
Modern Heterogeneous Oxidation Catalysis Design Reactions And Characterization

Design, Reactions and Characterization

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Design, Reactions and Characterization Newnes

While rust is an unwanted oxidation reaction, there are also many other useful oxidation reactions that are extremely important and number among the most commonly used reactions in the chemical industry. This completely revised, updated second edition now includes additional sections on industrial oxidation

and biochemical oxidation. Edited by one of the world leaders in the field, high-quality contributions cover every important aspect from classical to green chemistry methods: - Recent Developments in Metal-catalyzed Dihydroxylation of Alkenes - Transition Metal-Catalyzed Epoxidation of Alkenes - Organocatalytic Oxidation. Ketone-Catalyzed Asymmetric Epoxidation of Alkenes and Synthetic Applications - Catalytic Oxidations with Hydrogen Peroxide in Fluorinated Alcohol Solvents - Modern Oxidation of Alcohols using Environmentally Benign Oxidants - Aerobic Oxidations and Related Reactions Catalyzed by N-Hydroxyphthalimide - Ruthenium-Catalyzed

Oxidation for Organic Synthesis - Selective Oxidation of Amines and Sulfides - Liquid Phase Oxidation Reactions Catalyzed by Polyoxometalates - Oxidation of Carbonyl Compounds - Manganese-Catalyzed Oxidation with Hydrogen Peroxide - Biooxidation with Cytochrome P450 Monooxygenases By providing an overview of this vast topic, the book represents an unparalleled aid for organic, catalytic and biochemists working in the field.

Heteropolyacids as Highly Efficient and Green Catalysts Applied in Organic Transformations John Wiley & Sons

Masakatsu Shibasaki, Motomu Kanai, Shigeki Matsunaga, and Naoya Kumagai: Multimetallic Multifunctional Catalysts for Asymmetric Reactions.- Takao Ikariya: Bifunctional transition metal-based molecular catalysts for asymmetric syntheses.- Chidambaram Gunanathan and David Milstein: Bond Activation by Metal-Ligand Cooperation: Design of "Green" Catalytic Reactions Based on Aromatization-De aromatization of Pincer Complexes.- Madeleine C. Warner, Charles P. Casey, and Jan-E. Bäckvall: Shvo's Catalyst in Hydrogen Transfer Reactions.- Noritaka Mizuno, Keigo Kamata, and Kazuya Yamaguchi: Liquid-Phase Selective Oxidation by Multimetallic Active Sites of Polyoxometalate-Based Molecular Catalysts.- Pingfan Li and Hisashi Yamamoto: Bifunctional Acid Catalysts for Organic Synthesis.- Jun-ichi Ito, Hisao Nishiyama: Bifunctional Phebox Complexes for Asymmetric Catalysis.

Homogeneous and Heterogeneous Catalysis John Wiley & Sons
Heteropolyacids as Highly Efficient and Green Catalysts Applied in Organic Transformations introduces heteropolyacids (HPAs) as promising candidates for use as green catalysts. This book

initially presents an overview of chemistry of HPAs, including the history of their discovery and applications, systematic classifications, solubility, coordination and binding chemistry, isomerization, stability, redox activity, acidic properties, basicity, skeleton structure, structure types, self-assembly, surface area, electrochemical behavior, methods of investigation, and characterization. Other sections present and compare the applications of HPAs as homogeneous and heterogeneous catalysts. The book provides readers with a basic-to-advanced range of knowledge on how useful and green HPAs can be used for use as catalysts in organic transformations and even the synthesis of complex organic molecules. Focuses on applications of HPAs as catalysts, but also includes basic information on HPAs to make it useful to those researchers and scientists whose activities are focused on biochemical analysis, electrochemistry, electrochemical devices, protection of corrosion, medicine and photo-catalyzed reactions Includes a subdivision devoted to HPA-catalyzed multicomponent reactions for the synthesis of some biologically active compounds via a double-green strategy Illustrates reactions with approximately 100 chemical reaction schemes to aid understanding

Principles, Tools and Industrial Examples John Wiley & Sons
Organized to enable students and synthetic chemists to understand and expand on aromatic reactions covered in foundation courses, the book offers a thorough and accessible mechanistic explanation of aromatic reactions involving arene compounds. • Surveys methods used for preparing arene compounds and their transformations • Connects reactivity and methodology with mechanism • Helps readers apply aromatic

reactions in a practical context by designing syntheses • Provides essential information about techniques used to determine reaction mechanisms

