Combining Development of Solid Catalytic Materials - Design of High Throughput Experiments - Data Analysis - Catalytic Science - Imperial College Press

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Supported Metals in Catalysis - James Arthur Anderson 2012 With contributions from experts in supported metal catalysts, from both the industry and academia, this book presents the latest developments in characterization and application of supported metals in heterogeneous catalysis. In addition to a thorough and updated coverage of the traditional aspects of heterogeneous catalysis such as preparation, characterization, and use in well-established technologies such as Naphtha reforming, the book also includes emerging areas such as biomass conversion and the catalytic processing of bio-oil from thermochemical treatment processes. Gold, considered catalytically inactive for a long time, is now a fascinating partner of modern chemistry, as scientists such as Bond, Teles, Haruta, and Stetter have opened new perspectives for the whole synthetic chemist community. This book presents the major advances in homogeneous catalysis, emphasizing the methodologies that create carbon–carbon bonds. Contents:From Gold in Nature to Gold in the Laboratory; Research into the Properties of Gold; Gold as a Catalyst; New Perspectives in Gold-Catalyzed Reactions; Heterogeneous Gold Catalysts in Natural Product Synthesis (Michael R Geisemann and F Dean Toste) Readership: Graduate students and researchers in chemistry and chemical engineering.

Deactivation and Renewal of Zeolite Catalysts - M. Gainet 2011 In chemical processes, the progressive decrease of activity or selectivity of solid catalysts is considered as a problem in controlling their activity and selectivity. For these reasons, there is a strong motivation to understand the mechanisms of deactivation in real reactors and to develop methods for regenerating deactivated catalysts. Some deactivation and regenerative solutions that open the way towards cheaper and cleaner processes. This book covers in a comprehensive manner both the fundamental understanding of deactivation and the deactivation-reactivation mechanisms from the state-of-the-art in the field of reactions catalyzed by zeolites. This particular choice is justified by the widespread use of molecular sieves in refining, petrochemicals and organic chemical syntheses processes, by the large variety of the nature of their active sites (acid, base, acid-base, redox, bifunctional) and especially by their peculiar features, in terms of crystalinity, structural order and textural properties, which make them ideal models for studying the general trends in catalysis. The book is divided into three parts: in the first part, the factors that lead to deactivation and regeneration, by collecting a series of contributions by experts in the field which describe the factors, explain the mechanisms and describe the regeneration techniques, a truly interdisciplinary work; in the second part, written by industrial experts, the text presents a series of chapters containing important summaries of research in a rapidly evolving field. Very few books deal with the highly pertinent subject matter, and as such, it is a must-have for anyone working in the field of heterogeneous catalysis.

Hydroprocessing Catalysts And Processes: The Challenges For Biofuels Production - Simonet Jacques 2017-10-13 This book documents the latest developments in hydroprocessing catalysts and processes. The book includes a large amount of information about the consumption of hydroprocessing catalysts, and it is anticipated that the consumption of hydroprocessing catalysts will show a significant increase in the near future. Hydroprocessing catalysts and processes have a key role in the conversion of bio-based liquid and gaseous fuels from bio-feedstocks produced through agricultural, forest and marine waste. This book includes a common platform that connects the link between basic research and industrial applications. This book offers a large amount of information about the consumption of hydroprocessing catalysts, and it is anticipated that the consumption of hydroprocessing catalysts will show a significant increase in the near future.

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Noble Metal Noble Value-Kao-Feng Wu 2016-06-24 Heterocyclic chemistry constitutes the largest branch of chemical research among all organic chemistry, where the presence of heterocyclic structures in the fine and pharmaceutical industries is increasing. Heterocyclic chemistry is one of the most active areas of current research, and the development of new methodologies and tools is essential. The book is intended for researchers, chemists, and scientists working in the field of heterocyclic chemistry, as well as for students in the field of chemical sciences. It is a comprehensive guide to the latest advances in the field, providing an overview of the current state of research and the future directions in heterocyclic chemistry.

