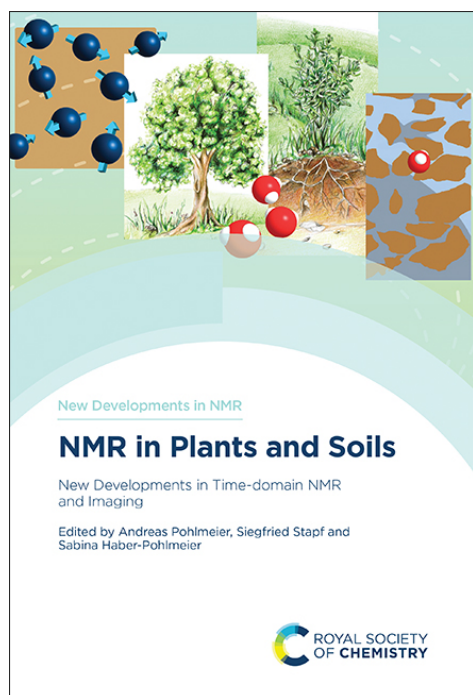


Advance Book Information



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NMR in Plants and Soils

New Developments in Time-domain NMR and Imaging

Andreas Pohlmeier Forschungszentrum Jülich GmbH, Germany

Siegfried Stapf Technische Universität Ilmenau, Germany

Sabina Haber-Pohlmeier University Stuttgart, Germany

Synopsis

Processes in soils, with special focus on plant-soil interaction, are a hot economic and social topic driven by climate change and its impact on human nutrition. Following the pioneering work in the last 40 years, NMR and MRI have become more and more important as non-invasive and versatile methods. The area is currently under rapid development, driven by the increasing pressure to contribute to food security and by the increasing availability of new MRI methods and mobile technology. This book highlights NMR in the space- and time-domains as a non-invasive and versatile method for elucidation of processes in plants, soil, and their interactions. It mainly addresses an audience from academia including postgraduates who want to inform themselves about the current state of NMR and MRI in the research of plants, soils and their interaction and those new to the topic who want a quick overview.

Brief Contents

- NMR/MRI of Plants and Soils: Principles, and Retrospective
- Unravelling Soil Complexity: Using Low-Field ^1H -NMR Relaxometry to Investigate the Soil Pore System and Dynamics at Soil Interfaces
- NMR Relaxometry Modelling of Digital Soil: Clay Type and Distribution Effects
- Relaxation and Diffusion Experiments Under Extreme Conditions: Salt and Iron Rich Soil
- Hydrological Connectivity Inside the Soil: A New Vision by Fast Field Cycling (FFC) NMR Relaxometry
- NMR Sensors and Circuits to Measure Soil Moisture *In Situ*
- Mobile NMR Relaxometry for Characterising Peat Soil Decomposition
- Surface-NMR for Soil Moisture Investigation: Principles and Methods-
- Investigation of Soil and Root Water Processes by Coupling MRI with Soil Physical Modelling
- Coupling MRI and Modeling to Investigate Solute and Colloid Transfer – From Homogeneous to Heterogeneous Porous Media
- High-resolution Magnetic Resonance Imaging and Spatially Resolved Spectroscopy in Plants
- Application of NMR and MRI Relaxometry and Diffusometry to Plants Research
- Visualization of Xylem Sap Flow and Freezing Behaviors in Trees Using MRI
- Mobile Magnetic Resonance of Plants: Towards Practical Day-to-day Use
- NMR of Roots in Soil Grown in Field and Greenhouse Conditions
- Coupling of MRI and Modelling
- Root Phenotyping with MRI
- Application of MRI to Shiitake Mushroom Cultivation
- The Potential of Magnetic Resonance for Accurate Measurement of Water Content in Wood

