
SOFT MECHANOCHEMICAL SYNTHESIS

A Basics for New Chemical Technologies

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Soft Mechanochemical Synthesis A Basis For New Chemical Technologies

Tobias Bleicker

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Soft Mechanochemical Synthesis G.V. Avvakumov, Mamoru Senna, N. V. Kosova, 2013-03-26 Mechanical methods of the activation of chemical processes are currently widely used for the synthesis of various compounds The present monograph deals with the development of a novel approach to mechanochemical synthesis based on reactions of solid acids bases hydrated compounds crystal hydrates basic and acidic salts This method has been called soft mechanochemical synthesis The monograph includes the papers published by the present authors They describe the results of their investigations in the last two decades New theoretical and experimental data on kinetics and mechanism of soft mechanochemical reactions in the mixtures of compounds mentioned above to give complex oxide compounds are presented The description of new high energetic and high efficient mills providing effective occurrence of these reactions is delivered The possibilities of applying soft mechanochemical synthesis for materials used in catalysts material science electronics etc are discussed The advantages of the method proposed in comparison with other methods are demonstrated The monograph is designed for researchers engineers and technicians engaged in chemical and ceramic industry for scientists and students specialized in the area of development and application of new materials

Mechanochemical Synthesis of Composite Materials Zulkhair A. Mansurov, Nina N. Mofa, Tlek A. Ketegenov, Bakhtiyar S. Sadykov, 2022-08-01 Mechanochemical treatment is one of the promising directions of the chemical and technological processes of obtaining a new substance as a result of the transformation of mechanical energy into the chemical physical processes of system restructuring The peculiarity of the state of solid matter because of intense mechanical action is determined not only by its destruction i.e. dispersing and obtaining a powder material with a high and active surface but also by the accumulation of defects in the entire volume of particles which increases their reactivity This book presents the results of many years of

research on the mechanochemical synthesis of composites consisting of inorganic and organic components obtained by the scientific team at the Institute of Combustion Problems Kazakhstan It begins with the general ideas about the mechanochemical process and the phenomena and further discusses the main provisions of the structural rearrangement and modification of the surface of dispersible particles

Biomass Fractionation Technologies for a Lignocellulosic Feedstock Based Biorefinery S.I. Mussatto, 2016-02-18 Biomass Fractionation Technologies for a Lignocellulosic Feedstock based Biorefinery reviews the extensive research and tremendous scientific and technological developments that have occurred in the area of biorefining including industrial processes and product development using green technologies often referred as white biotechnology As there is a huge need for new design concepts for modern biorefineries as an alternative and amendment to industrial crude oil and gas refineries this book presents the most important topics related to biomass fractionation including advances challenges and perspectives all with references to current literature for further study Presented in 26 chapters by international field specialists each chapter consists of review text that comprises the most recent advances challenges and perspectives for each fractionation technique The book is an indispensable reference for all professionals students and workers involved in biomass biorefinery assisting them in establishing efficient and economically viable process technologies for biomass fractionation Provides information on the most advanced and innovative pretreatment processes and technologies for biomass Reviews numerous valuable products from lignocellulose Discusses integration of processes for complete biomass conversion with minimum waste generation Identifies the research gaps in scale up Presents an indispensable reference for all professionals students and workers involved in biomass biorefinery assisting them in establishing efficient and economically viable process technologies for biomass fractionation

Mechanochemistry in Nanoscience and Minerals Engineering Peter Balaz, 2008-10-20 Mechanochemistry as a branch of solid state chemistry enquires into processes which proceed in solids due to the application of mechanical energy This provides a thorough up to date overview of mechanochemistry of solids and minerals Applications of mechanochemistry in nanoscience with special impact on nanogeoscience are described Selected advanced identification methods most frequently applied in nanoscience are described as well as the advantage of mechanochemical approach in minerals engineering Examples of industrial applications are given Mechanochemical technology is being applied in many industrial fields powder metallurgy synthesis of nanometals alloys and nanocompounds building industry activation of cements chemical industry solid waste treatment catalyst synthesis coal ashes utilization minerals engineering ore enrichment enhancement of processes of extractive metallurgy agriculture industry solubility increase of fertilizers and pharmaceutical industry improvement of solubility and bioavailability of drugs This reference serves as an introduction to newcomers to mechanochemistry and encourages more experienced researchers to broaden their knowledge and discover novel applications in the field

