Stereochemistry Basic Concepts And Applications

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Stereochemistry of Organic Compounds John Wiley & Sons
A unique guide to variable temperature CD spectroscopy and its application in organic chemistry This timely, original, thought-provoking work looks at organic stereochemistry from the perspective of circular dichroism (CD), using variable temperature CD spectroscopy to determine the conformation or absolute configuration of chiral molecules. With an emphasis on the analysis of optically active ketones and the carbonyl chromophore, the authors demonstrate the advantages of this highly sensitive spectroscopic tool for obtaining stereochemical information in diverse areas of organic chemistry, biochemistry, and medicinal/pharmaceutical chemistry. They combine detailed examples of stereochemical analysis with clear, thorough presentations, correlating chiroptical data with molecular mechanics calculations as well as data from NMR spectroscopy and other spectroscopic techniques. In addition, they provide a systematic survey of the professional literature, featuring an extraordinary collection of original CD spectra run at varying temperatures. Coverage includes: * Chiroptical measurements: CD and ORD (Optical Rotatory Dispersion) * Conformational analysis of compounds ranging from simple cyclic ketones to polycyclics * Conjugated and homoconjugated systems * Stereochemistry of the carbon-carbon double bond * Stereochemistry from exciton coupling of two or more chromophores * An interesting historical account of the development of stereochemical concepts
Basic Concepts in Organic Stereochemistry Springer
This well-illustrated and well-referenced book provides a systematic introduction to the modern aspects of the topographical stereochemistry of coordination compounds, which are made up of metal ions surrounded by other non-metal atoms, ions and molecules.
Chiral Separations and Stereochemical Elucidation John Wiley & Sons
"This book should become an indispensable asset on the bookshelves of pharmaceutical laboratories in academia and in industry, as well as of laboratories devoted to plant protection. I am convinced that studying this book will be an eye-opener for many scientists in the field of life sciences. Furthermore, for teachers in this area it will not only be a useful compilation of the various languages and definitions of organic stereochemistry, but also a welcome source of examples for demonstrating to their students the intricate and intriguing role stereochemistry plays in the chemistry of life." - Prof. Dr. Dieter Seebach, Laboratory of Organic Chemistry, ETH Zurich, Switzerland This textbook presents the molecular scale of matter in the broad diversity and richness of its three dimensions, giving due attention when relevant to the temporal dimension in which molecules exist, act, and react. The focus is on two significant fields of three-dimensional chemistry: a presentation of the guiding principles in organic stereochemistry, followed by a focus on the biochemical and medicinal relevance of this discipline. The treatment of Guiding Principles gives priority to didactic clarity and nomenclature issues, as detailed and illustrated in Parts 1 to 4: 'Symmetry Elements and Operations, Classification of Stereoisomers' 'Stereoisomerism Resulting from One or Several Stereogenic Centers' 'Other Stereogenic Elements: Axes of Chirality, Planes of Chirality, Helicity, and (E,Z)-Diastereoisomerism' 'Isomerisms about Single Bonds and in Cyclic Systems' This is followed by Parts 5 to 8 which focus on the biomedicinal relevance of stereochemistry, with special reference to the biochemistry and pharmacology of medicinal compounds. Here, examples and applications are discussed and illustrated based on their relevance to a given specific stereochemical aspect: 'Chirality in Molecular and Clinical Pharmacology' 'The Conformational Factor in Molecular Pharmacology' 'The Concept of Substrate Stereoselectivity in Biochemistry and Xenobiotic Metabolism' 'Prostereoisomerism and the Concept of Product Stereoselectivity in Xenobiotic Metabolism' Finally, the book contains a gift for broad-minded readers with an interest in the historical roots of stereochemistry: 'Molecular Chirality in Chemistry and Biology: Historical Milestones' Key features: * Consists entirely of beautifully produced colored figures * Includes marginal notes, giving clear-cut short definitions of terms used in the corresponding caption * Provides an alphabetic glossary of terms * Offers an extensive index
Acta chimica Vikas Publishing House
Provides an in-depth study of organic compounds that bridges the gap between general and organic chemistry Organic Chemistry: Concepts and Applications presents a comprehensive review of organic compounds that is appropriate for a two-semester sophomore organic chemistry course. The text covers the fundamental concepts needed to understand organic chemistry and clearly shows how to apply the concepts of organic chemistry to problem-solving. In addition, the book highlights the relevance of organic chemistry to the environment, industry, and biological and medical sciences. The author includes multiple-choice questions similar to aptitude exams for professional schools, including the Medical College Admissions Test (MCAT) and Dental Aptitude Test (DAT) to help in the preparation for these important exams. Rather than categorize content information by functional groups, which often stresses memorization, this textbook instead divides the information into reaction types. This approach bridges the gap between general and organic chemistry and helps students develop a better understanding of the material. A manual of possible solutions for chapter problems for instructors and students is available in the supplementary websites. This important book: • Provides an in-depth study of organic compounds with division by reaction types that bridges the gap between general and organic chemistry • Covers the concepts needed to understand organic chemistry and teaches how to apply them for problem-solving • Puts a focus on the relevance of organic chemistry to the environment, industry, and biological and medical sciences • Includes multiple choice questions similar to aptitude exams for professional schools Written for students of organic chemistry, Organic Chemistry: Concepts and Applications is the comprehensive text that presents the material in clear terms and shows how to apply the concepts to problem solving.
