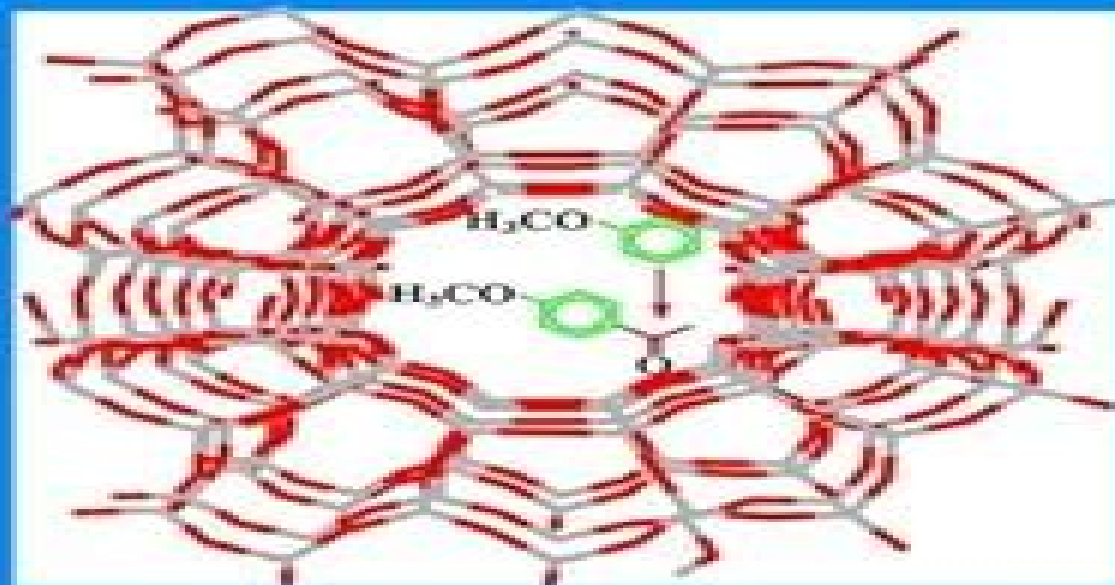


Fine Chemicals through Heterogeneous Catalysis

Edited by R. A. Sheldon, H. van Bekkum



Fine Chemicals Through Heterogenous Catalysis

Yuki Saito



Fine Chemicals Through Heterogeneous Catalysis:

Fine Chemicals through Heterogeneous Catalysis R. A. Sheldon, Herman van Bekkum, 2008-07-11 Nowadays the chemical industry is under increased pressure to develop cleaner production processes and technologies Much effort is devoted to the development of heterogeneous catalysts and their application in industrial scale organic synthesis This handbook concentrates on current attempts focusing on fine chemical production With contributions from an impressive array of international experts this is essential reading for everyone interested in the advances in this field *Heterogeneous Catalysis and Fine Chemicals III* J. Barbier, J. Barrault, C. Bouchoule, D. Duprez, C. Montassier, M. Guisnet, G. Pérot, 1993-09-09 Heterogeneous catalysis plays a major role in the organic synthesis of specialty and fine chemicals However as the interaction between surface sites and functional groups is complex more investigations are necessary into the effects of catalysts on the reaction mechanisms The Third International Symposium on Heterogeneous Catalysis and Fine Chemicals provided an opportunity for discussions on the basic and practical aspects of this subject between researchers manufacturers and users of solid catalysts for synthesis of fine chemicals The present volume comprises the invited plenary lectures and research papers classified under the three main headings hydrogenation oxidation and acid catalysis All papers were refereed A large variety of reactions are described the emphasis being on selectivity taking into account all aspects chemo regio and stereoselectivity including enantioselectivity and on the change of these selectivities as a function of the characteristics of the catalysts and operating conditions **Heterogeneous Catalysis and Fine Chemicals IV** H.U. Blaser, A. Baiker, R. Prins, 1997-06-19 After three meetings in Poitiers France the 4th International Symposium on Heterogeneous Catalysis and Fine Chemicals was held under the auspices of the New Swiss Chemical Society in Basel Switzerland Fundamental as well as applied contributions on the use of heterogeneous catalysis for the preparation of fine chemicals were presented and discussed The program consisted of 4 plenary lectures 28 oral contributions and around 90 posters covering a broad range of reactions and catalytic aspects 82 of these contributions are collected in the present proceedings grouped into the following 8 topical areas Industrial and engineering problems 7 contributions Alkylation and acylation reactions 11 contributions Enantio and diastereoselective hydrogenation reactions 9 contributions Chemoselective hydrogenation reactions 12 contributions Oxidation reactions 14 contributions Immobilized and encapsulated complex catalysts 12 contributions Zeolite and clay catalysts 12 contributions Miscellaneous topics 5 contributions *Heterogeneous Catalysis and Fine Chemicals* J. Barrault, C. Bouchoule, D. Duprez, C. Montassier, M. Guisnet, G. Pérot, 1988-08-01 The recession in the traditional heavy industries along with the development of advanced technologies in all the industrial countries has meant that the impact of heterogeneous catalysis in the synthesis of fine chemicals is becoming increasingly noticeable The first International Symposium on Heterogeneous Catalysis and Fine Chemicals is to be seen in this perspective Organised by the Laboratory of Catalysis in Organic Chemistry of the University of Poitiers within the framework

