Attosecond Molecular Dynamics

Marc J J Vrakking Max Born Institute, Germany
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Synopsis
Presenting an overview of theory behind attosecond science, this book explains and predicts manifestations of attosecond timescale dynamics in molecular systems. It is ideal for theoretical chemists wanting to better understand molecular dynamics at the ultrafast scale.

Brief Contents
- theoretical description of correlation-induced dynamics using multi-electronic approaches
- quantum chemistry methods applied to the description of pump-probe schemes
- "time-space" implementation of time-dependent density functional theory
- descriptions of highly non-linear interactions between light and one/few-atom systems
- fully ab-initio electron-nuclear dynamics in diatomic molecules
- non-adiabatic electro-nuclear dynamics and multi-electronic propagation
- hole and electron dynamics in molecules

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Chemical and Biological Synthesis
Enabling Approaches for Understanding Biology

Nick J Westwood University of St Andrews, UK
Adam Nelson University of Leeds, UK

Synopsis
Through a series of recent case studies, this book summarises and showcases the ways in which the preparation of new chemical tools by synthesis has had a major impact in chemical biology. The book provides synthetic chemists with the broader context to which their work contributes and the biological questions that can be addressed through it. It also introduces synthetic techniques and methods to those who wish to incorporate synthesis for the first time into their biology-focussed research programs. It will be a useful guide to postgraduate students and researchers in synthetic organic chemistry and chemical biology.

Brief Contents
- Synthetic tools for the elucidation of biological mechanisms
- The Application of Diversity-Oriented Synthesis in Chemical Biology
- Biology-Oriented Synthesis
- Lead- and Fragment-Oriented Synthesis
- Principles and Applications of Fragment Based Drug Discovery for Chemical Probes
- Function-driven discovery of bioactive small molecules
- DNA-Encoded Library Technology (ELT)
- Engineering Chemistry to Enable Bioactive Small Molecule Discovery
- Genetically-encoded cyclic peptide libraries

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Click Polymerization

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Ben Zhong Tang The Hong Kong University of Science and Technology, Hong Kong

Synopsis
A comprehensive summary of the recently emerged technique of click polymerization, edited by world renowned experts. From the basic knowledge through to the recent progress of click polymerizations, the book provides a complete overview for readers. This authoritative guide will provide an excellent resource for graduate students and researchers interested in polymer chemistry and materials science.

Brief Contents
- Overview of the click polymerization
- Transition-metal catalysed click polymerization
- Metal-free click polymerization of azide and alkyne
- Catalyst-Free Click Polymerisation Using Nitrile N-Oxides Applicable to Various Dipolarophiles
- Thiol-yne click polymerization
- Proton Transfer Polymerization through Thiol-Epoxy and Amine-Epoxy ‘Click’ Reactions
- Multicomponent Polymerization Mediated by the Click Chemistry

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Electrospinning
From Basic Research to Commercialization

Erich Kny Austrian Institute of Technology
Kajal Ghosal Dr. B. C. Roy College of Pharmacy and Allied Health Sciences, India
Sabu Thomas Mahatma Gandhi University, India

Synopsis
Electrospinning is a technique used to produce nanofibres from a polymer solution using an electrostatic force. The technology is now being used to create materials for a wide variety of uses. This new book focusses on recent developments and understanding the commercial applications of electrospinning. The book will be suitable for graduate students, academics and industrial entrepreneurs in materials science, polymer science and chemical engineering as well as those interested in the energy and health applications of the materials.