Organic Chemistry Springer Nature
A comprehensive overview of fundamental concepts of asymmetric synthesis along with in-depth discussion. Recent developments that address important synthetic challenges are presented and highlighted with hundreds of examples.
Organic and Bio-molecular Chemistry - Volume I Springer Science & Business Media
Political pressure has translated into legislation requiring industry to reduce waste. There is an unprecedented opportunity for chemists to develop and apply new methods that result in waste reduction, and this book describes examples of new chemical methods used to reduce waste at source and to treat toxic waste.
Advanced Organic Chemistry Springer Science & Business Media
This reference provides an introduction to the phenomenon of chirality and its importance in conjunction with biological activity and offers an easy-to-read examination of practical, industrially relevant methods for the synthesis of optically active compounds.;Furnishing hands-on guidelines for the development of economically viable synthetic compounds, Chirotechnology: explains optical isomerism and stereochemistry; gives a general overview of various methods of synthesis; supplies detailed explications of specific techniques, including fermentation, crystallization, the chirality pool, enzymatic methods, and catalytic asymmetric synthesis; illustrates and compares approaches with examples taken directly from industry such as the synthesis of pharmaceuticals, agrochemicals, flavours, and fragrances; and clarifies the importance of determining which approach to use for the synthesis of particular molecules.;With over 1100 literature citations, tables and figures, Chirotechnology is a reference for chemical engineers; industrial, organic and medicinal chemists; and bioprocess technologists, as well as a text for upper-level undergraduate, graduate and continuing-education students in these disciplines.
Basic Stereochemistry of Organic Molecules John Wiley & Sons
Since it was first published in 1967, the highly regarded Topics in Stereochemistry series has consistently reflected the state of the art in the field and provided readers with a coherent framework for the conceptual, theoretical, and practical aspects of modern stereochemistry. With the new series editor, Scott E. Denmark, at the helm, Volume 22 continues to offer important insights into the evolution of stereochemistry and its future direction. Written by internationally recognized leaders in their respective fields, this volume introduces readers to some of the most intensely studied topics in research laboratories today. Along with the fundamental principles of chirality, the authors describe exciting new applications of stereochemistry in synthetic organic, physical organic, and bioorganic chemistry. They cover cutting-edge research in areas such as asymmetric catalysis, reactions with catalytic antibodies, and stereoelectronic control of organic reactions. In addition, a feature chapter provides a critical analysis of the concepts of molecular chirality. Timely and authoritative, Topics in Stereochemistry, Volume 22, features over 120 illustrations and a cumulative index covering Volumes 1 through 22. It is an essential resource for organic chemists involved in synthesis as well as those in the physical and bioorganic areas of organic chemistry. Volume 22 relaunches this highly respected series, providing a timely, valuable reference to the theory and practice of stereochemistry. Cutting-edge topics include: * Foundations of molecular and topological chirality. * Stereoselective reactions with catalytic antibodies. * Stereoelectronic effects of the group 4 metal substituents in organic chemistry. * Asymmetric catalysis with the new class of chiral lanthanoid complexes. * Basic principles of the exciting new area of asymmetric amplification.
Revue Roumaine de Chimie John Wiley & Sons
Molecular chirality is one of the fundamental aspects of chemistry. Chirality properties of molecules have implications in a wide variety of subjects, ranging from the basic quantum mechanical properties of simple of a few atoms to molecular optical activity, asymmetric synthesis, systems and the folding pattern of proteins. Chirality, in both the geometrical and the topological sense, has also been the subject of investigations in various branches of mathematics. In particular, new developments in a branch of topology, called knot theory, as well as in various branches of discrete mathematics, have led to a novel perspective on the topological aspects of molecular chirality. Some of the mathematical advances have already found applications to the interpretation of new concepts in theoretical chemistry and mathematical chemistry, as well as to novel synthetic approaches leading to new molecules of exceptional structural properties. Some of the new developments in molecular chirality have been truly fundamental to the theoretical understanding and to the actual practice of many aspects of chemistry. The progress in this field has been very rapid, even accelerating in recent years, and a review appears more than justified. This book offers a selection of subjects covering some of the latest developments. Our primary aim is to clarify some of the basic concepts that are the most prone to misinterpretation and to provide brief introductions to some of those subjects that are expected to have further, important contributions to our understanding of molecular properties and chemical reactivity.
Stereochemistry Springer
This book connects a retrosynthetic or disconnection approach with synthetic methods in the preparation of target molecules from simple, achiral ones to complex, chiral structures in the optically pure form. Retrosynthetic considerations and asymmetric syntheses are presented as closely related topics, often in the same chapter, underlining the importance of retrosynthetic consideration of target molecules neglecting stereochemistry and equipping readers to overcome the difficulties they may encounter in the planning and experimental implementation of asymmetric syntheses. This approach prepares students in advanced organic chemistry courses,

