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# Chemistry

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chromatography of aroma compounds and fragrances

Aroma compounds and fragrances play a decisive role in the determination of the quality and marketability of a wide variety of merchandises such as foods and food products, cosmetics, pharmaceutical preparations, etc. The exact knowledge of the composition of these compounds and the contribution of the individual components to the overall acceptability of the product is of paramount importance not only for scientific research but also for the large-scale industrial production. The book is a new milestone in this rapidly developing field including both theoretical and applied research as well as industrial applications.

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Due January 2010

978-3-642-01655-4 ► 159,95 €

P. Gütlich, E. Bill, A.X. Trautwein

mössbauer spectroscopy and transition metal chemistry

Fundamentals and Application

Mössbauer spectroscopy is a profound analytical method which has nevertheless continued to develop. The authors now present a state-of-the-art book which consists of two parts. The first part details the fundamentals of Mössbauer spectroscopy and is based on a book published in 1978 in the Springer series 'Inorganic Chemistry Concepts' by P. Gütlich, R. Link and A.X. Trautwein. The second part covers useful practical aspects of measurements, and the application of the techniques to many problems of materials characterization. The update includes the use of synchrotron radiation and many instructive and illustrative examples in fields such as solid state chemistry and physics, materials and the geosciences, as well as industrial applications. Special chapters on magnetic relaxation phenomena (S. Morup) and computation of hyperfine interaction parameters (F. Neece) are also included. An attached CD-ROM with more than 400 full-color PowerPoint images provides self-explanatory examples. The book concentrates on teaching the technique using theory as much as needed and as little as possible. The reader will learn the fundamentals of the technique and how to apply it to many problems of materials characterization. Transition metal chemistry, studied on the basis of the most widely used Mössbauer isotopes, will be in the foreground.

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A. Lund, M. Shiotani, S. Shimada

principles and Applications of ESR spectroscopy

"Principles and Applications of ESR Spectroscopy" fills the gap between the detailed monographs in ESR spectroscopy and the general textbooks in molecular physics, physical chemistry, biochemistry or spectroscopy. The latter only briefly explain the underlying theory and do not provide details about applications, while the currently available ESR textbooks are primarily focused on the technique as such. This text is based upon the authors' long experience of teaching the subject to a mixed audience, in the extreme case ranging from physics to biology. The potential of the method is illustrated with applications in fields such as molecular science, catalysis and environmental sciences, polymer and materials sciences, biochemistry and radiation chemistry/physics, which were selected from the authors' wide experience. Theoretical derivations have in general been omitted, as they have been presented repeatedly in previous works. The necessary theory is instead illustrated by practical examples from the literature. "Principles and Applications of ESR Spectroscopy" provides the principles of continuous wave and pulsed ESR techniques and illustrates the applications at a level that is accessible to masters and doctoral students as well as to scientists in physical chemistry/chemical physics, catalysis and environmental sciences, polymer science, free radical chemistry in bio-chemistry and medicine, materials science, radiation dosimetry and dating, as well as radiation physics and chemistry.

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H.L. Makin, D. Gower

steroid analysis

This comprehensive and up-to-date 2nd edition of the Steroid Analysis handbook, written by a team of distinguished experts from around the world concentrates on the analysis of steroids in biological fluids. This edition is based on the same format as the first, primarily dealing with analysis of low levels of steroid analytes in biological fluids, but including an extra chapter on pharmaceutical aspects of steroid analysis. Spectroscopic and other methods, including UV and IR absorption spectroscopy, NMR spectroscopy, mass spectrometry, X-ray diffraction, chromatography and immunoassay of steroids are treated in detail. Extraction, purification and quantitation is followed by analysis of specific steroid groups, such as progestagens, estrogens, corticosteroids and anabolic steroids. The editors have made a conscious decision to leave the first edition to stand on its own with regards to steroid analysis prior to 1995 and authors therefore were asked to review the modern post-1995 steroid scene. This book should be of interest to analytical chemists, biochemists and chemical pathologists working on medical steroids.

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M. Zourob, A. Lakhtakia

optical guided-wave chemical and biosensors I

For the first time, distinguished scientists from key institutions worldwide provide a comprehensive approach to optical sensing techniques employing the phenomenon of guided wave propagation for chemical and biosensors. This includes both state-of-the-art fundamentals and innovative applications of these techniques. The authors present a deep analysis of their particular subjects in a way to address the needs of novice researchers such as graduate stu-
dents and post-doctoral scholars as well as of established researchers seeking new avenues. Researchers and practitioners who need a solid foundation or reference will find this work invaluable. This first of two volumes contains nine chapters covering planar waveguides for sensing, as well as sensing techniques based on plasmonic waveguides.

More on www.springer.com/978-3-540-88241-1
Due February 2010
10. X. 250 p. 115 illus., 1 in color. (Springer Series on Chemical Sensors and Biosensors, 7)
978-3-540-88241-1 ► 189,95 €

M. Zourob, A. Lakhtakia

Optical Guided-wave Chemical and Biosensors II

For the first time, distinguished scientists from key institutions worldwide provide a comprehensive approach to optical sensing techniques employing the phenomenon of guided wave propagation for chemical and biosensors. This includes both state-of-the-art fundamentals and innovative applications of these techniques. The authors present a deep analysis of their particular subjects in a way to address the needs of novice researchers such as graduate students and post-doctoral scholars as well as of established researchers seeking new avenues. Researchers and practitioners who need a solid foundation or reference will find this work invaluable. This second of two volumes covers the incorporation of periodic structures in waveguides to exploit the Bragg phenomenon, optical fiber sensors, hollow waveguides and micro-resonators as well as a review of the tremendous expansion of terahertz technology for sensing applications.

More on www.springer.com/978-3-642-02826-7
Due February 2010
10. X. 316 p. 157 illus., 3 in color. (Springer Series on Chemical Sensors and Biosensors, 8)
978-3-642-02826-7 ► 229,00 €

Biotechnology (general)

V.K. Pasupuleti, A.L. Demain

Protein Hydrolysates in Biotechnology

The protein hydrolysates industry is growing rapidly yet there is no single book that describes the challenges and opportunities for manufacturers and end users, techniques used in manufacturing, characterization and screening of protein hydrolysates, their applications in a wide variety of industries in biotechnology. One of the misconceptions in using protein hydrolysates in fermentations is that the end user believes and uses it as a mere nitrogen source. However, the functionality of the product obtained is not necessarily due to protein hydrolysates alone because it may not be a pure peptide or a combination of peptides and may contain carbohydrates, lipids, micronutrients, etc., present in the raw material used or sometimes the manufacturers deliberately add to the process to bring unique functionality. Only a handful of manufacturers dictate this market that tend to keep manufacturing process proprietary making it harder to understand. This book will close the gap by unfolding information on latest developments.

Due February 2010
978-1-4020-6673-3 ► approx. 100,00 €

Environmental Biotechnology

Volume 10: Environmental Biotechnology in the Handbook of Environmental Engineering series presents the theories and principles of various environmental biotechnologies. This outstanding collection of science information is designed as a basic Environmental Biotechnology textbook as well as a reference book for scientists, researchers, educators, and engineers. The book’s expert panel of authors provides an introduction at a wide range of topics, including sanitary microbiology, microbial systematics, ecology, microbial metabolism, life support systems, solid-state processes and reactors, value-added biotechnology products, anaerobic processes, membrane bioreactors, space life support systems, biospherics, natural environmental systems, aerobic and anoxic biotechnologies, sequencing batch reactors, and flotation biological systems. Volume 10: Environmental Biotechnology and its sister book – Volume 11: Environmental Bioengineering – are indispensable as both basic biotechnology textbooks and comprehensive reference books for all environmentalists. Another gold-standard addition to The Humana Press series, Volume 10: Environmental Biotechnology gives readers a cutting-edge illustration of the theories and principles of biotechnologies, systems, processes, and methodologies. Coverage of basic and advanced environmental biotechnologies, systems, methodologies, and processes. Emphasis on detailed descriptions, introductions, theories, principles, classifications, and mechanisms of microbiology, ecology, life support systems, and biological processes. Reference of practical use to scientists, researchers, educators and engineers. Contents Environmental biotechnology, microbiology, microbial systematics, ecology, metabolism, life support systems, solid-state processes and reactors, value-added biotechnology products, anaerobic suspended biological processes, membrane bioreactors, closed ecological systems, space life support systems, biospherics, natural environmental biotechnologies, aerobic processes, anoxic processes, suspended-growth processed, attached-growth processes, and flotation biological systems.

