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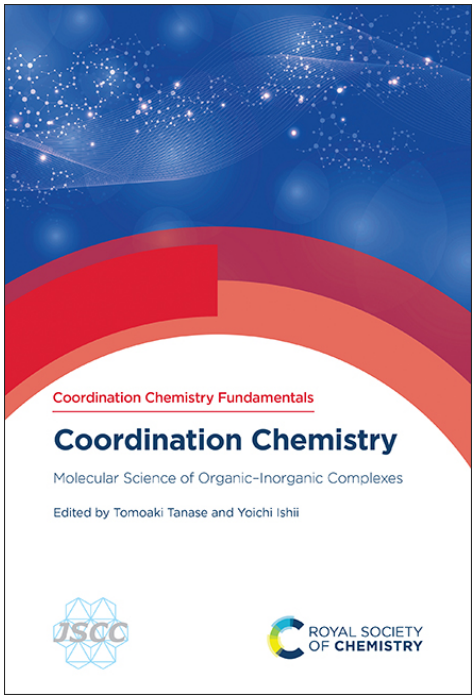

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Series:	Coordination Chemistry Fundamentals Volume 3

Coordination Chemistry

Molecular Science of Organic–Inorganic Complexes

Tomoaki Tanase Nara Women's University, Japan
Yoichi Ishii Chuo University, Japan

Synopsis

Coordination chemistry is a long-established field of science. Modern coordination chemistry is recognized as an interdisciplinary molecular science that has developed at the intersection of inorganic and organic chemistry. Translated from the original Japanese, this book is for undergraduate and graduate students and young researchers new to coordination chemistry. It explores transition metal complexes involving d and f orbitals. Structured as a step-by-step guide, it starts with the basics, as the foundation of the topic, progressing in complexity to explain some of the recent interdisciplinary developments.

Brief Contents

- Introduction: What is a 'Metal Complex'
- Structure of Metal Complexes
- Electronic Structure of Metal Complexes
- Optical Absorption and Emission of Metal Complexes
- Magnetism of Metal Complexes
- Stability of Metal Complexes and Ligand Substitution Reactions
- Electron Transfer Reactions of Metal Complexes
- Organometallic Complexes
- Theoretical Chemistry of Metal Complexes
- Assembled Metal Complexes and Their Functions
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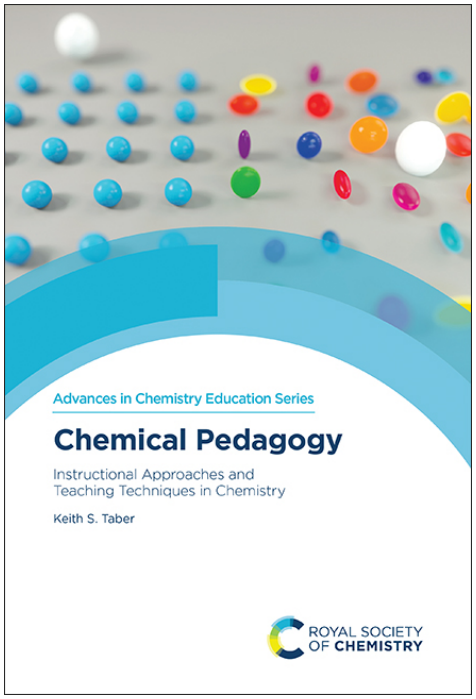

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Chemical Pedagogy

Instructional Approaches and Teaching Techniques in Chemistry

Keith S Taber University of Cambridge, UK

Synopsis

Chemical Pedagogy introduces core principles – from research into human cognition and learning – to provide a theoretical perspective on how to best teach for engagement and understanding. An examination of some of the more contentious debates about pedagogy leads to the advice to seek 'optimally guided instruction' which balances the challenge offered to learners with the level of support provided. This provides a framework for discussing a wide range of teaching approaches and techniques that have been recommended to those teaching chemistry across educational levels, including both those intended to replace 'from the front' and others that can be built into traditional lecture courses to enhance the learning experience.