and in particular young scientists working at academic and industrial laboratories, for independently solving synthetic problems and creating proposals for the synthesis of complex structures.

Enzyme Chemistry Springer Science & Business Media

Raman Spectra of Hydrocarbons: A Data Handbook provides information pertinent to the fundamental aspects of the phenomenon of Raman scattering of light. This book discusses the methods of molecular spectroscopy, which occupy one of the primary places in investigations of the structure and composition of matter. This book begins with an overview of the conditions for obtaining the Raman spectra. This text then examines the spatial directivity and polarization of laser radiation, which makes it easy to measure the polarization properties of the Raman lines and their absolute intensity. The reader is also introduced to the comparison between the intensities of a given line and of the standard, which is carried out according to the rules of photographic photometry. This book discusses as well the spectrum of each hydrocarbon presented in the form of a table containing data on frequencies, intensities, and in several cases degrees of depolarization and width of the Raman lines. This book is a valuable resource for scientists.

Organic Stereochemistry Arcler Press

Thoroughly revised, with either entirely new or completely updated contents, this is a practical manual for the small and large-scale preparation of enantiomerically pure products. The result is a vital resource for meeting the highest purity standards in the manufacture of chiral pharmaceuticals, food additives and related compounds. All the approaches covered here are highly relevant to modern manufacturing and quality control schemes in the pharmaceutical and biotech industries, addressing the increasingly important issue of drug safety in view of tougher regulatory standards worldwide.

