**Electron Properties in Rare-earth and Actinide Materials**

Materials containing atoms with an open f shell have special electronic and crystalline properties that are controlled by the localized or extended character of the f states. This book aims at giving a theoretical discussion of the various spectroscopic methods that shed light on the character of the f states and on the connection between their localisation and those properties. Part 1 of the book will cover the behaviour of the f states in atoms and solids and include discussion of the electronic properties of lanthanides and actinides in connection with these f states. Part 2 will describe the various spectroscopic methods used to establish the distribution and energies of the electronic states. Examples will deal with the determination of the f state distibutions. Among the methods discussed are optical spectroscopies (involving valence levels) and high-energy spectroscopies (involving core levels). Part 3 concentrates on the theoretical treatment of the electronic transitions involving f states and simulation of their spectra and includes comparison with experimental data.

**Contents**

- Introduction to the Fundamentals of and the theoretical treatment of the electronic transitions involving f states and cause and effect laboratory bioassays
- Provides blue prints for designing more field-relevant screening and includes comparison with experimental data.
- Part 2 will describe the various spectroscopic methods used to establish the distribution and energies of the electronic states. Examples will deal with the determination of the f state distibutions. Among the methods discussed are optical spectroscopies (involving valence levels) and high-energy spectroscopies (involving core levels). Part 3 concentrates on the theoretical treatment of the electronic transitions involving f states and simulation of their spectra and includes comparison with experimental data.

**Fields of interest**

- Physical Chemistry; Theoretical and Computational Chemistry; Materials Science, general

**Product category**

- Monograph

**Due June 2014**

2014. Approx. 250 p. 100 illus. (Progress in Theoretical Chemistry and Physics, Volume 28) Hardcover

- $289.00

---

**Plant-Plant Allelopathic Interactions II**

Laboratory Bioassays for Water-Soluble Compounds with an Emphasis on Phenolic Acids

This volume presents detailed descriptions and analyses of the underlying features, issues and suppositions associated with seed and seedling laboratory bioassays presented in a previous volume.

**Features**

- Provides an in-depth analysis of laboratory bioassays used to study the roles of water-soluble compounds in plant-plant allelopathic interactions
- Describes the fundamentals of and the issues and challenges for designing field-relevant laboratory bioassays
- Provides blue prints for designing more field-relevant screening and cause and effect laboratory bioassays
- Compares field systems with laboratory bioassay systems
- Suggests future directions for the study of plant-plant allelopathic interactions

**Contents**

- Background for Designing Laboratory Bioassays
- Introduction to the Fundamentals of Laboratory Bioassays
- Some Issues and Challenges When Designing Laboratory Bioassays
- Hypothetical Standard Screening Bioassays
- Effects, Modifiers and Modes of Action of Allelopathic Compounds Using Phenolic Acids as Model Compounds
- Hypothetical Cause and Effect Bioassays
- Laboratory Model Systems and Field Systems: Some Final Thoughts

**Fields of interest**

- Biotechnology; Plant Biochemistry; Plant Ecology

**Product category**

- Monograph

**Due March 2014**

2014. XXI, 301 p. 27 illus. Hardcover

- $129.00
- ISBN 978-3-319-04731-7

---

**Chemistry**
J. Gong, Peking University Shenzhen Graduate School (PKUSZ), Shenzhen, People’s Republic of China

**Total Synthesis of (±)-Maoecrystal V**

In this thesis, the author describes the total synthesis of natural product Maoecrystal V in detail. In the first part of the thesis, the author introduces the research background and reviews the research progress in total synthesis of Maoecrystal V. In the second part, the author develops a novel and concise approach for the stereo selective construction of the tetracyclic model system of Maoecrystal V. The model system is accomplished in 8 steps with 20% yield. In the third part, the author describes the first successful total synthesis of Maoecrystal V and investigates four strategies for constructing the key tetrahydrofuran oxa-bridge skeleton. The total synthesis starts from a known compound and is accomplished in 17 steps with 1.2% yield. The successful total synthesis of Maoecrystal V will contribute to the development of efficient synthetic strategies for natural products and other compounds with complex structures.

