**Advances in Polymer Science**


Volume 239

G. Heinrich, Leibniz-Institut für Polymerforschung Dresden e.V., Dresden, Germany (Ed.)

ISBN 978-3-642-19503-7

2011. XII, 308 p. Hardcover

**Advanced Rubber Composites**


Rubber–Clay Nanocomposites: Some Recent Results, by Amit Das, De-Yi Wang, Klaus Werner Stöckelhuber, René Jurk, Juliane Fritzche, Manfred Klüppel and Gert Heinrich;


Recent Developments on Thermoplastic Elastomers by Dynamic Vulcanization, by R. Rajesh Babu and Kinsun Naskar;

PTFE-Based Rubber Composites for Tribological Applications, by M. S. Khan and G. Heinrich

**Features**

- Highest Impact Factor of all publications ranked by ISI within Polymer Science
- Short and concise reports on physics and chemistry of polymers, each written by the world renowned experts
- Still valid and useful after 5 or 10 years
- The electronic version is available free of charge for standing order customers at: springer.com/series/12/

**Fields of interest**

Polymer Sciences; Medicinal Chemistry; Pharmacy

**Target groups**

Research

**Type of publication**

Reviews

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**Emulsion-based Free-Radical Retrograde-Precipitation Polymerization**

This monograph is a follow-up material to the first FRPPP book by Gerard Caneba in 2009. It includes additional conceptual results, implementation of the FRPPP process in emulsion media to produce various block copolymers, and other FRPPP-related supplementary topics. Conceptual topics include the application of the quantitative analysis presented in the first FRPPP monograph for the occurrence of the FRPPP process to the polystyrene-styrene-ether (PS-S-Ether) and poly(methacrylic acid)-methacrylic acid-water (PMAA-MAA-Water) systems, as well as extensions through unsteady state analysis of the occurrence of flat temperature profiles. Also, the generalization of the quantitative analysis is done to consider molecular weight effects, especially based on changes of the phase envelope to an hourglass type. Topics in implementation of the FRPPP process from pre-emulsions of monomers and the solvent/precipitant are highlighted. Additional FRPPP topics are included in this monograph that pertain to more recent efforts of Gerard Caneba, such as oil spill control, oil dispersant system, and caustic sludge remediation from emulsion-based FRPPP materials, hydrolysis of vinyl acetate-acrylic acid-based copolymers, and other polymer modification studies from FRPPP-based emulsions.

**Features**

- Fills the gap between modern developments in electrochemistry and outdated information on metals electrodeposition
- Currently available in competing titles essential information on the theoretical and practical electrochemistry
- Necessary to investigate modern metal deposition is provided part of the growing literature on electrodeposition

**From the contents**


**Fields of interest**

Electrochemistry; Tribology, Corrosion and Coatings; Nanotechnology

**Target groups**

Professional/practitioner

**Type of publication**

Monograph

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**Theory and Practice of Metal Electrodeposition**

The authors provide new insights into the theoretical and applied aspects of metal electrodeposition. The theory largely focuses on the electrochemistry of metals. Details on the practice discuss the selection and use of metal coatings, the technology of deposition of metals and alloys, including individual peculiarities, properties and structure of coatings, control and investigations. This book aims to acquaint advanced students and researchers with recent advances in electrodeposition while also being an excellent reference for the practical electrodeposition of metals and alloys.

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**From the contents**


**Fields of interest**

Electrochemistry; Tribology, Corrosion and Coatings; Nanotechnology

**Target groups**

Professional/practitioner

**Type of publication**

Monograph

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**Electrodeposition**

Y. D. Gambug, Russian Academy of Sciences, Moscow, Russia; G. Zangari, University of Virginia, Department of Materials Science & Engineering, Charlottesville, VA, USA

The authors provide new insights into the theoretical and applied aspects of metal electrodeposition. The theory largely focuses on the electrochemistry of metals. Details on the practice discuss the selection and use of metal coatings, the technology of deposition of metals and alloys, including individual peculiarities, properties and structure of coatings, control and investigations. This book aims to acquaint advanced students and researchers with recent advances in electrodeposition while also being an excellent reference for the practical electrodeposition of metals and alloys.

