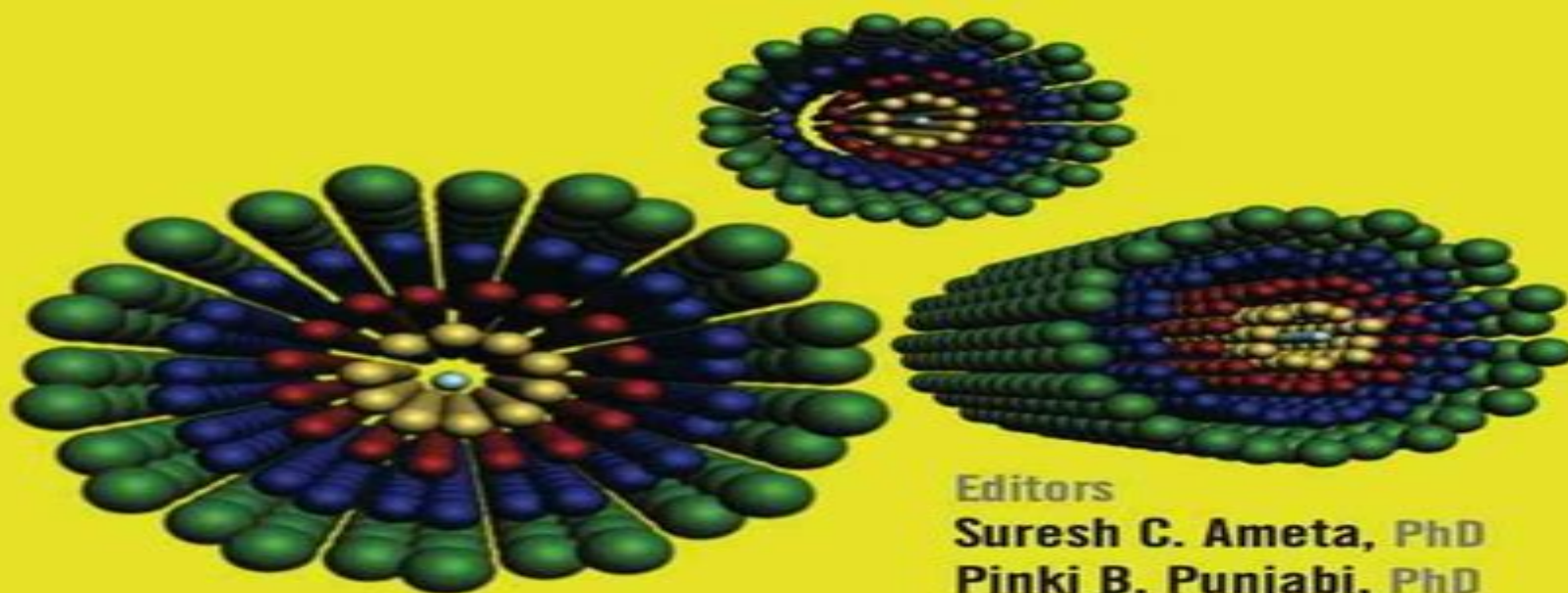


Microwave-Assisted Organic Synthesis

A Green Chemical Approach



Editors

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Microwave Assisted Organic Synthesis A Green Chemical Approach

B. P. Nandeshwarappa



Microwave Assisted Organic Synthesis A Green Chemical Approach:

Microwave-Assisted Organic Synthesis Suresh C. Ameta, Pinki B. Punjabi, Rakshit Ameta, Chetna Ameta, 2014-12-22

The large scale production of chemicals to meet various societal needs has created environmental pollution including pollution from byproducts and improper disposal of waste. With the world facing adverse consequences due to this pollution, green chemistry is increasingly being viewed as a means to address this concern. Since most organic syntheses

Contemporary Chemical Approaches for Green and Sustainable Drugs Marianna Torok, 2022-08-26

Contemporary Chemical Approaches for Green and Sustainable Drugs provides readers with the knowledge they need to integrate sustainable approaches into their work. Sections cover different aspects of green and sustainable drug development from design to disposal, including computer-aided drug design, green resourcing of drugs and drug candidates, an overview of the health concerns of pharmaceutical pollution, and a survey of potential chemical methods for its reduction. Drawing together the knowledge of a global team of experts, this book provides an inclusive overview of the chemical tools and approaches available for minimizing the negative environmental impact of current and newly developed drugs. This will be a useful guide for all academic and industrial researchers across green and sustainable chemistry, medicinal chemistry, environmental chemistry, and pharmaceutical science. Provides an integrative overview of the environmental risks of drugs and drug by-products to support chemists in preemptively addressing these issues. Highlights the advantages of computer-aided drug design, green and sustainable sourcing, and novel methods for the production of safer, more effective drugs. Presents individual chapters written by renowned experts with diverse backgrounds. Reflects research in practice through selected case studies and extensive state-of-the-art reference sections to serve as a starting point in the design of any specialized environmentally conscious medicinal chemistry project.

