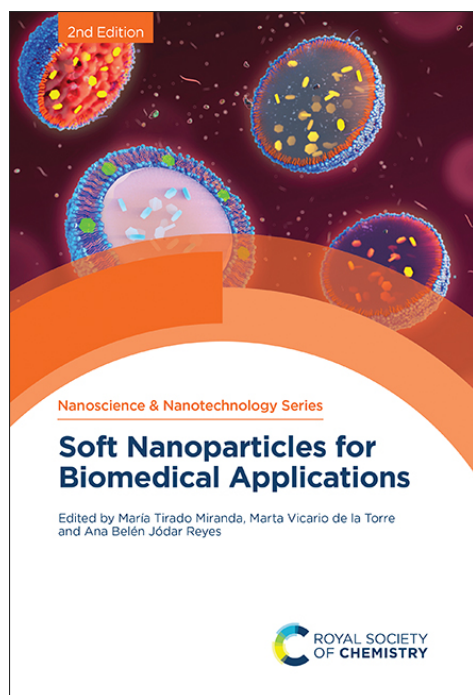


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Soft Nanoparticles for Biomedical Applications

María Tirado Miranda University of Granada, Spain

Marta Vicario de la Torre Universidad Complutense Madrid, Spain

Ana Belén Jódar Reyes Universidad de Granada, Spain

Synopsis

This fully revised and updated second edition of the popular 2014 title presents a detailed review of soft nanoparticles and their biomedical applications which range from imaging to therapeutics and diagnostics. Each chapter provides a description of the synthesis of the particles and, in addition, the book covers techniques used to characterize the nanoparticles including modelling and simulation methods, together presenting a strong physicochemical approach to the topic.

This new edition updates many of the original chapters, providing current insight into the field, and three new chapters focusing on extracellular vesicles, micro- and nano-emulsions and water-in-water emulsions, and nanoparticles for multiple sclerosis.

Given the multidisciplinary nature of the topic, this book – edited by experts in the field – is suitable for postgraduates and academics who work at the soft matter junction of physics, chemistry and biology.

Brief Contents

- Introductory Aspects of Soft Nanoparticles
- Experimental Techniques Used for the Characterization of Soft Nanoparticles
- Nanogels for Drug Delivery: The Key Role of Nanogel–Drug Interactions
- Polymeric Micelles
- DNA Particles
- Dendrimers
- Bicellar Systems: Characterization and Skin Applications
- Computer Simulations of Soft Nanoparticles and Their Interactions with DNA-like Polyelectrolytes
- What Are Extracellular Vesicles? Implications in the Pathophysiology of Diseases and Infections and Current Biomedical Applications
- Liquid–Liquid Colloidal Systems as Advanced Biomedical Nanocarriers
- Potential Applications of Micro/Nanoparticles in Diagnosis and Therapeutics of Autoimmune Neurological Disorders

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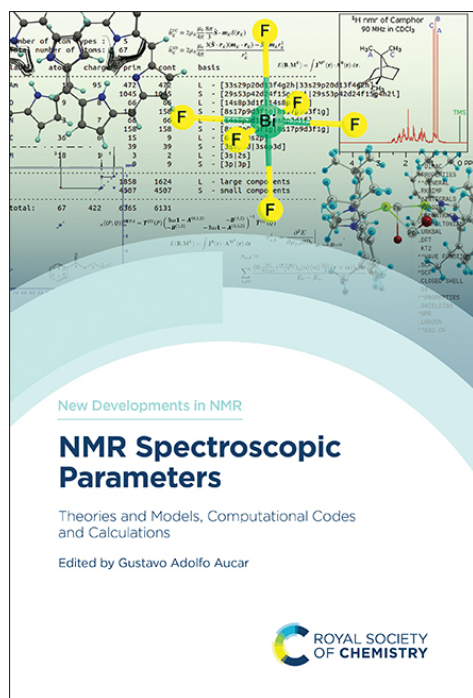
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Series: New Developments in NMR
Volume 38

