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Organic Chemistry - Robert V. Hoffman 2004-11-26

Ideal for those who have previously studied organic chemistry but not in great depth and with little exposure to organic chemistry in a formal sense. This text aims to bridge the gap between introductory-level instruction and more advanced graduate-level texts, reviewing the basics as well as presenting the more advanced ideas that are currently of importance in organic chemistry. * Provides students with the organic chemistry background required to succeed in advanced courses. * Practice problems included at the end of each chapter.

Lanthanide and Actinide Chemistry - Simon Cotton 2013-03-15

The only introduction into the exciting chemistry of Lanthanides and Actinides. The book is based on a number of courses on "f elements". The author has a long experience in teaching this field of chemistry. Lanthanides have become very common elements in research and technology applications; this book offers the basic knowledge. The book offers insights into a vast range of applications, from lasers to synthesis. The Inorganic Chemistry: A Textbook series reflects the pivotal role of modern inorganic and physical chemistry in a whole range of emerging areas, such as materials chemistry, green chemistry and bioinorganic chemistry, as well as providing a solid grounding in established areas such as solid state chemistry, coordination chemistry, main group chemistry and physical inorganic chemistry. Lanthanide and Actinide Chemistry is a one-volume account of the Lanthanides (including scandium and yttrium), the Actinides and the Transactinide elements, intended as an introductory treatment for undergraduate and postgraduate students. The principal features of these elements are set out in detail, enabling clear comparison and contrast with the Transition Elements and Main Group metals. The book covers the extraction of the elements from their ores and their purification, as well as the synthesis of the man-made elements; the properties of the elements and principal binary compounds; detailed accounts of their coordination chemistry and organometallic chemistry, from both preparative and structural viewpoints, with a clear explanation of the factors responsible for the adoption of particular coordination numbers; spectroscopy and magnetism, especially for the lanthanides, with case studies and accounts of applications in areas like magnetic resonance imaging, lasers and luminescence; nuclear separations and problems in waste disposal for the radioactive elements, particularly in the context of plutonium. Latest developments are covered in areas like the synthesis of the latest man-made elements, whilst there is a whole chapter on the application of lanthanide compounds in synthetic organic chemistry. End-of-chapter questions suitable for tutorial discussions are provided, whilst there is a very comprehensive bibliography providing ready access to further reading on all topics.

Isocyanide Chemistry - V. Nenajdenko 2012-06-04

The efficacy of isocyanide reactions in the synthesis of natural or natural-like products has resulted in a renaissance of isocyanide chemistry. Now isocyanides are widely used in different branches of organic, inorganic, coordination, combinatorial and medicinal chemistry. This invaluable reference is the only book to cover the topic in such depth, presenting all aspects of synthetic isonitrile chemistry. The highly experienced and internationally renowned editor has brought together an equally distinguished team of authors who cover multicomponent reactions, isonitriles in total synthesis, isonitriles in polymer chemistry and much more.

Flash Chemistry - Jun-ichi Yoshida 2008-10-13

Have you ever wished you could speed up your organic syntheses without losing control of the reaction? Flash Chemistry is a new concept which offers an integrated scheme for fast, controlled organic synthesis. It

brings together the generation of highly reactive species and their reactions in Microsystems to enable highly controlled organic syntheses on a preparative scale in timescales of a few seconds or less. Flash Chemistry: Fast Organic Synthesis in Microsystems is the first book to describe this exciting new technique, with chapters covering: an introduction to flash chemistry reaction dynamics: how fast is the act of chemical transformation, what is the rate of reaction, and what determines the selectivity of a reaction? examples of why flash chemistry is needed: the rapid construction of chemical libraries, rapid synthesis of radioactive PET probes, and on-demand rapid synthesis in industry the generation of highly reactive species through thermal, microwave, chemical, photochemical, and electrochemical activation microsystems: What are microsystems and how are they made? Why is size so important? What are the characteristic features of microsystems? conduction and control of extremely fast reactions using microsystems applications of flash chemistry in organic synthesis polymer synthesis based on flash chemistry industrial applications of flash chemistry Flash Chemistry: Fast Organic Synthesis in Microsystems is an essential introduction to anyone working in organic synthesis, process chemistry, chemical engineering and physical organic chemistry concerned with fundamental aspects of chemical reactions and synthesis and the production of organic compounds.

Chemistry Education - Javier García-Martínez 2015-05-04

Winner of the CHOICE Outstanding Academic Title 2017 Award This comprehensive collection of top-level contributions provides a thorough review of the vibrant field of chemistry education. Highly-experienced chemistry professors and education experts cover the latest developments in chemistry learning and teaching, as well as the pivotal role of chemistry for shaping a more sustainable future. Adopting a practice-oriented approach, the current challenges and opportunities posed by chemistry education are critically discussed, highlighting the pitfalls that can occur in teaching chemistry and how to circumvent them. The main topics discussed include best practices, project-based education, blended learning and the role of technology, including e-learning, and science visualization. Hands-on recommendations on how to optimally implement innovative strategies of teaching chemistry at university and high-school levels make this book an essential resource for anybody interested in either teaching or learning chemistry more effectively, from experience chemistry professors to secondary school teachers, from educators with no formal training in didactics to frustrated chemistry students.