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THEMA: PNFR, PST, TVBP, PNC

BISAC: SCI013010, SCI011000,
SCI013080

Series: New Developments in NMR
Volume 37

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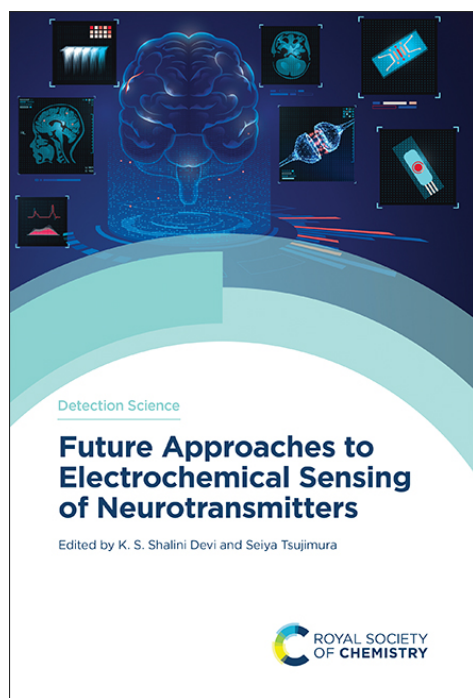
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Future Approaches to Electrochemical Sensing of Neurotransmitters

K S Shalini Devi University of Tsukuba, Japan

Seiya Tsujimura University of Tsukuba, Japan

Synopsis

This volume provides a comprehensive overview of the advancements in wearable and implantable electrochemical sensors for monitoring neurological disorders. Electrochemical sensors offer portability, sensitivity and ease of handling, making real-time, *in situ* detection simpler. The book delves into the strategies, advantages and the limitations of existing devices, as well as the role new materials have in driving advancements in this field. The key contributing factors for their integration in new age technologies such as robots, smart devices, miniaturized sensor chips, and flexible and wearable sensors are reviewed. Researchers from various backgrounds, from materials scientists to healthcare specialists, will find this book informative and valuable.

Brief Contents

- Overview of Neurotransmitter Detection and Its Importance
- Working Principles of Different Techniques Involved in Detection of Neurotransmitters
- List of Biomarkers with Non-invasive Samples, *In Vitro* and *In Vivo* Monitoring Strategies Involved for Neurotransmitter Detection
- Electrochemical Sensors for Detection of Neurotransmitters
- Role of Electrochemical Biosensors in Neurotransmitter Detection
- Design and Development of Immunosensors for Detection of Neurotransmitters
- Screen Printed Electrodes for Detection of Neurotransmitters
- Paper-based Electrodes for Detection of Neurotransmitters
- Microfluidic Interdigitated Electrodes for Determination of Neurotransmitters
- Implantable Microelectrodes for *In Vivo* Monitoring of Neurotransmitters
- Simultaneous Electrochemical Detection of Neurotransmitters
- Existing and Emerging Point-of-Care Devices for Neurotransmitter Detection
- Future Perspectives of Electrochemical Detection of Neurotransmitters

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THEMA: PNRH, TCBS, PSAN, PNF

BISAC: SCI013100, TEC064000,
MED057000, SCI013010

Series: Detection Science Series
Volume 30

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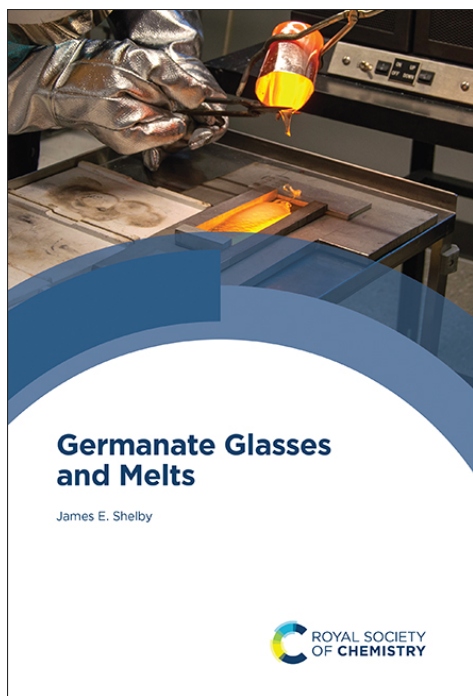
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Germanate Glasses and Melts

James E Shelby Alfred University, USA

Synopsis

This book provides a comprehensive review of the properties, structure, and applications of germanate glasses and melts. These glasses are of great interest to basic glass scientists and the major portion of **Germanate Glasses and Melts** consists of a comprehensive review of the glass and melt properties for an extensive range of compositions.