Microwave Assisted Organic Synthesis Jason Tierney, Pelle

Lidström, 2009-02-12. The first reports on the application of microwaves in organic synthesis date back to 1986, but it was not until the recent introduction of specifically designed and constructed equipment which countered the safety and reproducibility concerns that synthetic application of microwaves has become established as a laboratory technique. Microwave-assisted synthesis is now being adopted in many industrial and academic laboratories to take advantage of the novel chemistry that can be carried out using a variety of organic reaction types. This book demonstrates the underlying principles of microwave dielectric heating and, by reference to a range of organic reaction types, its effective use in synthetic organic chemistry. To illustrate the impact microwave-assisted organic synthesis can have on chemical research, case studies drawn mainly from the pharmaceutical industry are presented.

Green Synthetic Approaches for Biologically Relevant Heterocycles Goutam Brahmachari, 2021-03-20. Green Synthetic Approaches for Biologically Relevant Heterocycles, Second Edition, Volume One: Advanced Synthetic Techniques reviews this significant group of organic compounds within the context of sustainable methods and processes, expanding on the first edition with fully updated coverage and a whole range of new

chapters Volume One explores advanced synthetic techniques with each chapter presenting in depth coverage of various green protocols for the synthesis of a wide variety of bioactive heterocycles that are classified on the basis of ring size and or the presence of heteroatoms Techniques covered range from high pressure cycloaddition reactions and microwave irradiation to sustainable one pot domino reactions This updated edition is an essential resource on sustainable approaches for academic researchers R D professionals and students working across medicinal organic natural product and green chemistry Provides fully updated coverage of the field of greener heterocycle synthesis Includes new chapters on varied multicomponent reactions alongside both traditional and novel approaches Presents information in an accessible style with an emphasis on sustainability Green Chemical Synthesis with Microwaves and Ultrasound Dakeshwar Kumar

Verma, Chandrabhan Verma, Paz Otero Fuertes, 2024-12-23 Green Chemical Synthesis with Microwaves and Ultrasound A guide to the efficient and sustainable synthesis of organic compounds Chemical processes and the synthesis of compounds are essential aspects of numerous industries and particularly central to the creation of drug like structures Their often significant environmental biproducts however have driven substantial innovations in the areas of green and organic synthesis which have the potential to drive efficient solvent free synthesis and create more sustainable chemical processes The use of microwaves and ultrasounds in chemical synthesis has proven an especially fruitful area of research with the potential to produce a more sustainable industrial future Green Chemical Synthesis with Microwaves and Ultrasound provides a comprehensive overview of recent advances in microwave and ultrasound driven synthesis and their cutting edge applications Green Chemical Synthesis with Microwaves and Ultrasound readers will also find Introduction to the key equipment and tools of green chemical synthesis Detailed discussion of methods including ultrasound irradiation metal catalyzed reactions enzymatic reactions and many more An authorial team with immense experience in environmentally friendly organic chemical production Green Chemical Synthesis with Microwaves and Ultrasound is ideal for chemists organic chemists chemical engineers biochemists and any researchers or industry professionals working on the synthesis of chemicals and or organic compounds **Green Approaches in Medicinal Chemistry for Sustainable Drug Design**