Modern Fluoroorganic Chemistry - Peer Kirsch 2006-03-06

In this handbook, Peer Kirsch clearly shows that this exciting field is no longer an exotic area of research. Aimed primarily at synthetic chemists wanting to gain a deeper understanding of the fascinating implications of including the highly unusual element fluorine in organic compounds, the main part of the book presents a wide range of synthetic methodologies and the experimental procedures selected undeniably show that this can be done with standard laboratory equipment. To round off, the author looks at fluorine chemistry and the applications of organofluorine compounds in liquid crystals, polymers and more besides. This long-awaited book represents an indispensable source of high quality information for everyone working in the field.

Reviews of Reactive Intermediate Chemistry - Matthew S. Platz 2007-04-20

The chemistry of reactive intermediates is central to a modern mechanistic and quantitative understanding of organic chemistry. Moreover, it underlies a significant portion of modern synthetic chemistry and is integral to a molecular view of biological chemistry. Reviews in Reactive Intermediate Chemistry presents an

up-to-date, authoritative guide to this fundamental topic. Although it follows Reactive Intermediate Chemistry by the same authors, it serves as a free-standing resource for the entire chemical and biochemical community. The book includes: Relevant, practical applications Coverage of such topics as mass spectrometry methods, reactive intermediates in interstellar medium, quantum mechanical tunnelling, solvent effects, reactive intermediates in biochemical processes, and excited state surfaces Discussions of emerging areas, particularly those involving dynamics and theories Concluding sections identifying key directions for future research are provided at the end of each chapter

The Chemistry of Metal-Organic Frameworks - Stefan Kaskel 2016-06-14

Providing vital knowledge on the design and synthesis of specific metal-organic framework (MOF) classes as well as their properties, this ready reference summarizes the state of the art in chemistry. Divided into four parts, the first begins with a basic introduction to typical cluster units or coordination geometries and provides examples of recent and advanced MOF structures and applications typical for the respective class. Part II covers recent progress in linker chemistries, while special MOF classes and morphology design are described in Part III. The fourth part deals with advanced characterization techniques, such as NMR, in situ studies, and modelling. A final unique feature is the inclusion of data sheets of commercially available MOFs in the appendix, enabling experts and newcomers to the field to select the appropriate MOF for a desired application. A must-have reference for chemists, materials scientists, and engineers in academia and industry working in the field of catalysis, gas and water purification, energy storage, separation, and sensors.

Supramolecular Chemistry in Water - Stefan Kubik 2019-05-13

Provides deep insight into the concepts and recent developments in the area of supramolecular chemistry in water Written by experts in their respective field, this comprehensive reference covers various aspects of supramolecular chemistry in water?from fundamental aspects to applications. It provides readers with a basic introduction to the current understanding of the properties of water and how they influence molecular recognition, and examines the different receptor types available in water and the types of substrates that can be bound. It also looks at areas to where they can be applied, such as materials, optical sensing, medicinal imaging, and catalysis. Supramolecular Chemistry in Water offers five major sections that address important topics like water properties, molecular recognition, association and aggregation phenomena, optical detection and imaging, and supramolecular catalysis. It covers chemistry and physical chemistry of water; water-mediated molecular recognition; peptide and protein receptors; nucleotide receptors; carbohydrate receptors; and ion receptors. The book also teaches readers all about coordination compounds; self-assembled polymers and gels; foldamers; vesicles and micelles; and surface-modified nanoparticles. In addition, it provides in-depth information on indicators and optical probes, as well as probes for medical imaging. -Covers, in a timely manner, an emerging area in chemistry that is growing more important every day -Addresses topics such as molecular recognition, aggregation, catalysis, and more -Offers comprehensive coverage of everything from fundamental aspects of supramolecular chemistry in water to its applications -Edited by one of the leading international scientists in the field Supramolecular Chemistry in Water is a one-stop-resource for all polymer chemists, catalytic chemists, biochemists, water chemists, and physical chemists involved in this growing area of research.