Brief Contents

- History of Germanate Glasses
- Models for the Structures of Germanate Glasses
- Vitreous GeO_2
- Germanate Glasses Containing Only Glassformers
- Germanate Glasses Containing Conditional Glassformers
- Monovalent Cations in Germanate Glasses and Melts
- Mixed Monovalent Germanate Glasses
- RO Germanate Glasses
- PbO and SnO Germanate Glasses
- Germanate Glasses Containing a Modifier Oxide and either SiO_2 or B_2O_3
- $\text{R}_2\text{O}-\text{M}_2\text{O}_3-\text{GeO}_2$ Glasses
- $\text{RO}-\text{M}_2\text{O}_3-\text{GeO}_2$ Glasses
- Germanate Glasses Containing Nb_2O_5 or Ta_2O_5
- Rare Earths in Germanate Glasses
- Fluorogermanate Glasses
- Applications of Germanate Glasses

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Audience:

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THEMA: TDCQ, TGM, TTB, PNR, PNK

BISAC: TEC021000, TEC008000,
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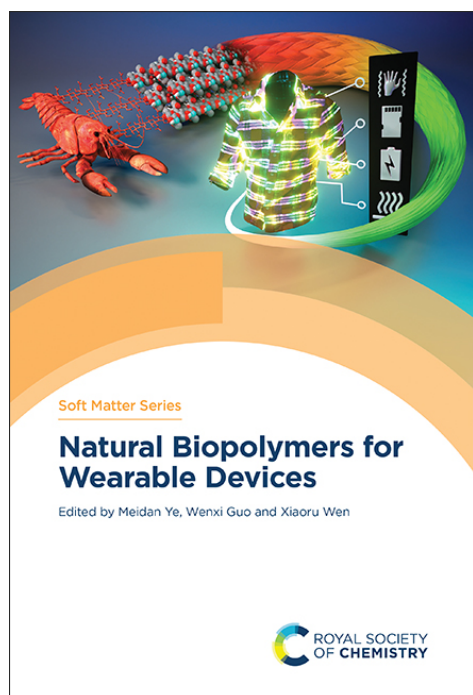
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Natural Biopolymers for Wearable Devices

Meidan Ye Xiamen University, China

Wenxi Guo Xiamen University, China

Xiaoru Wen Inner Mongolia University, Mongolia

Synopsis

Flexible and wearable technologies are gaining wide attention with their promise of applications in sensing, electronics, and energy. The materials involved should be flexible, lightweight, robust, and non-toxic. Natural biopolymers such as silk, chitin, collagen, cellulose, and gelatine have these properties, with the additional benefits of low cost, renewability, and biocompatibility. Taking a closer look at these soft materials and their forms, this book reveals novel multifunctional abilities, paving the way for new devices.

Brief Contents

- Structures, Properties and Fabrication of Silk-based Natural Biopolymer Materials
- Structures, Properties, and Fabrication of Cellulose-based Natural Biopolymer Materials
- Structures, Properties and Fabrication of Chitosan-based Natural Biopolymer Materials
- Natural Biopolymer Materials for Wearable Sensors
- Natural Biopolymer Materials for Flexible Implantable Electronics
- Natural Biopolymer Materials for Flexible Energy Conversion and Storage Devices
- Natural Biopolymer Materials for Multifunctional Triboelectric Nanogenerators

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Pages: 354

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THEMA: TJFD, TGMP, TGMS

BISAC: TEC021040, SCI013060

Series: Soft Matter Series Volume 21

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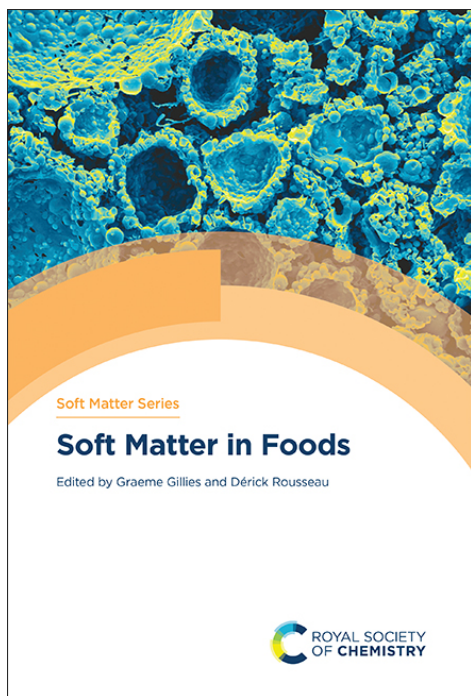
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Advance Book Information



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Soft Matter in Foods

Graeme Gillies Fonterra Co-operative Group Limited, New Zealand

D eric Rousseau Toronto Metropolitan University, Canada

Synopsis

Using soft matter physics to understand food materials at different length scales creates new opportunities in academia and industry to enhance the properties, production, and nutritional quality of processed foods. Chapters on techniques and the behaviour of soft matter systems provide food scientists with new approaches to characterise food. Taking a soft matter approach to a range of real food systems, it demonstrates the synergy between food science and soft matter.