Proceedings of the IV Advanced Ceramics and Applications Conference Bill Lee, Rainer

Gadow, Vojislav Mitic, 2017-01-16 This is the Proceedings of III Advanced Ceramics and Applications conference held in Belgrade Serbia in 2014 It contains 25 papers on various subjects regarding preparation characterization and application of advanced ceramic materials

CRC Concise Encyclopedia of Nanotechnology Boris Ildusovich Kharisov, Oxana Vasilievna Kharissova, Ubaldo Ortiz-Mendez, 2016-01-06 The CRC Concise Encyclopedia of Nanotechnology sets the standard against which all other references of this nature are measured As such it is a major resource for both skilled professionals and novices to nanotechnology The book examines the design application and utilization of devices techniques and technologies critical to research at the

The Future of Dynamic Structural Science Judith A.K. Howard, Hazel A. Sparkes, Paul R. Raithby, Andrei V. Churakov, 2014-07-08 This work focuses on complementary crystallographic and spectroscopic areas of dynamic structural science from papers presented at the 46th NATO sponsored course in Erice Sicily 2013 These papers cover a range of material from background concepts to more advanced material and represent a fully inter disciplinary collection of the latest ideas and results within the field They will appeal to practising or novice crystallographers both chemical and biological who wish to learn more about modern spectroscopic methods and convergent advances and hence vice versa for experimental and computational spectroscopists The chapters refer to the latest techniques software and results and each chapter is fully referenced The volume provides an excellent starting point for new comers in the emerging multi disciplinary area of time resolved science

High-Energy Ball Milling Małgorzata Sopicka-Lizer, 2010-05-24 Mechanochemical processing is a novel and cost effective method of producing a wide range of nanopowders It involves the use of a high energy ball mill to initiate chemical reactions and structural changes High energy ball milling Mechanochemical processing of nanopowders reviews the latest techniques in mechanochemistry and how they can be applied to the synthesis and processing of various high tech materials Part one discusses the basic science of mechanochemistry with chapters on such topics as the mechanism and kinetics of mechanochemical processes kinetic behaviour in mechanochemically induced structural and chemical transformations and materials design through mechanochemical processing Part two reviews mechanochemical treatment of different materials including synthesis of complex ceramic oxides production of intermetallic compound powders synthesis of organic compounds synthesis of metallic ceramic composite powders and activation of covalent bond based materials Part three covers mechanochemical processes in metal powder systems and other applications with coverage of topics such as plating and surface modification using ultrasonic vibrations activated powders as precursors for spark plasma sintering titanium dioxide photocatalyst synthesis by mechanochemical doping and synthesis of materials for lithium ion batteries With its distinguished editor and international team of contributors High energy ball milling Mechanochemical processing of nanopowders is a standard reference for all those involved in the production of ceramic and metallic components using sintering and other powder metallurgy techniques to produce net shape components Examines the latest techniques in mechanochemistry and how they can be applied to the

synthesis and processing of various high tech materials Discusses the basic science of mechanochemistry including kinetic behaviour processes and mechanisms and materials design through mechanochemical processing Reviews mechanochemical treatment of different materials including synthesis of ceramic oxides organic compounds and metallic ceramic composite powders

Environmental Mechanochemistry Matej Baláž, 2021-10-22 This book provides a comprehensive overview on mechanochemistry including its history high energy ball milling process equipment used and fundamentals behind the observed scientific phenomena It also shows that mechanochemistry is highly applicable in the field of waste treatment The text reviews 1017 studies utilizing mostly high energy ball milling for the treatment of various types of consumer technogenic and agricultural waste The text is divided into chapters based on individual waste types The book presents an Appendix compiling all studies arranged according to the application that the recycled waste is meant for In this way readers from both academia and companies interested either in the treatment of a particular waste or particular application might easily locate sections of interest

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