Introduction to Materials Chemistry - Harry R. Allcock 2019-10-02

This textbook introduces the reader to the elementary chemistry on which materials science depends by discussing the different classes of materials and their applications. It shows the reader how different types of materials are produced, why they possess specific properties, and how they are used in technology. Each chapter contains study questions to enable discussions and consolidation of the acquired knowledge. The new edition of this textbook is completely revised and updated to reflect the significant expansion of the field of materials chemistry over the last years, covering now also topics such as graphene, nanotubes, light emitting diodes, extreme photolithography, biomedical materials, and metal organic frameworks. From the reviews of the first edition: "This book is not only informative and comprehensive for a novice reader, but also a valuable resource for a scientist and/or an industrialist for new and novel challenges." (Materials and Manufacturing Process, June 2009) "Allcock provides a clear path by first describing basic chemical principles, then distinguishing between the various major materials groups, and finally enriching the student by offering a variety of special examples." (CHOICE, April 2009) "Proceeding logically from the basics to

materials in advanced technology, it covers the fundamentals of materials chemistry, including principles of materials synthesis and materials characterization methods." (Internationale Fachzeitschrift Metall, January 2009)

Introduction to Reticular Chemistry - Omar M. Yaghi 2019-03-22

A concise introduction to the chemistry and design principles behind important metal-organic frameworks and related porous materials Reticular chemistry has been applied to synthesize new classes of porous materials that are successfully used for myriad applications in areas such as gas separation, catalysis, energy, and electronics. Introduction to Reticular Chemistry gives an unique overview of the principles of the chemistry behind metal-organic frameworks (MOFs), covalent organic frameworks (COFs), and zeolitic imidazolate frameworks (ZIFs). Written by one of the pioneers in the field, this book covers all important aspects of reticular chemistry, including design and synthesis, properties and characterization, as well as current and future applications Designed to be an accessible resource, the book is written in an easy-to-understand style. It includes an extensive bibliography, and offers figures and videos of crystal structures that are available as an electronic supplement. Introduction to Reticular Chemistry: -Describes the underlying principles and design elements for the synthesis of important metal-organic frameworks (MOFs) and related materials -Discusses both real-life and future applications in various fields, such as clean energy and water adsorption -Offers all graphic material on a companion website -Provides first-hand knowledge by Omar Yaghi, one of the pioneers in the field, and his team. Aimed at graduate students in chemistry, structural chemists, inorganic chemists, organic chemists, catalytic chemists, and others, Introduction to Reticular Chemistry is a groundbreaking book that explores the chemistry principles and applications of MOFs, COFs, and ZIFs.

Copper-Oxygen Chemistry - Kenneth D. Karlin 2011-08-24

Covers the vastly expanding subject of oxidative processes mediated by copper ions within biological systems Copper-mediated biological oxidations offer a broad range of fundamentally important and potentially practical chemical processes that cross many chemical and pharmaceutical disciplines. This newest volume in the Wiley Series on Reactive Intermediates in Chemistry and Biology is divided into three logical areas within the topic of copper/oxygen chemistry—biological systems, theory, and bioinorganic models and applications—to explore the biosphere for its highly evolved and thus efficient oxidative transformations in the discovery of new types of interactions between molecular oxygen and copper ion. Featuring a diverse collection of subject matter unified in one complete and comprehensive resource, Copper-Oxygen Chemistry probes the fundamental aspects of copper coordination chemistry, synthetic organic chemistry, and biological chemistry to reveal both the biological and chemical aspects driving the current exciting research efforts behind copper-oxygen chemistry. In addition, Copper-Oxygen Chemistry: Addresses the significantly increasing literature on oxygen-atom insertion and carbon-carbon bond-forming reactions as well as enantioselective oxidation chemistries Progresses from biological systems to spectroscopy and theory, and onward to bioinorganic models and applications Covers a wide array of reaction types such as insertion and dehydrogenation reactions that utilize the cheap, abundant, and energy-containing O₂ molecule With thorough coverage by prominent authors and researchers shaping innovations in this growing field, this valuable reference is essential reading for bioinorganic chemists, as well as organic, synthetic, and pharmaceutical chemists in academia and industry.

Iodine Chemistry and Applications - Tatsuo Kaiho 2014-10-09

This book comprehensively covers iodine, its chemistry, and its role in functional materials, reagents, and compounds. • Provides an up-to-date, detailed overview of iodine chemistry with discussion on elemental aspects: characteristics, properties, iodides, and halogen bonding • Acts as a useful guide for readers to learn how to synthesize complex compounds using iodine reagents or intermediates • Describes traditional and modern processing techniques, such as starch, copper, blowing out, and ion exchange resin methods • Includes seven detailed sections devoted to the applications of iodine: Characteristics, Production, Synthesis, Biological Applications, Industrial Applications, Bioorganic Chemistry and Environmental Chemistry, and Radioisotopes • Features hot topics in the field, such as hypervalent iodine-mediated cross coupling reactions, agrochemicals, dyesensitized solar cells, and therapeutic agents

The Chemistry of Food - Richard Koplik 2020-07-29

Wiley's landmark food chemistry textbook that provides an all-in-one reference book, revised and updated. The revised second edition of *The Chemistry of Food* provides a comprehensive overview of important compounds constituting of food and raw materials for food production. The authors highlight food's structural features, chemical reactions, organoleptic properties, nutritional, and toxicological importance. The updated second edition reflects the thousands of new scientific papers concerning food chemistry and related disciplines that have been published since 2012. Recent discoveries deal with existing as well as new food constituents, their origin, reactivity, degradation, reactions with other compounds, organoleptic, biological, and other important properties. The second edition extends and supplements the current knowledge and presents new facts about chemistry, legislation, nutrition, and food safety. The main chapters of the book explore the chemical structure of substances and subchapters examine the properties or uses. This important resource:

- Offers in a single volume an updated text dealing with food chemistry
- Contains complete and fully up-to-date information on food chemistry, from structural features to applications
- Features several visual aids including reaction schemes, diagrams and tables, and nearly 2,000 chemical structures
- Written by internationally recognized authors on food chemistry

Written for upper-level students, lecturers, researchers and the food industry, the revised second edition of *The Chemistry of Food* is a quick reference for almost anything food-related as pertains to its chemical properties and applications.