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Series:	Advances in Chemistry Education Series Volume 12

Brief Contents

- An Introduction to Chemical Pedagogy
- Evaluating Pedagogy Through Experimental Studies of Teaching
- Debates About Pedagogy
- Optimally Guided Instruction
- Designing Teaching Schemes and Sequences
- Matching Teaching to Learners
- Making the Unfamiliar Familiar: Presenting Subject Matter
- Lectures and Laboratories: Their Discontents and Alternatives
- Engaging Different Voices in the Chemistry Classroom
- Designing and Curating Learning Resources
- Strategies for Organising Chemistry Teaching
- Learners Choosing and Creating

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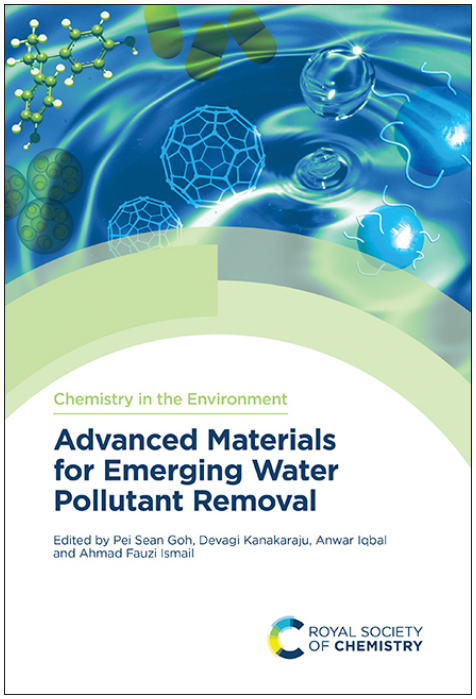

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Advanced Materials for Emerging Water Pollutant Removal

Pei Sean Goh Universiti Teknologi Malaysia, Malaysia
Devagi Kanakaraju Universiti Malaysia Sarawak, Malaysia
Anwar Iqbal Universiti Sains Malaysia, Malaysia
Ahmad Fauzi Ismail Universiti Teknologi Malaysia, Malaysia

Synopsis

Water scarcity affects 40% of the world's population, and to make the situation worse, 80% of wastewater enters water bodies without being adequately treated. **Advanced Materials for Emerging Water Pollutant Removal** focuses on the synthesis, characterisation and application of advanced materials that can be used for the removal of various emerging water pollutants. With an emphasis on renewable starting materials and sustainable processes this is a great book for environmental chemists, materials scientists and water treatment specialists alike.

Brief Contents

- Preparation and Modification of New Functional Materials for Organic Pollutant Elimination
- Synthesis and Functionalisation of Advanced Material for Pollutant Removal
- Membranes for the Removal of Endocrine Disrupting Compounds from Aqueous Environment
- Ultrafiltration for Laundry Wastewater Treatment
- TiO_2-graphitic Carbon Nitrate-based Nanocomposites for the Degradation of Emerging Pollutants
- Carbon-based Nanomaterials for the Removal of Emerging Water Pollutants
- Synthesis and Functionalization of Metal Oxides for the Removal of Organic Pollutants
- Application of Nanoparticles in the Mitigation of Harmful Algal Blooms

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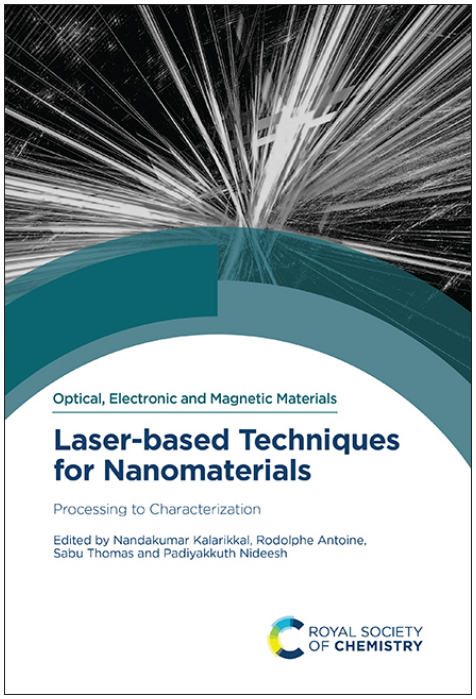

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Series:	Optical, Electronic and Magnetic Materials, Volume 2

Laser-based Techniques for Nanomaterials

Processing to Characterization

Nandakumar Kalarikkal Mahatma Gandhi University, India
Rodolphe Antoine Université Claude Bernard, France
Sabu Thomas Mahatma Gandhi University, India
Padiyakkuth Nideesh Mahatma Gandhi University, India

Synopsis

This book focuses on the recent advances and future perspectives of laser-based synthesis, processing, characterization, and application of materials. Written for researchers in academia and industry, the book is divided into three sections making it accessible to students and emerging investigators alike. The first presents a general introduction to laser principles and non-linear optics, this is followed by a section containing chapters on materials processing and the concluding section explores characterisation techniques and applications.

