

*Book Received\**

**Synthetic Organic Sonochemistry.** Jean-Louis Luche (Université de Savoie-ESIGEL, Le Bourget du Lac, France). Kluwer Academic/Plenum Publishers (<http://www.wkap.nl/book.htm/0-306-45916-7>). September 1998, 444 pp. Hardbound, NLG 235.00 / USD 115.00 / GBP 74.75. ISBN 0-306-45916-7

*Received: 22 December 2000*

The use of ultrasound in chemistry – sonochemistry – has grown spectacularly in recent years, resulting in a significant body of empirical research. This timely volume brings together the work and perspectives of theoreticians and acousticians, whose interest is centered on physical aspects, and of synthetic chemists, who need guidelines to successfully apply fundamental principles.

The text begins with a theoretical introduction that summarizes the key physical principles of sonochemistry, keeping mathematics to a minimum. Subsequent chapters describe the major characteristics of sonochemistry for solutions and for biphasic, catalytic, and electrochemical systems with the aim of elucidating the state of the art and of identifying major points for future study.

Highlights of *Synthetic Organic Sonochemistry* include:

- A selection of experimental procedures that illustrate important facets of ultrasound-mediated organic synthesis

- A description of the relevant laboratory equipment with helpful suggestions on proper use, and

- A valuable concluding section that delineates the successes of sonochemistry, less developed areas requiring further research, and possible links with other ‘new chemistries’.

What this text does significantly better than any other competing text is to render sonochemistry as a technically simple, easily performed method that greatly enhances organic synthesis, even in industrial applications. For this reason, the book will be a welcome addition to the reference shelves of academic and industrial researchers and advanced-level students in organic and physical chemistry, synthesis and mechanistic studies, acoustics, and high-energy processes.

# Synthetic Organic Sonochemistry

**Jean-Louis Luche**



## **Synthetic Organic Sonochemistry:**

**Synthetic Organic Sonochemistry** Jean-Louis Luche, 1998-09-30 TEAN LOUIS LUCHE A French poet of this century Pierre Mae Orlan wrote Adventure does not exist it is only in the mind of he who is pursuing it and as soon as it is at one s finger tips it vanishes to come back to life far away in a different shape at the frontiers of imagination This sentence could be used to define the adventure that many sonochemists experienced Most of them did not even suspect that the laboratory trick they were using was the first contact with a considerable amount of science If a personal note is allowed here it can be interesting to mention the part played by chance in my involvement in sonochemistry Almost 20 years ago we had to perform an apparently simple Grignard reaction with n butylmagnesium bromide and geranial but the results were repeatedly unsatisfactory The one pot Barbier technique was attempted also without success From my studies at the University I imagined that the failure of the latter reaction could be caused by a common phenomenon known by solid state chemists as passivation which in some cases can be overcome by ultrasonication By chance an ultrasonic bath was sitting on the next bench borrowed to clean some equipment We clamped our reluctant reaction mixture into the bath the reaction proceeded vigorously and the adventure started Without knowing anything about cavitation high energies etc we had an illustration of Goethe s word Am Anfang war die Tat at the Beginning was the Act

**Synthetic Organic Sonochemistry** Jean-Louis Luche, 2013-06-19 TEAN LOUIS LUCHE A French poet of this century Pierre Mae Orlan wrote Adventure does not exist it is only in the mind of he who is pursuing it and as soon as it is at one s finger tips it vanishes to come back to life far away in a different shape at the frontiers of imagination This sentence could be used to define the adventure that many sonochemists experienced Most of them did not even suspect that the laboratory trick they were using was the first contact with a considerable amount of science If a personal note is allowed here it can be interesting to mention the part played by chance in my involvement in sonochemistry Almost 20 years ago we had to perform an apparently simple Grignard reaction with n butylmagnesium bromide and geranial but the results were repeatedly unsatisfactory The one pot Barbier technique was attempted also without success From my studies at the University I imagined that the failure of the latter reaction could be caused by a common phenomenon known by solid state chemists as passivation which in some cases can be overcome by ultrasonication By chance an ultrasonic bath was sitting on the next bench borrowed to clean some equipment We clamped our reluctant reaction mixture into the bath the reaction proceeded vigorously and the adventure started Without knowing anything about cavitation high energies etc we had an illustration of Goethe s word Am Anfang war die Tat at the Beginning was the Act