NMR Spectroscopic Parameters

Theories and Models, Computational Codes and Calculations

Gustavo Adolfo Aucar Northeastern University of Argentina (UNNE), Argentina

Synopsis

NMR spectroscopy is one of the most useful tools to get reliable information about both the geometrical and the electronic structures of small-size (containing few atoms) to large-size (containing thousands of atoms) molecules. It can also give information about subtle and intrinsic characteristics of those molecules or chemical processes in which the nuclei that resonate by NMR are involved. To get this information requires both the computation and theoretical analysis of the spectroscopic parameters. This book provides a basic presentation, which is as thorough as possible, of the most commonly used theories and models for the theoretical understanding and calculation of the spectroscopic parameters of NMR spectroscopy. This information is combined with their applications in both model systems and complex systems, highly accurate calculations for small-size molecules and their calculations in fragments of DNA, larger compounds and solid-state quantum systems. The authors have been encouraged to present the most insightful ideas and the most important findings that one can get from NMR spectroscopy as well as its limitations or drawbacks. This book is aimed at undergraduate and graduate students, specialists and, possibly, industry workers who will find information about the theoretical developments that have been performed in the past decade.

Brief Contents

- An Introduction to Quantum Chemical Methods for the Calculation of NMR Parameters: Different Sides of the Coin
- Polarization Propagator Calculations of NMR Spin-Spin Coupling Constants
- NMR Spectroscopic Parameters in Local Exact Two-component Theory
- The Two-component LRESC Model
- Magnetically Induced Current Densities and Nuclear Magnetic Shielding Constants
- Computation of NMR Parameters in Solids
- New Understandings of NMR Spectroscopic Parameters Arising from Relativistic Polarization Propagators
- Basis Sets for Calculating Nuclear Magnetic Resonance Parameters
- Analysis of NMR Spectroscopic Parameters
- NMR and Fundamental Experiments to Probe Bound-state QED in Strong Electric and Magnetic Fields
- Hydrogen Bonds and NMR
- Computational NMR Spectroscopy of Ionic Liquids
- Paramagnetic NMR Modeling for Molecules with Significant Orbital Contribution

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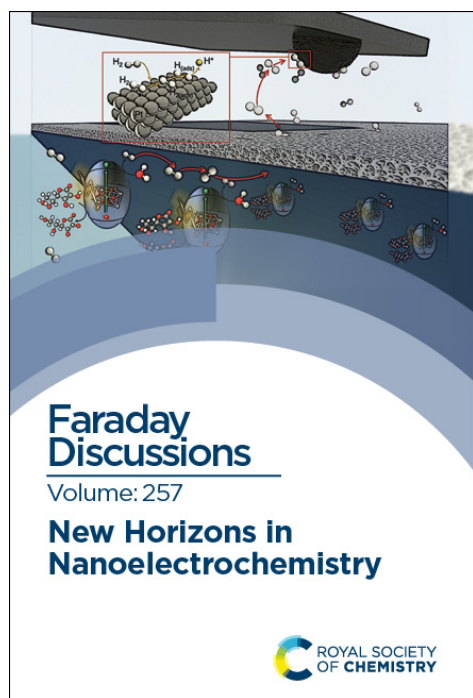
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New Horizons in Nanoelectrochemistry

Faraday Discussion 257

Synopsis

The fundamental steps of electrochemistry occur at the nanoscale, and therefore through studying nanoelectrochemistry we can further our knowledge of electrochemical processes. Trying to expand our insight of these steps presents significant challenges, but new approaches and technologies mean our understanding has expanded greatly in recent years. This Faraday Discussion focuses on recent advances in nanoelectrochemistry, in which individual, transient intermediates and fast charge transfer at the nanointerface can be probed, enabling a comprehensive understanding of electrochemistry at any scale, from single entity to ensemble.