More on www.springer.com/978-1-58829-166-0
Due January 2010
2010. Approx. 805 p. 318 illus. (Handbook of Environmental Engineering, 10)
978-1-58829-166-0 ► 139,95 €

Catalysis

L.K. Wang, V. Ivanov, J. Tay, Y. Hung

Environmental Biotechnology

Volume 10: Environmental Biotechnology in the Handbook of Environmental Engineering series presents the theories and principles of various environmental biotechnologies. This outstanding collection of science information is designed as a basic Environmental Biotechnology textbook as well as a reference book for scientists, researchers, educators, and engineers. The book’s expert panel of authors provides an introduction at a wide range of topics, including sanitary microbiology, microbial systematics, ecology, microbial metabolism, life support systems, solid-state processes and reactors, value-added biotechnology products, anaerobic processes, membrane bioreactors, space life support systems, biospherics, natural environmental systems, aerobic and anoxic biotechnologies, sequencing batch reactors, and flotation biological systems. Volume 10: Environmental Biotechnology and its sister book – Volume 11: Environmental Bioengineering – are indispensable as both basic biotechnology textbooks and comprehensive reference books for all environmentalists. Another gold-standard addition to The Humana Press series, Volume 10: Environmental Biotechnology gives readers a cutting-edge illustration of the theories and principles of biotechnologies, systems, processes, and methodologies. Coverage of basic and advanced environmental biotechnologies, systems, methodologies, and processes. Emphasis on detailed descriptions, introductions, theories, principles, classifications, and mechanisms of microbiology, ecology, life support systems, and biological processes. Reference of practical use to scientists, researchers, educators and engineers. Contents Environmental biotechnology, microbiology, microbial systematics, ecology, metabolism, life support systems, solid-state processes and reactors, value-added biotechnology products, anaerobic suspended biological processes, membrane bioreactors, closed ecological systems, space life support systems, biospherics, natural environmental biotechnologies, aerobic processes, anoxic processes, suspended-growth processed, attached-growth processes, and flotation biological systems.

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R. Rioux

Model Systems in Catalysis

Single Crystals to Supported Enzyme Mimics

Researchers in catalysis and surface science will find this book to be an invaluable compendium of material on the preparation, characterization, and investigation of model catalyst systems, including single
Carotenoids Volume 5: Nutrition and Health

The Carotenoids book series provides detailed accounts of the fundamental chemistry of carotenoids and the basic methods used in carotenoid research, and critical discussions of the biochemistry, functions and applications of these important compounds. The final volume, Volume 5, deals with the topic that is of greatest general interest and public concern, carotenoids in human health and nutrition. This is the era of ‘functional foods’, and identifying roles of chemical components of foods as important micronutrients. Carotenoids feature high on the list of these. Volume 5 follows the carotenoid story from food to biological actions. Carotenoids, Volume 5 is planned as a coordinated, integrated treatment providing up-to-date and critical research surveys by leading authorities in the field, and incorporating some background material to help make the chapters accessible to carotenoid researchers who are not specialists on the particular topic.

More on www.springer.com/978-3-7643-7500-3
Available
2009. XXVI, 431 p. 51 illus., 7 in color. (Carotenoids, 5) 978-3-7643-7500-3 ▶ 89,90 €

Forthcoming
A. Karachalios

Erich Hückel (1896-1980)
From Physics to Quantum Chemistry

This study, the first comprehensive account of Erich Hückel’s career, examines his scientific work as well as his importance for the emergence of quantum chemistry as an independent discipline in Germany during the 1930s. Hückel began his career by studying quantum physics in Göttingen, but his background in chemistry led him to take up pioneering research on the physics of chemical bonding. Drawing on a variety of sources, Andreas Karachalios offers a probing account of fast-breaking developments in quantum theory that paved the way for Hückel’s research. In Göttingen and later in Leipzig, Hückel interacted with leading figures not only in quantum physics and physical chemistry but also with others in nearby fields, including organic chemistry and mathematics. During his later career in Marburg, Hückel clashed with Linus Pauling over the properties of the benzene molecule. In order to appreciate this controversy, Karachalios gives a brief account of the mathematical formalism of spin invariants, with both Hückel and Pauling used in their analyses, though with different interpretations. This serves not only to clarify their differences but also to illustrate the importance of the quantum-mechanical theory of resonance for chemistry at this time.

More on www.springer.com/978-3-642-03966-9
Due February 2010
2010. Approx. 325 p. 69 illus. (Monographs in Electrochemistry, 5) 978-3-642-03966-9 ▶ approx. 129,95 €

Introduction to Corrosion Science

Introduction to Corrosion Science is suitable for a one-semester course in corrosion science at the graduate or advanced undergraduate level for students that do not have backgrounds in electrochemistry but have taken introductory courses in materials science or physical chemistry. The text follows the approach of a physical chemist or materials scientist and is geared toward students of physical chemistry, materials science, and engineering. In addition, practicing corrosion engineers and materials engineers will find useful information that will broaden their understanding of the fundamental principles of corrosion science. This textbook grew out of classroom lectures, which the author presented as a Professorial Lecturer at George Washington University, Washington, D.C. Chapters on: o Charged interfaces o Electrochemical cells o Thermodynamics of corrosion o Corrosion kinetics and mixed potential theory o Concentration polarization and diffusion o Passivity o Crevice corrosion and pitting o Stress-corrosion cracking and corrosion fatigue o Corrosion inhibitors o Corrosion under organic coatings o AC impedance o High temperature oxidation Key features: o Detailed illustrations o Worked example problems o Problem sets after each chapter o Extensive references o Appendices
deserve all appreciation for maintaining the excellence of much use to researchers in the field of electroanalytical chemistry "Will definitely continue the valuable service that has stood the test of time and will be a must-have for every electrochemists and related workers." - Chemistry and Industry 

The methods used in the analysis of electrochemical systems, including computer simulations and quantum and statistical mechanics. The techniques used to investigate ionic and solvent transfer and transport in electroactive materials Monte Carlo simulations of the underpotential deposition of metal layers on metallic substrates. The range of models applied to localized corrosion processes and a review of recent work on the modeling of pitting corrosion.

Descriptions of the conceptual structure of Density-Functional Theory and its practical applications. Whether scanning acoustic microscopy can be applied to nanoscaled electrochemically deposited thin film systems. The processes and equations underlying the modeling of the current distribution in electrochemical cells. From reviews of previous volumes: "This long-standing series continues its tradition of offering high quality reviews of established and emerging subject areas, together with the less common aspects of electrochemical science ... Deserves a place in electrochemistry libraries and should prove useful to electrochemists and related workers." - Chemistry and Industry 

"Continues the valuable service that has been rendered by the Modern Aspects series." - Journal of the American Chemical Society

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Due January 2010


978-1-4419-0454-6 ► 69.95 €

Electroanalytical Methods
Guide to Experiments and Applications

Researchers and professionals will find a hands-on guide to successful experiments and applications of modern electroanalytical techniques here. The new edition has been completely revised and extended by a chapter on quartz-crystal microbalances. The book is written for chemists, biochemists, environmental and materials scientists, and physicists. A basic knowledge of chemistry and physics is sufficient for understanding the described methods. Electroanalytical techniques are particularly useful for qualitative and quantitative analysis of chemical, biochemical, and physical systems. Experienced experts provide the necessary theoretical background of electrochemistry and thoroughly describe frequently used measuring techniques. Special attention is given to experimental details and data evaluation. From Reviews of the Previous Edition "This guide is warmly recommended" (Advances in Food Sciences) "Fritz Scholz and his twelve-strong team ... are to be congratulated on the production of a highly readable and well-structured book." (Chemical Educator) "The book fills a gap with regard to some methods that have previously not been adequately covered ... it also provides many practical hints." (Angewandte Chemie)

More on www.springer.com/978-3-642-02914-1

Due December 2009


978-3-642-02914-1 ► 89,95 €

Electrochemical Impedance Spectroscopy in PEM Fuel Cells
Fundamentals and Applications