Environmental Organic Chemistry - René P. Schwarzenbach 2005-06-24

Environmental Organic Chemistry focuses on environmental factors that govern the processes that determine the fate of organic chemicals in natural and engineered systems. The information discovered is then applied to quantitatively assessing the environmental behaviour of organic chemicals. Now in its 2nd edition this book takes a more holistic view on physical-chemical properties of organic compounds. It includes new topics that address aspects of gas/solid partitioning, bioaccumulation, and transformations in the atmosphere. Structures chapters into basic and sophisticated sections. Contains illustrative examples, problems and case studies. Examines the fundamental aspects of organic, physical and inorganic chemistry - applied to environmentally relevant problems. Addresses problems and case studies in one volume.

Solvents and Solvent Effects in Organic Chemistry - Christian Reichardt 2006-03-06

In most cases, every chemist must deal with solvent effects, whether voluntarily or otherwise. Since its publication, this has been the standard reference on all topics related to solvents and solvent effects in organic chemistry. Christian Reichardt provides reliable information on the subject, allowing chemists to understand and effectively use these phenomena. 3rd updated and enlarged edition of a classic 35% more contents excellent, proven concept includes current developments, such as ionic liquids indispensable in research and industry. From the reviews of the second edition: "...This is an immensely useful book, and the source that I would turn to first when seeking virtually any information about solvent effects."

—Organometallics

Silicon Chemistry - Peter Jutzi 2007-09-24

The combined results from an international research project involving 40 interdisciplinary groups, providing the latest knowledge from the past few years. Adopting an application-oriented approach, this handy reference is a must-have for every silicon chemist, whether working in inorganic, organic, physical or polymer chemistry, materials science or physics.

Computational Chemistry - David Young 2004-04-07

A practical, easily accessible guide for bench-top chemists, this book focuses on accurately applying computational chemistry techniques to everyday chemistry problems. Provides nonmathematical explanations of advanced topics in computational chemistry. Focuses on when and how to apply different computational techniques. Addresses computational chemistry connections to biochemical systems and polymers. Provides a prioritized list of methods for attacking difficult computational chemistry problems, and compares advantages and disadvantages of various approximation techniques. Describes how the choice of methods of software affects requirements for computer memory and processing time.

Amino Group Chemistry - Alfredo Ricci 2008-06-25

Here, probably the most important functional group in organic chemistry is discussed in one handy volume. The monograph covers its application -- from natural products to synthetic pharmaceuticals -- detailing complex syntheses using the amino group as templates and modern techniques focussing on the

introduction of the amino group. A definitive must-have for every chemist.

Chemistry and Technology of Surfactants - Richard J. Farn 2008-04-15

Surfactants are used throughout industry as components in a huge range of formulated products or as effect chemicals in the production or processing of other materials. A detailed understanding of the basis of their activity is required by all those who use surfactants, yet the new graduate or postgraduate chemist or chemical engineer will generally have little or no experience of how and why surfactants work. *Chemistry & Technology of Surfactants* is aimed at new graduate or postgraduate level chemists and chemical engineers at the beginning their industrial careers and those in later life who become involved with surfactants for the first time. The book is a straightforward and practical survey of the chemistry of surfactants and their uses, providing a basic introduction to surfactant theory, information on the various types of surfactant and some application details. This will allow readers to build on their scientific education the concepts and principles on which the successful use of surfactants, across a wide range of industries, is based.

Quantum Chemistry and Dynamics of Excited States - Leticia González 2021-02-01

An introduction to the rapidly evolving methodology of electronic excited states. For academic researchers, postdocs, graduate and undergraduate students, *Quantum Chemistry and Dynamics of Excited States: Methods and Applications* reports the most updated and accurate theoretical techniques to treat electronic excited states. From methods to deal with stationary calculations through time-dependent simulations of molecular systems, this book serves as a guide for beginners in the field and knowledge seekers alike. Taking into account the most recent theory developments and representative applications, it also covers the often-overlooked gap between theoretical and computational chemistry. An excellent reference for both researchers and students, *Excited States* provides essential knowledge on quantum chemistry, an in-depth overview of the latest developments, and theoretical techniques around the properties and nonadiabatic dynamics of chemical systems. Readers will learn:

- Essential theoretical techniques to describe the properties and dynamics of chemical systems
- Electronic Structure methods for stationary calculations
- Methods for electronic excited states from both a quantum chemical and time-dependent point of view
- A breakdown of the most recent developments in the past 30 years

For those searching for a better understanding of excited states as they relate to chemistry, biochemistry, industrial chemistry, and beyond, *Quantum Chemistry and Dynamics of Excited States* provides a solid education in the necessary foundations and important theories of excited states in photochemistry and ultrafast phenomena.