Brief Contents

- Laser Fundamentals
- Fundamentals of Nonlinear Optics in Nanostructures
- Linear and Nonlinear Optical Techniques for Light–Matter Interaction in Nanoscale Systems
- Laser Induced Plasma: Fundamentals and Characterization
- Ultrafast Laser Nanoprocessing and Applications
- Ultrafast Laser Ablation – A Peerless Synthesis Strategy for Functional Nanomaterials
- Advances in Ultrafast Laser Structuring of Materials at the Nanoscale
- Recent Advances and Prospects in Selective Laser Sintering (SLS) and Melting (SLM) and Multiphoton Lithography for 3D Printing
- Nonlinear Optical Techniques for Nanomaterials
- LIBS for Characterizing Nanomaterials
- Transient Absorption Spectroscopy: Probing the Ultrafast Dynamics in Nanomaterial Complex Systems
- Application of Random Lasers for Multi-scale Imaging of the Dynamics of Processes on the Nano–Microscale

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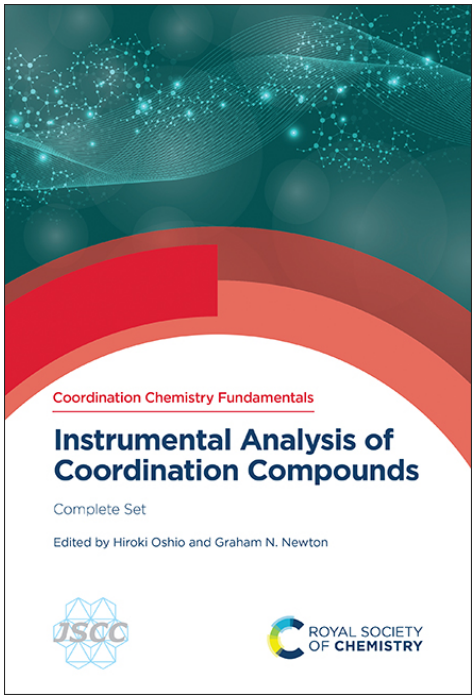

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BISAC:	SCI013030, SCI013010
Series:	Coordination Chemistry Fundamentals Volume 4 and 5

Instrumental Analysis of Coordination Compounds

Complete Set

Hiroki Oshio The University of Tsukuba, Japan
Graham N Newton University of Nottingham, UK

Synopsis

This set comprises two volumes of English translations of books originally published in Japanese. They are translated by the original authors with a full verification process. They describe the principles and practical methods of measurement of coordination compounds and the basic theories for understanding the data obtained. The instrumental analyses dealt with cover measurements of solid, liquid, and gaseous states and surface analysis. As a key resource for graduate students and researchers in coordination chemistry and its complementary interdisciplinary fields, the books are an excellent reference for experienced researchers.

Brief Contents

Volume 1:

- Ligand Field Theory
- Electronic Spectra, Circular Dichroism, Magnetic Circular Dichroism
- Acid Dissociation Constants, Formation Constants, and Other Thermodynamic Parameters
- Electrochemistry
- Calorimetry and Thermal Analysis
- Single Crystal X-Ray Structure Analysis
- Infrared and Raman Spectroscopies

Volume 2:

- Magnetic Measurement
- ESR Spectroscopy
- Solid NMR Spectroscopy
- Mössbauer Spectroscopy
- X-Ray Absorption Spectrum
- Surface Analyses AFM and STM
- Transmission Electron Microscope
- Fluorescence and Phosphorescence Spectroscopies
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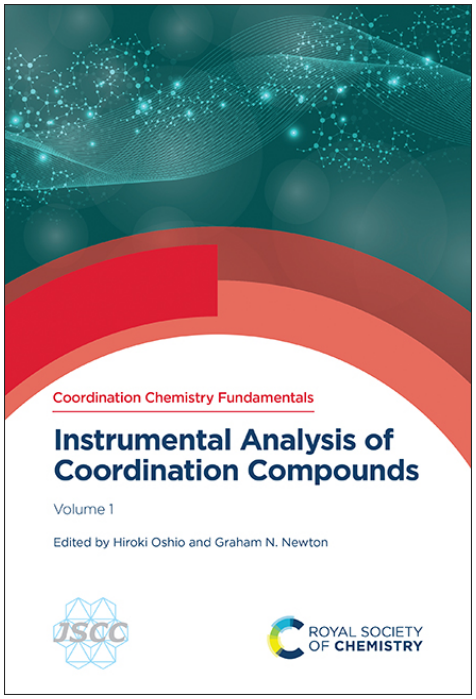

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BISAC:	SCI013030, SCI013010
Series:	Coordination Chemistry Fundamentals Volume 4

Instrumental Analysis of Coordination Compounds

Volume 1

Hiroki Oshio The University of Tsukuba, Japan
Graham N Newton University of Nottingham, UK

Synopsis

Various types of physical measurements are available for the study of metal complexes. In pursuing the chemical and physical properties of metal complexes, it is necessary first to clarify what you want to know about and then select the most suitable measurements. To understand the experimental data obtained, it is essential to comprehend ligand field theory and a wide range of fundamental chemistry, such as quantum chemistry, thermodynamics, kinetics, equilibrium theory, analytical chemistry, surface chemistry, and solid-state physics.

This book is Volume 1 in a set comprising two volumes of English translations of books originally published in Japanese. They are translated by the original authors with a full verification process. They describe the principles and practical methods of physical measurements and the fundamental theories for understanding the data obtained. The instrumental analyses dealt with cover measurements of solid, liquid, and gaseous states, as well as surface analysis. As a key resource for graduate students and researchers in coordination chemistry and its complementary interdisciplinary fields, the books are also an excellent reference for experienced researchers.

Brief Contents

- Ligand Field Theory
- Optical Spectroscopy
- Acid Dissociation Constants, Formation Constants, and Other Thermodynamic Parameters
- Electrochemistry
- Calorimetry and Thermal Analysis
- Single Crystal X-Ray Structure Analysis
- IR and Raman Spectroscopies

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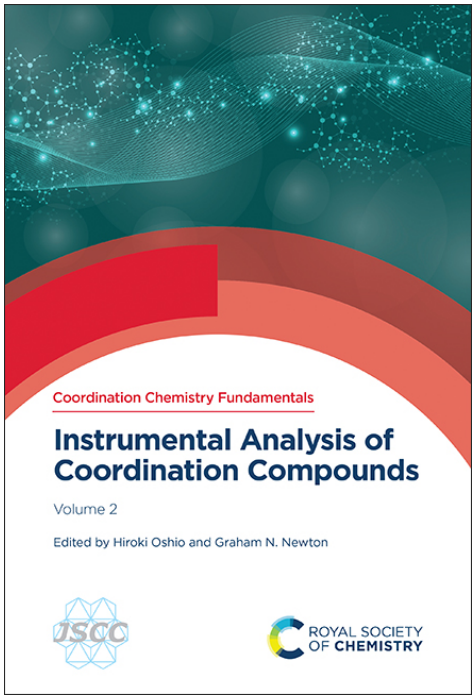

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Series:	Coordination Chemistry Fundamentals Volume 5

Instrumental Analysis of Coordination Compounds

Volume 2

Hiroki Oshio The University of Tsukuba, Japan
Graham N Newton University of Nottingham, UK

Synopsis

Various types of physical measurements are available for the study of metal complexes. In pursuing the chemical and physical properties of metal complexes, it is necessary first to clarify what you want to know about and then select the most suitable measurements. To understand the experimental data obtained, it is essential to comprehend ligand field theory and a wide range of fundamental chemistry, such as quantum chemistry, thermodynamics, kinetics, equilibrium theory, analytical chemistry, surface chemistry, and solid-state physics. This book is Volume 2 in a set comprising two volumes of English translations of books originally published in Japanese. They are translated by the original authors with a full verification process. They describe the principles and practical methods of physical measurements and the fundamental theories for understanding the data obtained. The instrumental analyses dealt with cover measurements of solid, liquid, and gaseous states, as well as surface analysis. As a key resource for graduate students and researchers in coordination chemistry and its complementary interdisciplinary fields, the books are also an excellent reference for experienced researchers.