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**From the contents**


**Fields of interest**

Electrochemistry; Tribology, Corrosion and Coatings; Nanotechnology

**Target groups**

Professional/practitioner

**Type of publication**

Monograph
**Ion Channels and Their Inhibitors**

Being the crucial components of living cells, ion channels are important targets of therapeutic agents. Historically, it has been challenging to develop drugs on this target class. A major issue with targets based on ion channel drug development is the identification of effective small chemical leads for medicinal chemistry optimization to the clinical candidate status. Thus enough attention has been paid to the study of structure and functions of ion channels and their potential inhibitors. The present book compiles important chapters authored by eminent workers in the field to cover important recent advances in the studies of the structure and functions of ion channels and their inhibitors, such as sodium ion, potassium ion, chloride ion, calcium ion channel inhibitors. The book may be of great use to the students and scientists working in the area of molecular biology, biochemistry, physiology, and neurobiology, and medicinal chemistry.

**Features**
- First book since 2000 covering the topic
- Comprehensive chapters written by experts in the field
- A need for industrial and academic researchers working in the field

**From the contents**

**Fields of interest**
Medicinal Chemistry; Molecular Medicine; Protein Science

**Target groups**
Research

**Type of publication**
Monograph

**Due April 2011**
2011. 300 p. Hardcover
- approx. € 139,95 | £126.00
- approx. *£ (D) 149,75 | € (A) 153,94 | sFr 201,00 ISBN 978-3-642-19921-9

**Dictionary of Food Ingredients**

The Dictionary of Food Ingredients is a unique, easy-to-use source of information on over 1,000 food ingredients and additives. Like the previous editions, the Fifth Edition provides clear and concise information on currently used additives, including natural ingredients, FDA-approved artificial ingredients, and compounds used in food processing. The dictionary entries, organized in alphabetical order, include information on ingredient functions, chemical properties, and uses in food products. This revised and updated fifth edition also features a new section, “Food Definitions and Formulations,” a thoroughly expanded list of food ingredients approved for use in the European Union, with E numbers, as well as new information on existing and more recently approved ingredients.

**Features**
- Includes 28 new FDA-approved ingredients, for a total of more than 1,000 ingredients
- Brand new section, “Food Definitions and Formulations”
- Features a thoroughly expanded list of food ingredients approved for use in the European Union, with E numbers

**Contents**

**Field of interest**
Chemistry/Food Science, general

**Target groups**
Professional/practitioner

**Type of publication**
Monograph

**Due August 2011**
2011. 5th ed. VI, 250 p. Softcover
- approx. € 39,95 | £33.99
- approx. *£ (D) 42,75 | € (A) 43,95 | sFr 53,50 ISBN 978-3-642-19922-6

**Chemical Thermodynamics**

An Introduction

This course-derived undergraduate textbook provides a concise explanation of the key concepts and calculations of chemical thermodynamics. Instead of the usual ‘classical’ introduction, this text adopts a straightforward postulatory approach that introduces thermodynamic potentials such as entropy and energy more directly and transparently. Structured around several features to assist students’ understanding, Chemical Thermodynamics: Develops applications and methods for the ready treatment of equilibria on a sound quantitative basis. Requires minimal background in calculus to understand the text and presents formal derivations to the student in a detailed but understandable way. Offers end-of-chapter problems (and answers) for self-testing and review and reinforcement, of use for self-or group study. This book is suitable as essential reading for courses in a bachelor and master chemistry program and is also valuable as a reference or textbook for students of physics, biochemistry and materials science.