of the International Symposia of the Centre National de la Recherche Scientifique CNRS the symposium provided an opportunity for contact between academic researchers and manufacturers users or potential users of solid catalysts for fine chemical synthesis Two panels of industrial and academic researchers one on selective hydrogenation the other on selective synthesis of substituted aromatics showed that heterogeneous catalysis already plays a significant role in fine organic chemistry The main topics of the symposium were introduced in six plenary lectures and three invited communications maintaining a balance between the industrial and the academic points of view Some 60 research papers were submitted from which the Scientific Committee selected the 35 communications oral or poster which fitted most closely the theme of the symposium All are reproduced in full in this Proceedings volume

Heterogeneous Catalysis and Fine Chemicals II M. Guisnet, J. Barrault, C. Bouchoule, D. Duprez, G. Pérot, R. Maurel, C. Montassier, 1991-04-19 The recession in the traditional heavy industries along with the development of advanced technologies in all the industrial countries has meant that the impact of heterogeneous catalysis in the synthesis of fine chemicals is becoming increasingly noticeable The second International Symposium on Heterogeneous Catalysis and Fine Chemicals is to be seen in this perspective Organised by the Laboratory of Catalysis in Organic Chemistry of the University of Poitiers within the framework of the International Symposia of the Centre National de la Recherche Scientifique CNRS the symposium provided an opportunity for contact between academic researchers and manufacturers users or potential users of solid catalysts for fine chemical synthesis The book gives an overall view of the problems encountered by academic and industrial researchers A large variety of reactions are described the emphasis being on selectivity chemo regio stereoselectivity even enantioselectivity and on the change of these selectivities as a function of the characteristics of the surface sites nature distribution etc The three themes of the symposium hydrogenation oxidation and acid base catalysis were introduced in four plenary lectures and two invited communications maintaining a balance between the industrial and the academic points of view Some 60 research papers selected by the Scientific Committee were presented All are reproduced in full in this proceedings volume

Multistep Continuous Flow Synthesis of Fine Chemicals with Heterogeneous Catalysts Yuki Saito, 2022-11-30 This book describes the development of two kinds of continuous flow transformation using heterogeneous catalysts and explains how they can be applied in the multistep synthesis of active pharmaceutical ingredients It demonstrates and proves that fine chemicals can be synthesized under continuous flow conditions using heterogeneous catalysis alone Importantly the book also proposes a general concept and strategy for achieving multistep flow synthesis and developing heterogeneous catalysts and shows that commercially available anion exchange resin can be used as a water tolerant strong base catalyst for various types of continuous flow aldol type reaction Reviewing the state of the art in heterogeneous catalysis in flow chemistry a hot topic and rapidly developing area of organic synthesis the book will provide readers with a deeper understanding of fine chemical flow synthesis and its future prospects

