

Chirality From Dynamic Kinetic Resolution

Asymmetric Synthesis in Organophosphorus Chemistry Oleg I. Kolodiazny. 2016-12-19 Authored by one of the leading experts in the field, this is the only comprehensive overview of chiral organophosphorus compounds, from asymmetric synthesis to catalysis and pharmacological applications. As such, this unique reference covers the chemical background as well as spectroscopical analysis of phosphorus compounds, and thoroughly describes all the various synthetic strategies for these substances. Metal-, organo- and biocatalyzed reactions for the introduction of phosphorus are explained as are asymmetric oxidation and reduction methods for the preparation of all possible oxidation states of phosphorus. The text also includes industrial applications for these compounds. Of particular interest to chemists working in the field of asymmetric synthesis, as well as to the pharmaceutical industry due to the increasing number of phosphorous-containing drugs.

Dynamic Stereochemistry of Chiral Compounds Christian Wolf. 2008 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.

Comprehensive Biotechnology . 2019-07-17 Comprehensive Biotechnology, Third Edition, Six Volume Set unifies, in a single source, a huge amount of information in this growing field. The book covers scientific fundamentals, along with engineering considerations and applications in industry, agriculture, medicine, the environment and socio-economics, including the related government regulatory overviews. This new edition builds on the solid basis provided by previous editions, incorporating all recent advances in the field since the second edition was published in 2011. Offers researchers a one-stop shop for information on the subject of biotechnology Provides in-depth treatment of relevant topics from recognized authorities, including the contributions of a Nobel laureate Presents the perspective of researchers in different fields, such as biochemistry, agriculture, engineering, biomedicine and environmental science

Anion-Binding Catalysis Olga Garcia-Mancheno. 2022-03-21 Explores the potential of new types of anion-binding catalysts to solve challenging synthetic problems Anion-Binding Catalysis introduces readers to the use of anion-binding processes in catalytic chemical activation, exploring how this approach can contribute to the future design of novel synthetic transformations. Featuring contributions by world-renowned scientists in the field, this authoritative volume describes the structure, properties, and catalytic applications of anions as well as synthetic applications and practical analytical methods. In-depth chapters are organized by type of catalyst rather than reaction type, providing readers with an accessible overview of the existing classes of effective catalysts. The authors discuss the use of halogens as counteranions, the combination of (thio)urea and squaramide-based anion-binding with other types of organocatalysis, anion-binding catalysis by pnictogen and tetrel bonding, nucleophilic co-catalysis, anion-binding catalysis by pnictogen and tetrel bonding, and more. Helping readers appreciate and evaluate the potential of anion-binding catalysis, this timely book: Illustrates the historical development, activation mode, and importance of anion-binding in chemical catalysis Explains the analytic methods used to determine the anion-binding affinity of the catalysts Describes catalytic and synthetic applications of common NH- and OH-based hydrogen-donor catalysts as well as C-H triazole/triazolium catalysts Covers amino-catalysis involving enamine, dienamine, or iminium activation approaches Discusses new trends in the field of anion-binding catalysis, such as the combination of anion-binding with other types of catalysis Presenting the current state of the field as well as the synthetic potential of anion-binding catalysis in future, Anion-Binding Catalysis is essential reading for researchers in both academia and industry involved in organic synthesis, homogeneous catalysis, and pharmaceutical chemistry.

Stereochemical Aspects of Organolithium Compounds Robert E. Gawley. 2010-04-16 Topics in Stereochemistry, previously edited by the father of stereochemistry Ernest L. Eliel, is a longstanding, successful series covering the most important advances in the field. The much-anticipated Volume 26 on stereochemical aspects of organolithium compounds includes chapters on the following topics: * Asymmetric Deprotonations Using Chiral Lithium Amide Bases * Self-Regeneration of Stereocenters (SRS) via Stereolabile Axially Chiral Intermediates * Overview of Carbanion Dynamics and Electrophilic Substitutions in Chiral Organolithium Compounds * Oxiranyllithiums as Chiral Synthons for Asymmetric Synthesis * Test on the Configurational Stability/Lability of Organolithium Compounds * Mechanism and Stereochemical Features in Asymmetric Deprotonation Using RLi/(-)-Sparteine Bases * Dynamic Resolutions of Chiral Organolithiums Volume 26 of Topics in Stereochemistry marks the end of an era, while developing a bridge to the next generation. A new generation in publishing, parallel to a new generation in Stereochemistry mandated a new venue and modus operandi for Topics. Zurich, the home of Werner and Wislicenus, has a unique heritage in Stereochemistry. Fortunately, the Wiley family's publishing partnerships include Verlag Helvetica Chimica Acta, a house with a reputation for superior quality in publishing. Indeed, within the pages of its namesake periodical, Helvetica Chimica Acta, one finds many of the seminal research works of stereochemistry's giants. As such, a transfer of editorial operations to Zurich and a collaboration bringing Topics as a series closer to periodical status provides a growth platform for the future.