Brief Contents

- Magnetic Measurement
- ESR Spectroscopy
- Solid State NMR
- Mössbauer Spectroscopy
- X-Ray Absorption Spectroscopy
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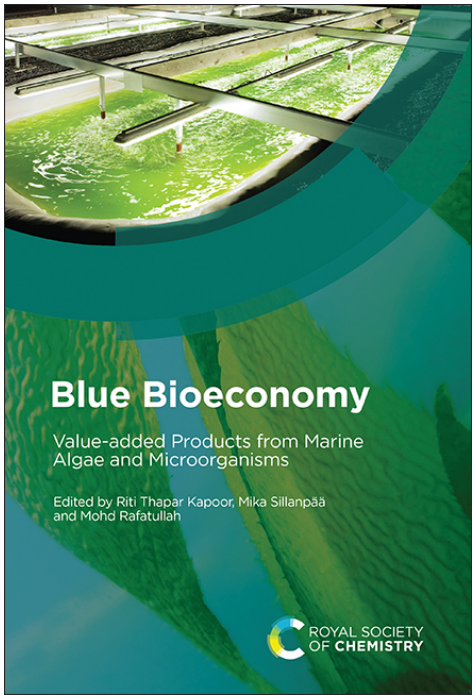

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Blue Bioeconomy

Value-added Products from Marine Algae and Microorganisms

Riti Thapar Kapoor Amity University, India
Mika Sillanpää University of Johannesburg, South Africa
Mohd Rafatullah Universiti Sains Malaysia, Malaysia

Synopsis

The marine environment is an abundant source of organisms which are rich in functional/bioactive compounds. Many of these compounds exhibit a remarkable potential for medical, industrial and biotechnological applications. Handles appropriately, with a focus on sustainability, these organisms and compounds can offer new and renewable feedstocks for a variety of industries. Focusing on the use of biomass from marine algae (both macro and micro), bacteria and yeasts this book looks at opportunities for producing high value chemicals with applications across multiple industries.

Brief Contents

- Biofuel Production from Seaweed: A Green Alternative for a Sustainable Future
- Applications of Marine Resources for Generation of Green Energy: A Step Towards Attaining Sustainable Development
- Harnessing Diatoms: A Comprehensive Exploration of Their Role in Wastewater Treatment, Biomass Utilization, and Nanotechnological Applications
- Unveiling a Game-changer in the Net-zero Race: Marine Seaweeds for Sustainable Macrofuel Generation
- The Use of Marine Biomass in Biofertiliser and Biostimulant Production: Current Status and Future Perspectives
- Recent Advances in Marine Microalgae Production: Highlighting Human Health Products from Microalgae
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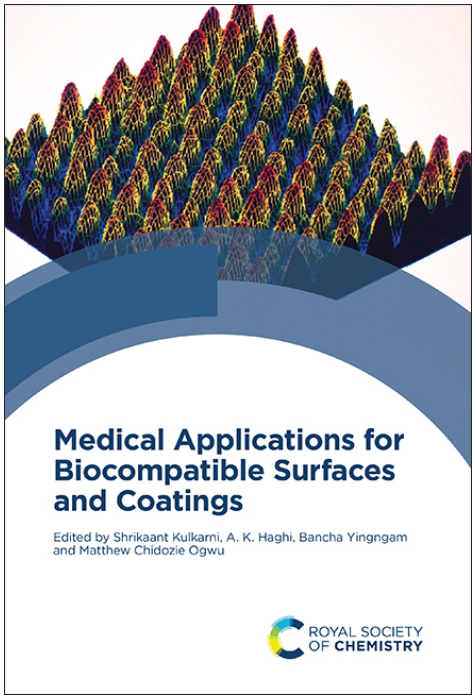

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Medical Applications for Biocompatible Surfaces and Coatings

Shrikaant Kulkarni Victorian Institute of Technology, Australia
A K Haghi University of Coimbra, Portugal
Bancha Yingngam Ubon Ratchathani University, Thailand
Matthew Chidozie Ogwu Appalachian State University, USA

Synopsis

Surface chemistry has a major influence on the biocompatibility of materials, and applying a suitable coating can provide a cost-effective way to ensure the compatibility of medical devices without compromising their physical properties.