**Features**
- Eminently suitable as a required textbook comprising complete material for or an undergraduate chemistry major course in chemical thermodynamics
- Clearly explains details of formal derivations that students can easily follow and so master applied mathematical operations
- Offers problems and solutions at the end of each chapter for self-test and self-or group study

**From the contents**
Postulates of thermodynamics.- Thermodynamic equilibrium in isolated and isentropic systems.- Thermodynamic equilibrium in systems with other constraints.- Thermodynamic processes and engines.- Thermodynamics of mixtures (multi-component systems).- Phase equilibria.- Equilibria of chemical reactions.

**Fields of interest**
Physical Chemistry; Thermodynamics; Engineering Thermodynamics, Heat and Mass Transfer

**Target groups**
Upper undergraduate

**Type of publication**
Undergraduate textbook

**Due June 2011**
2011. 328 p. Softcover
- approx. € 49,95 | £44.99
- approx. *£ (D) 53,45 | € (A) 54,95 | sFr 72,00 ISBN 978-3-642-19923-3

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**S. P. Gupta, Meerut Institute of Engineering and Technology, Meerut, India**

**R. S. Igoe, San Diego, CA USA**

**E. Keszei, University of Budapest, Hungary**
Chemogenomics and Chemical Genetics
A User’s Introduction for Biologists, Chemists and Informaticians

Biological and chemical sciences have undergone an unprecedented transformation, reflected by the huge use of parallel and automated technologies in key fields such as genome sequencing, DNA chips, nanoscale functional biology or combinatorial chemistry. It is now possible to generate and store from tens of thousands to millions of new small molecules, based on enhanced chemical synthesis strategies. Automated screening of small molecules is one of the technologies that has revolutionized biology, first developed for the pharmaceutical industry and recently introduced in academic laboratories. High-throughput and high-content screening allow the identification of bioactive compounds in collections of molecules (chemical libraries), being effective on biological targets defined at various organizational scales, from proteins to cells to complete organisms. These bioactive molecules can be therapeutic drug candidates, molecules for biotech, diagnostic or agronomic applications, or tools for basic research. Handling a large number of biological (genomic and post-genomic), chemical and experimental information, screening approaches cannot be envisaged without any electronic storage and mathematical treatment of the data. “Chemogenomics and Chemical Genetics” is an introductory manual presenting methods and concepts making up the basis for this recent discipline.

Features
- Conceived for beginners
- Not only for medicinal chemists, but any biologist, chemist, mathematician or IT scientist interested in that field
- Written by experts from both the academic (University) and private (Pharma companies) sectors
- Shows more applications than just drug discovery

Fields of interest
Medicinal Chemistry; Computer Applications in Chemistry; Bioinformatics

Target groups
Research

Type of publication
Monograph

Due April 2011

Original French edition published by EDP Sciences, 2007, Jointly published with Grenoble Sciences

2011. 270 p. Hardcover
- approx. € 99,95 | £90.00
- appx. * (D) 106,95 | € (A) 109,95 | FR 143,50
ISBN 978-3-642-19614-0

Solid Base Catalysis

The importance of solid base catalysts has come to be recognized for their environmentally benign qualities, and much significant progress has been made over the past two decades in catalytic materials and solid base-catalyzed reactions. The book is focused on the solid base. Because of the advantages over liquid bases, the use of solid base catalysts in organic synthesis is expanding. Solid bases are easier to dispose than liquid bases, separation and recovery of products, catalysts and solvents are less difficult, and they are non-corrosive. Furthermore, base-catalyzed reactions can be performed without using solvents and even in the gas phase, opening up more possibilities for discovering novel reaction systems. Using numerous examples, the present volume describes the remarkable role solid base catalysis can play, given the ever increasing worldwide importance of “green” chemistry. The reader will obtain an overall view of solid base catalysis and gain insight into the versatility of the reactions to which solid base catalysts can be utilized. The concept and significance of solid base catalysis are discussed, followed by descriptions of various methods for the characterization of solid bases, including spectroscopic methods and test reactions. The preparation and properties of base materials are presented in detail, with the two final chapters devoted to surveying the variety of reactions catalyzed by solid bases.