Brief Contents

- Finding a Common Ground in Soft Matter and Food Science
- What Are Our Food/Water Isotherms Really Telling Us? A New Way to Look at Old Data
- Self-assembly of Food-related Lipids
- Modelling Thermodynamics of Food Plasticizers
- Colloids, Suspensions, Foams and Composite Materials
- Rheological Properties and Structure of Colloidal Oleogels and Hydrogels
- Molecular Simulations of Food Biomolecules
- Fluid Mechanics-based Measurement Techniques: Using Rheology and Tribology for Material Characterization and Product Development
- Combined Techniques to Understand the Multiscale Structure and Functionality of Foods
- Recent Advances in Scattering Techniques for Studying Food Emulsions
- Fat Crystallization in Complex Multiphase Systems
- Soft Solids in Dairy
- Gelation of Soy Protein: A Key Aspect of Tofu Processing
- From Fruit and Vegetable Juices to Pur ees: A Story of Soft and Deformable Particle Suspensions
- Ice Cream
- Soft Matter Structuring in Plant-based Meat Analogues
- Applying Soft Matter Principles in Food Oral Processing: The Case of Stickiness
- Bread Dough and Baking Foams

Publisher: Royal Society of Chemistry

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Size: 234 x 156 (Royal 8vo) mm

Pages: 510

BIC: TDCT, PHFC1, PNR

THEMA: TDCT, PHFC1, PNR

BISAC: TEC012010, SCI013050

Series: Soft Matter Series Volume 22

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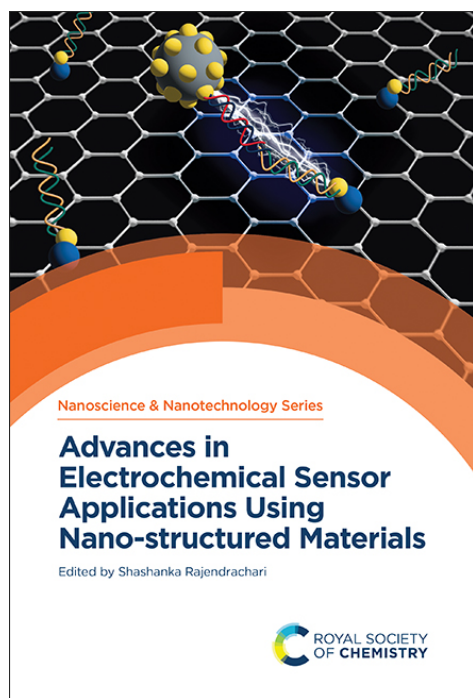
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Advance Book Information



Advances in Electrochemical Sensor Applications Using Nano-structured Materials

Shashanka Rajendrachari SR University, India

Synopsis

Various nanomaterials can be used as possible electrocatalysts for the determination of huge amounts of bioactive compounds, surfactants, dyes, toxic chemicals, food additives, fertilizers, heavy metals, etc. The detection of such compounds in the human body, the environment, food or water is very important for our safety and well-being.

This state-of-the-art book focuses on recent electrochemical and nanomaterials research, taking the reader from basic principles to recent advances, before discussing different techniques and tools for determining the presence of a variety of compounds.