Introduction to Coordination Chemistry - Geoffrey A. Lawrance 2013-03-15

At the heart of coordination chemistry lies the coordinate bond, in its simplest sense arising from donation of a pair of electrons from a donor atom to an empty orbital on a central metalloid or metal. Metals overwhelmingly exist as their cations, but these are rarely met 'naked' – they are clothed in an array of other atoms, molecules or ions that involve coordinate covalent bonds (hence the name coordination compounds). These metal ion complexes are ubiquitous in nature, and are central to an array of natural and synthetic reactions. Written in a highly readable, descriptive and accessible style, *Introduction to Coordination Chemistry* describes properties of coordination compounds such as colour, magnetism and reactivity as well as the logic in their assembly and nomenclature. It is illustrated with many examples of the importance of coordination chemistry in real life, and includes extensive references and a bibliography. *Introduction to Coordination Chemistry* is a comprehensive and insightful discussion of one of the primary fields of study in *Inorganic Chemistry* for both undergraduate and non-specialist readers.

Dynamic Covalent Chemistry - Wei Zhang 2017-09-07

The first and only exhaustive review of the theory, thermodynamic fundamentals, mechanisms, and design principles of dynamic covalent systems. *Dynamic Covalent Chemistry: Principles, Reactions, and Applications* presents a comprehensive review of the theory, thermodynamic fundamentals, mechanisms, and design principles of dynamic covalent systems. It features contributions from a team of international scientists, grouped into three main sections covering the principles of dynamic covalent chemistry, types of dynamic covalent chemical reactions, and the latest applications of dynamic covalent chemistry (DCvC) across an array of fields. The past decade has seen tremendous progress in (DCvC) research and industrial applications. The great synthetic power and reversible nature of this chemistry has enabled the development of a variety of functional molecular systems and materials for a broad range of applications in organic

synthesis, materials development, nanotechnology, drug discovery, and biotechnology. Yet, until now, there have been no authoritative references devoted exclusively to this powerful synthetic tool, its current applications, and the most promising directions for future development. *Dynamic Covalent Chemistry: Principles, Reactions, and Applications* fills the yawning gap in the world literature with comprehensive coverage of: The energy landscape, the importance of reversibility, enthalpy vs. entropy, and reaction kinetics Single-type, multi-type, and non-covalent reactions, with a focus on the advantages and disadvantages of each reaction type Dynamic covalent assembly of discrete molecular architectures, responsive polymer synthesis, and drug discovery Important emerging applications of dynamic covalent chemistry in nanotechnology, including both material- and bio-oriented directions Real-world examples describing a wide range of industrial applications for organic synthesis, functional materials development, nanotechnology, drug delivery and more *Dynamic Covalent Chemistry: Principles, Reactions, and Applications* is must-reading for researchers and chemists working in dynamic covalent chemistry and supramolecular chemistry. It will also be of value to academic researchers and advanced students interested in applying the principles of (DCvC) in organic synthesis, functional materials development, nanotechnology, drug discovery, and chemical biology.

Bioinorganic Vanadium Chemistry - Dieter Rehder 2008-04-15

Vanadium is named after Vanadis, the most aristocratic of Norse goddesses, who symbolises beauty and fertility - essential features of vanadium chemistry. It is a ubiquitous trace element, with a surprising range of biological functions. In *Bioinorganic Vanadium Chemistry*, Dieter Rehder addresses the major aspects of vanadium chemistry related to living organisms and the mutual impact between biological and inorganic vanadium chemistry. Topics covered include: the history, natural occurrence, distribution and impact of vanadium inorganic aspects of the function of vanadium in biological systems interaction of aqueous vanadate and vanadyl with biogenic ligands vanadium coordination compounds the vanadium-carbon bond methods of characterisation of biogenic and model vanadium systems (EPR and ENDOR for oxovanadium(IV); 51V NMR for vanadium(V); XAS) vanadium in ascidians and polychaeta worms the concentration of vanadium in the form of amavadin by Amanita mushrooms vanadate-dependent haloperoxidases vanadium and the nitrogen cycle vanadate as energiser for bacteria, and vanadophores medicinal aspects including the anti-diabetic potential of vanadium compounds interaction of vanadium with proteins and protein substrates vanadium and phosphate-metabolising enzymes *Bioinorganic Vanadium Chemistry* conveys the essential aspects of vanadium bioinorganic chemistry, making this book a valuable complement to more general bioinorganic chemistry texts and more specialized topical reviews for researchers and students alike.