*Synthetic Organic Sonochemistry* Jean-Louis Luche, 2013-06-29 TEAN LOUIS LUCHE A French poet of this century Pierre Mae Orlan wrote Adventure does not exist it is only in the mind of he who is pursuing it and as soon as it is at one s finger tips it vanishes to come back to life far away in a different shape at the frontiers of imagination This sentence could be used to define the adventure that many sonochemists experienced Most of them did not even suspect that the

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*Organic Sonochemistry* Jean-Marc Lévêque, Giancarlo Cravotto, François Delattre, Pedro Cintas, 2018-10-11 This book provides informative useful and stimulating reading on the topic of organic sonochemistry the core of ultrasound based applications Given the increasing interest in new and improved technologies allied to their green and sustainable character not always a valid premise there is a great attraction for organic chemists to apply these protocols in synthesis and process chemistry Unfortunately as with other enabling technologies many researchers new to the field have received a simple and dishonest message just switch on Therefore a significant portion of sonochemical syntheses lack reproducibility surprisingly cavitation control and/or ultrasonic parameters are omitted and the actual role of sonication remains uncertain While this book does not provide a detailed description of fundamentals the introductory remarks highlight the importance of cavitation effects and their experimental control It presents a number of concepts of sonochemical reactivity and empirical rules with pertinent examples often from classical and recent literature It then focuses on scenarios of current interest where organic chemistry and synthesis in particular may benefit from sonication in terms of both chemical and mechanical activation The sustainable corner of this field is largely exemplified through concepts like atom economy renewable sources wasteless syntheses and benign solvents as reaction media This book is useful for both researchers and graduate students especially those familiar with the field of sonochemistry and applications of ultrasound in general However it is also of interest to a broader audience as it discusses the fundamentals techniques and experimental skills necessary for scientists wishing to initiate the use of ultrasound in their domain of expertise

Organic Synthesis Engineering L. K. Doraiswamy, 2001-02-15 This book will formally launch organic synthesis engineering as a distinctive field in the armory of the reaction engineer Its main theme revolves around two developments catalysis and the role of process intensification in enhancing overall productivity Each of these two subjects are becoming increasingly useful in organic synthesis engineering especially in the production of medium and small volume chemicals and enhancing reaction rates by extending laboratory techniques such as ultrasound phase transfer catalysts membrane reactor and microwaves to industrial scale production This volume describes the applications of

catalysis in organic synthesis and outlines different techniques of reaction rate and or selectivity enhancement against a background of reaction engineering principles for both homogeneous and heterogeneous systems *Catalyst-free Organic Synthesis* Goutam Brahmachari, 2017-11-06 It is well established that organic synthetic processes have been at the core of the chemical industry for hundreds of years in the production of organic compounds with a wide range of applications. However, we are becoming increasingly aware of the hazardous substances used and generated by these chemical processes. The field of organic synthesis has undergone profound changes to switch to equally efficient but more sustainable processes that avoid the extensive use of toxic and hazardous reagents and solvents, harsh reaction conditions, and expensive and sophisticated catalysts. 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. It is an important reference for chemists involved in organic synthesis as well as for green chemists.

**Advances in Organic Synthesis** Atta-ur- Rahman, 2005-01-15 The volume focuses on recent advances in organofluorine chemistry directed towards selective fluorine introduction into various target molecules employing both traditional and contemporary electrophilic and nucleophilic fluorinating agents. It brings to the fore the *Green Techniques for Organic Synthesis and Medicinal Chemistry* Wei Zhang, Berkeley W. Cui, 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.