Organocatalytic Dynamic Kinetic Resolution H el ene Pellissier. 2022-05-06 In a classical kinetic resolution, two enantiomers of a racemate are transformed into chiral products at different rates with a maximum theoretical yield of 50%. However, the need to reduce costs and waste in synthesis have led to efforts to develop novel resolution procedures proceeding beyond this 50% limited yield. This has led to the evolution of classical kinetic resolution into dynamic kinetic resolution (DKR), allowing a quantitative yield of one of the enantiomers. DKR combines the resolution step of kinetic resolution with an in-situ racemization of the chirally-labile substrate. It is only in the last two decades that chiral green organocatalysts have been demonstrated to be capable of promoting DKRs considerably expanding the synthetic scope of the powerful concept of DKR. Collecting all the developments in the field of DKR, this book shows that a wide variety of organocatalysts allow excellent levels of stereocontrol and yields in many types of transformations. It is a great resource for academics and industrialists interested in green enantioselective catalytic reactions.

Chiral Drugs Cynthia A Challener. 2017-10-23 This title was first published in 2001: In the early twentieth century the relevance of chirality to the pharmaceutical industry was established by the fact that one enantiomer of hyoscyamine possessed greater pharmacological activity than the other. Today, most new drugs and those under development consist of a single optically active isomer, and chirality is also becoming an issue for the agrochemical and other industries. Regulatory agencies throughout the world are currently reviewing the importance of chirality with regard to pharmaceutical and agrochemical products. New guidelines from such agencies have been key drivers for the focus on single enantiomer products in these industries. These scientific and regulatory developments have created the need for a guide for workers in the pharmaceutical and chemical industries seeking information on chiral molecules, processes, and commercially available chiral chemicals. Chiral Drugs is a comprehensive listing of over 2500 chiral drugs, classified by therapeutic class, and including structures and physical properties for each entry in the listing. Its companion volume, Chiral Intermediates, presents the same detailed information for over 4700 commercially available chiral chemicals. The 'Chiral Pool' of readily available, relatively inexpensive chiral compounds has been expanding at a rapid rate as more and more products are produced in large quantities at economical prices. New developments in various technologies for isolating, preparing, and purifying chiral materials have greatly increased the opportunities for utilizing optically pure compounds in commercial applications. Novel techniques for classical resolution, new methodologies for developing selective enzymes for biocatalysis, advances in the application of microorganisms for chemical production, and continued progress in the area of asymmetric synthesis have all contributed to the growth of this field. Part One of each book contains four chapters which provide an introduction to topics relevant to the field of chiral chemistry and includes a brief overview of chirality, a short discussion on the current market drivers in the area of chiral chemistry, and a basic presentation of the various sources and methods for obtaining chiral compounds. Part Two presents entries for over 2500 chiral drugs, classified by therapeutic class. For each main entry, the chemical name and a list of trade names and synonyms is provided; the CAS Registry Number, the European Inventory of Existing Commercial Chemical Substances (EINECS) number, and the Merck Index (12th edition) number are given when available. The physical properties, including specific rotation, of each compound

are described and indicated applications are presented. The structure of nearly every compound is provided, and the manufacturers and suppliers of the compounds are also given. Indexes, including a master index of names and synonyms and an index of custom manufacturing services for production of chiral compounds, are appended. Chiral Drugs provides an introduction to the types of sources and methods currently in use for obtaining chiral molecules and is an invaluable resource for researchers in the pharmaceutical and biotechnology sectors as well as to those working in the basic biochemical sciences. Chiral Intermediates provides an introduction to the types of sources and methods currently in use for obtaining chiral molecules and is an invaluable resource for information on available chiral molecules. Chiral Intermediates and Chiral Drugs are the most comprehensive and detailed guides to chiral compounds available.

Non-Metal Catalyzed Synthesis Yunfei Du, Bubun Banerjee. 2023-12-04 Non-metal catalysis may provide new and green methods for obtaining bioactive heterocycles. Many catalysts contain metals, which can be toxic, energy intensive to remove, and require mining of the source materials. By utilizing metal-free catalysts we avoid these issues. This book explores the use of non-metal catalysts when synthesizing various heterocyclic structures with bioactivity.

Selectivity in Organic Synthesis Robert S. Ward. 1999-05-04 Selectivity is an increasingly important part of organic synthesis. The whole basis of organic chemistry, and especially organic synthesis, depends upon the selectivity which can be achieved in organic reactions. This concise textbook describes the strategies which can be adopted to improve selectivity, and the reactions which have been specially designed to afford high selectivity. The aim is to illustrate the range of processes to which these principles can be applied and the high degree of selectivity which can be achieved. Selectivity in Organic Synthesis aims to provide a solid introduction to this subject, focusing on the key areas and applications.