Bimal Banik, 2024-06-01 Extensive experimentation and high failure rates are a well recognised downside to the drug discovery process with the resultant high levels of inefficiency and waste producing a negative environmental impact Sustainable and Green Approaches in Medicinal Chemistry Second Edition reveals how medicinal chemistry can play a direct role in addressing this issue After providing essential context to the growth of green chemistry in relation to drug discovery the book goes on to identify a broad range of practical techniques and useful insights revealing how medicinal chemistry techniques can be used to improve efficiency mitigate failure and increase the environmental benignity of the entire drug discovery process Drawing on the knowledge of a global team of experts Sustainable and Green Approaches in Medicinal Chemistry 2e encourages the growth of green medicinal chemistry and supports medicinal chemists drug discovery

researchers pharmacologists and all those in related fields across both academia and industry in integrating these approaches into their own work This first volume of the second edition covers synthesis methods following green chemistry principles contributing to sustainability by saving energy using lesser toxic reagents solvents catalysts and environmentally benign sources including plants and agricultural materials Highlights the need for the adoption of sustainable and green chemistry pathways in drug development Reveals risk factors associated with the drug development process and the ways sustainable approaches can help address these factors Identifies novel and cost effective green medicinal chemistry approaches for improved efficiency and sustainability Microwave Chemical and Materials Processing Satoshi Horikoshi, José M. Catalá-Civera, Robert F. Schiffmann, Jun Fukushima, Tomohiko Mitani, Nick Serpone, 2024-10-24 This book adds remarkable advances in microwave chemistry methods equipment and practical examples since the first edition was published in 2018 Moreover practical examples of the use of microwave energy have been upgraded It also includes how to easily predict microwave heating using material constants In addition coupling analysis simulation with electromagnetic fields and heat transfer which greatly support researchers experiments is covered The principal aim of this book hasn't changed to introduce chemists through a tutorial approach to the use of microwaves by examining several experiments of microwave chemistry and materials processing It subsequently enables chemists to fashion their own experiments in microwave chemistry or materials processing This book helps chemists who take an interest in the use of microwave radiation to overcome difficulties to understand the nature of electromagnetism microwave engineering and thermodynamics

Green Techniques for Organic Synthesis and Medicinal Chemistry Wei Zhang, Berkeley W. Cue, 2012-07-23 Green chemistry is a new way of looking at organic synthesis and the design of drug molecules offering important environmental and economic advantages over traditional synthetic processes Pharmaceutical companies are increasingly turning to the principles of green chemistry in an effort to reduce waste reduce costs and develop environmentally benign processes Green Techniques for Organic Synthesis and Medicinal Chemistry presents an overview of the established and emerging techniques in green organic chemistry highlighting their applications in medicinal chemistry The book is divided into four parts Introduction Introduces the reader to the toxicology of organic chemicals their environmental impact and the concept of green chemistry Green Catalysis Covers a variety of green catalytic techniques including organocatalysis supported catalysis biocatalysis fluororous catalysis and catalytic direct C H bond activation reactions Green Synthetic Techniques Presents a series of new techniques assessing the green chemistry aspects and limitations i.e. cost equipment expertise Techniques include reactions in alternative solvents atom economic multicomponent reactions microwave and ultrasonic reactions solid supported synthesis fluororous and ionic liquid based recycling techniques and flow reactors Green Techniques in Pharmaceutical Industry Covers applications of green chemistry concepts and special techniques for medicinal chemistry including synthesis analysis separation formulation and drug delivery Process and business case studies are included to

illustrate the applications in the pharmaceutical industry Green Techniques for Organic Synthesis and Medicinal Chemistry is an essential resource on green chemistry technologies for academic researchers R D professionals and students working in organic chemistry and medicinal chemistry **Handbook of Sol-Gel Science and Technology** Lisa Klein,Mario

Aparicio,Andrei Jitianu,2018-05-31 This completely updated and expanded second edition stands as a comprehensive knowledgebase on both the fundamentals and applications of this important materials processing method The diverse international team of contributing authors of this reference clarify in extensive detail properties and applications of sol gel science and technology as it pertains to the production of substances active and non active including optical electronic chemical sensor bio and structural materials Essential to a wide range of manufacturing industries the compilation divides into the three complementary sections Sol Gel Processing devoted to general aspects of processing and recently developed materials such as organic inorganic hybrids photonic crystals ferroelectric coatings and photocatalysts Characterization of Sol Gel Materials and Products presenting contributions that highlight the notion that useful materials are only produced when characterization is tied to processing such as determination of structure by NMR in situ characterization of the sol gel reaction process determination of microstructure of oxide gels characterization of porous structure of gels by the surface measurements and characterization of organic inorganic hybrid and Applications of Sol Gel Technology covering applications such as the sol gel method used in processing of bulk silica glasses bulk porous gels prepared by sol gel method application of sol gel method to fabrication of glass and ceramic fibers reflective and antireflective coating films application of sol gel method to formation of photocatalytic coating films and application of sol gel method to bioactive coating films The comprehensive scope and integrated treatment of topics make this reference volume ideal for R D scientists and engineers across a wide range of disciplines and professional interests **Towards Green Chemical Processes: Strategies and**