Design of Heterogeneous Catalysts John Wiley & Sons

Sets the stage for environmentally friendly industrial organic syntheses From basic principles to new and emerging industrial applications, this book offers comprehensive coverage of heterogeneous liquid-phase selective oxidation catalysis. It fully examines the synthesis, characterization, and application of catalytic materials for environmentally friendly organic syntheses. Readers will find coverage of all the important classes of catalysts, with an emphasis on their stability and reusability. *Liquid Phase Oxidation via Heterogeneous Catalysis* features contributions from an international team of leading chemists representing both industry and academia. The book begins with a chapter on environmentally benign oxidants and then covers: Selective oxidations catalyzed by TS-1 and other metal-substituted zeolites Selective catalytic oxidation over ordered nanoporous metallo-aluminophosphates Selective oxidations catalyzed by mesoporous metal-silicates Liquid phase oxidation of organic compounds by supported metal-based catalysts Selective liquid phase oxidations in the presence of supported polyoxometalates Selective oxidations catalyzed by supported metal complexes Liquid phase oxidation of organic compounds by metal-organic frameworks Heterogeneous photocatalysis for selective oxidations with molecular oxygen All the chapters dedicated to specific types of catalysts follow a similar organization and structure, making it easy to compare the advantages and disadvantages of different catalysts. The

final chapter examines the latest industrial applications, such as the production of catechol and hydroquinone, cyclohexanone oxime, and propylene oxide. With its unique focus on liquid phase heterogeneous oxidation catalysis, this book enables researchers in organic synthesis and oxidation catalysis to explore and develop promising new catalytic materials and synthetic routes for a broad range of industrial applications.

Liquid Phase Oxidation via Heterogeneous Catalysis John Wiley & Sons

Gathering together the widespread literature in the field, this monograph acts as a reference guide to this very important chemical reaction. Following an introduction, the book goes on to discuss methodology, before treating synthetic and industrial applications -- the latter being a new focus in this completely revised, updated and extended second edition. A must-have for organic, natural products and catalytic chemists, as well as those working in industry, or for lecturers in chemistry.

Sustainable Industrial Chemistry John Wiley & Sons

This indispensable two-volume handbook covers everything on this hot research field. The first part deals with the synthesis, modification, characterization and application of catalytic active zeolites, while the second focuses on such reaction types as cracking, hydrocracking, isomerization, reforming and other industrially important topics. Edited by a highly experienced and internationally renowned team with chapters written by the "Who's Who" of zeolite research.

Zeolites and Catalysis John Wiley & Sons

A valuable introduction to green oxidation for organic chemists interested in discovering new strategies and new reactions for

oxidative synthesis Green Oxidation in Organic Synthesis provides a comprehensive introduction and overview of chemical preparation by green oxidative processes, an entry point to the growing journal literature on green oxidation in organic synthesis. It discusses both experimental and theoretical approaches for the study of new catalysts and methods for catalytic oxidation and selective oxidation. The book highlights the discovery of new reactions and catalysts in recent years, discussing mechanistic insights into the green oxidative processes, as well as applications in organic synthesis with significant potential to have a major impact in academia and industry. Chapters are organized according to the functional groups generated in the reactions, presenting interesting achievements for functional group formation by green oxidative processes with O₂, H₂O₂, photocatalytic oxidation, electrochemical oxidation, and enzymatic oxidation. The mechanisms of these novel transformations clearly illustrated. Green Oxidation in Organic Synthesis will serve as an excellent reference for organic chemists interested in discovering new strategies for oxidative synthesis which address the priorities of green and sustainable chemistry.

Modern Oxidation Methods Academic Press

Heterogeneous catalysis plays a central role in the global energy paradigm, with practically all energy-related process relying on a catalyst at a certain point. The application of heterogeneous catalysts will be of paramount importance to achieve the transition towards low carbon and sustainable societies. This book provides an overview of the design, limitations and challenges of heterogeneous catalysts for energy applications. In

an attempt to cover a broad spectrum of scenarios, the book considers traditional processes linked to fossil fuels such as reforming and hydrocracking, as well as catalysis for sustainable energy applications such as hydrogen production, photocatalysis, biomass upgrading and conversion of CO₂ to clean fuels. Novel approaches in catalysts design are covered, including microchannel reactors and structured catalysts, catalytic membranes and ionic liquids. With contributions from leaders in the field, Heterogeneous Catalysis for Energy Applications will be an essential toolkit for chemists, physicists, chemical engineers and industrials working on energy.