Future Directions in Biocatalysis Tomoko Matsuda. 2017-08-11 Future Directions in Biocatalysis, Second Edition, presents the future direction and latest research on how to utilize enzymes, i.e., natural catalysts, to make medicines and other necessities for humans. It emphasizes the most important and unique research on biocatalysis instead of simply detailing the ABC's on the topic. This book is an indispensable tool for new researchers in the field to help identify specific needs, start new projects that address current environmental concerns, and develop techniques based on green technology. It provides invaluable hints and clues for conducting new research on enzymes, with final sections outlining future directions in biocatalysis further expanding the science into new applications. Gives future directions in the area of biocatalysis research Presents research topics based on their uniqueness, originality, and novelty Includes many explanatory figures to demonstrate concepts to both organic chemists and biochemists Shows that there is no boundary between organic chemistry and biochemistry

Discrimination of Mobile Supramolecular Chirality Ayumi Imayoshi. 2021-11-18 This book proposes a novel concept for molecular recognition. In the field of asymmetric synthesis approaching the mature science, asymmetric discrimination and catalytic synthesis of chiral supramolecules still stand as unsolved problems. The extreme difficulty in asymmetric synthesis of such supramolecules may result from the mobile nature of supramolecular chirality. Here the author shows the first highly enantioselective synthesis of mechanically chiral supramolecules. In the presence of a chiral organocatalyst, a mechanically planar chiral rotaxane was obtained with perfect enantiopurity (>99% ee) with an excellent selectivity. The dynamic and flexible recognition mode enabled asymmetric synthesis of supramolecules with conformational flexibility and mobility. The recognition mode of the catalyst is a contrast to the traditional static and rigid recognition mode of the typical conventional catalysts. The concept of dynamic molecular recognition will be adopted as a novel concept in a wide range of fields beyond the field of organic chemistry, including material chemistry, biochemistry, and medicinal chemistry.

Catalytic Asymmetric Synthesis Iwao Ojima. 2013-03-14 Praise for the previous editions An excellent text . . . will no doubt provide the benchmark for comparative works for many years. —Journal of the American Chemical Society An excellent state-of-the-art compilation of catalytic asymmetric chemistry . . . should be included in any chemistry reference collection. —Choice This is a tremendous resource and an excellent read. I recommend immediate purchase. —Perkin Transactions Since this important work was first published in 1993, the field of catalytic asymmetric synthesis has grown explosively, spawning effective new methods for obtaining enantiomerically pure compounds on a large scale and stimulating new applications in diverse fields—from medicine to materials science. Catalytic Asymmetric Synthesis, Third Edition addresses these rapid changes through contributions from highly recognized world leaders in the field. This seminal text presents detailed accounts of the most important catalytic asymmetric reactions known today, and discusses recent advances and essential information on the initial development of certain processes. An excellent working resource for academic researchers and industrial chemists alike, the Third Edition features: Six entirely new chapters focusing on novel approaches to catalytic asymmetric synthesis including non-conventional media/conditions, organocatalysis, chiral Lewis and Bronsted acids, CH activation, carbon-heteroatom bond-forming reactions, and enzyme-catalyzed asymmetric synthesis A new section focusing on the important new reaction, asymmetric metathesis, in carbon-carbon bond-forming reactions Updated chapters on hydrogenation, carbon-carbon bond-forming reactions, hydrosilylations, carbonylations, oxidations, amplifications and autocatalysis, and polymerization reactions Retaining the best of its predecessors but now thoroughly up to date, Catalytic Asymmetric Synthesis, Third Edition serves as an excellent desktop reference and text for researchers and students from the upper-level undergraduates through experienced professionals in industry or academia.

Enantiomer Separation Fumio Toda. 2007-11-04 In spite of important advances in asymmetric synthesis, chiral compounds cannot all be obtained in a pure state by asymmetric synthesis. As a result, enantiomer separation remains an important technique for obtaining optically active materials. Although asymmetric synthesis is a once-only procedure, an enantiomer separation process can be repeated until the optically pure sample is obtained. This book discusses several new enantiomer separation methods using modern techniques developed by experts in the field. These methods consist mainly of the following three types: 1) Enantiomer separation by inclusion complexation with a chiral host compound 2) Enantiomer separation using biological methods 3) Enantiomer separation by HPLC chromatography using a column containing a chiral stationary phase. Separation of a racemic compound has been called "optical resolution" or simply "resolution". Nowadays, the descriptions "enantiomer resolution" or "enantiomer separation" are also commonly used. Accordingly, "Enantiomer Separation" is used in the title of this book. The editor and all chapter contributors hope that this book is helpful for scientists and engineers working in this field.

Comprehensive Organic Chemistry Experiments for the Laboratory Classroom Carlos A M Afonso, Nuno R Candeias, Dulce Pereira Simão, Alexandre F Trindade, Jaime A S Coelho, Bin Tan, Robert Franzén. 2020-08-28 This expansive and practical textbook contains organic chemistry experiments for teaching in the laboratory at the undergraduate level covering a range of functional group transformations and key organic reactions. The editorial team have collected contributions from around the world and standardized them for publication. Each experiment will explore a modern chemistry scenario, such as: sustainable chemistry; application in the pharmaceutical industry; catalysis and material sciences, to name a few. All the experiments will be complemented with a set of questions to challenge the students and a section for the instructors, concerning the results obtained and advice on getting the best outcome from the experiment. A section covering practical aspects with tips and advice for the instructors, together with the results obtained in the laboratory by students, has been compiled for each experiment. Targeted at professors and lecturers in chemistry, this useful text will provide up to date experiments putting the science into context for the students.