Brief Contents

- Confined nanopore electrochemistry
- Scanning electrochemical probe microscopy
- Spectroelectrochemistry and light active processes at the nanointerface
- Systems nanoelectrochemistry: from single-entity to ensemble

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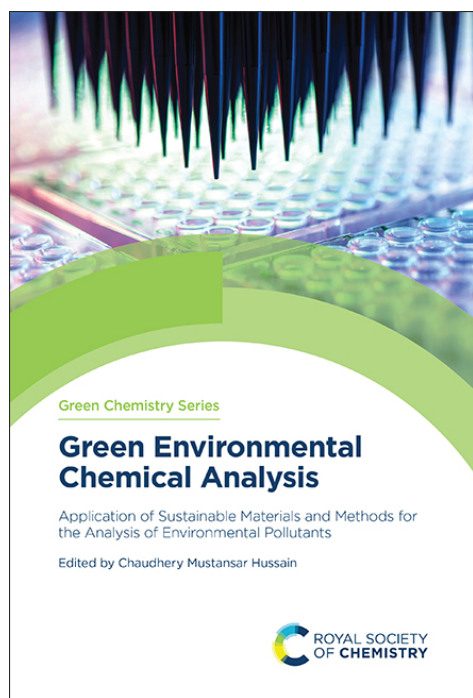
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Green Environmental Chemical Analysis

Application of Sustainable Materials and Methods for the Analysis of Environmental Pollutants

Chaudhery Mustansar Hussain New Jersey Institute of Technology, USA

Synopsis

This book promotes green environmental chemical analysis with the plan for a more sustainable and ecologically conscious future. Covering the whole spectrum of green environmental chemical analysis techniques including their concepts, new materials and applications, the content showcases the utilization of alternative solvents, renewable resources and energy-efficient processes. Providing practical insights for researchers and practitioners seeking to adopt greener practices in their laboratories, the scope extends to the integration of emerging technologies such as microfluidics, sensor technologies and artificial intelligence. Additionally, it offers case studies and real-world applications to illustrate successful environmental chemical analysis.

Brief Contents

- Green Analytical Chemistry Metrics
- Green Solvents in Analytical Chemistry
- Metal Oxide Particles: Green Synthesis, *In Situ* Methodologies, and Industrial Case Studies
- Sustainable Innovations in Environmental Pollutant Analysis: Advances Through Green Methods and Emerging Technologies
- Solid-phase Microextraction in Green Chemical Analysis
- Green Liquid-Liquid Extraction for Environmental Chemicals
- Green Chromatography for Environmental Chemical Analysis
- Membrane Technologies for Separation Processes in Decontamination Strategies
- Membrane-based Separation for Green Chemistry
- Harnessing Artificial Intelligence for Sustainable Environmental Technologies and Innovation
- Green Sensors
- Green Chemo/Nanosensors: From Sensing Approaches to the Latest Advances
- Advanced Green Optical Chemosensors for Environmental Pollutants
- Green and Sustainable Sensor Fabrication and Sensing Effectiveness: Carbon-based and Cement-based Sensors
- Green Sensors for Environmental Chemical Detection and Monitoring
- Green Separation Techniques for Environmental Chemicals
- Green Nanomaterial-based Electrochemical Sensors for Health and Environmental Monitoring
- Sustainable Sorbents in Environmental Analysis

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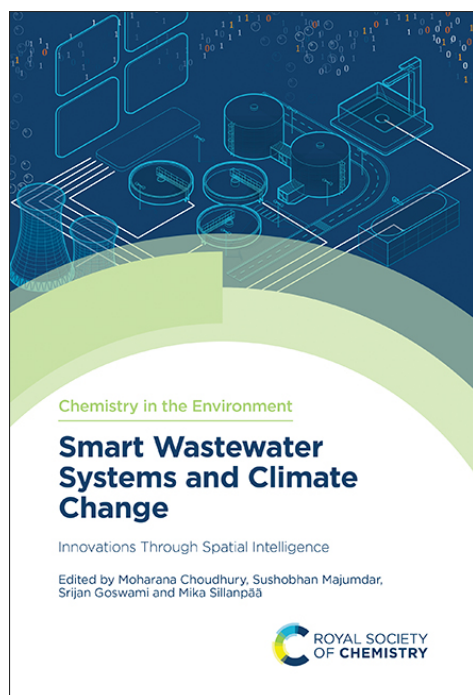
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Smart Wastewater Systems and Climate Change