Heterogeneous Catalytic Materials World Scientific Publishing Company

This book is devoted to the problems of oxidation chemical reactions and addresses bimodal reaction sequences. Chemical reactions of oxidation, occurring under certain conditions and in multicomponent systems are complex processes. The process of the oxidation essentially changes in the presence and contact of the solid substances with reactants. The role of solid substances and the appearance of this phenomenon in oxidation reaction are discussed. The reader will understand the "driving forces" of this phenomenon and apply it in practice. Written for chemists, physicists, biologists and engineers working in the domain of oxidation reactions. Key Selling Features: Covers the historical background, modern state of the art, and perspectives in investigations of the coupling between heterogeneous and homogeneous reactions Discusses the feasible pathways of the coupling of heterogeneous and homogeneous reactions in oxidation in man-made and natural chemical systems Addresses

the abundance, peculiarities and mechanisms of the bimodal reaction sequences in oxidation with dioxygen in recent decades Discusses the existence of the bimodal reaction sequences in chemical systems investigations in atmospheric chemistry and heterogeneous photocatalysis Presented in a simple concise style, accessible for both specialists and non-specialists
Innovative Catalysis in Organic Synthesis World Scientific
 Catalysts are required for a variety of applications and industrialists and academics are increasingly challenged to find cost effective and environmentally benign catalysts to use. This volume looks at modern approaches to catalysis and reviews the extensive literature on areas such as electrochemical promotion of catalysis, biodiesel-based metals on emission control devices, deoxygenation of fatty acids and transitioning rationally designed catalytic materials to real world catalysts produced on a commercial scale.

Characterization of Solid Materials and Heterogeneous Catalysts
 John Wiley & Sons

This book provides an unparalleled contemporary assessment of hydrocarbon chemistry – presenting basic concepts, current research, and future applications. • Comprehensive and updated review and discussion of the field of hydrocarbon chemistry • Includes literature coverage since the publication of the previous edition • Expands or adds coverage of: carboxylation, sustainable hydrocarbons, extraterrestrial hydrocarbons • Addresses a topic of special relevance in contemporary science, since hydrocarbons play a role as a possible replacement for coal, petroleum oil, and natural gas as well as their environmentally safe use • Reviews of prior edition: “...literature coverage is comprehensive and ideal

for quickly reviewing specific topics...of most value to industrial chemists...” (Angewandte Chemie) and “...useful for chemical engineers as well as engineers in the chemical and petrochemical industries.” (Petroleum Science and Technology)

Methods, Reactions, and Applications John Wiley & Sons

In recent years the need for sustainable process design and alternative reaction routes to reduce industry's impact on the environment has gained vital importance. The book begins with a general overview of new trends in designing industrial chemical processes which are environmentally friendly and economically feasible. Specific examples written by experts from industry cover the possibilities of running industrial chemical processes in a sustainable manner and provide an up-to-date insight into the main concerns, e.g., the use of renewable raw materials, the use of alternative energy sources in chemical processes, the design of intrinsically safe processes, microreactor and integrated reaction/ separation technologies, process intensification, waste reduction, new catalytic routes and/or solvent and process optimization.

Organic Synthesis and Industrial Applications John Wiley & Sons

The first handbook on this emerging field provides a comprehensive overview of transition metal-catalyzed coupling reactions in the presence of an oxidant. Following an introduction to the general concept and mechanism of this reaction class, the team of authors presents chapters on C-C cross-coupling reactions using organometallic partners, C-Heteroatom bond forming reactions via oxidative couplings, and C-H couplings via C-H activation. The text also covers such groundbreaking topics as recent achievements in the fields of C-C and C-X bond

formation reactions as well as C-H activation involving oxidative couplings. With its novel and concise approach towards important building blocks in organic chemistry and its focus on synthetic applications, this handbook is of great interest to all synthetic chemists in academia and industry alike.