**Features**
- Nominated by Peking University as an outstanding PhD thesis
- Describes the first successful total synthesis of Maoecrystal V in detail

**Contents**
Research Background for Natural Product Maoecrystal V and Its Family.- The Model Study of Natural Product Maoecrystal V.- The total synthesis study of Maoecrystal V.- Summary.

**Fields of interest**
Organic Chemistry; Medicinal Chemistry; Catalysis

**Target groups**
Research

**Product category**
Monograph

---

**Landolt-Börnstein: Numerical Data and Functional Relationships in Science and Technology - New Series**

**Editor-in-chief:** W. Martienssen

**Advanced Materials and Technologies**

**Part 6A2**

M. D. Lechner, Univ. Osnabrück, Osnabrück, Germany; K.-F. Arndt, TU Dresden Andreas-Schubert-Bau, Dresden, Germany (Eds)

**Thermal Properties and PVT-Data**

Polymers belong to an essential material group with many applications not only for polymer manufacturers but also in physics, chemistry, medicine and engineering techniques. This volume gives an introduction to the thermal properties and PVT-data of polymer solids and polymer melts.

**Fields of interest**
Polymer Sciences; Chemistry/Food Science, general

**Target groups**
Research

**Product category**
Reference work

---

**Practical Aspects of Computational Chemistry III**

J. Leszczynski, Jackson State University, Jackson, MS, USA; M. K. Shukla, US Army Engineer Research and Development, Vicksburg, MS, USA (Eds)

**Contents**
Yeast Metabolic Engineering
Methods and Protocols

Contents

Fields of interest
Biotechnology; Gene Expression

Target groups
Professional/practitioner

Product category
 Contributed volume

Due March 2014
2014. XVIII, 336 p. 44 illus., 18 in color. (Methods in Molecular Biology, Volume 1152) Hardcover
$119.00 ISBN 978-1-4939-0562-1

Fluorine in Heterocyclic Chemistry Vol. 1
5-Membered Heterocycles and Macrocycles

This two-volume work combines comprehensive information on the chemistry of the fluorinated heterocycles. The material has been divided such that the first volume is dedicated to 5-membered fluorinated heterocycles and macrocycles, while the second volume combines data connected with the chemistry of fluorine containing 6-membered heterocycles.

Features
► Has contributions from leading international fluorine chemists ► Provides a comprehensive listing of chemical, physical and physicochemical properties ► A treasure trove of fluorine data is clearly presented and classified

Contents

Fields of interest
Organic Chemistry; Biomaterials; Pharmacology/Toxicology

Target groups
Research

Product category
 Monograph

Due June 2014
2014. 550 p. 100 illus. Hardcover
$239.00 ISBN 978-3-319-04345-6

Fluorine in Heterocyclic Chemistry Vol. 2
6-Membered Heterocycles

This two-volume work combines comprehensive information on the chemistry of the fluorinated heterocycles. The material has been divided such that the first volume is dedicated to 5-membered fluorinated heterocycles and macrocycles, while the second volume combines data connected with the chemistry of fluorine containing 6-membered heterocycles. Both volumes will be of interest to synthetic organic chemists in general, and particularly for those colleagues working in the fields of heterocyclic compound chemistry, materials chemistry, medicinal chemistry, and fluorine chemistry. All information is presented and classified clearly to be effective source for broad auditory of chemists.

Features
► Has contributions from leading international fluorine chemists ► Provides a comprehensive listing of chemical, physical and physicochemical properties ► A treasure trove of fluorine data is clearly presented and classified

Contents

Fields of interest
Organic Chemistry; Biomaterials; Pharmacology/Toxicology

Target groups
Research

Product category
 Monograph

Due June 2014
2014. 550 p. 100 illus. Hardcover
$239.00 ISBN 978-3-319-04343-7
Urea-SCR Technology for deNOx After Treatment of Diesel Exhausts

Contents

Fields of interest
Catalysis; Industrial Chemistry; Chemical Engineering; Automotive Engineering

Target groups
Professional/practitioner

Product category
Professional book

Due May 2014

2014. XI, 907 p. 411 illus., 292 in color. (Fundamental and Applied Catalysis) Hardcover
Approx $109.00
ISBN 978-1-4899-8070-0