This book explores various approaches to designing and developing biocompatible coatings and the range of applications they offer. The editors have prepared a comprehensive volume addressing the current needs in medicine. Consideration is given to the next generation of coating systems and industry case studies are also presented.

Brief Contents

- Diamond-like Carbon (DLC) as a Biocompatible Coating for Biomedical Engineering
- Surface Modification Techniques for Enhancing the Functionality of Biomaterials in the Medical Field
- Recent Advances and Challenges in Targeted Drug Delivery Using Biofunctional Coatings
- Biocompatible Tablet Film Coating for Active Pharmaceutical Ingredients
- The Potential of Bacterial Nanocellulose-based Hydrogel and its Nanocomposites as Coating Materials in Regenerative Biomedicine
- Materials and Their Improvisations for Surface Coatings in Biomedical Applications
- Recent Advances in Biocompatible Coating Materials for Enhanced Medical Applications
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- Vibration-assisted Microbead Production: A New Frontier for Biocompatible Surfaces
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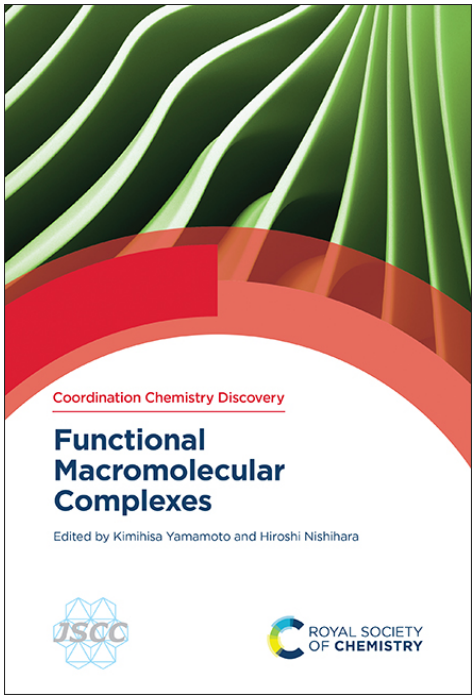

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BISAC:	SCI013030, TEC021000, SCI013040
Series:	Coordination Chemistry Discovery Volume 1

Functional Macromolecular Complexes

Kimihisa Yamamoto Tokyo Institute of Technology, Japan
Hiroshi Nishihara The University of Tokyo, Japan

Synopsis

Functional macromolecular complexes are classified as distinctive functional material groups in the fields of chemistry and materials science. This book provides a comprehensive introduction to the synthesis and applications of functional macromolecular complexes with a focus on Japanese chemists who are leading this field. Translated from the original Japanese title, it gives an overview of the synthesis, structures, functions, and applications of functional macromolecular complexes in an easily understandable manner. Useful for students who are interested in functional materials, as well as researchers and young scientists new to coordination chemistry in academic and industry settings, the book will help to generate new scientific and technological advances for the future.