Atropisomerism And Axial Chirality Lassaletta Jose M, Fernandez Rosario. 2019-05-23 Atropisomerism and Axial Chirality provides a global survey of the chemistry of axially chiral compounds including biaryls, heterobiaryls, non-biaryl atropisomers, allenes and spirocyclic derivatives. From the perspective of a synthetic organic chemist, this book provides a unique compilation of the available methodologies for their synthesis, with emphasis on the most efficient and modern strategies, a review of the huge amount of practical applications in the field of asymmetric catalysis, either as transition metal ligands or as organocatalysts, and an overview of their occurrence as bioactive compounds and natural products. The first of its kind, this book serves as a general introduction and a practical reference to advanced chemistry students and researchers, while also offering creative ideas for further developments in the field.

New Methodologies and Techniques for a Sustainable Organic Chemistry Alessandro Mordini, Ferenc Faigl. 2008-04-17 Chemical industries have to face the challenge of finding adequate processes to produce large quantities of new products, while at the same time decreasing both the impact on

the environment and the risk of disaster. This book addresses this challenge. It discusses the problems of environmentally benign organic processes on an interdisciplinary approach. The book features experts in selective catalysis, development of new reagents and methods who present their recent results.

Asymmetric Hydrogenation and Transfer Hydrogenation Virginie Ratovelomanana-Vidal, Phannarath Phansavath. 2021-04-06 Asymmetric Hydrogenation and Transfer Hydrogenation Discover the latest developments in homogeneous asymmetric (transfer) hydrogenation with this up-to-date resource Asymmetric Hydrogenation and Transfer Hydrogenation delivers a current and cutting-edge investigation of homogeneous asymmetric hydrogenation and transfer hydrogenation reactions of prochiral substrates by using organometallic catalysts (like ruthenium, rhodium, iridium, iron, and copper) and organic catalysts. Distinguished researchers and editors Virginie Ratovelomanana-Vidal and Phannarath Phansavath also offer readers a comprehensive walkthrough of substituted ketones through dynamic kinetic resolution, as well as a presentation of the mechanisms and application of asymmetric hydrogenation reactions to the synthesis of biologically relevant compounds. The book comprehensively details its complex subject matter clearly and plainly and covers everything from catalyst development and reactions to mechanisms and applications in academia and industry. The papers included within come from many of the leading voices in their respective fields and represent the newest and best research available today. Compiled for researchers and private-industry chemists alike, Asymmetric Hydrogenation and Transfer Hydrogenation also discusses a wide variety of other topics like: A discussion of the development of chiral metal catalysts for asymmetric transfer hydrogenation Several examinations of asymmetric transfer hydrogenation of a variety of chemical groups, including ketones, aryl and heteroaryl ketones, substituted ketones, and heteroaromatic compounds, alkenes, and imines An exploration of the mechanism of asymmetric hydrogenation and continuous flow asymmetric hydrogenation A full and thorough treatment of the industrial applications of asymmetric hydrogenation Perfect for catalytic chemists, chemists working on or with organometallics, organic chemists, natural product chemists, pharmaceutical chemists, medicinal chemists, and industrial chemists, Asymmetric Hydrogenation and Transfer Hydrogenation also belongs on the bookshelves of research and university institutes and libraries who wish to expand their selection on a topic fundamental to organic synthesis.

Chirality from Dynamic Kinetic Resolution Helene Pellissier. 2011-04-04 The last 15 years have witnessed significant developments in the efficiency and scope of the application of DKR. These now offer a serious alternative to conventional methods for asymmetric synthesis. Indeed, impressive examples using new enzymes and major progress in the DKR of racemates have taken place over the past few years. The powerful combination of enzymes and metals has also been the subject of spectacular development. In addition, a new type of DKR, involving organocatalysts, has recently appeared. Although asymmetric catalysis has undergone development during the last two decades, the most common industrial process used to obtain enantiomerically pure compounds is still via resolution of racemic mixtures. This is despite the major disadvantage that only a maximum of 50% product yield can be obtained. It is not surprising that DKR, which solves the problem of the limitation in yield, has attracted an increasing amount of interest from both the industrial and the academic perspective. This book provides an up-date on the principle methods employed to obtain dynamic kinetic resolution (DKR) by either enzymatic or non-enzymatic methods. It also illustrates the diversity of useful chiral products that can be obtained through this powerful concept. Divided into three sections, the book deals successively with non-enzymatic methods, enzymatic methods, and the use of transition metals and enzymes in tandem.

Cinchona Alkaloids in Synthesis and Catalysis Choong Eui Song. 2009-09-03 This comprehensive review of cinchona-based chirality inducers and their applications covers every topic, including ligands, immobilization and organocatalysis. Each chapter summarizes the scope and limitations of the new methods and technologies, while the final chapter contains carefully selected working procedures of cinchona alkaloid-promoted reactions organized according to reaction type. Invaluable reading for anyone wanting to learn about the current state of this hot topic.