Fuel cells, as environmentally-friendly power generation devices, have been fully recognized by scientists, governments, and the public as a unique solution to several of the most important issues that we face today: diminishing supplies of fossil fuels, environmental pollution, and global warming. Electrochemical Impedance Spectroscopy in PEM Fuel Cells discusses one of the most powerful and useful diagnostic tools for various aspects of the study of fuel cells: electrochemical impedance spectroscopy (EIS). The increasing speed of the development of fuel cell technologies brings many new researchers from different backgrounds into the field and, although the EIS technique is well-developed in other areas, it cannot be automatically transferred and applied to fuel cell research. This comprehensive reference on EIS fundamentals and applications in fuel cells contains information about basic principles, measurements, and fuel cell applications of the EIS technique. Many illustrated examples are provided to ensure maximum clarity and observability of the spectra. Electrochemical Impedance Spectroscopy in PEM Fuel Cells will enable readers to explore the frontiers of EIS technology in PEM fuel cell research and other electrochemical systems. As well as being a useful text for electrochemists, it can also help researchers who are unfamiliar with EIS to learn the technique quickly and to use it correctly in their fuel cell research. Managers or entrepreneurs may also find this book a useful guide to accessing the challenges and opportunities in fuel cell technology.

More on www.springer.com/978-1-84882-845-2

Available

2010. XII, 420 p. 346 illus.

978-1-84882-845-2 ► 129,95 €
Food Science

Sushi
Food for the Eye, the Body and the Soul

“It is clear that serious research, as well as much imagination, went into every page. It has become my new ‘go-to’ bible when I need a shot of inspiration.” Ken Oringer, internationally renowned and award-winning chefClio Restaurant, Uni Sashimi Bar, Boston

In recent decades, sushi has gone from being a rather exotic dish, eaten by relatively few outside of Japan, to a regular meal for many across the world. It is quickly gathering the attention of chefs and nutritionists everywhere. It has even made its way into numerous home kitchens where people have patiently honed the specialized craft required to prepare it. Few have been more attuned to this remarkable transition than Ole G. Mouritsen, an esteemed Danish scientist and amateur chef who has had a lifelong fascination with sushi’s central role in Japanese culinary culture. Sushi for the Eye, the Body, and the Soul is a unique melange of a book. In it, Mouritsen discusses the cultural history of sushi, then uses his scientific prowess to deconstruct and explain the complex chemistry of its many subtle and sharp taste sensations. He also offers insights from years of honing his own craft as a sushi chef, detailing how to choose and prepare raw ingredients, how to decide which tools and techniques to use, and how to arrange and present various dishes. Sushi is irresistible for both its simplicity and the hypnotic performance-art aspects that go into its preparation. With clear prose and straightforward instructions, Mouritsen looks at every facet of sushi in a book that is as accessible as it is informative, as useful as it is fun.


Available
2010. XXII, 330 p. 429 illus., 397 in color.
978-1-4419-0617-5 ► 34,95 €

Food Analysis
This book provides information on the techniques needed to analyze foods in laboratory experiments. All topics covered include information on the basic principles, procedures, advantages, limitations, and applications. This book is ideal for undergraduate courses in food analysis and is also an invaluable reference to professionals in the food industry. General information is provided on regulations, standards, labeling, sampling and data handling as background for chapters on specific methods to determine the chemical composition and characteristics of foods. Large, expanded sections on spectroscopy and chromatography also are included. Other methods and instrumentation such as thermal analysis, ion-selective electrodes, enzymes, and immunoassays are covered from the perspective of their use in the analysis of foods. A website with related teaching materials is accessible to instructors who adopt the textbook.

More on www.springer.com/978-1-4419-1477-4
Due February 2010
2010. Approx. 550 p. 271 illus. (Food Science Texts Series,)
978-1-4419-1477-4 ► 66,95 €

Industrial Chemistry / Chemical Engineering

Theoretical Chemical Engineering
Modeling & Simulation
This survey presents the theoretical methods of chemical engineering for modeling and simulation of industrial processes. On this basis it is possible to formulate correct experimental conditions and to understand the experimental results. The book uses the mechanics of continuous media approach for modeling of the simple processes as hydrodynamic processes, mass and heat transfer processes. The theory of the scalar, vector and tensor fields permit to create the basic equations and boundary conditions. The problems of rheology, turbulence, turbulent diffusion and turbulent mass transfer are examined too. The book incorporates a lot of fundamental knowledge but it is assumed that the readers are familiar with the mathematics at engineering level and that they thought some special topics in usual university courses. It includes examples at the end of all chapters using the author’s investigations. Therefore, it is highly valuable for scientists as well as graduate and PhD students.

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978-3-642-10777-1 ► 169,95 €

Forthcoming
S. Devotta, N.P. Thacker

Dioxins and Furans
Unintentional By-products of Chlorine Base Activities

Dioxins and Furans, more precisely polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), are two of the twelve persistent organic pollutants (POPs) covered by the Stockholm Convention held in May 2001. The Stockholm Convention is a global treaty to protect human health and environment from POPs. In implementing the Convention, Governments of many nations have taken measures to either eliminate or reduce the release of POPs into the environment. This book compiles all the information regarding Dioxins chemistry Sources Health effects Environmental levels Fate New processes Practices for reducing Dioxin emission. It brings together an extensive review of the present status of air, water, soil and food contamination with PCDDs and PCDFs.

More on www.springer.com/978-1-4020-5435-8
Due March 2010
978-1-4020-5435-8 ► 154,95 €

Forthcoming
C. Boyadjiev

Theoretical Chemical Engineering

Fluid Dynamics of Packed Columns
Principles of the Fluid Dynamic Design of Columns for Gas/Liquid and Liquid/Liquid Systems

This book provides support to engineers as well as graduate students in their daily design work within the industry or for the development of new plants. It investigates the key issues relating to the fluid dynamic design of packed columns used in rectification, absorption and stripping (desorption) under vacuum, normal pressure and up to 100 bar and liquid-liquid-extraction, which are relevant in waste air and wastewater technology. The author presents
a standardised model, which is valid for any type of packing and can be used to calculate the gas velocity at flooding point as well as the liquid hold-up and the pressure drop throughout the entire operating range for random packings, stacked packings elements, tube columns and structured packings with different flow channel angles. The book also contains packing parameter data for approx. 200 random and structured packings. In addition to outlining the fundamental principles of fluid dynamics, it presents numerous examples of practical application.

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Due January 2010
2010. XXI, 355 p. 147 illus. (VDI-Buch, )
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T. Majozi

Batch Chemical Process Integration

Analysis, Synthesis and Optimization

"Batch Chemical Process Integration: Analysis, Synthesis and Optimization" is an excellent source of information on state-of-the-art mathematical and graphical techniques for analysis, synthesis and optimization of batch chemical plants. It covers recent techniques in batch process integration with a particular focus on the capabilities of the mathematical techniques. There is a section on graphical techniques as well as performance comparison between graphical and mathematical techniques. Prior to delving into the intricacies of wastewater minimisation and heat integration in batch processes, the book introduces the reader to the basics of scheduling which is aimed at capturing the essence of time. A chapter on the synthesis of batch plants to highlight the importance of time in design of batch plants is also presented through a real-life case study. The book is targeted at undergraduates and postgraduate students, researchers in batch process integration, practising engineers and technical managers.

More on www.springer.com/978-3-642-04654-4
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978-3-642-04654-4 ► 129,95 €

R.M. Mortier, M.F. Fox, S.T. Orszulik

Chemistry and Technology of Lubricants

The Chemistry and Technology of Lubricants describes the chemical components that contribute to the formulation of liquid lubricants followed by discussion of lubricant technology for specific applications. The individual components are described in Part I: Base Fluids and in Part II: Additives. Part I covers the manufacture and properties of the most common base fluid types derived either from mineral oil or by synthesis, including products from natural gas via gas-to-liquid processes. Part II describes the manufacture, mode of action and performance of the additives that are used to supplement and enhance the performance of base fluids. The use of vegetable oils is also included. Part III: Applications covers the major areas of application of liquid lubricants and each chapter is focused on technology requirements specific to the application. The book is completed by Part IV: Performance which describes more generic technology related to aspects of condition monitoring, environmental impact and industry testing. The Chemistry and Technology of Lubricants will be of use to those in both academia and industry who are working on lubricants or related areas of research and development. It will be of particular relevance for those in industry who are involved with lubricant additives, formulation and testing as well as those who are concerned with the use and specification of lubricants. Academic interest will include related chemistry and applied chemistry research as well as certain areas of mechanical engineering such as surface engineering and tribology.