Brief Contents

- A Brief History of Electrochemical Sensors
- Basic Principles of Electrocatalysts
- Discussion of Various Types of Electrochemical Sensing Technology
- Recent Advances in Nanomaterial-based Electrochemical Sensing Devices
- Nanomaterial-incorporated Electrochemical Sensors to Determine Heavy Metal Ions
- Electro-analysis of Food Additives Using Nanomaterial-based Electrochemical Sensors
- Nanomaterial-based Electrochemical Sensing Devices for the Determination of Pesticides
- Nanomaterial-modified Electrodes for the Detection of Various Dyes
- Electrochemical Assessment of DNA-based Nanosensors
- Recent Advances in Nanomaterial-based Electrochemical Sensors for Pharmaceutical and Biomedical Diagnosis
- Development of Electrochemical Sensors for Vitamins and Hormones Using Nanomaterials
- Electrochemical Determination of Statin Drugs by Nanomaterial-based Electrodes
- Nanomaterial-based Neurotransmitter Sensors
- Electrochemical Assessment of Food Quality by Nanomaterial-based Sensors
- Fabrication of Novel Nano-structured Alloy-based Electrochemical Sensors for Various Applications
- Facilitation of Nanomaterial-based Electrochemical Sensors: Design and Processing

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Volume 68

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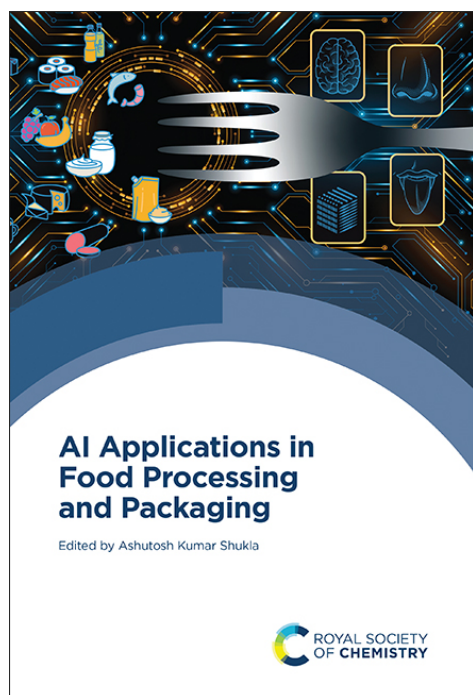
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AI Applications in Food Processing and Packaging

Ashutosh Kumar Shukla Ewing Christian College, India

Synopsis

This edited volume highlights the ways in which AI can be applied to optimization and automation in quality control, processing and packaging of food products. It covers a wide range of food products including oils and fats, milk, fish and fishery products. Filling the gap between literature covering conventional food processing and packaging and current research on AI linked to these areas, initial chapters highlight AI applications including the internet of things (IoT) and big data applications in the food industry. Then coverage details the intelligent integration of many technologies for different applications in the food industry for example non-destructive food quality assessment using digital images assisted by chemometrics, simulations to detect the existence of foreign objects in milk packaging using ultrasonic tomography and AI assisted 3D food printing. New advanced sensing technologies, including electronic noses and tongues, are discussed in detail emphasizing their role in ensuring food product quality and safety.

Key Features and Highlights

- Provides details on how AI can be applied to optimization and automation in quality control, processing and packaging of food products.
- Covers a wide range of food products including oils and fats, milk, fish and fishery products.
- Highlights AI applications in the food industry including the internet of things and big data applications, the intelligent integration of technologies and new advanced sensing technologies, including electronic noses and tongues.

Brief Contents

- Innovations in Food Technology: Intelligent Packaging and Advanced Traceability Solutions
- Artificial Intelligence in Fat and Oil Products: Quality Control and Authentication
- Artificial Intelligence Tools for Processing and Quality Detection of Fish and Fisheries Products
- Big Data in Food Safety and Security Applications and Examples in Food Authenticity, Adulteration and Fraud
- IoT and Big Data in the Food Industry: Future Trends
- Applications of Fuzzy Logic as a Smart Tool for Food Quality Management
- Applications of Artificial Neural Networks (ANNs) in Food Processing Industry
- Digital Images Assisted by Chemometrics to Verify Shelf-life of PANC Leaves
- Ultrasonic Tomography Approach for Detecting Foreign Objects in Milk Packaging: A Simulation Study
- Amalgamation of Nanosensor and AI Technology for Food Safety
- Artificial Intelligence Applications and the Rise of 3D Printers in the Food Industry in the Digitalizing World
- AI Assisted 3D Food Printing Technology: An Overview
- Electronic Nose and Electronic Tongue
- Ionizing Radiation Increasing the Quality of Food Potentially Suitable for AI Perfecting