**Sustainable Organic Synthesis** Dr Stefano Protti, Professor Alessandro Palmieri, 2021-10-29 Recent years have seen

huge growth in the area of sustainable chemistry In order to meet the chemical needs of the global population whilst minimising impacts on health and the environment it is essential to keep reconsidering and improving synthetic processes Sustainable Organic Synthesis is a comprehensive collection of contributions provided by specialists in Green Chemistry covering topics ranging from catalytic approaches to benign and alternative reaction media and innovative and more efficient technologies

*Research Anthology on Synthesis, Characterization, and Applications of Nanomaterials* Management Association, Information Resources, 2021-03-19 The use of nanotechnologies continues to grow as nanomaterials have proven their versatility and use in many different fields and industries within the scientific profession Using nanotechnology materials can be made lighter more durable more reactive and more efficient leading nanoscale materials to enhance many everyday products and processes With many different sizes shapes and internal structures the applications are endless These uses range from pharmaceuticals to materials such as cement or cloth electronics environmental sustainability and more Therefore there has been a recent surge of research focused on the synthesis and characterizations of these nanomaterials to better understand how they can be used their applications and the many different types The Research Anthology on Synthesis Characterization and Applications of Nanomaterials seeks to address not only how nanomaterials are created used or characterized but also to apply this knowledge to the multidimensional industries fields and applications of nanomaterials and nanoscience This includes topics such as both natural and manmade nanomaterials the size shape reactivity and other essential characteristics of nanomaterials challenges and potential effects of using nanomaterials and the advantages of nanomaterials with multidisciplinary uses This book is ideally designed for researchers engineers practitioners industrialists educators strategists policymakers scientists and students working in fields that include materials engineering engineering science nanotechnology biotechnology microbiology drug design and delivery medicine and more

**Modern Organic Synthesis** George S. Zweifel, Michael H. Nantz, Peter Somfai, 2017-03-13 This book bridges the gap between sophomore and advanced graduate level organic chemistry courses providing students with a necessary background to begin research in either an industry or academic environment Covers key concepts that include retrosynthesis conformational analysis and functional group transformations as well as presents the latest developments in organometallic chemistry and C C bond formation Uses a concise and easy to read style with many illustrated examples Updates material examples and references from the first edition Adds coverage of organocatalysts and organometallic reagents

**Activation Methods** Jean-Philippe Goddard, Max Malacria, Cyril Ollivier, 2020-02-26 Activation Methods examines recent improvements in the utilization of ultrasonic waves and pressurized gases to generate reactions A straightforward method to use sonochemistry allows chemical reactions to be carried out under ultrasound without the need for external heat reagents or catalysts leading to high yields and the production of a minimum amount of waste This book presents an overview of the main applications of sonochemistry in green organic chemistry with an emphasis on texts published within the last few years High pressure

chemical reactions offer innovative solutions to problems relating to synthesis. They allow access to new products and a further understanding of reaction mechanisms. This book presents the characteristics of hyperbaric activation which allow the integration of an arsenal of tools for green chemistry such as the lowering of energy costs and of by products as well as the possibility of using substrates that are sterically congested and generally inert.

**Handbook on Applications of Ultrasound** Dong Chen, Sanjay K. Sharma, Ackmez Mudhoo, 2011-07-26

Ultrasonic irradiation and the associated sonochemical and sonophysical effects are complementary techniques for driving more efficient chemical reactions and yields. Sonochemistry, the chemical effects and applications of ultrasonic waves and sustainable green chemistry, both aim to use less hazardous chemicals and solvents, reduce energy consumption and increase product selectivity. A comprehensive collection of knowledge, *Handbook on Applications of Ultrasound* covers the most relevant aspects linked to and linking green chemistry practices to environmental sustainability through the uses and applications of ultrasound-mediated and ultrasound-assisted biological, biochemical, chemical and physical processes. Chapters are presented in the areas of Medical applications, Drug and gene delivery, Nanotechnology, Food technology, Synthetic applications and organic chemistry, Anaerobic digestion, Environmental contaminants degradation, Polymer chemistry, Industrial syntheses and processes, Reactor design, Electrochemical systems, Combined ultrasound microwave technologies. While the concepts of sonochemistry have been known for more than 80 years, in-depth understanding of this phenomenon continues to evolve. Through a review of the current status of chemical and physical science and engineering in developing more environmentally friendly and less toxic synthetic processes, this book highlights many existing applications and the enormous potential of ultrasound technology to upgrade present industrial, agricultural and environmental processes.