Chirality in Supramolecular Assemblies F. Richard Keene. 2017-01-03 Supramolecular chemistry deals with the organisation of molecules into defined assemblies using non-covalent interactions, including weaker and reversible interactions such as hydrogen bonds, and metal-ligand interactions. The aspect of stereochemistry within such chemical architectures, and in particular chirality, is of special interest as it impacts on considerations of molecular recognition, the development of functional materials, the vexed question of homochirality, nanoscale effects of interactions at interfaces, biocatalysis and enzymatic catalysis, and applications in organic synthesis. Chirality in Supramolecular Assemblies addresses many of these aspects, presenting a broad overview of this important and rapidly developing interdisciplinary field. Topics covered include: Origins of molecular and topological chirality Homochirogenesis Chirality in crystallinity Host-guest behavior Chiral influences in functional materials Chirality in network solids and coordination solids Aspects of chirality at interfaces Chirality in organic assemblies Chirality related to biocatalysis and enzymes in organic synthesis. This book is a valuable reference for researchers in the molecular sciences, materials science and biological science working with chiral supramolecular systems. It provides summaries and special insights by acknowledged international experts in the various fields.

Chemo-Enzymatic Cascade Reactions Dunming Zhu. 2021-07-19 Chemo-Enzymatic Cascade Reactions A groundbreaking book focusing on chemo-enzymatic cascade transformations Chemo-Enzymatic Cascade Reactions offers a unique book that explores biocatalytic-chemical cascade reactions and their applications in the synthesis of valuable chemicals. Written by a noted expert on the topic, this comprehensive resource includes information on the advantages and disadvantages of traditional chemical and biocatalytic reactions and reviews the three modes of chemo-enzymatic transformations: separate-pot-two-step, one-pot-two-step, and one-pot-one-step. The author examines the most current developments of chemo-enzymatic transformations organized by the three modes and types of enzymes and considers retro-synthesis based on both chemical and biocatalytic transformations and the synthetic applications. This groundbreaking book is the first resource to present in one volume the state-of-art advances of the technology and explore the opportunities and challenges of this burgeoning field. The book also considers the future of cascade reactions and the myriad benefits including higher atom economy and production efficiency, and less resource consumption and waste generation. This important book: Offers the first book dedicated exclusively to chemo-enzymatic cascade transformations Explains the importance and the opportunities and challenges of chemo-enzymatic synthetic technology Includes information on the three modes of chemo-enzymatic transformation Reviews the most recent advances in the field Written for organic chemists, chemists in industry, biochemist, catalytic chemists, Chemo-Enzymatic Cascade Reactions offers an understanding to the importance, current advances, the opportunities and challenges of chemo-enzymatic synthetic technology.

Comprehensive Chirality . 2012-12-31 Although many books exist on the subject of chiral chemistry, they only briefly cover chiral synthesis and analysis as a minor part of a larger work, to date there are none that pull together the background information and latest advances in one comprehensive reference work. Comprehensive Chirality provides a complete overview of the field, and includes chiral research relevant to synthesis, analytic chemistry, catalysis, and pharmaceuticals. The individual chapters in each of the 9 volumes provide an in depth review and collection of references on definition, technology, applications and a guide/links to the related literature. Whether in an Academic or Corporate setting, these chapters will form an invaluable resource for advanced students/researchers new to an area and those who need further background or answers to a particular problem, particularly in the development of drugs. Chirality research today is a central theme in chemistry and biology and is growing in importance across a number of disciplinary boundaries. These studies do not always share a unique identifying factor or subject themselves to clear and concise definitions. This work unites the different areas of research and allows anyone working or researching in chiral chemistry to navigate through the most essential concepts with ease, saving them time and vastly improving their understanding. The field of chirality counts several journals that are directly and indirectly concerned with the field. There is no reference work that encompasses the entire field and unites the different areas of research through deep foundational reviews. Comprehensive Chirality fills this vacuum, and can be considered the definitive work. It will help users apply context to the diverse journal literature offering and aid them in identifying areas for further research and/or for solving problems. Chief Editors, Hisashi Yamamoto (University of Chicago) and Erick Carreira (ETH Zürich) have assembled an impressive, world-class team of Volume Editors and Contributing Authors. Each chapter has been painstakingly reviewed and checked for consistent high quality. The result is an authoritative overview which ties the literature together and provides the user with a reliable background information and citation resource.

Chiral Drugs Guo-Qiang Lin, Qi-Dong You, Jie-Fei Cheng. 2011-08-08 An integrated view of chiral drugs—from concept and synthesis to pharmaceutical properties. Chirality greatly influences a drug's biological and pharmacological properties. In an effort to achieve more predictable results from chiral drugs, the Food and Drug Administration now requires that these medicines be as pure as possible, which places great demands on drug synthesis, purification, analysis, and testing. To assist researchers in acquiring the essential knowledge to meet these rigid guidelines, *Chiral Drugs* focuses on three vital chiral technologies—asymmetric synthesis, biocatalytic process, and chiral resolution—to offer details on the basic concepts, key developments, and recent trends in chiral drug discovery, along with: The history of chiral drugs development and industrial applications of chiral technologies A section listing twenty-five approved or advanced-trial chiral drugs that lists each drug name, chemical name and properties, a representative synthetic pathway, pharmacological characterizations, and references An interdisciplinary approach combining synthetic organic chemistry, medicinal chemistry, and pharmacology Nearly two-thirds of the drugs on today's market are chiral drugs. Reducing and eliminating their negative characteristics is an ongoing and serious challenge for the pharmaceutical industry. With its well-balanced approach to covering each important aspect of chirality, *Chiral Drugs* champions important strategies for tipping the medical scale in a positive direction for the production of more effective—and safer—drugs.