Innovations Through Spatial Intelligence

Moharana Choudhury Voice of Environment (VoE), India

Sushobhan Majumdar Jadavpur University, India

Srijan Goswami Voice of Environment, India

Mika Sillanpää University of Johannesburg, South Africa

Synopsis

The changes in temperature and rainfall that will come with climate change combined with dense and growing populations will put huge stress on our wastewater systems. Smart systems use sensors, data analytics, and automation to enable real-time monitoring, data-driven decision-making, and enhanced control. **Smart Wastewater Systems and Climate Change** presents the ways smart technology can be used to improve wastewater management and increase the climate resilience of wastewater systems.

Brief Contents

- The Emergence and Impact of Smart Systems
- Smart Integration: Designing Effective Frameworks for Enhanced Storm Water Management in Urban Areas
- Spatial Intelligence Integration in Smart Wastewater Systems
- A Roadmap for Transitioning to Smart Wastewater Systems
- Defining Spatial Intelligence for Effective Management
- Optimizing Wastewater Management Through Geospatial Analysis and Modeling
- Adaptive Control Systems in Anaerobic Digestion Efficiency Enhancement
- Predictive Modeling for Wastewater Infrastructure Sustainability
- Innovations in Resource Recovery and Wastewater Management for Sustainable Futures
- Emergency Response Strategies in Wastewater Management
- Disaster Preparedness and Emergency Response Strategies
- Climate Change Effects on Wastewater
- Assessing Vulnerabilities and Mitigating Risks in Wastewater Infrastructure
- Revolutionizing Wastewater Treatment
- Challenges in Adapting Wastewater Systems to Climate Change
- Big Data Challenges and Opportunities in Wastewater Management
- -Machine Learning and AI in Decision-making Processes
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- Exploring the Future of Smart Wastewater Systems

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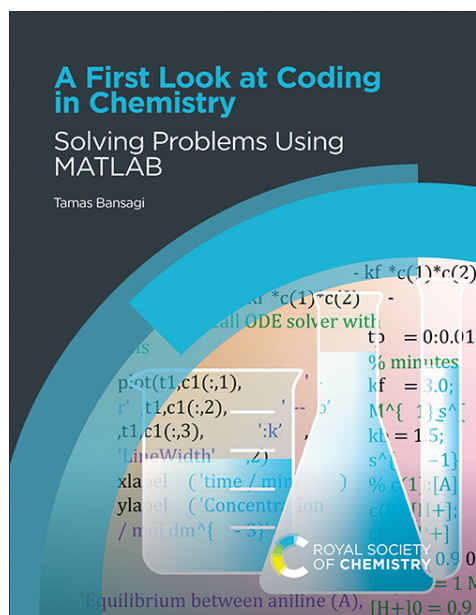
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A First Look at Coding in Chemistry Solving Problems Using MATLAB

Tamas Bansagi University of Southampton, UK

Synopsis

Focusing on developing basic coding skills in chemistry, this concise introductory text takes a problem-based approach and is organized in a workbook style for helping those new to programming. Discussions on coding are viewed from a chemistry perspective and embedded in solving problems familiar to most first-year undergraduate chemistry students. While primarily building programming and broadly-applicable related skills, some topics in data analysis and presentation, uncertainties in measurements, and areas of mathematics relevant to these and chemistry are also briefly surveyed.

Key Features and Highlights

- Maths, statistics and programming are unified into one book.
- Discusses material through chemistry-based scenarios and worked examples.
- Is oriented to problem solving with a strong workbook feel to enhance engagement.

Brief Contents

- MATLAB Basics
- Scripts and Their Applications to Chemistry
- Presenting Data in Chemistry: Plots and Charts
- Curve Fitting in Chemistry
- Measurements and Their Uncertainties
- Propagation of Uncertainties (Errors)
- Vectors and Their Uses in Chemistry
- Matrices in Chemistry
- One-line Functions and Kinetic Modelling
- Self-controlling Code
- Maths for Chemistry with MATLAB I
- Maths for Chemistry with MATLAB II

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