Organic Synthesis John Wiley & Sons

Mathematical Stereochemistry uses both chemistry and mathematics to present a challenge towards the current theoretical foundations of modern stereochemistry, that up to now suffered from the lack of mathematical formulations and minimal compability with chemoinformatics. The author develops novel interdisciplinary approaches to group theory (Fujita’s unit-subduced-cycle-index, USCI) and his proligand method before focussing on stereoisograms as a main theme. The concept of RS-stereoisomers functions as a rational theoretical foundation for remedying conceptual faults and misleading terminology caused by conventional application of the theories of van’t Hoff and Le Bel. This book indicates that classic descriptions on organic and stereochemistry in textbooks should be thoroughly revised in conceptionally deeper levels. The proposed intermediate concept causes a paradigm shift leading to the reconstruction of modern stereochemistry on the basis of mathematical formulations. •Provides a new theoretical framework for the reorganization of mathematical stereochemistry. •Covers point-groups and permutation symmetry and exemplifies the concepts using organic molecules and inorganic complexes. •Theoretical foundations of modern stereochemistry for chemistry students and researchers, as well as mathematicians interested in chemical application of mathematics. Shinsaku Fujita has been Professor of Information Chemistry and Materials Technology at the Kyoto Institute of Technology from 1997-2007; before starting the Shonan Institute of Chemoinformatics and Mathematical Chemistry as a private laboratory.

Chemistry of Waste Minimization New Age International

Organic And Bio-Molecular Chemistry is the component of Encyclopedia of Chemical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The Theme on Organic And Bio-Molecular Chemistry in the Encyclopedia of Chemical Sciences, Engineering and Technology Resources deal with the discipline that studies the molecules of life, which are made by carbon atoms, and includes also all the synthetic compounds the skeletons of which contain carbon atoms. The first chapter describes in general terms, for not expert readers, what Organic and Bio-molecular chemistry is, the nature and behavior of organic compounds in living organisms, the importance of organic compounds in the market and in our every day life. The subsequent chapters are organized in order to provide the reader with information on the structure, reactivity, analysis and different applications of Organic Compounds. These two volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.

Raman Spectra of Hydrocarbons John Wiley & Sons

Stereochemistry: The Three-Dimensional Chemistry draws on the knowledge of its expert authors, providing a systematic treatment on the fundamental aspects of stereochemistry, covering conformational aspects, configurational aspects, effects of bulkiness, stereoelectronic effects on properties of molecules, and the genesis of enantiomerism, among other topics. Visuals and exercises are included to consolidate the principles learned, and the contents are carefully structured to prepare readers for predicting and organizing reaction components to obtain desired stereochemical outcomes. This book is an indispensable guide for all those exploring stereochemistry within their work. The principles of stereochemistry are fundamental to understanding chemical behavior and can provide insights into a whole range of problems, from unusual selectivity and unexpected behaviors, to abnormally fast reactions and surprising biochemical preferences. However, understanding and exploring these 3D effects can be difficult within a 2D medium. This book has been designed to address this problem, providing foundational guidance on the principles and applications of stereochemistry that are fully supported by multimedia visuals. Combines foundational concepts and definitions with examples of stereochemistry in practice Highlights the conformational and configurational impact of atomic arrangement on chemical behavior Outlines methods of analysis Provides practical exercises and detailed multimedia visuals to support learning