Fine Chemicals Through Heterogeneous Catalysis Roger A. Sheldon, Herman van

Bekkum, 2001 Concentrating on the areas of fine chemicals production this handbook presents current attempts to combine fine chemicals synthesis with heterogeneous catalysis a new route to developing modern and clean synthetic methods

Introduction to Zeolite Science and Practice P.A. Jacobs, E.M. Flanigen, J.C. Jansen, Herman van Bekkum, 2001-06-26
In view of the substantial progress made in the last decade in the fields of zeolites and related materials it was decided to go for an extended 2nd Edition of Introduction to Zeolite Science and Practice Unfortunately as often is the case this process took more time than expected by the Editors In the mean time some new texts on zeolites were issued Nevertheless the combination of data discussion and dedication provided by the present book is a unique coverage of the field in the opinion of the Editors In the present Edition the number of chapters rose from 16 to 22 The contributions can be divided into three categories updated chapters by the original authors updated chapters by an expanded or new team of authors and completely new chapters This 2nd Edition also contains new chapters on Zeolite based supramolecular assemblies by Dirk De Vos and Pierre Jacobs experts in this area and on The use of bulky probe molecules by Paul Kunkeler Roger Downing and one of the Editors Finally the super large pore zeolites and the fast growing area of ordered mesoporous materials are dealt with by Eelco Vogt Charlie Kresge and Jim Vartuli The latter two authors belong to the discoverers of the M41S family of mesoporous materials

Fine Chemicals Manufacture A. Cybulski, 2001 The sector of fine chemicals including pharmaceuticals agrochemicals dyes and pigments fragrances and flavours intermediates and performance chemicals is growing fast For obvious reasons chemistry is a key to the success in developing new processes for fine chemicals However as a rule chemists formulate results of their work as recipes which usually lack important information for process development Fine Chemicals Manufacture Technology and Engineering is intended to show what is needed to make the recipe more useful for process development purposes and to transform the recipe into an industrial process that will be safe environmentally friendly and profitable The goal of this book is to form a bridge between chemists and specialists of all other branches involved in the scale up of new processes or modification of existing processes with both a minimum effort and risk and maximum profit when commercializing the process New techniques for scale up and optimization of existing processes and improvements in the utilization of process equipment that have been developed in recent years are presented in the book

Catalysis for Fine Chemicals Werner Bonrath, Jonathan Medlock, Marc-André Müller, Jan Schütz, 2024-06-04 A wide range of chemical products especially fine chemicals are important for a healthy and enjoyable modern life therefore efficient syntheses of these materials are essential Traditional stoichiometric processes need to be replaced by modern catalytic methods in the change to sustainable chemistry and the production of lower amounts of waste This book summarizes the wide variety of catalytic methods that have been developed and applied on an industrial scale in recent years to fulfill this goal The synthesis of compound classes such as pharmaceuticals agrochemicals flavoring and fragrance compounds as well as food additives such as vitamins exemplify the use of these modern catalytic methods in the modern chemical industry

Industrial Catalytic Processes for Fine and Specialty Chemicals Sunil S Joshi,Vivek V. Ranade,2016-04-12 Industrial Catalytic Processes for Fine and Specialty Chemicals provides a comprehensive methodology and state of the art toolbox for industrial catalysis The book begins by introducing the reader to the interesting challenging and important field of catalysis and catalytic processes The fundamentals of catalysis and catalytic processes are fully covered before delving into the important industrial applications of catalysis and catalytic processes with an emphasis on green and sustainable technologies Several case studies illustrate new and sustainable ways of designing catalysts and catalytic processes The intended audience of the book includes researchers in academia and industry as well as chemical engineers process development chemists and technologists working in chemical industries and industrial research laboratories Discusses the fundamentals of catalytic processes catalyst preparation and characterization and reaction engineering Outlines the homogeneous catalytic processes as they apply to specialty chemicals Introduces industrial catalysis and catalytic processes for fine chemicals Includes a number of case studies to demonstrate the various processes and methods for designing green catalysts