Brief Contents

- Introduction to Polymer Complexes
- One-dimensional π-conjugated Polymer Complexes
- Helical Polymer Complexes
- Rotaxane Polymer Complexes
- Functional Coordination Polymers That Self-assemble in Solution
- Two-dimensional Polymer Complexes: Coordination Nanosheets
- Dendrimer Metal Complexes
- Biofunctional Polymer Complexes: Functional Antibody Supramolecules
- Development of Artificial O_2 Carriers as Red Blood Cell Substitutes
- Functionalization of Artificial Metalloenzymes
- Multimers and Assemblies of Porphyrins and Hemoproteins
- Metallosupramolecular Polymers as Display Materials
- Energy Conversion Materials
- Glyme-based Solvate Ionic Liquids and Their Electrolyte Properties
- Polymer Complex Dynamic Gels
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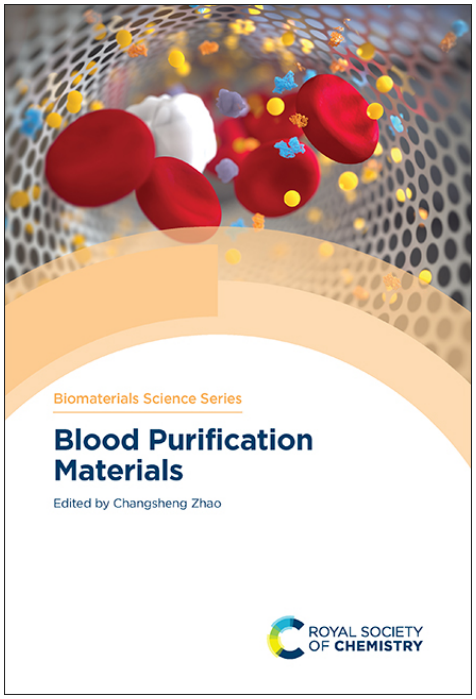

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Blood Purification Materials

Changsheng Zhao Sichuan University, China

Synopsis

Treating diseases involving the kidney, liver and immune systems often requires a good grasp of blood purifying technologies, specifically membranes and adsorbents. This is the first book to elucidate the role of biomaterials in blood purification technologies. Edited by a leader in the field, this book is a novel and comprehensive analysis of blood purification materials. It is essential reading for those working in biomaterials science and engineering.

Brief Contents

- A Brief Introduction to Blood Purification Materials
- Hemocompatibility of Blood Purification Materials: Concepts, Mechanisms and Characterization Techniques
- Strategies for Improvement of Hemocompatibility
- Blood Purification Membranes
- Blood Purification Membranes Used in Liquid–Liquid Environments
- Blood Purification Membranes Used in Liquid–Gas Environments: Artificial Lungs
- Blood Purification Materials for Hybrid Artificial Organs
- Development Tendency of Blood Purification Membranes
- Categories, Characteristics, and Applications of Adsorbents for Blood Purification
- *In Vivo* Evaluation and Application of Adsorbents for Hemoperfusion
- Development Trends of Blood Purification Related Adsorbents: From Novel Adsorbents to Functional Porous Materials
- Processing and Assembly of Membrane Devices
- Processing and Assembly of Adsorption Devices
- Conclusion

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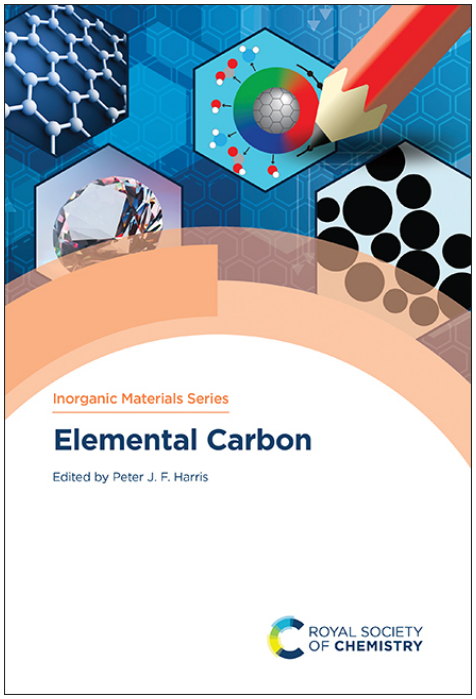

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Elemental Carbon

Peter J F Harris Bristol University, UK

Synopsis

This book provides an overview of the most rapidly developing areas of contemporary carbon science, including both well-established materials such as graphite and carbon black and new forms such as graphene. As well as giving a brief history of each topic, the five chapters provide reviews of the latest research, covering synthesis, chemical and physical properties, and applications. Aimed towards advanced undergraduates, postgraduates and other researchers in academia and industry, the book provides an invaluable introduction to these increasingly important materials.

Brief Contents

- Graphite and Carbon Fibres
- Synthesis, Properties and Applications of Graphene and Related Materials
- Carbon Black: Manufacturing Processes and Fundamental Properties
- Carbon Dots
- Low Pressure Synthesis of Diamond by Chemical Vapour Deposition and its Technological Applications

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