**March's Advanced Organic Chemistry** Michael B. Smith, 2025-07-23

Leading reference on the theories of organic chemistry, now updated to reflect the most recent literature from 2018 to 2023. Building on the success of the 8th Edition as winner of the Textbook Academic Authors Association 2021 McGuffey Longevity Award, the revised and updated 9th Edition of *March's Advanced Organic Chemistry* explains the theories of organic chemistry, covers new advances in areas of organic chemistry published between 2018 and 2023, and guides readers to plan and execute multi-step synthetic reactions. Detailed examples and descriptions of all reactions are included throughout the text. As in previous editions, the goal of this edition is to give equal weight to three fundamental aspects of the study of organic chemistry: reactions, mechanisms, and structure. Specific but specialized areas of organic chemistry, such as terpenes, polymerization, and steroids, have been incorporated into primary sections rather than segregated into their own sections. The first nine chapters cover general organic chemistry with theoretical principles. The next 10 chapters address reactions and mechanistic discussion. Appendix A focuses on literature references and resources. More than 4,400 references are included throughout the text. *March's Advanced Organic Chemistry* provides information on localized and delocalized chemical bonding and bonding weaker than covalent, Microwave chemistry, use of ultrasound, mechanochemistry, and

reactions done under flow conditions Acids and bases irradiation processes stereochemistry structure of intermediates and ordinary and photochemical reactions Mechanisms and methods of determining carbocations carbanions free radicals carbenes and nitrenes Aliphatic alkenyl and alkynyl substitution additions to carbon carbon and carbon hetero bonds eliminations rearrangements and oxidations and reductions This 9th Edition of March s Advanced Organic Chemistry continues to serve as a must have reference for every student and professional working in organic chemistry or related fields

Sonochemistry Timothy J. Mason, Mircea Vinatoru, 2023-03-06 In the 1980 s sonochemistry was considered to be a rather restricted branch of chemistry involving the ways in which ultrasound could improve synthetic procedures predominantly in heterogeneous systems and particularly for organometallic reactions Within a few years the subject began to expand into other disciplines including food technology environmental protection and the extraction of natural materials Scientific interest grew and led to the formation of the European Society of Sonochemistry in 1990 and the launch of a new journal Ultrasonics Sonochemistry in 1994 The subject continues to develop as an exciting and multi disciplinary science with the participation of not only chemists but also physicists engineers and biologists The resulting cross fertilisation of ideas has led to the rapid growth of interdisciplinary research and provided an ideal way for young researchers to expand their knowledge and appreciation of the ways in which different sciences can interact It expands scientific knowledge through an opening of the closed doors that sometimes restrict the more specialist sciences The journey of exploration in sonochemistry and its expansion into new fields of science and engineering is recounted in Sonochemistry Evolution and Expansion written by two pioneers in the field It is unlike other texts about sonochemistry in that it follows the chronological developments in several very different applications of sonochemistry through the research experiences of the two authors Tim Mason and Mircea Vinatoru Designed for chemists and chemical engineers Written by two experts and practitioners in the subject Volume 1 covers the historical background and evolution of sonochemistry Volume 2 explains the wider applications and expansion of the subject VOLUME 2 Applications and Developments Volume 2 contains six chapters which detail the developments of sonochemistry in fields which continue to attract considerable research and development interest from academia and industry The topics range from the important developments in chemical synthesis through food technology and materials processing to therapeutic ultrasound The authors have made contributions to all of these and so the content is written in a way which should be understandable to readers whose expertise may not necessarily be in the individual topic Each of the applications and developments described help to illustrate not only the diverse nature of sonochemistry but also the unifying theme of the effects of acoustic cavitation on a wide range of procedures **Advances in Sonochemistry** T.J. Mason, 1999-08-31 This is the fifth volume of Advances in Sonochemistry the first having been published in 1990 The definition of sonochemistry has developed to include not only the ways in which ultrasound has been harnessed to effect chemistry but also its uses in material processing Subjects included range from chemical dosimetry to ultrasound in