Innovations Pallavi Jain,Sapna Raghav,Anil Kumar Jangir,2025-08-01 This book is designed for forward thinking professionals researchers and senior students in chemistry chemical engineering and industrial manufacturing this essential resource explores how green chemistry can be effectively applied in real world industrial settings It also speaks directly to environmental engineers and sustainability experts eager to stay ahead of emerging trends and innovations in sustainable practices With practical insights tailored for industry leaders and policymakers committed to reducing environmental impact this work delivers scalable solutions and cutting edge strategies for transforming industrial processes A vital tool for anyone looking to drive meaningful change it empowers organizations to meet sustainability targets while enhancing efficiency and innovation **Nontraditional Activation Methods in Green and Sustainable Applications** Bela Torok,Christian Schaefer,2021-02-25 Nontraditional Activation Methods in Green and Sustainable Applications Microwaves Ultrasounds Photo Electro and Mechan ochemistry and High Hydrostatic Pressure provides a broad overview of non traditional activation methods to help readers identify and use appropriate approaches in reducing the environmental impact of their work

Sections discuss the fundamental principles of each method and provide examples of their practical use illustrating their usefulness Given the importance of expanding laboratory based technologies to the industrial level chapters that cover both existing and potential industrial and environmental applications are also included Highlighting the usefulness and adaptability of these methods for a range of practical applications this book is a practical guide for both those involved with the design and application of synthetic methodologies and those interested in the implementation and impact of green chemistry principles in practice from synthetic and medicinal chemists to food developers and environmental policy planners Discusses and critically assesses the advantages of non traditional activation methods in green and sustainable chemistry applications Features individual chapters written by renowned experts in the field Contains extensive state of the art reference sections providing critically filtered information to readers

Advanced Oxidation Processes for Wastewater Treatment Suresh C. Ameta,Rakshit Ameta,2018-02-19 Advanced Oxidation Processes for Waste Water Treatment Emerging Green Chemical Technology is a complete resource covering the fundamentals and applications of all Advanced Oxidation Processes AOPs This book presents the most up to date research on AOPs and makes the argument that AOPs offer an eco friendly method of wastewater treatment In addition to an overview of the fundamentals and applications it details the reactive species involved along with sections on reactor designs thus helping readers understand and implement these methods Presents in depth coverage of all types of Advanced Oxidation Processes including Super Critical Water Oxidation Photo Fenton and Like Processes Includes a fundamental review applications reactive species and reactor designs Reviews applications across waste types including industrial waste domestic and municipal sewage and hospital wastes **A Green Chemistry Approach - Microwave Assisted Organic Synthesis** B. P. Nandeshwarappa,2017-04-20

Microwave-assisted Polymer Synthesis Richard Hoogenboom,Ulrich S. Schubert, Frank Wiesbrock,2016-09-02 The series Advances in Polymer Science presents critical reviews of the present and future trends in polymer and biopolymer science It covers all areas of research in polymer and biopolymer science including chemistry physical chemistry physics material science The thematic volumes are addressed to scientists whether at universities or in industry who wish to keep abreast of the important advances in the covered topics Advances in Polymer Science enjoys a longstanding tradition and good reputation in its community Each volume is dedicated to a current topic and each review critically surveys one aspect of that topic to place it within the context of the volume The volumes typically summarize the significant developments of the last 5 to 10 years and discuss them critically presenting selected examples explaining and illustrating the important principles and bringing together many important references of primary literature On that basis future research directions in the area can be discussed Advances in Polymer Science volumes thus are important references for every polymer scientist as well as for other scientists interested in polymer science as an introduction to a neighboring field or as a compilation of detailed information for the specialist Review articles for the individual volumes are invited by the volume editors Single contributions

can be specially commissioned Readership Polymer scientists or scientists in related fields interested in polymer and biopolymer science at universities or in industry graduate students

Catalyst-free Organic Synthesis Goutam Brahmachari, 2017-11-06 Explaining methods for carrying out chemical syntheses without the use of catalysts this book shows how avoiding catalysts during synthesis can mean less use of toxic chemicals environmentally damaging chemicals or endangered elements and lower costs