Combinatorial Catalysis and High Throughput Catalyst Design and Testing-F.G. Denton, 2004-12-06 High throughput methods have revolutionized the pharmaceutical industry, allowing researchers to conduct experiments in a parallel and high-throughput manner. This book provides an overview of the key concepts and principles that underpin high throughput experimentation and the role it plays in accelerating drug discovery. It covers the various techniques used in high throughput experimentation, including automation, robotics, and data analysis, and discusses the challenges and opportunities that this approach presents.

Soft Computing as Transdisciplinary Science and Technology-Ajit Abraham 2007-12-14 This book presents the proceedings of the Fourth International Workshop on Soft Computing as Transdisciplinary Science and Technology (WSTST '07), May 25-27, 2007, Muroran, Japan. It brings together the original work of international soft computing and computational intelligence researchers. The book is divided into two parts: the first part provides an overview of the current state of research in soft computing and computational intelligence, while the second part presents the various applications of soft computing in different areas, such as medicine, engineering, and finance.
Combinatorial Catalysis and High Throughput Catalyst Design and Testing

E.G. Derouane

This second volume in the two-volume set, Protective Thin Coatings and Functional Thin Films Technology, will benefit industry professionals and researchers working in areas related to semiconductors, optoelectronics, plasma technology, solid-state energy storages, and 5G, as well as advanced students studying electrical, mechanical, chemical, and materials engineering.

Catalysts are central in modern industrial chemistry and there is an urgent need to develop new catalysts. Such a rapid pace of development brings with it a new set of challenges at all levels of research, from synthesis and characterization to testing and modelling. This book reviews the current status of combinatorial catalysis, scientific catalyst design techniques, methods for preparing inorganic combinatorial libraries, experimental design methods, data processing, system modelling and simulation, and catalyst testing. The individual contributions reveal the development of high throughput catalyst design and test methods and identify the main challenges in the field, including new catalyst preparation techniques, rapid performance evaluation, and new microreactor configurations. Readership: All those working in catalytic process analysis and development. The extensive review of catalysis principles is especially relevant for postgraduate students seeking to pursue studies in catalysis.

Advances in Catalysis, Volume 46 builds foundations of fundamental understanding at the atomic and molecular scales in support of technologically important catalytic processes. The first two chapters forge links between molecular (homogeneous) catalysis and catalysis occurring analogously—and sometimes more successfully—on surfaces. The following three chapters are concerned with advances in classical surface catalysis building on concepts of reaction kinetics and surface characterization.


Polymeric Materials in Organic Synthesis and Catalysis

Michael R. Buchmeiser

This is the first book to describe the synthesis and characterization of the materials used in polymer-supported synthesis. The authors cover not only the classical polymers and their use in homogeneous, heterogeneous and micellar catalysis, but also such new developments as “enzyme-labile linkers”, illustrating how to simplify the purification process and avoid waste. The result is a wealth of useful information – for beginners and experts alike - in one handy reference, removing the need for difficult and time-consuming research among the literature.

Kinetics of Chemical Reactions

Guy B. Martin

This second, extended and updated edition presents the current state of kinetics of chemical reactions, combining basic knowledge with results recently obtained at the frontier of science. Special attention is paid to the problem of the chemical reaction complexity with theoretical and methodological concepts illustrated throughout by numerous examples taken from heterogeneous catalysis combustion and enzyme processes. Of great interest to graduate students in both chemistry and chemical engineering.

Beyond the Molecular Frontier

National Research Council

Chemistry and chemical engineering have changed significantly in the last decade. They have broadened their scope—into biology, nanotechnology, materials science, computation, and advanced methods of process systems engineering and controls—so much that the programs in most chemistry and chemical engineering departments now barely resemble the classical notion of chemistry. Beyond the Molecular Frontier brings together research, discovery, and invention across the entire spectrum of the chemical sciences—from fundamental, molecular-level chemistry to large-scale chemical processing technology. This reflects the way the field has evolved, the synergy at universities between research and education in chemistry and chemical engineering, and the way chemists and chemical engineers work together in industry. The astonishing developments in science and engineering during the 20th century have made it possible to dream of new goals that might previously have been considered unthinkable. This book identifies the key opportunities and challenges for the chemical sciences, from basic research to societal needs and from terrorism defense to environmental protection, and it looks at the ways in which chemists and chemical engineers can work together to contribute to an improved future.