Features
- Presents all aspects of solid base catalysis in a comprehensive way
- Gives an important contribution to ‘green’ chemistry
- Describes methods for the characterization of solid bases
- Presents in detail the preparation and properties of catalytic materials

Fields of interest
Catalysis; Physical Chemistry; Surface and Interface Science, Thin Films

Type of publication
Monograph

Due July 2011

Copub with Tokyo Tech Press, Japan

2011. 409 p. 320 illus. (Springer Series in Chemical Physics, Volume 101) Hardcover
- € 119,95 | £108.00
- * € (D) 128,35 | € (A) 131,95 | sFr 172,00
ISBN 978-3-642-18338-6

Laser Capture Microdissection
Methods and Protocols

Laser microdissection techniques have revolutionized the ability of researchers in general, and pathologists in particular, to carry out molecular analysis on specific types of normal and diseased cells and to fully utilize the power of current molecular technologies including PCR, microarrays, and proteomics. In second edition of Laser Capture Microdissection: Methods and Protocols, experts in the field provide the reader with practical advice on how to carry out tissue-based laser microdissection successfully in their own laboratory using the different laser microdissection systems that are available and to apply a wide range of molecular technologies. The individual chapters encompass detailed descriptions of the individual laser based micro-dissection systems. The downstream applications of the laser microdissected tissue described in the book include PCR in its many different forms as well as gene expression analysis including application to microarrays and proteomics. Written in the highly successful Methods in Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls.

Features
- Provides practical methods and protocols involving tissue-based laser microdissection, ideal for labs around the globe
- Fully updates and reexamines the popular first edition
- Features key notes and expert implementation advice

Fields of interest
Biotechnology; Gene Expression

Target groups
Professional/practitioner

Type of publication
Contributed volume

Due July 2011

- approx. € 104,95 | £93.00
- approx. * € (D) 112,30 | € (A) 115,45 | sFr 148,00
ISBN 978-1-61779-162-8

Humana Press

Due July 2011

Original French edition published by EDP Sciences, 2007, Jointly published with Grenoble Sciences

2011. 270 p. Hardcover
- approx. € 99,95 | £90.00
- *appx. * (D) 106,95 | € (A) 109,95 | sFr 143,50
ISBN 978-3-642-19614-0

E. MARECHAL, S. Roy, L. Lafanéchère, Joseph Fourier University, Grenoble, France (Eds.)

G. I. Murray, Department of Pathology, University of Aberdeen, Aberdeen, UK (Ed.)

Y. Ono, Tokyo Institute of Technology, Tokyo, Japan; H. Hattori, Hokkaido University, Sapporo, Japan
A. M. Pravilov, Fock Inst. of Physics, St. Petersburg State Univ., Russia

Radiometry in Modern Scientific Experiments

The reader is provided with information about methods of calibration of light sources and photodetectors as well as responsiveness of spectral instruments ranging from near infrared to vacuum UV spectral, 1200 – 100 nm, and radiation intensities of up to several quanta per second in absolute and arbitrary units. The author describes for the first time original methods of measurements they created and draws upon over 40 years of experience in working with light sources and detectors to provide accurate and precise measurements. This book is the first to cover these aspects of radiometry and is divided into seven chapters that examine information about terminology, units, light sources and detectors, methods, including author’s original ones, of absolute calibration of detectors, spectral instruments responsiveness, absolute measurements of radiation intensity of photoprocesses, and original methods of their study. Of interest to researchers measuring: luminescence spectra, light intensities from IR to vacuum UV, spectral range in wide-light intensity ranges, calibrate light sources and detectors, absolute or relative quantum yields of photoprocess determination.