Supported Metals in Catalysis John Wiley & Sons

Modern Heterogeneous Oxidation Catalysis Design, Reactions and Characterization John Wiley & Sons

Volume 29 VSP

With contributions from experts in supported metal catalysis, 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 where supported metal catalysis will make significant contributions in future developments, such as fuel cells and fine chemicals synthesis. The second edition of Supported Metals in Catalysis comes complete with new and updated chapters containing important summaries of research in a rapidly evolving field. Very few other books deal with this highly pertinent subject matter, and as such, it is a must-have for anyone working in the field of heterogeneous catalysis.

Purification of Laboratory Chemicals John Wiley & Sons

This two-volume book provides an overview of physical techniques used to characterize the structure of solid materials, on the one hand, and to investigate the reactivity of their surface,

on the other. Therefore this book is a must-have for anyone working in fields related to surface reactivity. Among the latter, and because of its most important industrial impact, catalysis has been used as the directing thread of the book. After the preface and a general introduction to physical techniques by M. Che and J.C. Védrine, two overviews on physical techniques are presented by G. Ertl and Sir J.M. Thomas for investigating model catalysts and porous catalysts, respectively. The book is organized into four parts: Molecular/Local Spectroscopies, Macroscopic Techniques, Characterization of the Fluid Phase (Gas and/ or Liquid), and Advanced Characterization. Each chapter focuses upon the following important themes: overview of the technique, most important parameters to interpret the experimental data, practical details, applications of the technique, particularly during chemical processes, with its advantages and disadvantages, conclusions.

An Introduction Elsevier

A best seller since 1966, Purification of Laboratory Chemicals keeps engineers, scientists, chemists, biochemists and students up to date with the purification of the chemical reagents with which they work, the processes for their purification, and guides readers on critical safety and hazards for the safe handling of chemicals and processes. The Seventh Edition is fully updated and provides expanded coverage of the latest commercially available chemical products and processing techniques, safety and hazards: over 200 pages of coverage of new commercially available chemicals since the previous edition. It will be accompanied by a CD-ROM database of all the substances in the book, fully searchable by chemical name, chemical group, CAS

registry number, Beilstein number, etc. * The only comprehensive chemical purification reference, a market leader since 1966, Amarego delivers essential information for research and industrial chemists, pharmacists and engineers: '... (it) will be the most commonly used reference book in any chemical or biochemical laboratory' (MDPI Journal) * An essential lab practice and procedures manual. Improves efficiency, results and safety by providing critical information for day-to-day lab and processing work. Improved, clear organization and new indexing delivers accurate, reliable information on processes and techniques of purification along with detailed physical properties. * The Sixth Edition has been reorganised and is fully indexed by CAS Registry Numbers; compounds are now grouped to make navigation easier; literature references for all substances and techniques have been added; ambiguous alternate names and cross references removed; new chemical products and processing techniques are covered; hazards and safety remain central to the book.

A Comprehensive View Elsevier

Written by one of the world's leading experts on the topic, this advanced textbook is the perfect introduction for newcomers to this exciting field. Concise and clear, the text focuses on such key aspects as kinetics, reaction mechanism and surface reactivity,

concentrating on the essentials. The author also covers various catalytic systems, catalysis by design, and activation-deactivation. A website with supplementary material offers additional figures, original material and references.

Advanced Design, Characterization, and Applications Elsevier C-H, C-O, C-C, and C-Heteroatom bond forming processes by using metal-ligand approaches for the synthesis of organic compounds of biological, pharmacological and organic nanotechnological utility are the key areas addressed in this book. Authored by a European team of leaders in the field, it brings together innovative approaches for a variety of catalysis reactions and processes frequently applied in organic synthesis into a handy reference work. It covers all major types of catalysis, including homogeneous, heterogeneous, and organocatalysis, as well as mechanistic and computational studies. Special attention is paid to the improvements in efficiency and sustainability of important catalytic processes, such as selective oxidations, hydrogenation, and cross-coupling reactions, and to their utilization in industry. The result is a valuable resource for advanced researchers in both academia and industry, as well as graduate students in organic chemistry aiming for chemo-, regio- or stereoselective synthesis of organic compounds by using novel catalytic systems.

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