Chiral Amine Synthesis Thomas C. Nugent. 2010-01-14 This first comprehensive presentation of this hot and important topic compiles the most up-to-date methods for chiral amine synthesis. The international list of authors reads like a Who's Who of the subject, providing a large array of highly practical information concentrated into the useful and essential methods. Following an introductory chapter devoted to helping readers quickly determine which strategies to choose for their investigation, this handbook and ready reference focuses on the examination of methods that are reliable and simultaneously efficient for the synthesis of structurally diverse aliphatic and aromatic chiral amines. Modern methods and applications found in (pharmaceutical) industry are also covered.

Practical Synthetic Organic Chemistry Stéphane Caron. 2020-01-31 This book is a hands-on guide for the organic chemist. Focusing on the most reliable and useful reactions, the chapter authors provide the information necessary for a chemist to strategically plan a synthesis, as well as repeat the procedures in the laboratory. Consolidates all the key advances/concepts in one book, covering the most important reactions in organic chemistry, including substitutions, additions, eliminations, rearrangements, oxidations, reductions Highlights the most important reactions, addressing basic principles, advantages/disadvantages of the methodology, mechanism, and techniques for achieving laboratory success Features new content on recent advances in CH activation, photoredox and electrochemistry, continuous chemistry, and application of biocatalysis in synthesis Revamps chapters to include new and additional examples of chemistry that have been demonstrated at a practical scale

Separation of Enantiomers Matthew H. Todd. 2014-05-06 In one handy volume this handbook summarizes the most common synthetic methods for the separation of racemic mixtures, allowing an easy comparison of the different strategies described in the literature. Alongside classical methods, the authors also consider kinetic resolutions, dynamic kinetic resolutions, divergent reactions of a racemic mixture, and a number of neglected cases not covered elsewhere, such as the use of circularly polarized light, polymerizations, ripening processes, dynamic combinatorial chemistry, and several thermodynamic processes. The result is a thorough introduction to the field plus a long-needed, up-to-date overview of the chemical, biological, and physical methods and their applications. Newcomers to the field, students as well as experienced synthetic chemists will benefit from the highly didactic presentation: Every method is presented in detail, from relatively simple separation problems to advanced complex resolution methods.

Stereochemistry and Stereoselective Synthesis Mihály Nógrádi, László Poppe, József Nagy, Gábor Hornyánszky, Zoltán Boros. 2016-06-22 Written by a well-respected and experienced author, this textbook fills the gap for a concise introduction to the key concepts of organic stereochemistry and the most important classical and modern methods in stereoselective synthesis. The concepts are extensively illustrated in color, with practical examples and question-answer sets to help consolidate the reader's knowledge. In addition, animations are available from the Wiley website. A must-have for students in chemistry, biochemistry, and life sciences, as well as researchers in pharmaceutical and agrochemical companies in need of a quick introduction to the field.

Asymmetric Hydrogenation and Transfer Hydrogenation Virginie Ratovelomanana-Vidal, Phannarath Phansavath. 2021-03-19 Discover the latest developments in homogeneous asymmetric (transfer) hydrogenation with this up-to-date resource *Asymmetric Hydrogenation and Transfer Hydrogenation* delivers a current and cutting-edge investigation of homogenous asymmetric hydrogenation and transfer hydrogenation reactions of prochiral substrates by using organometallic catalysts (like ruthenium, rhodium, iridium, iron, and copper) and organic catalysts. Distinguished researchers and editors Virginie Ratovelomanana-Vidal and Phannarath Phansavath also offer readers a comprehensive walkthrough of substituted ketones through dynamic kinetic resolution, as well as a presentation of the mechanisms and application of asymmetric hydrogenation reactions to the synthesis of biologically relevant compounds. The book comprehensively details its complex subject matter clearly and plainly and covers everything from catalyst development and reactions to mechanisms and applications in academia and industry. The papers included within come from many of the leading voices in their respective fields and represent the newest and best research available today. Compiled for researchers and private-industry chemists alike, *Asymmetric Hydrogenation and Transfer Hydrogenation* also discusses a wide variety of other topics like: A discussion of the development of chiral metal catalysts for asymmetric transfer hydrogenation Several examinations of asymmetric transfer hydrogenation of a variety of chemical groups, including ketones, aryl and heteroaryl ketones, substituted ketones, and heteroaromatic compounds, akenes, and imines An exploration of the mechanism of asymmetric hydrogenation and continuous flow asymmetric hydrogenation A full and thorough treatment of the industrial applications of asymmetric hydrogenation Perfect for catalytic chemists, chemists working on or with organometallics, organic chemists, natural product chemists, pharmaceutical chemists, medicinal chemists, and industrial chemists, *Asymmetric Hydrogenation and Transfer Hydrogenation* also belongs on the bookshelves of research and university institutes and libraries who wish to expand their selection on a topic fundamental to organic synthesis.