More on www.springer.com/978-1-4020-8661-8
Available
2010. XII, 560 p.
978-1-4020-8661-8 ► 199,95 €

R. Nater, A. Reichmuth, R. Schwartz, M. Borys, P. Zervos

Dictionary of Weighing Terms

A Guide to the Terminology of Weighing

This Dictionary of Weighing Terms is a comprehensive practical guide to the terminology of weighing for all users of weighing instruments in industry and science. It explains more than 1000 terms associated with weighing technology and related areas; numerous illustrations assist understanding. The Dictionary of Weighing Terms is a joint work of the Physikalisch-Technische Bundesanstalt (PTB) (the German Federal Institute of Physics and Metrology) and METTLER TOLEDO, the weighing instruments manufacturer. It contains terms relating to the following topics: Fundamentals of weighing • Definitions of terms • Physical weighing principles • Function and construction of weighing instruments • Types of weighing instruments Applications of weighing instruments • Weighing methods • Operation of weighing instruments • Restrictions on the use of weighing instruments International standards Legal requirements for weighing instruments • European Directives • Verification regulations Weighing accuracy • Specifications of weighing instruments • Weighing accuracy and uncertainty • Air buoyancy

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Available
978-3-642-02013-1 ► 59,95 €

W. Marquardt, J. Morbach, A. Wiesner, A. Yang

OntoCAPE

A Re-Usable Ontology for Chemical Process Engineering

This book presents OntoCAPE, a formal domain ontology for chemical process engineering, which is based on a general upper ontology for engineering. The organization and structure of the ontology are depicted, and the conceptualizations of various topic areas are described in detail, including the areas of meroology, topology, systems theory, network systems, plant engineering, and others. Additionally, the rationale for choosing one particular conceptualization over the other is explained, thus providing the reader with the necessary background knowledge for extending and customizing the ontology to his/her own purposes. Finally, the usage of the ontology is explained, and some sample applications are presented.

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Inorganic Chemistry

Metallointercalators

Synthesis and Techniques to Probe Their Interactions with Biomolecules

A comprehensive treatment of the characterisation techniques used in investigating inorganic and organic molecules that interact with biomolecules is presented to the reader in a clear fashion. The work consists of two parts: (i) synthetic aspects of metallointercalators along with targeting and improving transport and (ii) the various techniques that are used for probing their interactions, such as; DNA-NMR, PGSE-NMR, DNA ESI-MS, Linear and Circular Dichroism, Fluorescence Spectroscopy, Confocal Microscopy, Viscosity, TGA and dialysis, Microwaves, biological analysis. Chapters are devoted to the synthesis and the techniques used to study the interactions of inorganic complexes with biomolecules. Considerably detailed examples are used to help illustrate the application of these techniques. This book is a useful resource for an array of inorganic and organic advanced undergraduate and graduate courses and for researchers in drug discovery.

Due April 2010
2010. Approx. 475 p. 120 illus., 40 in color.
978-90-481-09427-3 ▶ approx. 129,95 €

Mathematical Applications in Chemistry

Mathematical Modeling of Biosensors

An Introduction for Chemists and Mathematicians

This book presents biosensor development and modeling from both a chemical and a mathematical point of view. It contains unique modeling methods for analytical (amperometric, potentiometer and optical) biosensors. It examines processes that occur in the sensors’ layers and at their interface, and it provides analytical and numerical methods to solve enzymatic kinetic and diffusion equations. The action of single enzyme as well as polyenzyme biosensors is studied, and the modeling of biosensors that contain perforated membranes and multipart mass transport profiles is critically investigated. Furthermore, it is fully described how signals can be biochemically amplified, how cascades of enzymatic substrate conversion are triggered, and how signals are processed via a chemometric approach and artificial neuronal networks. The results of digital modeling are compared with both proximal analytical solutions and experimental data.

More on www.springer.com/978-3-642-05242-2
Due February 2010
2010. Approx. 240 p. (Structure and Bonding, 136)
978-3-642-05242-2 ▶ approx. 189,95 €

The Chemistry of the Actinide and Transactinide Elements

Volume 6

This volume is a continuation of the five volumes of The Chemistry of the Actinide and Transactinide Elements that appeared in 2006. Volume 6 expounds on topics in actinide science that are undergoing rapid scientific developments and that are germane to the safe development of nuclear energy in the 21st century, from nuclear fuels to the environmental science and management of waste. The scope of volume 6 encompasses a wide array of subjects: actinides in the geosphere, subsurface interactions of actinides species with microorganisms, chemistry of nuclear fuels, actinide waste forms and radiation effects, analytical chemistry of plutonium, actinide chalcogenide compounds, molecular spectroscopy and reaction of the actinide ions in the gas phase and rare gas matrices, and hydrothermal synthesis of actinide compounds. The authors of each chapter are active practitioners and recognized experts in their specialty areas. They have collaborated so as to provide an authoritative, balanced, and comprehensive treatment of their fields. Each of the topics in volume 6 represents the current state of our knowledge in this fascinating area of science and technology.

More on www.springer.com/978-90-481-3146-4
Due April 2010
978-90-481-3146-4 ▶ 279,00 €

Structure and Function

The thermodynamic properties, reactivities and electronic properties of molecular compounds and materials depend on structure. Therefore, an important basis for progress is to fully appreciate and fundamentally understand the intimate relation between structure and function. Structure and Function describes various fundamental aspects of structures, dynamics and physics of molecules and materials. The approaches, data and models discussed include new theoretical developments, computational studies and experimental work from molecular chemistry to biology and materials science.

Due December 2009
978-90-481-2887-7 ▶ 129,95 €
Medicinal Chemistry

Forthcoming
P.J. Cragg

Supramolecular Chemistry
From Biological Inspiration to Biomedical Applications

The aim of this book is to return to the biomimicry and medicinal potential that inspired many of the early supramolecular chemists and to set it in the context of current advances in the field. Following an overview of supramolecular chemistry, the first section considers the efforts made to synthesize artificial systems that mimic biological entities. The second section addresses the application of supramolecular principles to molecular diagnostics with a particular emphasis on the 'receptor-relay-reporter' motif. Many of the examples chosen have clinical importance. The third section takes the clinical diagnostic theme further and demonstrates the therapeutic applications of supramolecular chemistry through photodynamic therapy, drug delivery, and the potential for synthetic peptides to form antibiotic tubes. The short epilogue considers the potential for supramolecular solutions to be found for further challenges in biomimetic and therapeutic chemistry.

More on www.springer.com/978-90-481-2581-4
Due June 2010

2010. Approx. 300 p. 50 illus. in color.
978-90-481-2581-4 ► approx. 149,95 €

Organic Chemistry (general)

