Organocatalytic Dynamic Kinetic Resolution

Hélène Pellissier CNRS, France

Synopsis

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%. Many efforts have been devoted to overcoming this limitation which has led to the evolution of classical kinetic resolution into dynamic kinetic resolution (DKR), allowing a quantitative yield of one of the enantiomers. Collecting together 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.

Brief Contents

- General Introduction
- Dynamic Kinetic Resolutions Promoted by Cinchona Alkaloid Catalysts
- Dynamic Kinetic Resolutions Promoted by Amino Acid Catalysts and Derivatives
- Dynamic Kinetic Resolutions Promoted by Phosphoric Acid Catalysts
- Dynamic Kinetic Resolutions Promoted by N-Heterocyclic Carbene Catalysts
- Dynamic Kinetic Resolutions Promoted by Thiourea Catalysts
- Dynamic Kinetic Resolutions Promoted by Pyridine-based Lewis Base Catalysts
- Dynamic Kinetic Resolutions Promoted by Tetramizole Catalysts
- Dynamic Kinetic Resolutions Promoted by Other Organocatalysts
- General Conclusion
Berries and Berry Bioactive Compounds in Promoting Health

Dorothy Klimis-Zacas The University of Maine, USA
Ana Rodriguez-Mateos King’s College London, UK

Synopsis

The area of research on the health benefits of berries has exploded in the past 20 years resulting in new knowledge in the understanding of their metabolism, molecular mode of action as well as their clinical significance in promoting health and preventing chronic disease. This comprehensive book reviews state-of-the-art research findings from international experts in their corresponding fields. Exploring the effects and mechanisms of action of berry bioactive compounds and their metabolites on different body systems and chronic diseases, including their role on gut microbiota and effect on health is the focus of this book. It will benefit scientists conducting research in this area and health care professionals, nutritionists, dietitians and clinical researchers.

Brief Contents

- Bioactive Compounds of Berries: Chemistry and Analytical Methods of Detection
- Occurrence, Bioavailability and Metabolism of Berry (Poly)phenols
- Factors Affecting the Inter-individual Variability in the Cardiometabolic Response to Berry (Poly)phenols
- Berries: Functional Foods that Promote Beneficial Bacterial Species in the Gut
- The Effects of Berry Bioactive Compounds on Vascular Function
- Mechanisms of Action of Berry Bioactives on the Vascular System
- Berry Bioactives and Cognition
- Neuroprotective Mechanisms of Berry Bioavailable Polyphenol Metabolites
- The Role and Mechanisms of Berries and Berry Bioactive Compounds in Cancer
- The Role of Berry Bioactive Compounds in Diabetes Mellitus
- The Role of Berries and Their Bioactive Compounds on Obesity-induced Inflammation
- Mechanisms of Action of Berry Bioactives on Obesity-induced Inflammation
- The Role of Berries as Potential Wound Healing Agents

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Lectures on Spin Dynamics
The Theoretical Minimum

Giuseppe Pileio  University of Southampton, UK

Synopsis
Describing the theoretical minimum the author believes to be necessary to understand and practice the dynamics of nuclear spins, this book outlines the theory at the heart of well-known techniques such as NMR and MRI. It provides a comprehensive description of the most essential concepts needed to understand spin dynamics, including quantum mechanics operators and superoperators, irreducible spherical tensors, rotation operators, a theory for spin relaxation and so on. Written in the concise and direct style appropriate for university lectures, it is aimed at final year undergraduate programmes where there has already been some coverage of quantum mechanics. PhD students and postdocs will also benefit from the book as a good reference source to support building their theoretical understanding.