Fundamentals of Asymmetric Catalysis Patrick J. Walsh, Marisa C. Kozlowski. 2009-01-02 This work describes the essential aspects of enantioselective catalysis, with chapters organised by concept rather than by reaction type. Each concept is supported by examples to give the reader broad exposure to a wide range of catalysts, reactions and reaction mechanisms.

Chirality from Dynamic Kinetic Resolution Hélène Pellissier. 2011 This book provides an up-date on the methods employed to obtain dynamic kinetic resolution (DKR) by enzymatic and non-enzymatic methods.

Asymmetric Organic Synthesis with Enzymes Vicente Gotor, Ignacio Alfonso, Eduardo García-Urdiales. 2008-09-08 Perfect for biochemists, synthetic and organic chemists, this book covers all important reactions, including C-C coupling reactions, oxidation reactions and many more. Divided into two parts, the first section on methodology presents new innovative methods for enzymatic catalysis optimization, including such new trends as medium engineering, directed evolution and computer-aided prediction of enantioselectivity. The second and main section deals with applications to synthesis, showing important reaction types and their applications. Only those reactions with very high selectivity are presented, allowing readers to improve their own reaction yields.

Green Biocatalysis Ramesh N. Patel. 2016-05-09 Green Biocatalysis presents an exciting green technology that uses mild and safe processes with high regioselectivity and enantioselectivity. Bioprocesses are carried out under ambient temperature and atmospheric pressure in aqueous conditions that do not require any protection and deprotection steps to shorten the synthetic process, offering waste prevention and using renewable resources. Drawing on the knowledge of over 70 internationally renowned experts in the field of biotechnology, Green Biocatalysis discusses a variety of case studies with emphases on process R&D and scale-up of enzymatic processes to catalyze different types of reactions. Random and directed evolution under process conditions to generate novel highly stable and active enzymes is described at length. This book features: A comprehensive review of green bioprocesses and application of enzymes in preparation of key compounds for pharmaceutical, fine chemical, agrochemical, cosmetic, flavor, and fragrance industries using diverse enzymatic reactions Discussion of the development of efficient and stable novel biocatalysts under process conditions by random and directed evolution and their applications for the development of environmentally friendly, efficient, economical, and

sustainable green processes to get desired products in high yields and enantiopurity The most recent technological advances in enzymatic and microbial transformations and cutting-edge topics such as directed evolution by gene shuffling and enzyme engineering to improve biocatalysts With over 3000 references and 800 figures, tables, equations, and drawings, Green Biocatalysis is an excellent resource for biochemists, organic chemists, medicinal chemists, chemical engineers, microbiologists, pharmaceutical chemists, and undergraduate and graduate students in the aforementioned disciplines.

N-Heterocyclic Carbenes in Organocatalysis Akkattu T. Biju.2019-01-07 Summarizing the emerging field of N-heterocyclic carbenes used in organocatalysis, this is an excellent overview of the synthesis and applications of NHCs focusing on carbon-carbon and carbon-heteroatom bond formation. Alongside comprehensive coverage of the synthesis, characteristics and applications, this handbook and ready reference also includes chapters on NHCs for polymerization reactions and natural product synthesis.

Axially Chiral Compounds Bin Tan.2021-08-16 Axially Chiral Compounds Explore this comprehensive and current volume summarizing the characteristics, synthesis, and applications of axial chirality Appearing widely in natural products, biologically active molecules, asymmetric chemistry, and material science, axially chiral motifs constitute the core backbones of the majority of chiral ligands and organocatalysts in asymmetric catalysis. In a new work of particular relevance to synthetic chemists, Axially Chiral Compounds: Asymmetric Synthesis and Applications delivers a clearly structured and authoritative volume covering the classification, characteristics, synthesis, and applications of axial chirality. A must read for every synthetic chemist practicing today, the book follows the development history, research status, and applications of axial chirality. An introductory chapter familiarizes the reader with foundational material before the distinguished authors describe the different classes and the synthesis of axial chiral compounds used in asymmetric synthesis. The book concludes with a focus on the applications of chiral ligands, chiral catalysts, and materials. Readers will also benefit from the inclusion of: A thorough introduction to asymmetric synthesis, including biaryls atropisomers, heterobiaryls atropisomers, and non-biaryls atropisomers Explorations of chiral allene, spiro skeletons, and natural products Practical discussions of asymmetric transformation, chiral ligands, and chiral catalysts An examination of miscellaneous applications of axially chiral compounds Perfect for organic chemists, chemists working with or on organometallics, catalytic chemists, and materials scientists, Axially Chiral Compounds: Asymmetric Synthesis and Applications will also earn a place in the libraries of natural products chemists who seek a one-stop reference for compounds exhibiting axial chirality.