Modern Carbonyl Chemistry - Junzo Otera 2008-11-21

The carbonyl group is undoubtedly one of the most important functional groups in organic chemistry, both in its role as reactive center for synthesis or derivatisation and as crucial feature for special structural or physiological properties. Vast and profound progress has been made in all aspects modern carbonyl chemistry. These achievements are, however, rather dispersed in the literature and it is often not easy for the researcher obtain a comprehensive overview of a relevant topic. *Modern Carbonyl Chemistry* overcomes this inconvenience by collating the information for appropriate themes. In this work internationally renowned experts and leaders in the field have surveyed recent aspects and modern features in carbonyl chemistry, such as cascade-reactions, one-pot-syntheses, recognition, or site differentiation.

The Chemistry of Metal CVD - Toivo T. Kodas 2008-09-26

High purity, thin metal coatings have a variety of important commercial applications, for example, in the microelectronics industry, as catalysts, as protective and decorative coatings as well as in gas-diffusion barriers. This book offers detailed, up-to-date coverage of the chemistry behind the vapor deposition of different metals from organometallic precursors. In nine chapters, the CVD of metals including aluminum, tungsten, gold, silver, platinum, palladium, nickel, as well as copper from copper(I) and copper(II) compounds is covered. The synthesis and properties of the precursors, the growth process, morphology, quality and adhesion of the resulting films as well as laser-assisted, ion-assisted and plasma-assisted methods are discussed. Present applications and prospects for future developments are summarized. With ca. 1000 references and a glossary, this book is a unique source of in-depth information. It is indispensable for chemists, physicists, engineers and materials scientists working with metal-coating processes and

technologies. From Reviews: 'I highly recommend this book to anyone interested in learning more about the chemistry of metal CVD.' J. Am Chem. Soc.

Bioanalytical Chemistry - Susan R. Mikkelsen 2016-03-07

A timely, accessible survey of the multidisciplinary field of bioanalytical chemistry Provides an all in one approach for both beginners and experts, from a broad range of backgrounds, covering introductions, theory, advanced concepts and diverse applications for each method Each chapter progresses from basic concepts to applications involving real samples Includes three new chapters on Biomimetic Materials, Lab-on-Chip, and Analytical Methods Contains end-of-chapter problems and an appendix with selected answers

Visible Light Photocatalysis in Organic Chemistry - Corey R.J. Stephenson 2018-05-29

Filling the need for a ready reference that reflects the vast developments in this field, this book presents everything from fundamentals, applications, various reaction types, and technical applications. Edited by rising stars in the scientific community, the text focuses solely on visible light photocatalysis in the context of organic chemistry. This primarily entails photoinduced electron transfer and energy transfer chemistry sensitized by polypyridyl complexes, yet also includes the use of organic dyes and heterogeneous catalysts. A valuable resource to the synthetic organic community, polymer and medicinal chemists, as well as industry professionals.

Organoselenium Chemistry - Thomas Wirth 2012-01-09

Selenium-based methods in synthetic chemistry have developed rapidly over the past years and are now offering highly useful tools for organic synthesis. Filling the gap for a comprehensive handbook and ready reference, this book covers all modern developments within the field, including biochemical aspects. The chemistry chapters are organized according to the different reactivities of various selenium compounds and reagents, with each chapter dealing with a special reaction type. Also includes a table with 77Se NMR shifts to aid in practical problems. From the Contents: * Electrophilic and Nucleophilic Selenium * Selenium Compounds in Radical Reactions * Selenium-Stabilized Carbanions * Selenium Compounds with Valency Higher than Two * Selenocarbonyls * Selenoxide Elimination and [2,3]-Sigmatropic Rearrangement * Selenium Compounds as Ligands and Catalysts * Biological and Biochemical Aspects of Selenium Compounds

Organic Chemistry - David R. Klein 2017-08-14

In *Organic Chemistry*, 3rd Edition, Dr. David Klein builds on the phenomenal success of the first two editions, which presented his unique skills-based approach to learning organic chemistry. Dr. Klein's skills-based approach includes all of the concepts typically covered in an organic chemistry textbook, and places special emphasis on skills development to support these concepts. This emphasis on skills development in unique SkillBuilder examples provides extensive opportunities for two-semester Organic Chemistry students to develop proficiency in the key skills necessary to succeed in organic chemistry.

Relativistic Quantum Chemistry - Markus Reiher 2009-02-17

"Written by two researchers in the field, this book is a reference to explain the principles and fundamentals in a self-contained, complete and consistent way. Much attention is paid to the didactical value, with the chapters interconnected and based on each other. From beginning to end, the authors deduce all the concepts and rules, such that readers are able to understand the fundamentals and principles behind the theory. Essential reading for theoretical chemists and physicists." --Book Jacket.