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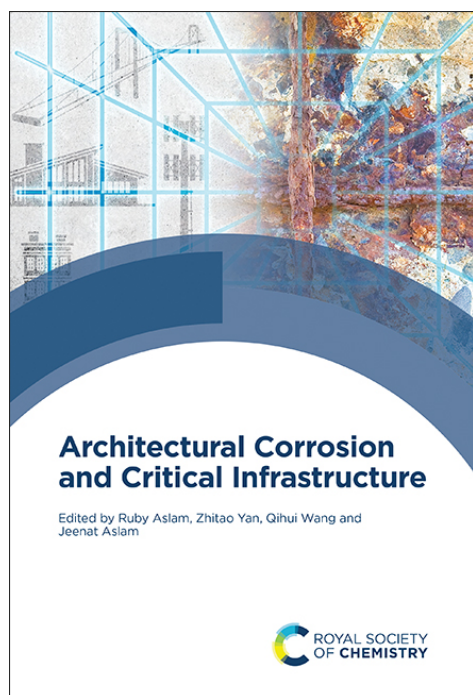
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Architectural Corrosion and Critical Infrastructure

Ruby Aslam Chongqing University of Science and Technology, Chongqing, China

Zhitao Yan Chongqing University of Science and Technology, Chongqing, China

Qihui Wang Chongqing University of Science and Technology, Chongqing, China

Jeenat Aslam Taibah University, Saudi Arabia

Synopsis

Corrosion significantly degrades buildings and infrastructure, impacting the economy and public safety. This book examines corrosion in structures like towers and bridges, exploring chemical processes, environmental and material factors, and maintenance. It covers effective inspection methods, mitigation strategies, and innovative solutions using machine learning and AI. This comprehensive reference is essential for professionals and students in engineering, materials science, architecture, and construction, focusing on preserving critical infrastructure.

Brief Contents

- Understanding the Chemistry and Common Corrosion Issues of Infrastructure Corrosion
- Environmental Factors Influencing Infrastructure Corrosion
- Electrochemical Corrosion Monitoring
- Visual, Surface and Non-destructive Techniques
- Computational Approaches
- Corrosion of Steel and Iron
- Corrosion in Concrete and Masonry
- Corrosion in Residential Buildings and Architectural Structures
- Corrosion in Communication Towers
- Sustainable Approaches to Corrosion Management in Transportation Networks
- Corrosion in Transportation Infrastructure
- Use of Corrosion Inhibitor in Concrete Corrosion
- Use of Protective Coatings and Surface Treatments for Long Term Protection
- Proper Building Design Techniques for Corrosion Resistance
- Use of Cathodic Protection-Systems
- Smart Corrosion Inhibition Techniques for Civil and Marine Infrastructures
- Use of Computer-based Methods in Measuring Aging in Infrastructures

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THEMA: TNK, PNRH, TGMS, TDPM

BISAC: TEC009020, SCI013100,
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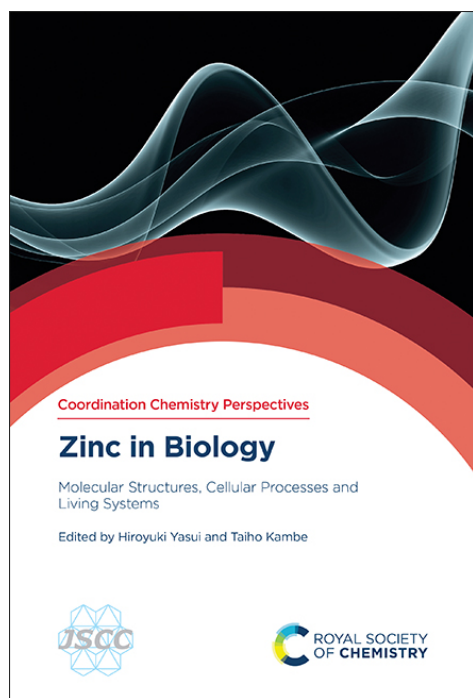
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Zinc in Biology

Molecular Structures, Cellular Processes and Living Systems

Hiroyuki Yasui Kyoto Pharmaceutical University, Japan

Taiho Kambe Kyoto University, Japan

Synopsis

This book highlights the latest progress in zinc biology, from its chemistry to its association with diseases. Zinc is the second most abundant trace metal in living organisms, playing a crucial role in many biological processes. It functions as a catalyst in enzymatic reactions, a structural component in proteins and a signalling molecule in cellular pathways. Zinc homeostasis is tightly regulated by proteins involved in absorption, storage, transport, and utilization. Disruptions in homeostasis are linked to various diseases. Resulting from a 5-year project on integrated biometal science in Japan, this book not only documents the latest research but also fills a gap between chemical understanding and our real life.