Noncovalent Interactions in Catalysis Kamran T Mahmudov, Maximilian N Kopylovich, M Fatima C Guedes da Silva, Armando J L Pombeiro.2019-03-04 Noncovalent interactions often provide the spine of biomolecular and material structures, and can therefore play a key role in biological and catalytic processes. Selectivity in chemical reactions, particularly in catalytic processes, is often an orchestral action of various noncovalent interactions occurring in intermediates and transition states. Although the role of hydrogen bonding is well explored in catalysis, the other types of weak interactions, namely cation- π , anion- π , π - π stacking, pseudo-agostic, halogen, chalcogen, pnictogen, tetrel and icosagen bonds, must also be considered. Naturally, the chemo-, regio- or stereoselectivity of a reaction depends on the stability of such noncovalent-interaction-supported species in catalytic systems. Therefore, an in-depth understanding of these weak interactions may be the key to designing new catalytic materials. Providing an overview of the role of these different types of noncovalent interactions in both homogenous and heterogeneous catalysis, this book is a valuable resource for synthetic chemists who are interested in exploring and further developing noncovalent-interaction-assisted synthesis and catalysis.

Enzyme Supported Crystallization of Chiral Amino Acids Kerstin Würges.2011

Asymmetric Catalysis on Industrial Scale Hans Ulrich Blaser, Elke Schmidt.2007-02-27 Edited by two of the experts in the field, the central aim is to show organic chemists working in process development that enantioselective catalysis is suitable for the large-scale production of enantioenriched intermediates. In so doing, it is equally a source of information and inspiration for academic research, and, with its contribution by Noble prizewinner W. S. Knowles, will also heighten the status of industrial catalyst specialists working in the exciting field of enantioselective catalysis. Some 25 contributions from top industrial researchers around the world present case studies on the development of the widest possible range of large-scale enantioselective processes, featuring stereoselective production processes of fine-chemicals, agrochemicals and pharmaceuticals. Clearly structured according to the nature of the task, this handbook adopts a problem-driven approach such that readers can easily find how colleagues have dealt with a similar situation.

Asymmetric Synthesis with Chemical and Biological Methods Dieter Enders, Karl-Erich Jaeger.2007-06-27 Edited by two of the leading researchers in the field, this book provides a deep, interdisciplinary insight into stoichiometric and catalytic reactions in this continuously expanding area. A plethora of top German scientists with an international reputation covers various aspects, from classical organic chemistry to process development, and from the theoretical background to biological methods using enzymes. Throughout the focus is on the development of new synthetic methods in asymmetric synthesis, the synthesis of natural and bioactive compounds and the latest developments in both chemical and biological methods of catalysis, as well as the investigation of special technical and biotechnical aspects.

Dynamic Kinetic Resolution (DKR) and Dynamic Kinetic Asymmetric Transformations (DYKAT) Jan-E. Bäckvall.2022-12-07 Principles and applications of DKR and DYKAT DKR and DYKAT are of ever increasing importance in the synthesis of enantiomerically enriched compounds. The preparation of enantiomerically pure compounds is of great importance in society today, in particular in pharmaceutical chemistry and in the agrochemical sector. Kinetic resolution is a popular method for differentiating two enantiomers in a racemic mixture that react at different rates with a chiral catalyst or reagent. The drawback of kinetic resolution is that the yield of one pure enantiomer is limited to a maximum of 50%. To overcome this limitation, an in situ racemization of the starting material can be combined with a kinetic resolution. This combination leads to a so called "dynamic kinetic resolution" (DKR), where the two enantiomers are in equilibrium with one another. The slow-reacting enantiomer will continuously be converted into the fast-reacting one, when the latter is transformed into the enantiomerically pure product. Thus, a racemic starting material can be transformed in catalytic processes into a single isomer of a chiral compound in up to 100% yield. DKR only applies to the resolution of racemic mixtures and the involvement of enantiomers leads to simple kinetics. When diastereomers, either as starting materials or as diastereomeric intermediates, are involved in the resolution process under dynamic conditions (via equilibria between diastereomers), the kinetics is different from DKR. These reactions are classified as "dynamic kinetic asymmetric transformations" (DYKAT). This volume covers the principles of DKR and DYKAT and presents examples of organocatalytic, chemoenzymatic, and transition-metal catalyzed approaches, including applications in the synthesis of complex, biologically active compounds.

Understanding Kinetic Resolution by Hydrolases Abir B. Majumder, Kalluri V. S. Ranganath.2024-01-01 This brief is a concise guide that explores the theory and practical aspects of improving enantioselectivity in enzymatic kinetic resolution, with a specific focus on the role of hydrolases in this process. Enzymatic kinetic resolution is a valuable technique for obtaining enantiopure compounds, and hydrolases are highlighted as a crucial class of enzymes widely used in industries for chiral synthesis involving kinetic resolution. The book emphasizes the importance of tuning and optimizing the enzymatic kinetic resolution process to achieve the highest possible enantiomeric excess in the final product or starting material while maintaining the desired yield. Through illustrative examples, the text aims to make the concept accessible and appealing to graduate students, researchers, and young organic chemists seeking to incorporate hydrolases in their stereoselective synthesis endeavors.

Decoding Chirality From Dynamic Kinetic Resolution: Revealing the Captivating Potential of Verbal Expression

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an enlightening odyssey, unraveling the intricate significance of language and its enduring affect our lives. In this appraisal, we shall explore the book is central themes, evaluate its distinctive writing style, and gauge its pervasive influence on the hearts and minds of its readership.

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