Heterogeneous Catalysis and Fine Chemicals II M. Guisnet,1991-01-01 The recession in the traditional heavy industries along with the development of advanced technologies in all the industrial countries has meant that the impact of heterogeneous catalysis in the synthesis of fine chemicals is becoming increasingly noticeable The second International Symposium on Heterogeneous Catalysis and Fine Chemicals is to be seen in this perspective Organised by the Laboratory of Catalysis in Organic Chemistry of the University of Poitiers within the framework of the International Symposia of the Centre National de la Recherche Scientifique CNRS the symposium provided an opportunity for contact between academic researchers and manufacturers users or potential users of solid catalysts for fine chemical synthesis The book gives an overall view of the problems encountered by academic and industrial researchers A large variety of reactions are described the emphasis being on selectivity chemo regio stereoselectivity even enantioselectivity and on the change of these selectivities as a function of the characteristics of the surface sites nature distribution etc The three themes of the symposium hydrogenation oxidation and acid base catalysis were introduced in four plenary lectures and two invited communications maintaining a balance between the industrial and the academic points of view Some 60 research papers selected by the Scientific Committee were presented All are reproduced in full in this proceedings volume

Heterogeneous Catalysis in Sustainable Synthesis Bela Torok,Christian Schaefer,Anne Kokel,2021-09-17 Heterogeneous Catalysis in Sustainable Synthesis is a practical guide to the use of solid catalysts in synthetic chemistry that focuses on environmentally benign applications Collating essential information on solid catalysts into a single volume it reveals how the efficient use of heterogeneous catalysts in synthetic chemistry can support sustainable applications Beginning with a review of the fundamentals of heterogeneous catalytic synthesis the book then explores the basic concepts of heterogeneous catalytic reactions from adsorption to catalyst poisons the use of non traditional activation methods

recommended solvents the major types of both metal and non metal solid catalysts and applications of these catalysts in sustainable synthesis Based on the extensive experience of its expert author this book aims to encourage and support synthetic chemists in using solid catalysts in their own work while also highlighting the important link between heterogeneous catalysis and sustainability to all those interested Combines foundational knowledge with a focus on practical applications Organizes information by reaction type allowing readers to easily find examples of how to carry out specific reaction types with solid catalysts Highlights emerging areas such as nanoparticle catalysis and metal organic framework MOF based catalysts

Green Chemistry and Catalysis R. A. Sheldon, Isabella Arends, Ulf Hanefeld, 2007-04-09 This first book to focus on catalytic processes from the viewpoint of green chemistry presents every important aspect Numerous catalytic reductions and oxidations methods Solid acid and solid base catalysis C C bond formation reactions Biocatalysis Asymmetric catalysis Novel reaction media like e g ionic liquids supercritical CO₂ Renewable raw materials Written by Roger A Sheldon without doubt one of the leaders in the field with much experience in academia and industry and his co workers the result is a unified whole an indispensable source for every scientist looking to improve catalytic reactions whether in the college or company lab

Heterogeneous Catalysis and Fine Chemicals IV (Volume 108)., 1997

Heterogenized Homogeneous Catalysts for Fine Chemicals Production Pierluigi Barbaro, Francesca Liguori, 2010-09-02 Table 1 E factors tonnes of waste generated per tonne of product manufactured 7 Industry segment Annual product tonnage E factor 6 8 Oil refining 10 10 Approx 0 1 4 6 Bulk chemicals 10 10