Brief Contents

- Quantitative Imaging of Labile Zinc in Intracellular Organelles Using Fluorescent Probes
- Zinc Conditional Proteomics Using Zinc-responsive Protein Labelling Reagent and Recent Examples of Expansion to Other Biometals
- Structure and Biological Activity of Zinc Complexes Coordinated with Chalcogen Atoms
- Structure Activity Relationship of Insulin-mimetic Zinc Complexes Having Hydroxyazine-type Heterocyclic Bidentate Ligands
- Regulation of Zn Absorption Process in the Small Intestine: Functional Insights into Zn Transporters ZIP4 and ZNT1
- Zinc Homeostasis Ensures Protein Homeostasis in the Early Secretory Pathway
- Regulation of Pluripotent Stem Cell Pluripotency and Differentiation Through Zinc Mobilization
- Importance of Zinc in Epigenetic Control
- Role of ZNT5-6 and ZNT7 in Zinc Enzyme Activation
- TRPC6-mediated Zn^{2+} Influx as a Cardioprotective Mediator
- Role of Zinc in Brain Functions, and Brain Zinc Dyshomeostasis
- Regulation of Skin Wound Healing by Zinc and Zinc Transporters
- Role of Zinc Homeostasis in the Pathophysiology of Diabetes
- Zinc Transporters and Zinc Signaling in Disease Pathogenesis
- Roles of Zinc and Zinc Transporters in Breast Cancer
- Role of Zinc in the Pathogenesis of Inflammatory Bowel Disease: From Trace Elements to Zinc Signaling

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| THEMA: | PNK, PNND, PSB |
| BISAC: | SCI013030, SCI013040, SCI007000 |
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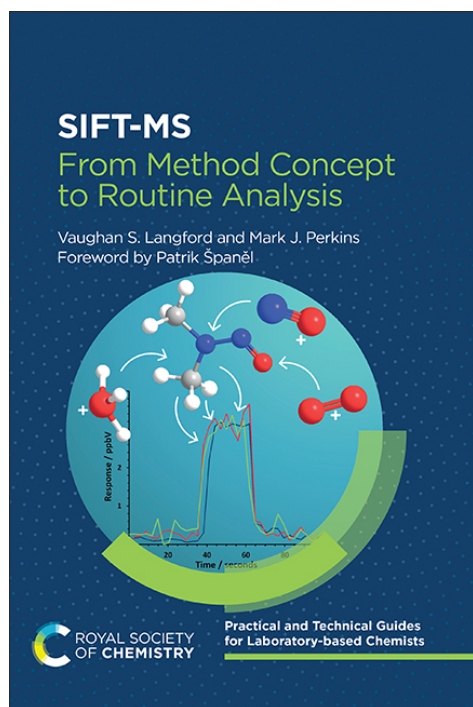
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Audience:

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From Method Concept to Routine Analysis

Vaughan S Langford Syft Technologies Limited, New Zealand

Mark J Perkins Element Lab Solutions, UK

Synopsis

Selected ion flow tube mass spectrometry (SIFT-MS) is a chromatography-free, direct-analysis technique that is ideally suited to real-time, quantitative analysis of volatile compounds in air at trace concentrations. This book provides readers with a broad understanding of the principles of the SIFT-MS technique and how it differs from conventional chromatographic approaches that are used for analysis of volatiles. It will also aid users to identify existing and new methods where adoption of SIFT-MS would be advantageous, e.g. through reduction in sample preparation or higher throughput, and provides the knowledge and insight required to develop best-practice methods and effectively evaluate the data that they generate and approaches to optimising, validating, and transferring methods to routine analysis and other applications. The audience for the book is method developers and laboratory technicians and graduate students.