R. Bruckner, M. Harmata

Organic Mechanisms
Reactions, Stereochemistry and Synthesis

This English edition of a best-selling and award-winning German textbook Reaction Mechanisms: Organic Reactions · Stereochemistry · Modern Synthetic Methods is aimed at those who desire to learn organic chemistry through an approach that is facile to understand and easily committed to memory. Michael Harmata, Norman Rabjohn Distinguished Professor of Organic Chemistry (University of Missouri) surveyed the accuracy of the translation, made certain contributions, and above all adapted its rationalizations to those prevalent in the organic chemistry community in the English-speaking world. Throughout the book fundamental and advanced reaction mechanisms are presented with meticulous precision. The systematic use of red “electron-pushing arrows” allows students to follow each transformation elementary step by elementary step. Mechanisms are not only presented in the traditional contexts of rate laws and substituent effects but, whenever possible, are illustrated using practical, useful and state-of-the-art reactions. The abundance of stereoselective reactions included in the treatise makes the reader familiar with key concepts of stereochemistry. The fundamental topics of the book address the needs of upper-level undergraduate students, while its advanced sections are intended for graduate-level audiences. Accordingly, this book is an essential learning tool for students and a unique addition to the reference desk of practicing organic chemists, who as life-long learners desire to keep abreast of both fundamental and applied aspects of our science. In addition, it will well serve ambitious students in chemistry-related fields such as biochemistry, medicinal chemistry and pharmaceutical chemistry. From the reviews: "... The strength of the book stems from Professor Bruckner’s ability to provide lucid explanations based on a deep understanding of physical organic chemistry... The panoply of organic synthesis is analyzed and dissected according to fundamental structural, orbital, kinetic and thermodynamic principles with an effortless coherence that yields great insight and never over-simplifies. ..." Alan C. Spivey, Imperial College London "Bruckner’s Organic Mechanisms accurately reflects the way practicing organic chemists think and speak about organic reactions. The book will be very useful to new US graduate students and will help bring them to the level of sophistication needed to be serious researchers in organic chemistry." Charles P. Casey, University of Wisconsin-Madison "... a superb book to put in the hands of all who would want to learn synthetic organic chemistry or refresh their knowledge. "Paul Knochel, Ludwig-Maximilians-University Munich"... This text is aimed squarely at students that have completed a typical one-year introductory course in organic chemistry and now wish to continue refining their understanding of the subject. It is a sound introduction to the underlying principles that control reactivity in variety of transformations. The book is particularly well suited for intermediate and advanced classes in organic chemistry. ..." Marc L. Snapper, Boston College "This is an excellent advanced organic chemistry textbook that provides a key resource for students and teachers alike." Mark Rizzacasa, University of Melbourne, Australia "Holding in high regard the 1st English edition of Bruckner’s textbook Organic Reaction Mechanisms I have been waiting for years for an updated version to appear. This long-awaited textbook is now available. It has been completely revised and considerably expanded and is a meticulously composed treatise at the interface between synthetic organic chemistry and mechanistic analysis. Every student of advanced organic chemistry will benefit from this book." Koichi Narasaka, Nanyang Technical University, Singapore

More on www.springer.com/978-3-642-03650-7
Due January 2010

2010. Approx. 800 p. 900 illus. in color.
978-3-642-03650-7 ► 79,95 €

Nutrition

Handbook of Drug-Nutrient Interactions

Handbook of Drug-Nutrient Interactions, Second Edition is an essential new work that provides a scientific look behind many drug-nutrient interactions, examines their relevance, offers recommendations, and suggests research questions to be explored. In the five years since publication of the first edition of the Handbook of Drug-Nutrient Interactions new perspectives have emerged and new data have been generated on the subject matter. Providing both the scientific basis and clinical relevance with appropriate recommendations for many interactions, the topic of drug-nutrient interactions is significant for clinicians and researchers alike. For clinicians in particular, the book offers a guide for understanding, identifying or predicting, and ultimately preventing or managing drug-nutrient interactions to optimize patient care. Divided into six sections, all chapters have been revised or are new to this edition. Chapters balance the most technical information with practical discussions and include outlines that reflect the content; discussion questions that can guide the reader to the critical areas covered in each chapter, complete definitions of terms with the abbreviation fully defined and consistent use of terms between chapters. The editors have performed an outstanding service to clinical pharmacology and pharmacono-nutrition by bringing together a multi-disciplinary group of authors. Handbook of Drug-Nutrient Interactions, Second Edition is a comprehensive up-to-date text for the total management of patients on drug and/or nutrition therapy but also an insight into the recent developments in drug-nutrition interactions which will act as a reliable reference for clinicians and students for many years to come.

Available
2010. XXVIII, 824 p. 11 illus. With CD-ROM. (Nutrition and Health, )
978-1-60327-363-3 ► 149,95 €
Fulleranes
The Hydrogenated Fullerenes

Fulleranes are a special class of carbon molecules derived from fullerenes whose double bonds are partially or at least theoretically fully saturated by hydrogen. The hydrogenation changes the chemical properties of fullerenes which can become susceptible to substitution reactions as opposed to addition reactions to the double bonds (present in common fullerenes). One of the most intriguing aspects of fulleranes is the fact that they have been thought to exist in the interstellar medium or even in certain circumstellar media. The reasoning is quite simple: if fullerenes can be formed in the interstellar or better in the circumstellar medium, then they should undergo a simple hydrogenation reaction because of the ubiquitous presence of hydrogen in the universe. There is therefore a need not only to synthesize fulleranes in order to study their properties but also to study their infrared and electronic absorption spectra. Such spectra are used in the search for these molecules in the interstellar medium and around certain promising carbon-rich stars. Many efforts have been made by chemists and chemical physicists to synthesize these molecules at different degrees of hydrogenation and to record their spectra. Thus, Fulleranes: The Hydrogenated Fullerenes presents the state of the art research, synthesis and properties of these molecules; astrophysicists and astrochemists detail their expectations regarding the presence of these molecules in space. Fulleranes: The Hydrogenated Fullerenes is written for researchers, postgraduates, and advanced undergraduates in organic synthetic chemistry, physical chemistry, and astrophysics.

**Due May 2010**  
2010. Approx. 350 p. (Carbon Materials: Chemistry and Physics, 2)  
978-1-4020-9886-4 ➤ approx. 159,95 €

G.W. Gribble

Naturally Occurring Organohalogen Compounds - A Comprehensive Update

Despite the long association of organohalogen compounds with human activities, nature is the producer of nearly 5,000 halogen-containing chemicals. Once dismissed as accidents of nature or isolation artifacts, organohalogen compounds represent an important and ever growing class of natural products, in many cases exhibiting exceptional biological activity. Since the last comprehensive review in 1996 (Vol. 68, this series), there have been discovered an additional 2,500 organochlorine, organobromine, and other organohalogen compounds. These natural organohalogenes are biosynthesized by bacteria, fungi, lichen, plants, marine organisms of all types, insects, and higher animals including humans. These compounds are also formed abiogenically, as in volcanoes, forest fires, and other geothermal events. In some instances, natural organohalogenes are precisely the same chemicals that man synthesizes for industrial use, and some of the quantities of these natural chemicals far exceed the quantities emitted by man.

More on [www.springer.com/978-3-211-99322-4](http://www.springer.com/978-3-211-99322-4)  
**Due December 2009**  
2010. XVI, 616 p. 414 illus., 41 in color. (Fortschritte der Chemie organischer Naturstoffe / Progress in the Chemistry of Organic Natural Products, 91)  
978-3-211-99322-4 ➤ 299,00 €

W. Griffith

Ruthenium Oxidation Complexes
Their uses as homogenous organic catalysts

Ruthenium Oxidation Complexes explores ruthenium complexes, particularly those in higher oxidation states, which function as useful and selective organic oxidation catalysts. Particular emphasis is placed on those systems which are of industrial significance. The preparation, properties and applications of the ruthenium complexes are described, followed by a presentation of their oxidative properties and summary of the different mechanisms involved in the organic oxidations (e.g. oxidations of alcohols, alkenes, arenes and alkynes, alkanes, amines, ethers, phosphines and miscellaneous substances). Moreover, future trends and developments in the area are discussed. This monograph is aimed at inorganic, organic, industrial and catalysis chemists, especially those who wish to carry out specific organic oxidations using catalytic methods.

More on [www.springer.com/978-1-4020-9376-0](http://www.springer.com/978-1-4020-9376-0)  
**Due March 2010**  
2010. Approx. 330 p. (Catalysis by Metal Complexes, 32)  
978-1-4020-9376-0 ➤ 179,95 €

J.J. Li

Name Reactions
A Collection of Detailed Mechanisms and Synthetic Applications

The third edition of this book contains major improvements over the previous edition. In addition to updated references, each reaction is now supplemented with two to three representative examples in synthesis to showcase its synthetic utility. Biographical sketches for the chemists who discovered or developed those name reactions have been included. Furthermore, the subject index is significantly expanded. This book differs from others on name reactions in organic chemistry by focusing on their mechanisms. It covers over 300 classical as well as contemporary name reactions. Each reaction is delineated by its detailed step-by-step, electron-pushing mechanism, supplemented with the original and the latest references, especially review articles. Thus, it is not only an indispensable resource for senior undergraduate and graduate students for learning and exams, but also a good reference book for all chemists interested in name reactions.