Features
- Detailed descriptions of experimental methods
- The author distills over 40 years of experience for the reader
- Each chapter contains problems for the reader to test their knowledge

From the contents
1. Introduction. 2. Radiation sources in radiometric applications. 3. Photodetectors in radiometric application. 4. Methods of absolute calibration for photodetectors and light sources.

Fields of interest
Spectroscopy/Spectrometry; Spectroscopy and Fields of interest

Target groups
Research

Type of publication
Monograph

J. Villadsen, Technical University of Denmark, Lyngby, Denmark; J. Nielsen, Chalmers University of Technology, Gothenburg, Sweden; G. Lidén, Department of Chemical Engineering, Lund University, Sweden

Bioreaction Engineering Principles

The present text is a complete revision of the 2nd edition from 2003 of the book with the same title. In recognition of the fast pace at which biotechnology is moving we have rewritten several chapters to include new scientific progress in the field from 2000 to 2010. More important we have changed the focus of the book to support its use, not only in universities, but also as a guide to design new processes and equipment in the biotechnology industry. A new chapter has been included on the prospects of the bio-refinery to replace many of the oil- and gas based processes for production of especially bulk chemicals. This chapter also serves to make students in Chemical Engineering and in the Bio-Sciences enthusiastic about the whole research field. As in previous editions we hope that the book can be used as textbook for classes, even at the undergraduate level, where chemical engineering students can work side by side with students from biochemistry and microbiology. To help the chemical engineering students Chapter 1 includes a brief review of the most important parts of microbial metabolism. In our opinion this review is sufficient to understand microbial physiology at a sufficiently high level to profit from the rest of the book. Likewise the bio-students will not be overwhelmed by mathematics, but since the objective of the book is to teach quantitative process analysis and process design at a hands-on level some mathematics and model analysis is needed.

Features
- Complete revision of the 2nd edition from 2003
- New chapter has been included on the prospects of bio-refinery
- Around 100 detailed figures included in text

Field of interest
Biochemical Engineering; Biotechnology; Biochemistry, general

Target groups
Graduate

Type of publication
Monograph

A. Virkar, c3Nano Group, Mountain View, CA, USA

Investigating the Nucleation, Growth, and Energy Levels of Organic Semiconductors for High Performance Plastic Electronics

This thesis details the significant progress made in improving the performance of organic transistors and the network conductivity of carbon nanotubes. The first section investigates organic semiconductor nucleation and growth on the most common dielectric surface used to fabricate organic thin film transistors. The nucleation and growth of the semiconductor was determined to be a critical factor affecting the device performance. Excellent dielectric modification layers, which promote desirable semiconductor growth leading to high conductivity were identified, and a technologically relevant deposition technique was developed to fabricate high quality dielectric modification layers over large areas. This may represent an important step towards the realization of large area organic circuitry. In the final section, lessons learned from studying organic semiconductor nucleation and growth were utilized to improve the conductivity of carbon nanotube networks. Selective nucleation of materials at the junctions between nanotubes in the network significantly decreased the network’s sheet resistance. The resulting networks may be promising candidates for transparent electrodes with a variety of optoelectronic applications.

Features
- Entry into the Springer Theses program

Fields of interest
Biochemical Engineering; Semiconductors; Industrial Chemistry/Chemical Engineering

Target groups
Research

Type of publication
Monograph

Due July 2011
2011. 1 p. 50 illus. Hardcover
- approx. € 99,95 | £90.00
- approx. * € (D) 106.95 | € (A) 109,95 | sFr 143,50

Due June 2011
- approx. € 154,95 | £139.50
- approx. * € (D) 165,40 | € (A) 170,44 | sFr 222,00

Due July 2011
2011. 200 p. 55 illus., 15 in color. (Springer Theses) Hardcover
- approx. € 99,95 | £90.00
- approx. * € (D) 106.95 | € (A) 109,95 | sFr 143,50
ISBN 978-1-4419-9703-4