Brief Contents
- Lecture 1: Operator and Superoperator Algebra
- Lecture 2: Spin
- Lecture 3: The Quantum Description of an Isolated Spin-1/2
- Lecture 4: Irreducible Spherical Tensors
- Lecture 5: Perturbation Methods
- Lecture 6: The Spin Hamiltonian
- Lecture 7: The Radiofrequency Hamiltonian and the Rotating Frame
- Lecture 8: The Dynamics of an Isolated Spin-1/2
- Lecture 9: The Density Operator
- Lecture 10: The Dynamics of a Single Spin-1/2 Ensemble
- Lecture 11: The Dynamics of an Ensemble of Coupled Spin-1/2 Pairs
- Lecture 12: A Relaxation Theory of Nuclear Spin States
- Workshop 1: Spin States and Operators
- Workshop 2: Spherical Tensors and Spin Hamiltonians
- Workshop 3: The Dynamics of Single Spin-1/2 Systems
- The Dynamics of an Ensemble of Spin-1/2 Pairs and Spin Relaxation

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Advance Book Information

The Origin of Chirality in the Molecules of Life
From Awareness to the Current Theories and Perspectives of this Unsolved Problem

Albert Guijarro Universidad de Alicante, Spain

Synopsis

Completely revised and updated, this book covers a hot topic and one of the unsolved problems not just in chemistry, but in all science. It condenses a large and very disperse number of contributions from almost every field, organized, interrelated and explained in a unified way. Structured to be amenable for both researchers and for educational purposes, this book covers fundamental aspects while maintaining a comprehensive overview. Highly illustrated throughout, the book provides a clear review of many interdisciplinary subjects treated in the book.

Brief Contents

- Introduction and Historical Background
- The Concept of Chirality
- Theories of the Origin of Biomolecular Homochirality
- Chiral Physical Forces
- Mechanisms of Amplification
- Spontaneous Symmetry Breaking
- Outside Earth: Meteorites and Comets
- Other Local Deterministic Theories
- Intrinsic Asymmetry of the Universe: The Absolute Direction of Time, the Absolute Sign of Charge and the Absolute Handedness

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Sustainable Nanotechnology

Zibiao Li A*STAR, Singapore
Jie Zheng A*STAR, Singapore
Enyi Ye A*STAR, Singapore

Synopsis

By fabricating materials into nanometre-scale, nanotechnology has facilitated an efficient, economically, and environmentally acceptable solution for waste treatment and energy production. This book illustrates how green nanotechnology is being used to promote sustainability, including applications in environmental remediation and energy optimization. Offering an important reference for the research community, the book will be of interest to graduate students and researchers in nanotechnology, materials science, sustainability, environmental science, and energy.

Brief Contents

- Introduction to Nanotechnology and Sustainability
- Green Nanotechnology for High-performance Impurity Detection and Water Treatment
- Nanotechnology for CO₂ Capture, Storage and Conversion
- Nanotechnology for the Remediation of Plastic Wastes
- Sustainable Nanomaterials for Pollutants Treatment
- The Application of Nanomaterial in Built Environment
- Nanotechnology for Energy Storage and Efficiency
- Nanocatalysis with Sustainability
- Bio-refinery Through Nanotechnology
- Nanotechnology Research for Alternative Renewable Energy

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Advance Book Information

Greener Organic Transformations

James H Clark University of York, UK
Anwar Jardine University of Cape Town, South Africa
Avtar Matharu University of York, UK
Christian Stevens Ghent University, Belgium

Synopsis

Green chemistry has progressed from being a driver for change in the chemical and allied industries to being a critical part of chemical education at all levels. Future chemists must be able to practice their trade in the light of increasing concerns about waste and resources, the safety of chemicals in consumer products, and increasingly restrictive legislation. Covering a variety of well-known reactions that commonly feature in standard organic textbooks this book supplements and supports the standard organic chemistry texts.

Brief Contents

- Introduction to Green Chemistry
- Alkylations
- Alkylations of Imines
- Amide Bond Formation
- Bromination Reactions
- Chlorinations Using Thionyl Chloride
- Chlorinations Using Chlorine Gas
- Diazomethane: A Cl Building Block
- Fluorinations Not Using Fluorine Gas
- Friedel–Crafts Reactions
- Heck Reactions
- Nitration Reactions
- Organometallic Additions to Ketones
- Phosphorus Oxychloride
- Polymer Chemistry
- Pyridines Synthesis
- Pyroles Synthesis
- Rearrangement Reactions
- Redox Reactions
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- Thiophenes Synthesis
- Wittig Reaction

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