More on [www.springer.com/978-3-642-01052-1](http://www.springer.com/978-3-642-01052-1)  
**Available**  
2009. XXII, 621 p. 6 illus.  
978-3-642-01052-1 ➤ 79,95 €
Organometallic Chemistry

S. Margadonna

Fullerene-Related Materials

"Fullerene-Related Materials" provides an in-depth coverage of the essential break-throughs in the Chemistry and Physics of fullerene related materials over the last five years. It includes materials such as: Metal intercalated fullerenes Endohedral fullerenes Higher fullerenes Non-conventional carbon cages. The first part of the text explores the structural, electronic and magnetic phase diagrams of fullerene derivatives and pays special attention to metal intercalated fullerenes. The second part covers the recent advances in synthesis, reactivity and applications of fullerene related materials. "Fullerene-Related Materials" forms an invaluable resource for academics and researchers in the field of functional molecular materials and also material scientists who are looking into implementing fullerene compounds in different types of devices.

More on www.springer.com/978-1-4020-4458-8
Due March 2010
978-1-4020-4458-8 ► 299,00 €

Forthcoming

R. Martin

Aromatic Hydroxyketones: Preparation and Physical Properties

Vol.1: Hydroxybenzophenones
Vol.2: Hydroxyacetophenones I
Vol.3: Hydroxyacetophenones II
Vol.4: Hydroxypropiophenones, Hydroxysobutyrophenones, Hydroxypivalophenones and Derivatives

Aromatic Hydroxyketones: Preparation and Physical Properties is a revised, new edition 4-volume handbook set which provides detailed information on physical properties and syntheses on a wide range of hydroxyketones. Each entry includes characterization data such as the Chemical Abstracts Service Registry Number (CAS RN), molecule name, molecular formula, and molecular weight. The handbooks are presented in dictionary style, with a logical classification of the ketones, making the information easily available for consultation. This handbook set provides 6000 hydroxyketone entries and includes approximately 6000 references. Volume 1: Hydroxybenzophenones Hydroxybenzophenones are most useful synthetic intermediates in the chemical industry, for example in pharmaceuticals, dyes, fragrances, agrochemicals, explosives and plastics. The first volume of this set is particularly intended for engineers in chemical synthesis and academics as well as industrial researchers from various branches of chemistry. Volume 2 and 3: Hydroxyacetophenones Hydroxyacetophenones constitute the starting material for a wide variety of syntheses in organic chemistry. They are versatile building blocks serving many different applications, such as especially polymers, pharmaceuticals and fine chemicals. These two volumes constitute a useful tool for chemists and pharmacists in general. Volume 4: Hydroxypropiophenones, Hydroxysobutyrophenones, Hydroxypivalophenones and Derivatives Hydroxypropiophenones, Hydroxysobutyrophenones, Hydroxypivalophenones and Derivatives constitute the starting material for a wide variety of syntheses in organic chemistry. They are versatile building blocks serving many different applications: pharmaceuticals, fine chemicals and polymers. This volume is a great book of reference on hydroxypropiophenones, hydroxysobutyrophenones, hydroxypivalophenones and their methyl ethers which also mentions some uses of these ketones. It is a powerful synthesis tool for researchers or industrial producers and provides a wide choice of hydroxyketones.

More on www.springer.com/978-1-4020-9786-7
Due May 2010
2010. Approx. 2800 p. In 4 volumes, not available separately. 978-1-4020-9786-7 ◄ approx. 799,00 €

More on www.springer.com/978-1-4020-4458-8
Due May 2010
978-1-4020-4458-8 ► 299,00 €

Environment-Friendly Antiviral Agents for Plants

Plant virus disease is a worldwide threat to agriculture. Environment-Friendly Antiviral Agents for Plants systematically describes the basic theory, new ideas, and new methods to discover novel antiviral agents through research on plant immune activation. The cutting-edge research methodology, technology and progress on novel antiviral agent innovation are systematically described. With abundant illustrations and figures, the book is intended for researchers and practitioners in the fields of pesticide science, plant protection, organic chemistry, fine chemicals, applied chemistry, environment chemistry and agriculture science. Dr. Baoan Song and Dr. Song Yang are professors at the Center for R&D of Fine Chemicals, Guizhou University, China; Mr. Linhong Jin and Dr. Pinaki S. Bhadury are associate professors there.

More on www.springer.com/978-3-642-03691-0
Due February 2010
2010. Approx. 350 p. (Catalysis by Metal Complexes, 33) 978-3-642-03691-0 ◄ approx. 139,00 €

Forthcoming

R. Chauvin, Y. Canac

Transition Metal Complexes of Neutral eta1-Carbon Ligands

Yves Canac and Remi Chauvin: Neutral eta1-carbon ligands: beyond carbon monoxide; Esteban P. Urriolabeitia: Ylide Ligands; Wolfgang Petz and Gerhard Frenking: Carbodiphosphoranes and related ligands; Mareike C. Jahnke and F. Ekkehardt Hahn: Chemistry of N-Heterocyclic Carbene Ligands; Tsuyoshi Kato, Eddy Maerten, Antoine Baceiredo: Proto-Catalysts, also mentioning the Osmium complexes for these transformations despite their lack of success so far - Sections on oligomerisation and polymerisation reactions, telomerisation, and cyclisation - Overview of reactions involving aryls, with particular care given to more challenging reactions such as C-F bond activation and direct arylation - Description of dehalogenations, followed by an outline of oxidation reactions - A section involving all reactions not mentioned before, allowing room for discussion on reactions less frequently encountered in NHC-based TM-catalysts - A large section to organocatalysis promoted by NHGs

Due June 2010
2010. Approx. 350 p. (Catalysis by Metal Complexes, 33) 978-90-481-2865-5 ◄ approx. 139,00 €

More on www.springer.com/978-1-4020-9786-7
Heteroatom-Conjugated Allenylidene and Related Cumulenyldiene Ligands.

More on www.springer.com/978-3-642-04721-3
Due February 2010
2010. X, 270 p. (Topics in Organometallic Chemistry, 30) 978-3-642-04721-3 ▶ 229,00 €

Forthcoming
A.J. Lees

Photophysics of Organometallics
Arvind Kumar, Shih-Sheng Sun, and Alistair J. Lees: Photophysics and Photochemistry of Organometallic Rhenium Diimine Complexes; Conor Long: Photophysics of CO Loss from Simple Metal Carbonyl Complexes; Antonín Vlcek Jr: Ultrafast Excited-State Processes in Re(I) Carbonyl-Diimine Complexes: From Excitation to Photochemistry; Kenneth Kam-Wing Lo: Exploitation of Luminescent Organometallic Rhenium(I) and Iridium(III) Complexes in Biological Studies; Maria L. Muro, Aaron A. Rachford, Xianghui Wang, and Felix N. Castellano: Platinum II Acetylide Photophysics; Andreas F. Rausch, Herbert H. H. Homeier, and Hartmut Yersin: Organometallic Pt(II) and Ir(III) Triplet Emitters for OLED Applications and the Role of Spin–Orbit Coupling: A Study Based on High-Resolution Optical Spectroscopy.

More on www.springer.com/978-3-642-04728-2
Due December 2009
2010. XI, 239 p. (Topics in Organometallic Chemistry, 29) 978-3-642-04728-2 ▶ 189,95 €

Physical Chemistry (general)

Symmetry through the Eyes of a Chemist

"Symmetry through the Eyes of a Chemist" surveys chemistry from the point of view of symmetry. The authors present many examples from chemistry as well as from other fields to emphasize the unifying nature of the symmetry concept. The aim has been to provide aesthetic pleasure in addition to learning experience. The structure of the successful earlier editions is retained. This edition has been further revised to contain streamlined text and updated illustrative material. The sections dealing with biopolymers and quasicrystals have been expanded. "Symmetry through the Eyes of a Chemist" is a valuable textbook for students of chemistry, the mathematical sciences, architecture, the fine arts and all those who have an interest in the study of symmetry.