Contemporary Carbene Chemistry - Robert A. Moss 2013-10-17

Presents the most innovative results in carbene chemistry, setting the foundation for new discoveries and applications The discovery of stable carbenes has reinvigorated carbene chemistry research, with investigators seeking to develop carbenes into new useful catalysts and ligands. Presenting the most innovative and promising areas of carbene research over the past decade, this book explores newly discovered structural, catalytic, and organometallic aspects of carbene chemistry, with an emphasis on new and emerging synthetic applications. *Contemporary Carbene Chemistry* features contributions from an international team of pioneering carbene chemistry researchers. Collectively, these authors have highlighted the most interesting and promising areas of investigation in the field. The book is divided into two parts: Part 1, Properties and Reactions of Carbenes, explores new findings on carbene stability, acid-base behavior, and catalysis. Carbenic structure and reactivity are examined in chapters dedicated to stable carbenes, carbodicarbenes, carbenes as guests in supramolecular hosts, tunneling in carbene and oxacarbene reactions,

and ultrafast kinetics of carbenes and their excited state precursors. Theoretical concerns are addressed in chapters on computational methods and dynamics applied to carbene reactions. Part 2, Metal Carbenes, is dedicated to the synthetic dimensions of carbenes, particularly the reactions and catalytic properties of metal carbenes. The authors discuss lithium, rhodium, ruthenium, chromium, molybdenum, tungsten, cobalt, and gold. All the chapters conclude with a summary of the current situation, new challenges on the horizon, and promising new research directions. A list of key reviews and suggestions for further reading also accompanies every chapter. Each volume of the Wiley Series on Reactive Intermediates in Chemistry and Biology focuses on a specific reactive intermediate, offering a broad range of perspectives from leading experts that sets the stage for new applications and further discoveries.

Discovering Chemistry With Natural Bond Orbitals - Frank Weinhold 2012-06-15

This book explores chemical bonds, their intrinsic energies, and the corresponding dissociation energies which are relevant in reactivity problems. It offers the first book on conceptual quantum chemistry, a key area for understanding chemical principles and predicting chemical properties. It presents NBO mathematical algorithms embedded in a well-tested and widely used computer program (currently, NBO 5.9). While encouraging a "look under the hood" (Appendix A), this book mainly enables students to gain proficiency in using the NBO program to re-express complex wavefunctions in terms of intuitive chemical concepts and orbital imagery.

Orbital Interactions in Chemistry - Thomas A. Albright 2013-03-28

Explains the underlying structure that unites all disciplines in chemistry. Now in its second edition, this book explores organic, organometallic, inorganic, solid state, and materials chemistry, demonstrating how common molecular orbital situations arise throughout the whole chemical spectrum. The authors explore the relationships that enable readers to grasp the theory that underlies and connects traditional fields of study within chemistry, thereby providing a conceptual framework with which to think about chemical structure and reactivity problems. *Orbital Interactions in Chemistry* begins by developing models and reviewing molecular orbital theory. Next, the book explores orbitals in the organic-main group as well as in solids. Lastly, the book examines orbital interaction patterns that occur in inorganic-organometallic fields as well as cluster chemistry, surface chemistry, and magnetism in solids. This Second Edition has been thoroughly revised and updated with new discoveries and computational tools since the publication of the first edition more than twenty-five years ago. Among the new content, readers will find: Two new chapters dedicated to surface science and magnetic properties. Additional examples of quantum calculations, focusing on inorganic and organometallic chemistry. Expanded treatment of group theory. New results from photoelectron spectroscopy. Each section ends with a set of problems, enabling readers to test their grasp of new concepts as they progress through the text. Solutions are available on the book's ftp site. *Orbital Interactions in Chemistry* is written for both researchers and students in organic, inorganic, solid state, materials, and computational chemistry. All readers will discover the underlying structure that unites all disciplines in chemistry.

Supramolecular Chemistry - Jonathan W. Steed 2013-05-21

Supramolecular chemistry is 'chemistry beyond the molecule' - the chemistry of molecular assemblies and intermolecular bonds. It is one of today's fastest growing disciplines, crossing a range of subjects from biological chemistry to materials science; and from synthesis to spectroscopy. *Supramolecular Chemistry* is an up-to-date, integrated textbook that tells the newcomer to the field everything they need to know to get started. Assuming little in the way of prior knowledge, the book covers the concepts behind the subject, its breadth, applications and the latest contemporary thinking in the area. It also includes coverage of the more important experimental and instrumental techniques needed by supramolecular chemists. The book has been thoroughly updated for this second edition. In addition to the strengths of the very popular first edition, this comprehensive new version expands coverage into a broad range of emerging areas. Clear explanations of both fundamental and nascent concepts are supplemented by up-to-date coverage of exciting emerging trends in the literature. Numerous examples and problems are included throughout the book. A system of "key references" allows rapid access to the secondary literature, and of course comprehensive primary literature citations are provided. A selection of the topics covered is listed below. Cation, anion, ion-pair and molecular host-guest chemistry. Crystal engineering. Topological entanglement. Clathrates. Self-assembly. Molecular devices. Dendrimers. Supramolecular polymers. Microfabrication. Nanoparticles. Chemical emergence.