Brief Contents
- Biomimetic Electrospun Composites
- Characterization
- Cell Electrospinning and Technology Transfer from Lab to Market Scale
- Electrospun Scaffold and 3D Biomimetic Requirements
- Electrospun Fibres Transformation Towards Tissue-Engineering
- Electrospun Fibers for Advanced Wound Care
- Electrospinning and 3D Printing
- Industrial Applications of Super-Hydrophobic Surfaces
- Large Scale Production of Electrospun Based Mat to Explore in Electronics and Sensors

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Co-crystals
Preparation, Characterization and Applications
Christer B Aakeröy Kansas State University, USA
Abhijeet S Sinha Kansas State University, USA

Synopsis
Applications of co-crystals are varied and in the past decade this area of research has received tremendous attention from academia and industry alike. This book not only focusses on the effective design of co-crystals based on hydrogen- or halogen-bonds, but it also provides insights into practical synthesis and characterization of co-crystals. It also highlights the more recent but increasingly important practical applications of co-crystallization in, for example, pharmaceuticals, energetic materials, and separation technology. Postgraduate students and researchers new to applied co-crystal research and crystal engineering will find this a useful resource.

Brief Contents
- Co-crystals: Introduction and scope
- Design and assembly of hydrogen-bonded co-crystals
- Design and assembly of halogen-bonded co-crystals
- Applications of halogen-bonded co-crystals
- Preparation and characterization of co-crystals
- Pharmaceutical co-crystals
- Co-crystallization of energetic materials
- Co-crystals with magnetic properties
- Electronic and optical properties of co-crystals
- Co-crystallization as a versatile tool in separations technology
Molecular Gels
Structure and Dynamics
Richard G Weiss Georgetown University, USA

Synopsis
Edited and authored by leading researchers, this book provides a timely update of the molecular gels field. Chapters examine the physical chemistry of molecular gels, including the most recent theories, experimental techniques and computational approaches. Final chapters on applications of molecular gels illustrate, with modern case studies, the principles developed in previous chapters. This will be an indispensable resource for postgraduate students and researchers in supramolecular chemistry, materials science, polymer chemistry, soft matter and chemical engineering.

Brief Contents
- Viscoelastic Properties
- Thermodynamic Aspects
- Aggregation Steps to SAFINs
- Gelator Efficiencies
- Interfacial Considerations
- Stimulus Responses
- Techniques at Different Distance Scales
- Applications;
Paramagnetism in Experimental Biomolecular NMR

Claudio Luchinat University of Florence
Giacomo Parigi University of Florence, Italy
Enrico Ravera University of Florence, Italy

Synopsis
Paramagnetic NMR is a growing technique which represents an increasingly important tool for the investigation of biomolecules. This book presents an update and overview of the paramagnetic NMR effects as well as guidelines for practical implementation of state-of-the-art experiments. All experiments are backed up by a solid theoretical foundation. Compiled by experts in the field, this book has international appeal for researchers as well as students interested in magnetic resonance and structural biology who require experimental support.

Brief Contents
- NMR Consequences of the Nucleus-Electron Spin Interactions
- Intrinsic and Extrinsic Paramagnetic Probes
- Structural and Dynamic Characterization of Protein Domains Using Paramagnetic Data
- Treating Biomacromolecular Conformational Variability
- Protein-Protein Interactions
- Solid-State NMR of Paramagnetic Proteins
- Relaxometry and Contrast Agents
- Dynamic Nuclear Polarization
- Paramagnetic NMR in Drug Discovery
Advance Book Information

Pre-combustion Carbon Dioxide Capture Materials

Qiang Wang Beijing Forestry University, China

Synopsis
The book covers the use of inorganic materials for pre-combustion carbon dioxide capture materials including layered double hydroxides derived sorbents; magnesium oxide based sorbents; calcium oxide based sorbents; and alkali ceramics based sorbents. The emphasis is on the design, synthesis, characterization, performance, mechanism, and application of these different inorganic materials.

Brief Contents

- Layered Double Hydroxides Derived Intermediate-temperature CO2 Sorbents
- MgO-Based Intermediate-temperature CO2 Sorbents
- CaO Based High-temperature CO2 Sorbents
- Alkali Ceramics Based High-temperature CO2 Sorbents
- Application Status of Pre-combustion CO2 Capture Materials

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