Due December 2009
2010. Approx. 300 p. 4 illus. in color. 978-90-481-3689-6 ▶ approx. 149,95 €

Forthcoming
G. Maroulis, U. Hohm


Polarizability: A User's Handbook is intended to be a guide for all scientists active in this and related fields. The range of applications of electric polarizabilities and hyperpolarizabilities has dramatically expanded in recent years. Very active fields where the theory of electric polarizability is of primary importance include: Nonlinear Optics and the search for new materials with potential applications in Molecular Electronics and Optoelectronics. The design of molecules with specific characteristics relies strongly on reliable determinations of the molecular hyperpolarizability. Simulation Studies. In this rapidly expanding field the use of very accurate polarizability and hyperpolarizability values is a key factor to the success of the simulation. Scientists are always seeking reliable data for their studies. The absence of systematic presentation of such data constitutes a major problem. Emphasis is given to the presentation
of fields of application and the emerging new ideas. The most important part of the Handbook is the critical evaluation of the available data and the systematic presentation of the reliable data for large classes of systems, including atoms and almost all molecules currently of interest, in such a way that they are readily accessible for potential applications. It is intended that the primary audience for this work will be scientists at all levels, researchers, graduate students, and undergraduate students active in a wide spectrum of fields. These fields include Computational Chemistry, Quantum Chemistry, Spectroscopy, Simulation Studies, Molecular Physics, Nonlinear Optics, and Materials Science.


Due June 2010

978-1-4020-9778-2  ▶ approx. 400,00 €

Forthcoming

K.D. Sen

Statistical Complexity Applications in Electronic Structure

The understanding of electron density as the carrier of all the information of a multielectronic system is implicit in the theorems of density functional theory. Information theoretical based measures giving a quantitative understanding of statistical complexity of such systems is shaping up as a new area of research in chemical physics. This book is the first monograph on this topic.

More on www.springer.com/978-90-481-3889-0

Due June 2010

978-90-481-3889-0  ▶ approx. 99,95 €

M. Wolfsberg, W.A. Van Hook, P. Paneth, L.P. Rebelo

Isotope Effects in the Chemical, Geological, and Bio Sciences

As the title suggests, "Isotope Effects in the Chemical, Geological and Bio Sciences" deals with differences in the properties of isotopically substituted molecules, such as differences in the chemical and physical properties of water and the heavy waters. Isotope effects on the rates of chemical reactions, including enzyme catalyzed reactions, are treated in some detail. Since the various fields in which isotope effects are applied do not only share fundamental principles but also share experimental techniques, this book includes a discussion both of experimental apparatus and techniques. "Isotope Effects in the Chemical, Geological and Bio Sciences" is an educational monograph addressed to graduate students and others undertaking isotope effect research. The fundamental principles needed to understand isotope effects are presented in appropriate detail. While it is true that these principles are more familiar to students of physical chemistry and some background in physical chemistry is recommended, the text provides enough detail to make the book an asset to students in organic and biochemistry, and geochemistry.

More on www.springer.com/978-3-642-02939-4

Due February 2010

2010. X, 200 p. 31 illus.
978-3-642-02939-4  ▶ 59,95 €

M. Zhao, L. Song, X. Fan

The Boundary Theory of Phase Diagrams and Its Application

Rules for Phase Diagram Construction with Phase Regions and Their Boundaries

The Boundary Theory of Phase Diagrams and Its Application -- Rules for Phase Diagram Construction with Phase Regions and Their Boundaries presents a novel theory of phase diagrams. Thoroughly revised on the basis of the Chinese edition and rigorously reviewed, this book inspects the general feature and structure of phase diagrams, and reveals that there exist actually two categories of boundaries. This innovative boundary theory has solved many difficulties in understanding phase diagrams, and also finds its application in constructing multi-component phase diagrams or in calculating high-pressure phase diagrams. Researchers and engineers as well as graduate students in the areas of chemistry, metallurgy and materials science will benefit from this book. Prof. Muyu Zhao was the recipient of the 1998 Prize for Progress in Science and Technology (for his work on the boundary theory of phase diagrams) awarded by the National Commission of Education, China, and many other prizes.

More on www.springer.com/978-3-642-02939-4

Due February 2010

2010. Approx. 300 p. 63 illus., 3 in color.
978-3-642-02939-4  ▶ approx. 129,95 €

M.E. Starzak

Energy and Entropy Equilibrium to Stationary States

This book is an overview of classical thermodynamics, statistical thermodynamics, non-equilibrium and stationary state thermodynamics. This comprehensive work is the first book outside of specialized monographs to approach flow systems and irreversible thermodynamics for advanced undergraduate or introductory graduate courses in thermodynamics in chemistry, physics, biophysics, and engineering programs. Instructors for those courses will find in this book transparent models that clarify a broad range of difficult physical and mathematical concepts, including: Cooligative properties and solution thermodynamics Chemical potential for equilibrium systems Continuous energy systems Transition to non-equilibrium systems through statistical chemical kinetics Bose–Einstein statistics in conjunction with unimolecular reaction rate theory Irreversible thermodynamics with both time and spatial dependence Basic stationary state processes

More on www.springer.com/978-0-387-77822-8

Due January 2010

978-0-387-77822-8  ▶ 159,95 €
Polymer Sciences

Free-Radical Retrograde-Precipitation Polymerization (FRRPP)

Novel Concept, Processes, Materials, and Energy Aspects

The book pertains to unique phenomenological features of a potentially runaway polymerization reaction process that is apparently brought under control through a mass and energy confining mechanism. It integrates the combination of various concepts in order to explain a collection of experimental observations, which includes entrapment of reactive intermediates as well as their energy contents, nucleated thermal hot spots beyond adiabatic rise temperatures, and nanoscale confinement behavior that has been used for fine patterning of polymers. Toward the end, the author of the book will try to use whatever understanding that has been formulated about the Free-Radical Retrograde-Precipitation Polymerization (FRRPP) process to relate it to various materials including environmentally-re sponsible and energy-relevant types, and inherent control of energetic systems.

More on www.springer.com/978-3-642-03024-6
Due January 2010
2010. Approx. 300 p. 65 illus.
978-3-642-03024-6 ▶ 129,95 €

Organic and Polymer Chemistry for Engineers

Classes of Organic Compounds and Types of Polymeric Materials

The present volume provides a clear overview of organic and polymer chemistry. Divided into two three sections; nomenclature, organic reactions and polymer synthesis, each entry includes relevant characteristics and sources of the materials useful for engineers working with polymers. Reaction and synthetic strategies are complemented with physical properties, sources for the raw materials, as well as common applications within industry drawn upon the authors knowledge gathered in his many years of experience in the field.

More on www.springer.com/978-3-211-09443-3
Due March 2010
2010. Approx. 375 p. 50 illus.
978-3-211-09443-3 ▶ approx. 159,95 €

Scanning Force Microscopy of Polymers

This lab manual introduces the reader to scanning force microscopy of polymers based on a practice-oriented approach. It begins with a broad introduction to the necessary background of SFM, including intermolecular forces and various SFM imaging modes. "Scanning Force Microscopy of Polymers" is developed in a didactically clear and easily understandable style. The application of SFM to visualize and study polymers is exemplified by numerous case studies, including experimental protocols. In addition, the book helps the reader to develop a conscious and critical understanding of SFM data. This approach enables the reader to acquire the knowledge and experimental skills that are necessary to understand
Relativistic Methods for Chemists

Relativistic Methods for Chemists, written by a highly qualified team of authors, is targeted at both experimentalists and theoreticians interested in the area of relativistic effects in atomic and molecular systems and processes and in their consequences for the interpretation of the heavy element’s chemistry. The theoretical part of the book focuses on the relativistic methods for molecular calculations discussing problems such as relativistic two-component theory, density functional theory, pseudopotentials and correlations. These chapters are mostly addressed to experimentalists with only general background in theory and to computational chemists without training in relativistic methods. The experimentally oriented chapters describe the use of relativistic methods in different applications focusing on the design of new materials based on heavy element compounds, the role of the spin-orbit coupling in photochemistry and photobiology, and its relations to relativistic description of matter and radiation. This part of the book includes subjects of interest to theoreticians and experimentalists working in different areas of chemistry. Relativistic Methods for Chemists is written at an intermediate level in order to appeal to a broader audience than just experts working in the field of relativistic theory. The book is aimed at individuals not highly versed in these methods who want to acquire the rudiments of relativistic computing and the associated problems of importance for the heavy element chemistry. Relativistic Methods for Chemists is written for graduate students, academics, and researchers in theoretical chemistry as well as experimentalists in materials chemistry, inorganic chemistry, and physical chemistry.