Metal-organic frameworks. Gels. Ionic liquids. Supramolecular catalysis. Molecular electronics. Polymorphism. Gas sorption. Anion-pi interactions. Nanochemistry. Supramolecular Chemistry is a must for both students new to the field and for experienced researchers wanting to explore the origins and wider context of their work. Review: "At just under 1000 pages, the second edition of Steed and Atwood's *Supramolecular Chemistry* is the most comprehensive overview of the area available in textbook form...highly recommended."

—Chemistry World, August 2009

Visualizing Everyday Chemistry - Douglas P. Heller 2015-01-20

Visualizing Everyday Chemistry is for a one-semester course dedicated to introducing chemistry to non-science students. It shows what chemistry is and what it does, by integrating words with powerful and compelling visuals and learning aids. With this approach, students not only learn the basic principles of chemistry but see how chemistry impacts their lives and society. The goal of *Visualizing Everyday Chemistry* is to show students that chemistry is important and relevant, not because we say it is but because they see it is.

Handbook of Organopalladium Chemistry for Organic Synthesis - Ei-ichi Negishi 2003-11-24

Organized to provide maximum utility to the bench synthetic chemist. The editor is well-known for his work in exploring, developing, and applying organopalladium chemistry. Contributors include over 24 world authorities in the field.

Foundations of Chemistry - Philippa B. Cranwell 2021-07-30

FOUNDATIONS OF CHEMISTRY A foundation-level guide to chemistry for physical, life sciences and engineering students. *Foundations of Chemistry: An Introductory Course for Science Students* fills a gap in the literature to provide a basic chemistry text aimed at physical sciences, life sciences and engineering students. The authors, noted experts on the topic, offer concise explanations of chemistry theory and the principles that are typically reviewed in most one year foundation chemistry courses and first year degree-level chemistry courses for non-chemists. The authors also include illustrative examples and information on the most recent applications in the field. *Foundations of Chemistry* is an important text that outlines the basic principles in each area of chemistry - physical, inorganic and organic - building on prior knowledge to quickly expand and develop a student's knowledge and understanding. Key features include: Worked examples showcase core concepts and practice questions. Margin comments signpost students to knowledge covered elsewhere and are used to highlight key learning objectives. Chapter summaries list the main concepts and learning points.

Arrow Pushing in Inorganic Chemistry - Abhik Ghosh 2014-07-25

Involved as it is with 95% of the periodic table, inorganic chemistry is one of the foundational subjects of scientific study. Inorganic catalysts are used in crucial industrial processes and the field, to a significant extent, also forms the basis of nanotechnology. Unfortunately, the subject is not a popular one for undergraduates. This book aims to take a step to change this state of affairs by presenting a mechanistic, logical introduction to the subject. Organic teaching places heavy emphasis on reaction mechanisms - "arrow-pushing" - and the authors of this book have found that a mechanistic approach works just as well for elementary inorganic chemistry. As opposed to listening to formal lectures or learning the material by heart, by teaching students to recognize common inorganic species as electrophiles and nucleophiles, coupled with organic-style arrow-pushing, this book serves as a gentle and stimulating introduction to inorganic chemistry, providing students with the knowledge and opportunity to solve inorganic reaction mechanisms. • The first book to apply the arrow-pushing method to inorganic chemistry teaching • With the reaction mechanisms approach ("arrow-pushing"), students will no longer have to rely on memorization as a device for learning this subject, but will instead have a logical foundation for this area of study • Teaches students to recognize common inorganic species as electrophiles and nucleophiles, coupled with organic-style arrow-pushing • Provides a degree of integration with what students learn in organic chemistry, facilitating learning of this subject • Serves as an invaluable companion to any introductory inorganic chemistry textbook

Understanding Wine Chemistry - Andrew L. Waterhouse 2016-06-06

Wine chemistry inspires and challenges with its complexity, and while this is intriguing, it can also be a barrier to further understanding. The topic is demystified in *Understanding Wine Chemistry*, which explains the important chemistry of wine at the level of university education, and provides an accessible reference

text for scientists and scientifically trained winemakers alike. Understanding Wine Chemistry: Summarizes the compounds found in wine, their basic chemical properties and their contribution to wine stability and sensory properties Focuses on chemical and biochemical reaction mechanisms that are critical to wine production processes such as fermentation, aging, physiochemical separations and additions Includes case studies showing how chemistry can be harnessed to enhance wine color, aroma, flavor, balance, stability and quality. This descriptive text provides an overview of wine components and explains the key chemical

reactions they undergo, such as those controlling the transformation of grape components, those that arise during fermentation, and the evolution of wine flavor and color. The book aims to guide the reader, who perhaps only has a basic knowledge of chemistry, to rationally explain or predict the outcomes of chemical reactions that contribute to the diversity observed among wines. This will help students, winemakers and other interested individuals to anticipate the effects of wine treatments and processes, or interpret experimental results based on an understanding of the major chemical reactions that can occur in wine.