Zeolite Characterization and Catalysis Arthur W. Chester, E.G. Derouane, 2009-10-03 The idea for putting together a tutorial on zeolites came originally from my co editor Eric Derouane about 5 years ago I rst met Eric in the mid 1980s when he spent 2 years working for Mobil R D at our then Corporate lab at Princeton NJ He was on the senior technical staff with projects in the synthesis and characterization of new materials At that time I managed a group at our Paulsboro lab that was responsible for catalyst characterization in support of our catalyst and process development efforts and also had a substantial group working on new material synthesis Hence our interests overlapped considerably and we met regularly After Eric moved back to Namur initially we maintained contact and in the 1990s we met a number of times in Europe on projects of joint interest It was after I retired from ExxonMobil in 2002 that we began to discuss the tutorial concept seriously Eric had semi retired and lived on the Algarve the southern coast of Portugal In January 2003 my wife and I spent 3 weeks outside of Lagos and I worked parts of most days with Eric on the proposed content of the book We decided on a comprehensive approach that ultimately amounted to some 20 chapters covering all of zeolite chemistry and catalysis and gave it the title Zeolite Chemistry and Catalysis An integrated Approach and Tutorial

Catalytic Methods in Asymmetric Synthesis Michelangelo Gruttadauria, Francesco Giacalone, 2011-09-27 This book covers advances in the methods of catalytic asymmetric synthesis and their applications Coverage moves from new materials and technologies to homogeneous metal free catalysts and homogeneous metal catalysts The applications of several

methodologies for the synthesis of biologically active molecules are discussed Part I addresses recent advances in new materials and technologies such as supported catalysts supports self supported catalysts chiral ionic liquids supercritical fluids flow reactors and microwaves related to asymmetric catalysis Part II covers advances and milestones in organocatalytic enzymatic and metal based mediated asymmetric synthesis including applications for the synthesis of biologically active molecules Written by leading international experts this book consists of 16 chapters with 2000 References and illustrations of 560 schemes and figures

Heterogeneous Catalysis in Organic Transformations Varun Rawat, Anirban Das, Chandra Mohan Srivastava, 2022-04-26 As the broad challenges around energy and the environment have become the focus of much research scientists and experts have dedicated their efforts to developing more active and selective catalytic systems for key chemical transformations For many decades environmentally viable protocols for the synthesis of fine chemicals have been the crux of academic and industrial research *Heterogeneous Catalysis in Organic Transformations* serves as an overview of this work providing a complete description of role of heterogeneous catalysis in organic transformations and offering a review of the current and near future technologies and applications Discusses the fundamentals of catalysis and compares the advantages and disadvantages of different types of catalyst systems Examines oxide nanoparticles and noble metal nanoparticles Consider organometallic compounds solid supported catalysts and mesoporous materials Describes recent advances in metal based heterogeneous catalysts and new reactions with possible mechanistic pathways Providing a comprehensive review of heterogeneous catalysis from the basics through recent advances this book will be of keen interest to undergraduates graduates and researchers in chemistry chemical engineering and associated fields

Deactivation and Regeneration of Zeolite Catalysts M. Guisnet, F. Ramôa Ribeiro, 2011 In chemical processes the progressive deactivation of solid catalysts is a major economic concern and mastering their stability has become as essential as controlling their activity and selectivity For these reasons there is a strong motivation to understand the mechanisms leading to any loss in activity and or selectivity and to find out the efficient preventive measures and regenerative solutions that open the way towards cheaper and cleaner processes This book covers in a comprehensive way both the fundamental and applied aspects of solid catalyst deactivation and encompasses 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 chemicals synthesis processes by the large variety in the nature of their active sites acid base acid base redox bifunctional and especially by their peculiar features in terms of crystallinity structural order and textural properties which make them ideal models for heterogeneous catalysis The aim of this book is to be a critical review in the field of zeolite deactivation and regeneration by collecting a series of contributions by experts in the field which describe the factors explain the techniques to study the causes and suggest methods to prevent or limit catalyst deactivation At the same time an anthology of commercial processes and exemplar cases provides the reader with theoretical insights and practical

hints on the deactivation mechanisms and draws attention to the key role played by the loss of activity on process design and industrial practice

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