More on www.springer.com/978-3-642-01230-3
Due February 2010
2010. Approx. 265 p. (Springer Laboratory,)
978-3-642-01230-3 ▶ 129,95 €
Trends in Computational Nanomechanics
Transcending Length and Time Scales

Situated at the intersection of Computational Chemistry, Solid State Physics, and Mechanical Engineering, Computational Nanomechanics has emerged as a new interdisciplinary research area that has already played a pivotal role in understanding the complex mechanical response of the nano-scale. Many important nanomechanical problems concern phenomena contained in the microscopic or the continuum phenomenological scale. Thus, they can be simulated with traditional computational approaches, such as molecular dynamics (for the microscopic scale) and finite elements (for the continuum scale). More recently, significant advances in computational methodologies have made it possible to go beyond the distinct approaches mentioned above. By seamlessly linking the previously separated discipline methodologies, multi-scale aspects of the behaviour of nano-materials can now be simulated and studied from both fundamental and engineering-application viewpoints. Trends in Computational Nanomechanics: Transcending Length and Time Scales reviews recent results generated via the application of individual or blended microscopic (from ab initio to tight binding to empirical force field) and continuum modeling techniques. It illustrates the significant progresses and challenges in developing multi-scale computational tools that aim to describe the nanomechanical response over multiple time scales and length scales ranging from the atomistic, through the microstructure or transitional, and up to the continuum, as well as the tremendous opportunities in using atomistic-to-continuum nanomechanical strategies in the bio-materials arena. Trends in Computational Nanomechanics: Transcending Length and Time Scales is a useful tool of reference for professionals, graduates, and undergraduates interested in Computational Chemistry and Physics, Materials Science, and Engineering.

More on www.springer.com/978-1-4020-9784-3
Due December 2009

2010. XVIII, 620 p. (Challenges and Advances in Computational Chemistry and Physics, 9)
978-1-4020-9784-3 ► 329,00 €

Forthcoming
S. Gupta

QSAR and Molecular Modeling

QSAR and Molecular Modeling includes all the fundamentals of these approaches developed so far. Starting with the fundamentals of drug-receptor interactions, it covers various statistical approaches, different 2D QSAR methodologies, theories and values of useful variables governing biological activities, and popular 3D molecular modeling approaches. Written in a step-wise manner so it is accessible to students, academics, and researchers at all levels this book draws to together a multidisciplinary view of QSAR and molecular odeling.

More on www.springer.com/978-1-4020-5394-8
Due March 2010

2010. 400 p.
978-1-4020-5394-8 ► 134,95 €

I. Hubac, S. Wilson

Brillouin-Wigner Methods for Many-Body Systems

In twenty-first century science, computational modeling is a powerful tool for the study of matter on a nanoscale. It complements an increasing range of experimental probes providing new or more accurate measurements in nanoscience and nanotechnology. The theoretical apparatus upon which electronic structure models are built determines their computational tractability which in turn determines their utility in applications to systems of increasing complexity. The accurate description of the effects of electron correlation is of central importance in ab initio electronic structure theory of atomic and molecular systems. Many body methods, in particular many-body perturbation theory and various coupled cluster expansions, are firmly established as the methods of choice in calculating electron correlation energies. Second order, Möller-Plesset perturbation theory is the most widely used ab initio quantum chemical technique. Coupled cluster theory with single and double excitations and a perturbative estimate of the contribution of triple excitations is often regarded as a best compromise of accuracy and computational tractability. Both of these methods employ a single reference formalism which is not adequate for studies of systems involving significant quasidegeneracy effects such as bond breaking and bond making. Such studies require the use of a multireference formalism. However, the usual approach to the many-body multireference problem based on the Rayleigh-Schrödinger formalism suffers from the appearance of ‘intruder states’ which can destroy the utility of the method. For more than thirty years a robust approach to the multireference correlation problem has been lacking. The little used Brillouin-Wigner formalism shows considerable potential in that it avoids ‘intruder states’. This volume brings together in a single volume recent leading edge research developments in this area. Brillouin-Wigner Methods for Many-Body Systems provides an introduction to many-body methods in electronic structure theory for the graduate student and post-doctoral researcher. It provides the researcher in many-body physics and theoretical chemistry with an account of Brillouin-Wigner methodology as it has been developed in recent years to handle the multireference correlation problem and defines the frontiers of this research field. This volume is of interest to atomic and molecular physicists, physical chemists and chemical physicists, quantum chemists and condensed matter theorists, computational chemists and applied mathematicians.

“The book on ‘Brillouin-Wigner methods for many-body systems’ by Hubac and Wilson is perhaps the first comprehensive treatise on the subject. The authors are both internationally recognised experts in the field and are to be congratulated on their clear and thorough presentation of the present ‘state of the art’. I recommend the book to anyone working in the field.” (Roy McWeeny, Emeritus Professor, University of Pisa, Italy) “I strongly recommend the book by Professors Hubac and Wilson on Brillouin-Wigner Perturbation Theory. From their masterly introduction to the most technical details, this book will be an inspiration to anyone interested in the use of modern perturbation theory in theoretical chemistry and physics.” (Henry F. Schaefer III, Graham Perdue Professor of Chemistry and Director of the Center for Computational Quantum Chemistry, University of Georgia, USA) “The book of I.Hubac and S.Wilson is very comprehensive. What is particularly interesting is a new fresh look on intruder state theory. Any serious student of Brillouin Wigner theory applied for many body systems should read this book.” (J. Cížek, Emeritus Professor, University of Waterloo, Canada) “Ever since the introduction of the Brillouin-Wigner version of the coupled-cluster method by Hubac and Neogrady in 1994, there has been a conspicuous attention paid to this approach, particularly by the Slovak and Czech quantum chemistry schools. Although lacking the exact size-extensive property, its attractiveness stems primarily from its ability to overcome the problems of intruder states that often plague standard multireference approaches. It is commendable that the authors gathered in this monograph the relevant up to date developments in this field of endeavour. The book will undoubtedly be very much appreciated by both students and practitioners dealing with molecular electronic structure calculations.” (Josef Paldus, Distinguished Professor Emeritus, University of Waterloo, Canada)

Due January 2010

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W.M. McClain

Symmetry Theory in Molecular Physics with Mathematica

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Prof. McClain has indeed produced "a new kind of tutorial book." It is written using the logic engine Mathematica, which permits concrete exploration and development of every concept involved in Symmetry Theory. The book may be read in your hand, or on a computer screen with Mathematica running behind it. It is intended for students of chemistry and molecular physics who need to know mathematical group theory and its applications, either for their own research or for understanding the language and concepts of their field. The book has three major parts: Part I begins with the most elementary symmetry concepts, showing how to express them in terms of matrices and permutations. These are then combined into mathematical groups. Many chemically important point groups are constructed and kept in a Mathematica package for easy reference. No other book gives such easy access to the groups themselves. The automated group construction machinery allows you to tabulate new groups that may be needed in research, such as permutation groups that describe flexible molecules. In Part II, mathematical group theory is presented with motivating questions and experiments coming first, and theorems that answer those questions coming second. You learn to make representations of groups based on any set of symmetric objects, and then to make Mathematica operators that carry out representation as a single call. Automated construction of representations is offered by no other book. Part II follows a reconstructed trail of questions, clues and solid results that led Issai Schur to a complete proof of the Great Orthogonality. In Part III, the projection operators that flow from the Great Orthogonality are automated and applied to chemical and spectroscopic problems, which are now seen to fall within a unified intellectual framework.

The topics include chemical bonding in symmetric molecules, molecular vibrations and rigorous reasoning about quantum mechanical matrix elements. As a concrete example of the enormous power of the automated projectors, the tensor operators for two- and three-photon processes are projected under all tabulated groups. All the machinery presented is general, and will work with new groups that you may construct. Finally, there is machinery that accepts input the multiplication table of any group and returns as output its character table. This will be of great use to spectroscopists who deal with flexible molecules belonging to permutation groups, which are too numerous even for a Mathematica package.


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