Food Freezing and Thawing Calculations

Freezing time and freezing heat load are the two most important factors determining the economics of food freezers. This Brief will review and describe the principal methods available for their calculation. The methods can be classified into analytical methods, which rely on making physical simplifications to be able to derive exact solutions; empirical methods, which use regression techniques to derive simplified equations from experimental data or numerical calculations and numerical methods, which use computational techniques such as finite elements analysis to solve the complete set of equations describing the physical process. The Brief will evaluate the methods against experimental data and develop guidelines on the choice of method. Whatever technique is used, the accuracy of the results depends crucially on the input parameters such as the heat transfer coefficient and the product's thermal properties. In addition, the estimation methods and data for these parameters will be reviewed and their impacts on the calculations will be evaluated. Freezing is often accompanied by mass transfer (moisture loss, solute absorption), super cooling and nucleation and may take place under high pressure conditions; therefore methods to take these phenomena into account will also be reviewed.

Contents

Fields of interest
Food Science; Biochemical Engineering

Target groups
Research

Product category
Brief

Due March 2014

$54.99
ISBN 978-1-4939-0556-0

Progress in the Chemistry of Organic Natural Products 99

The volumes of this classic series, now referred to simply as “Zechmeister” after its founder, Laszlo Zechmeister, have appeared under the Springer Imprint ever since the series’ inauguration in 1938. The series has featured contributions by seven Nobel laureates: D.H.R. Barton, D. Crowfoot Hodgkin, L. Pauling, K. Alder, O. Diels, P. Karrer, H. von Euler-Chelpin. The volumes contain contributions on various topics related to the origin, distribution, chemistry, synthesis, biochemistry, function or use of various classes of naturally occurring substances ranging from small molecules to biopolymers. Each contribution is written by a recognized authority in the field and provides a comprehensive and up-to-date review of the topic in question.

Features
► Written by recognized authorities in their fields  ► Provides comprehensive and up-to-date review in topic  ► Well-known series

Contents

Fields of interest
Organic Chemistry; Medicinal Chemistry; Medical Biochemistry

Target groups
Research

Product category
Monograph

Due May 2014

2014. X, 266 p. 238 illus., 74 in color. (Progress in the Chemistry of Organic Natural Products, Volume 99) Hardcover
$309.00
ISBN 978-3-319-04899-4
Engineering Multicellular Systems

Methods and Protocols

Contents
Recent Progress in Engineering Human-associated Microbiomes.- Constructing Synthetic Microbial Communities to Explore the Ecology and Evolution of Symbiosis.- Combining Engineering and Evolution to Create Novel Metabolic Mutualisms Between Species.- Design, Construction and Characterization Methodologies for Synthetic Microbial Consortia.- An Observation Method for Autonomous Signaling-mediated Synthetic Diversification in Escherichia coli.- Integration-free Reprogramming of Somatic Cells to Induced Pluripotent Stem Cells (iPSCs) without Viral Vectors, Recombinant DNA and Genetic Modification.- Transformation of Bacillus subtilis.- Culturing Anaerobes to use as a Model System for Studying the Evolution of Syntrophic Mutualism.- Therapeutic Microbes for Infectious Disease.- Quantitative Measurement and Analysis in a Synthetic Pattern Formation Multicellular System.- Transcriptome Analysis of a Microbial Coculture in which the Cell Populations are Separated by a Membrane.- Identification of Mutations in Laboratory Evolved Microbes from Next-generation Sequencing data using breseq.- 3D-Fluorescence in situ Hybridization of Intact, Anaerobic Biofilm.- The Characterization of Living Bacterial Colonies Using Nano spray Desorption Electrospray Ionization Mass Spectrometry.- Modeling Community Population Dynamics with the Open-Source Language R.- Simulating Microbial Community Patterning using Biocellion.

Fields of interest
Biotechnology; Biochemical Engineering

Target groups
Professional/practitioner

Product category
Contributed volume

Due October 2014

2015. XII, 284 p. 102 illus., 79 in color. (Methods in Molecular Biology, Volume 1151) Hardcover
➤ $129.00