microbiology to ultrasound in the extraction of plant materials and in leather technology      *Green Chemistry* Bela Torok, Timothy Dransfield, 2017-11-07 *Green Chemistry An Inclusive Approach* provides a broad overview of green chemistry for researchers from either an environmental science or chemistry background starting at a more elementary level incorporating more advanced concepts and including more chemistry as the book progresses Every chapter includes recent state of the art references in particular review articles to introduce researchers to this field of interest and provide them with information that can be easily built upon By bringing together experts in multiple subdisciplines of green chemistry the editors have curated a single central resource for an introduction to the discipline as a whole Topics include a broad array of research fields including the chemistry of Earth s atmosphere water and soil the synthesis of fine chemicals and sections on pharmaceuticals plastics energy related issues energy storage fuel cells solar and wind energy conversion etc greenhouse gases and their handling chemical toxicology issues of everyday products from perfumes to detergents or clothing and environmental policy issues Introduces the topic of green chemistry with an overview of key concepts Expands upon presented concepts with the latest research and applications providing both the breadth and depth researchers need Includes a broad range of application based problems to make the content accessible for professional researchers and undergraduate and graduate students Authored by experts in a broad range of fields providing insider information on the aspects or challenges of a given field that are most important and urgent      **Sonochemistry** Navnath

Hatvate, Hemantkumar N. Akolkar, A. K. Haghi, 2025-07-21 The study of the effects of ultrasound waves on a chemical reaction is known as sonochemistry Ultrasound radiation between 20 kHz and 2 MHz is used to drive chemical and physical processes in solution When ultrasound waves pass through liquid they generate tiny bubbles that expand and then collapse quickly This process releases energy which can speed up the chemical reactions Sonochemistry is considered a sustainable technology because it often utilizes less energy requires fewer toxic chemicals and generates less waste compared to traditional chemical processes Ultrasound waves are utilized in various processes including synthesis crystallization and purifications and find applications in various sectors like pharmaceuticals material sciences agriculture food processing and environment science This book is focused on applications of sonochemistry It begins by explaining the basics of the technology and moves on to describing applications in the fields of chemistry chemical engineering and environmental engineering and discussed applications currently being developed and future outlook      *Microwaves in Organic Synthesis* Antonio de la Hoz, André Loupy, 2013-02-26 The third edition of the bestselling two volume reference covers everything you need to know about microwave technology for synthesis from the best equipment to nonthermal effects from solid support reactions to catalysis Completely revised and updated with half of the authors completely new to the project this comprehensive work is clearly divided into two parts on the fundamentals of microwave irradiation and application of microwaves and synergies with other enabling techniques Also new to this edition are chapters on on line monitoring flow

chemistry combination with ultrasounds and natural products including multicomponent reactions An indispensable source for organic catalytic physical and medicinal chemists      **Chemistry and Chemical Technologies in Waste Valorization**

Carol Sze Ki Lin, 2018-08-13 The series Topics in Current Chemistry Collections presents critical reviews from the journal Topics in Current Chemistry organized in topical volumes The scope of coverage is all areas of chemical science including the interfaces with related disciplines such as biology medicine and materials science The goal of each thematic volume is to give the non specialist reader whether in academia or industry a comprehensive insight into an area where new research is emerging which is of interest to a larger scientific audience Each review within the volume critically surveys one aspect of that topic and places it within the context of the volume as a whole The most significant developments of the last 5 to 10 years are presented using selected examples to illustrate the principles discussed The coverage is not intended to be an exhaustive summary of the field or include large quantities of data but should rather be conceptual concentrating on the methodological thinking that will allow the non specialist reader to understand the information presented Contributions also offer an outlook on potential future developments in the field

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