioinspired approach is a revolution in our paradigms because it is not based on

what we can take to nature, but on what we can learn from it. Enzymatic systems involved in solar energy conversion (photosystem), hydrogen production (hydrogenases), dioxygen activation (oxydases et oxygenases), CO_2 reduction (CO dehydrogenase) use abundant and cheap starting material such as O_2, H_2O and CO_2. Inspiration of these biological systems is a solution to make our chemical processes greener. These are some of the many challenges that bioinspired chemistry is able to take up.A number of the recent developments in bioinspired chemistry are discussed, including some descriptions on the biological systems that are the source of inspiration. This book is a guide to where bioinspired chemistry will be in the near future and provides a thoughtful perspective on how bioinspiration could change our world.

Research Frontiers in Bioinspired Energy John Wiley & Sons

Shwocasing recent developments in inorganic biomaterials in an area of societal interest and importance, this text covers such areas as functional surfaces, energy storage and metamaterials, with an emphasis on how inorganic biomaterials are being used for cutting-edge applications.

The Biological Chemistry of the Elements John Wiley & Sons

Can scientists and engineers replicate Nature and develop systems that operate in extreme environments? Bio-inspiration is an established concept which is developing to meet the needs of the many challenges we face particularly in defence and security. This book explores the potential of bio-inspired materials and sensing systems together with examples of how they are being implemented. It is not an exhaustive study of the subject but provides an overview of how bio-inspired or -derived approaches can be used to enhance components, systems and systems of systems for defence and security applications. Readers will gain an awareness of the complexity and versatility of bio-inspired components as well as an understanding of how these technologies can be applied in a variety of operational scenarios. Consideration is given to using a conceptual model that can be deployed in distributed or autonomous operations. Using this model, bio-inspiration with behavioural science plays a major role in identification, movement, searching strategies and pattern recognition for chemical and biological detection. Examples focus on both learning new things from nature that have application to the defence and security areas and adapting known discoveries for practical use by these communities. This graduate level monograph provides an increased awareness of the need for more sophisticated, networked sensors and systems in the defence and security communities and will be of interest to both specialists in this area and science and technology generalists.

Bioinspired Structures and Design Cambridge University Press

Biological synthesis employing microorganisms, fungi or plants is an alternative method to produce nanoparticles in low-cost and eco-friendly ways. The book covers the synthesis of metal nanoparticles, metal oxide nanostructures and nanocomposite materials, as well as the stability and characterization of bioinspired nanomaterials. Applications include optical and electrochemical sensors, packaging, SERS and drug delivery processes. Keywords: Bioinspired Nanomaterials, Metal

Nanoparticles, Metal Oxide Nanostructures, Nanocomposite Materials, Microbicidal Activity, Drug Delivery, Packaging Applications, SERS Applications, Fluorescent Biosensing, Quantum Dots. Bio-Imaging, Electrochemical Sensors.

Alkane Functionalization World Scientific

This book presents an in-depth analysis of the investment in catalysis basic research by the U.S. Department of Energy (DOE) Office of Basic Energy Sciences (BES) Catalysis Science Program. Catalysis is essential to our ability to control chemical reactions, including those involved in energy transformations. Catalysis is therefore integral to current and future energy solutions, such as the environmentally benign use of hydrocarbons and new energy sources (such as biomass and solar energy) and new efficient energy systems (such as fuel cells). Catalysis for Energy concludes that BES has done well with its investment in catalysis basic research. Its investment has led to a greater understanding of the fundamental catalytic processes that underlie energy applications, and it has contributed to meeting long-term national energy goals by focusing research on catalytic processes that reduce energy consumption or use alternative energy sources. In some areas the impact of the research has been dramatic, while in others, important advances in catalysis science are yet to be made.

Emerging Research on Bioinspired Materials Engineering Materials Research Forum LLC

The authors of this study on bio-inorganic chemistry seek to examine the importance of inorganic elements. They survey chemical and physical factors controlling the elements of life, discuss the functions of inorganic elements and examine the co-operative interaction in living systems.

Bioinspired Chemistry for Energy Cambridge University Press

This text describes the functional role of the twenty inorganic elements essential to life in living organisms.

Bioinspired Chemistry Springer

This book presents a collection of chapters on modern bioelectrochemistry focusing on new materials for biodevice, bioelectrosynthesis and bioenergy. The chapters cover protein engineering, semiconductors, biorecognition, graphene-based bioelectronics, bioelectrosynthesis, biofuel cells, bioinspired batteries and biophotovoltaics.