Green Chemistry for Environmental Sustainability Sanjay K. Sharma, Ackmez Mudhoo, 2010-07-19 When the Nobel Prize Committee recognized the importance of green chemistry with its 2005 Nobel Prize for Chemistry this relatively new science came into its own Although no concerted agreement has been reached yet about the exact content and limits of this interdisciplinary discipline there seems to be increasing interest in environmental topic

Green Functionalized Nanomaterials for Environmental Applications Uma Shanker, Manviri Rani, Chaudhery Mustansar Hussain, 2021-08-20 Green nanomaterials are classed as nanomaterials with no environmentally harmful toxic properties The photocatalysis of nanomaterials involves photo conduction value in efficient removal degradation of noxious pollutants Green nanotechnology has objectives for the development of products and processes which are environmentally friendly economically sustainable safe energy efficient and produce little waste or emissions Such products and processes are based on renewable materials and or have a low net impact on the environment Green functionalized nanomaterials formed by a combination of nanomaterials with natural materials or are derived through a green source are the new trends in the remediation of pollutants in environmental industries This has the effect of making photoactive nanomaterials work under UV sunlight radiation in order to produce reactive radical species that rapidly remove pollutants by redox mechanism Green Functionalized Nanomaterials for Environmental Applications focuses on recent developments in the area of fabrication of green nanomaterials and their properties It also looks at ways of lowering the risk of exposure of green functionalized nanomaterials This needs to be pursued in the future for investigating and assessing health risks which may be due to exposure to green nanomaterials It is an important reference source for all those seeking to improve their understanding of how green functionalized nanomaterials are being used in a range of environmental applications as well as considering potential toxicity implications Highlights innovative industrial technologies for green functionalized nanomaterials Covers major fabrication techniques for sustainable functionalized nanomaterials Shows how sustainable functionalized nanomaterials are being developed for commercial applications

5th European Conference of the International Federation for Medical and Biological Engineering 14 - 18 September 2011, Budapest, Hungary Ákos Jobbágy, 2012-02-02 This volume presents the 5th European Conference of the International Federation for Medical and Biological Engineering EMBEC held in Budapest 14 18 September 2011 The scientific discussion on the conference and in this conference proceedings include the following issues Signal Image Processing ICT Clinical Engineering and Applications Biomechanics and Fluid Biomechanics Biomaterials and Tissue Repair Innovations and Nanotechnology Modeling and

Simulation Education and Professional *Microwave Chemistry* Giancarlo Cravotto, Diego Carnaroglio, 2017-09-25
Microwave Chemistry has changed the way to work in chemical laboratories and is an established state of the art technology to accelerate and enhance chemical processes This book not only gives an overview of the technology its historical development and theoretical background but also presents its exceptionally broad spectrum of applications Microwave Chemistry enables graduate students and scientist to learn and apply its methods successfully **Sustainable Approaches in Pharmaceutical Sciences** Kamal Shah, Durgesh Nandini Chauhan, Nagendra Singh Chauhan, 2023-11-06 Highly comprehensive and detailed text on best possible sustainable approaches associated with the development design and origination of pharmaceuticals Sustainable Approaches in Pharmaceutical Sciences enables readers to understand the best possible green approaches associated with the development design and origination of pharmaceuticals including resources that may minimize the adverse effects associated with synthesis isolation and extraction Sustainable Approaches in Pharmaceutical Sciences covers a myriad of current topics including mechanochemical improvements for API synthesis as well as the role of artificial intelligence AI in the development and discovery of pharmaceuticals along with recent developments in hydrogels which respond to triggered factors during topical drug delivery Authored by experienced scientists from institutions across the world other sample topics covered in Sustainable Approaches in Pharmaceutical Sciences include Green technologies and benefits associated with them white biotechnology green chemistry and eco friendly approaches for designing active pharmaceutical ingredients Impact of sustainable approaches in pharmaceutical industries regarding use of solvents nanoparticles formulations and antimicrobial bandages Micro extractive methods capable of generating high recovery values of the analytes and associated techniques such as dispersive liquid liquid microextraction Benefits of the exploration of sustainable chemistry on a commercial scale particularly in relation to bioresources chemical manufacturing and organic transformation Discussing both the foundational science and practicality of different approaches regarding human and environmental health Sustainable Approaches in Pharmaceutical Sciences is an essential resource for scientists medical professionals and industrial professionals working in the fields of sustainable technology and synthesis in pharmaceutical sciences along with advanced level students

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