Organic Chemistry from Retrosynthesis to Asymmetric Synthesis John Wiley & Sons

Since it was first published in 1967, the highly regarded Topics in Stereochemistry series has consistently reflected the state of the art in the field and provided readers with a coherent framework for the conceptual, theoretical, and practical aspects of modern stereochemistry. With the new series editor, Scott E. Denmark, at the helm, Volume 22 continues to offer important insights into the evolution of stereochemistry and its future direction. Written by internationally recognized leaders in their respective fields, this volume introduces readers to some of the most intensely studied topics in research laboratories today. Along with the fundamental principles of chirality, the authors describe exciting new applications of stereochemistry in synthetic organic, physical organic, and bioorganic chemistry. They cover cutting-edge research in areas such as asymmetric catalysis, reactions with catalytic antibodies, and stereoelectronic control of organic reactions. In addition, a feature chapter provides a critical analysis of the concepts of molecular chirality. Timely and authoritative, Topics in Stereochemistry, Volume 22, features over 120 illustrations and a cumulative index covering Volumes 1 through 22. It is an essential resource for organic chemists involved in synthesis as well as those in the physical and bioorganic areas of organic chemistry. Volume 22 relaunches this highly respected series, providing a timely, valuable reference to the theory and practice of stereochemistry. Cutting-edge topics include: * Foundations of molecular and topological chirality. * Stereoselective reactions with catalytic antibodies. * Stereoelectronic effects of the group 4 metal substituents in organic chemistry. * Asymmetric catalysis with the new class of chiral lanthanoid complexes. * Basic principles of the exciting new area of asymmetric amplification.

Stereoselective Synthesis of Drugs and Natural Products Routledge

This text deals with the new concepts and terminology that have been introduced into the treatment of organic stereochemistry over the last decade. Organic reaction mechanisms, as they relate to stereochemistry, are included, and the pericyclic reaction using the frontier molecular orbital approach is explained. The text does not assume a strong grounding in organic chemistry and will therefore be useful to a broader spectrum of students - both graduate and undergraduate. The volume features numerous illustrations and programmed problems.

Modern Conformational Analysis John Wiley & Sons

A thorough understanding of stereochemistry is essential for the comprehension of almost all aspects of modern organic chemistry. It is also of great significance in many biochemical and medicinal disciplines, since the stereoisomers of a compound can have dramatically different biological properties. This text explains how the different properties of stereoisomers of a compound arise, and what processes can be used to prepare and analyze stereoisomerically pure compounds. It also presents prominent coverage of the stereochemistry of inorganic and organometallic compounds, which is likely to increase in importance, as these compounds are used as symmetric catalysts in asymmetric synthesis. Modern stereochemical terminology is used throughout, although reference is also made to older terms which are still widely used. A set of problems at the end of each chapter aims to further the reader's understanding of how the content can be applied. The book is designed mainly as a textbook for undergraduate students and as a reference source for more advanced levels, but is also intended for academic and professional organic chemists.

Topics in Stereochemistry Elsevier

This volume presents the fundamentals of graph theory and then goes on to discuss specific chemical applications. Chapter 1 provides a historical setting for the current upsurge of interest in chemical graph theory. chapter 2 gives a full background of the basic ideas and mathematical formalism of graph theory and includes such chemically relevant notions as connectedness, graph matrix representations, metric properties, symmetry and operations on graphs. This is followed by a discussion on chemical nomenclature and the trends in its rationalization by using graph theory, which has important implications for the storage and retrieval of chemical information. This volume also contains a detailed discussion of the relevance of graph-theoretical polynomials; it describes methodologies for the enumeration of isomers, incorporating the classical Polya method, as well as more recent approaches.

Chiral Separation Techniques Wiley-Interscience

Stereochemistry: Basic Concepts and Applications is a three-chapter text that introduces the basic principles and concepts of stereochemistry, as well as its application to organic chemistry application. Chapter 1 describes first the stereochemistry of the ground state, specifically the configuration and conformation of organic compounds, as well as the most important methods for its investigation. This chapter also deals with the kinetics of conformational changes and provides an overview of the so-called "applied stereochemistry". Chapter 2 focuses on the analysis of the internal motions of the molecules and of the corresponding activation energies. This chapter also examines the principles of intramolecular symmetry. Chapter 3 considers the stereochemical aspect of several enzymic processes and the stereoisomerism of monotonic polymers and inorganic complexes. This book will be of great value to organic chemists and organic chemistry graduate students.