Key Features and Highlights

- Provides readers with a broad understanding of the principles of the selected ion flow tube mass spectrometry (SIFT-MS) technique and how it differs from conventional chromatographic approaches that are used for analysis of volatiles.
- Gathers the fundamental principles from the literature and laboratory experience to provide a practical textbook for those using SIFT-MS in routine laboratories, research organisations, and academia.
- Includes the knowledge and insight required to develop best-practice methods and effectively evaluate the data that they generate.

Brief Contents

- Introduction
- The Principles of the SIFT-MS Technique
- SIFT-MS Data Analysis
- Sample Preparation and Delivery
- Safety, Maintenance, and Troubleshooting
- Assessing SIFT-MS Method Feasibility (Procedure 1)
- Preparing the Automated SIFT-MS Instrument for Analysis (Procedure 2)
- Method Development – Phase I (Procedure 3)
- Method Development – Phase II (Procedure 4)
- Method Validation and Documentation (Procedure 5)
- Routine Analysis (Procedure 6)
- Modifying an Existing SIFT-MS Method (Procedure 7)
- Data Analysis and Reporting
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Waste Not! How Nanotechnologies Can Increase Efficiencies Throughout Society

Michael Berger Nanowerk LLC, Germany

Synopsis

Waste is a global issue impacting society, the environment, and the economy. This guide explores nanotechnologies as a solution, detailing their role in waste reduction and efficient management. It examines emerging trends, preparing readers for future advancements in nanotechnology and sustainable waste management. Authored by an expert, the book is a valuable resource for a global audience, including individuals, policymakers, and stakeholders, ensuring its continued relevance in the evolving technological landscape.

Brief Contents

- Introduction
- Where Is All the Waste Coming from?
- Where Is All the Waste Going?
- Environmental, Societal, and Economic Impact of Waste
- Novel Nanomaterials and Their Importance
- Application Areas of Nanotechnology
- Enabling Technologies, Interdisciplinary Collaboration, and Societal Implications of Nanotechnology
- Nanotechnology for Waste Reduction and Prevention
- Nanotechnology in Recycling and Waste Treatment
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- Challenges in Implementing Nanotechnology Solutions
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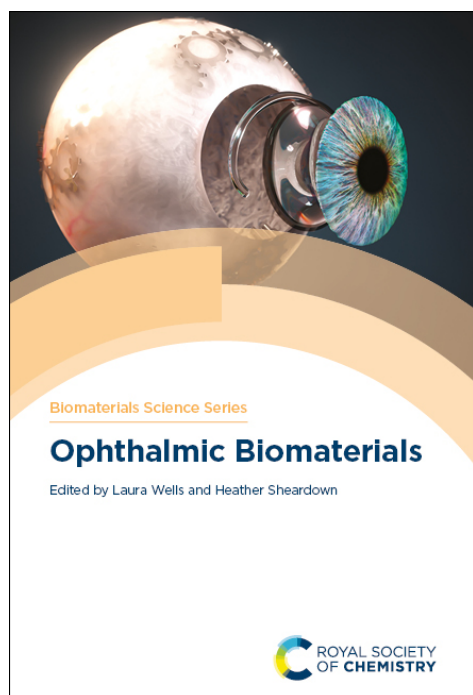
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Ophthalmic Biomaterials

Laura Wells Queen's University, Canada

Heather Sheardown McMaster University, Canada

Synopsis

Bridging the gap between biomaterials scientists and ophthalmologists, this book includes overviews of devices and cutting-edge research on current and future strategies to treat acute and chronic diseases in the eye. Edited by leaders in the field, the book provides perspectives for both biomaterials scientists and ophthalmologists. Suitable for those working in biomaterials science, biomedical engineering, chemical engineering, and clinicians specialising in ophthalmology, as well as those working in polymer science-based medical technologies.

Brief Contents

- Anatomy and Physiology of the Eye
- Contact Lenses: Current Designs and New Strategies
- Intraocular Lenses
- Vitreous Substitutes
- Emerging Biomaterials for Retinal Implants
- Orbital Implants After Enucleation and Evisceration
- Use of Modern Biomaterials in Ocular and Facial Prostheses
- Strategies to Replace and Regenerate the Cornea and Other Tissues in the Anterior Segment
- Biomaterials in Retinal Regeneration
- Tarsal Plate Substitutes in Modern Reconstructive Plastic Surgery of Eyelids
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