Biobased Smart Polyurethane Nanocomposites

From Synthesis to Applications

Niranjan Karak, Tezpur University, India

Synopsis
Polyurethane nanocomposites present an attractive and sustainable way for designing smart materials that can be used in packaging, health and energy applications. The book brings together the most recent research in the field from the basic concepts through to their application in paints and surface coatings, shape memory, self-healing, self-cleaning, biomaterials and packaging materials. Written by a leading expert on polyurethane nanocomposites, the book is a great introduction to this smart material and its applications.

Brief Contents
- Biobased Hyperbranched Polyurethane
- Nanomaterials for Polyurethane
- Biobased Polyurethane Nanocomposites
- Surface Coatings and Paints
- Shape Memory
- Self-healing
- Self-cleaning
- Biomaterials
- Packaging
- Miscellaneous Other Applications

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Bio-resources: Feeding a Sustainable Chemical Industry

Faraday Discussion

Synopsis
There is a rapid growth of interest in the use of renewable resources, and in particular bio-resources for the manufacture of future, sustainable chemicals and materials. This Faraday Discussion addresses some of the critical issues in this field by bringing together experts in different but complementary areas in the chemical sciences.

Brief Contents
- Bio-bases Materials
- Bio-based Chemicals
- Conversion Technologies
- Feedstocks and Analysis

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Intermolecular Interactions in Crystals
Fundamentals of Crystal Engineering
Juan Novoa University of Barcelona, Spain

Synopsis
Crystal Engineering concerns the design and synthesis of molecular crystals with desired properties, which requires a deep understanding of intermolecular interactions. This new book brings together all the current information about the most relevant intermolecular interactions providing an introductory text for graduates. The textbook introduces the nature and identification of bonds and the latest knowledge of their physical meaning. Properties of the most relevant intermolecular bonds identified in molecular crystals are described. Cooperative effects from different bond types present in one solid are also explained.

Brief Contents

- Part A: Basic concepts on intermolecular interactions
- Intermolecular interactions and bonds in crystals. A general view
- Theoretical models of the chemical and intermolecular bond
- On the meaning of bonds
- The importance of repulsive intermolecular interactions in crystals
- Experimental detection of intermolecular bonds using STM techniques
- Intermolecular bonds as seen from theoretical/experimental AIM analysis
- Spectroscopic MW techniques for the study of intermolecular interactions
- Spectroscopic vibrational techniques for the study of intermolecular interactions

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Ionic Liquid Devices
Ali Eftekhari Ulster University, UK

Synopsis
The use of ionic liquids as a monomer for polymers is a rapidly emerging field providing many applications as smart materials including ionic electromechanically actuators, shape-memory gels and responsive hydrogels, electrochromic devices and drug delivery. This two-volume set provides the first comprehensive overview of the applications of ionic liquids as smart materials. The book is aimed at researchers and students in materials science, polymer science, chemistry and physics interested in the design and applications of the materials.

Brief Contents
- Novel Analytical Techniques For Smart Ionic Liquid Materials
- High-Resolution Structural Analysis on Ionic-Liquid/Solid Interfaces By Atomic Force Microscopy
- Electron Microscopy Using Ionic Liquids For Wet Materials
- Ionic Liquid-Based Surfactants
- Surfactant Fluorinated Ionic Liquids
- Ion Solvation and Transport in Ionic Liquids and Ionogels
- Laser Deposition of Nano-Ionic Liquids and Their Process Applications
- Artificial Intelligence in Ionic Liquids
- Smart Design of Sustainable and Efficient Ionic Liquids

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Inorganic Two-dimensional Nanomaterials
Fundamental Understanding, Characterizations and Energy Applications
Changzheng Wu
University of Science and Technology of China, China

Synopsis
The book provides an overview of the development of inorganic two-dimensional nanomaterials from computational simulation and theoretical understanding to applications in energy conversion and storage. This book will be of interest to those working in industry and academia, particularly in the areas of materials chemistry, physics, energy and catalysis.

Brief Contents
- Exploring Two-Dimensional Crystals with Atomic Thickness from Molecular Design and Global Structure Search
- Degree of buckling on mechanics of ultrathin sheets
- Surface modification for engineering the intrinsic magnetic properties of inorganic 2D nanomaterials
- Optical and optoelectronic properties of two-dimensional materials
- Solid-state Synthesis of two-dimensional layered crystal
- Liquid Phase Synthesis of Two-Dimensional Crystals: from Top-down to Bottom-up
- Growth mechanism of 2D nanomaterials

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Organometallic Chemistry
Volume 41

Ian Fairlamb University of York, UK Jason M. Lynam University of York, UK Nathan Patmore University of Huddersfield, UK Paul Elliot University of Huddersfield, UK

Synopsis
With the increase in volume, velocity and variety of information, researchers can find it difficult to keep up to date with the literature in their field. This interdisciplinary field has the potential to provide answers to problems and challenges faced in catalysis, synthetic organic chemistry and the development of therapeutic agents and new materials. Providing an invaluable volume, Organometallic Chemistry Volume 41 contains analysed, evaluated and distilled information on the latest in organometallic chemistry research including developments and applications of Lewis acidic boron reagents, masked low-coordinate main group species in synthesis and the diiron centre.

Brief Contents
- Recent Developments and Applications of Lewis Acidic Boron Reagents
- Masked Low-Coordinate Main Group Species in Synthesis
- The Diiron Centre: Fe2(CO)9 and friends
- Taddol and Binol-derived Chiral Phosphonites in Asymmetric Catalysis
- Gold-catalysed C-F Bond Activation
- Silylamides
- Towards a Half-century of Stabilising Remarkable f-Element Chemistry
Polymerized Ionic Liquids

Ali Eftekhar | Ulster University, UK

Synopsis
The use of ionic liquids as a monomer for polymers is a rapidly emerging field providing many applications as smart materials including ionic electromechanically actuators, shape-memory gels and responsive hydrogels, electrochromic devices and drug delivery. This two-volume set provides the first comprehensive overview of the applications of ionic liquids as smart materials. The book is aimed at researchers and students in materials science, polymer science, chemistry and physics interested in the design and applications of the materials.

Brief Contents
- Polymerization of Ionic Liquids
- Nanoporous Polymerized Ionic Liquids
- Cationic and Anionic Polymerized Ionic Liquids
- Switchable Hydrophobicity and Hydrophilicity
- Switchable Polarity
- Stimuli Responsive Smart Fluids Based on Ionic Liquids and Poly(ionic liquid)
- Thermoresponsive Poly(ionic liquid) Prepared Via One-Step Crosslinking Copolymerization
- Redox Active Immobilized Ionic Liquids and Polymer Ionic Liquids

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