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Advanced Diffusion Encoding Methods in MRI

Daniel Topgaard Lund University, Sweden

Synopsis

The medical MRI community is by far the largest user of diffusion NMR techniques and this book captures the current surge of methods and provides a primary source to aid adoption in this field. Recently published papers indicate great potential for improved diagnosis of the numerous pathological conditions associated with changes of tissue microstructure that are invisible to conventional diffusion MRI. This book disseminates these recent developments to the wider community of MRI researchers and clinicians. The chapters cover the theoretical basis, hardware and pulse sequences, data analysis and validation, and recent applications aimed at promoting further growth in the field.

Brief Contents

- Diffusion Encoding with General Gradient Waveforms
- Diffusion Anisotropy and Tensor-valued Diffusion Encoding
- Restricted Diffusion and Spectral Content of the Gradient Waveforms
- Disentangling Intercompartment Exchange from Restricted Diffusion
- Resolving Incoherent Flow from Diffusion Using Velocity-compensated Diffusion Encoding
- Estimating Chemical and Microstructural Heterogeneity by Correlating Relaxation Rates and Diffusion Tensors
- Hardware for Generating Modulated Gradient Waveforms with High Precision

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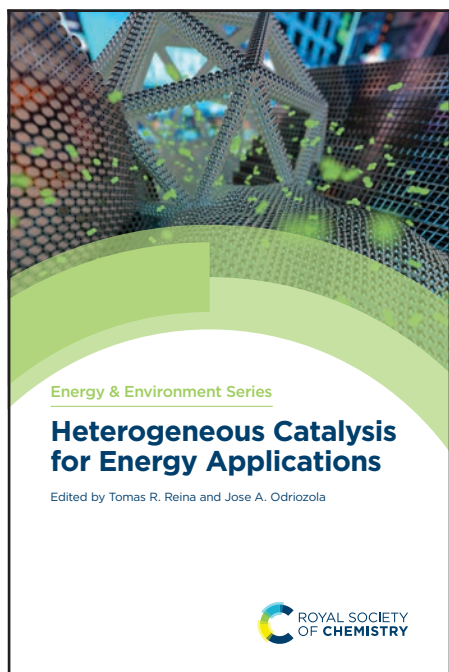
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Heterogeneous Catalysis for Energy Applications

Tomas R Reina University of Surrey, UK
Jose A Odriozola Universidad de Sevilla, Spain

Synopsis

Heterogeneous catalysis plays a central role in the global energy paradigm, with practically all energy-related process relying on a catalyst at a certain point. This book provides an overview of the design, limitations and challenges of heterogeneous catalysts for energy applications. With contributions from leaders in the field, Heterogeneous Catalysis for Energy Applications is an essential toolkit for chemists, physicists, chemical engineers and industrials working on energy.

Brief Contents

- Design of advanced catalysts for natural gas reforming reactions
- Catalysis for industrial hydrocracking processes
- Catalytic Upgrading of hydrocarbon: approaches using sub and supercritical water as reaction media
- Sustainable photocatalytic materials for clean energy applications
- Catalytic Technologies for clean hydrogen production
- Application of solid catalysts on catalytic conversion of biomass into valuable chemicals
- Catalysis in modern bio-refineries: towards a new bio-energy paradigm
- Microchannel reactors, structured catalysts and non-conventional reactor design for energy applications

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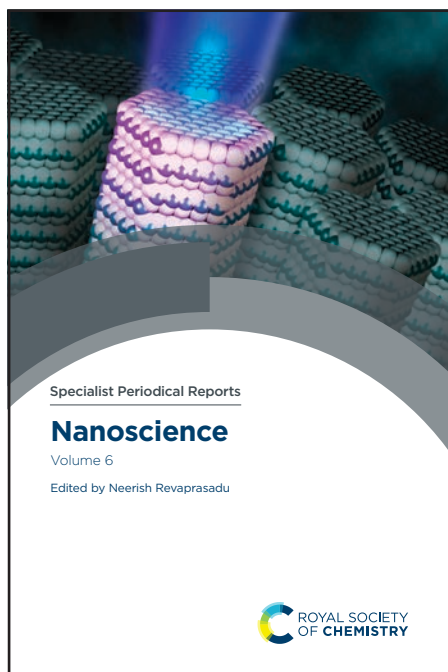
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Nanoscience

Volume 6

Neerish Revaprasadu University of Zululand, South Africa

Synopsis

The field of nanoscience continues to grow and, with such a vast landscape of material, careful distillation of the most important discoveries will help researchers find the key information they require. Nanoscience provides a critical and comprehensive assessment of the most recent research and opinion from across the globe. Anyone practising in any nano-allied field, or wishing to enter the nano-world will benefit from this resource, presenting the current thought and applications of nanoscience.

Brief Contents

- Metal-organic Precursors for Ternary and Quaternary Metal Chalcogenide Nanoparticles and Thin Films
- Fundamentals of Metal Halide Perovskite Nanomaterials: Synthetic Protocols, Properties and their Smart Applications
- Nanoparticles and Nanocomposites for New Permanent Magnets
- 2-Dimensional Magnetic Materials for Spintronics Technology
- Broadening the Horizon for Supercapacitor Research via 2D Material Systems
- Graphene-based Materials for Energy Conversion Applications

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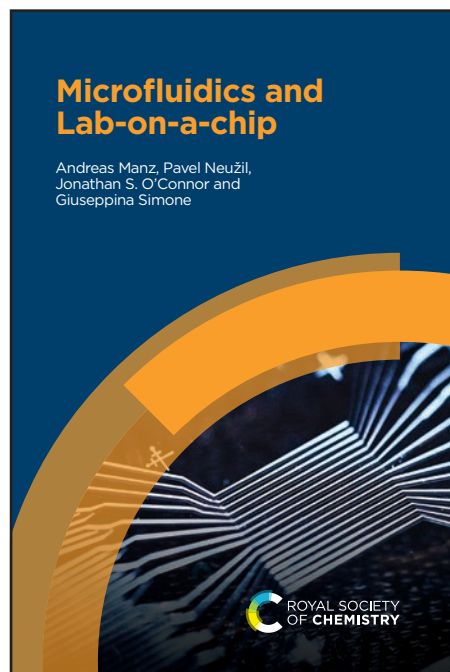
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Microfluidics and Lab-on-a-chip

Andreas Manz Universität des Saarlandes, Germany
Pavel Neuzil Northwestern Polytechnical University, China
Jonathan S O'Connor Universität des Saarlandes, Germany
Giuseppina Simone Northwestern Polytechnical University, China

Synopsis

Covering the fast and dynamic development of miniaturization, μ TAS and microfluidics, this accessible text is unique in its approach. The chapters provide the tools for analysing phenomena from the scientific point of view and aids for implementing quantitative/qualitative models including applications in cell biology and bioanalytical chemistry. Providing a short, affordable text for students that includes sufficient information to open up this area to them, this book is useful to a wide audience, students that for the first time approach the field, as well as engineers, physicians, cell biologists, biochemists, microbiologists, geneticists, and medical researchers.

Brief Contents

- Theory of Microfluidics
- Device Fabrication
- Layout of Microfluidic Chips
- Engineering Surfaces
- Forces in Microfluidics
- Flow Control
- Valving and Pumping
- Mixing
- Droplet Formation and Manipulation
- Extraction and Reactions

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