

Fundamental and Applied Catalysis

Metal-Catalysed Reactions of Hydrocarbons

Geoffrey C. Bond

Metal Catalysed Reactions Of Hydrocarbons

Paul J. Dyson, Tilmann J. Geldbach



Metal Catalysed Reactions Of Hydrocarbons:

Metal-Catalysed Reactions of Hydrocarbons Geoffrey C. Bond, 2006-10-03 This unique book drawing on the author's lifetime experience critically evaluates the extensive literature on the field of Metal Catalysed Reactions of Hydrocarbons. Emphasis is placed on reaction mechanisms involving hydrogenation, hydrogenolysis, skeletal and positional isomerisation and exchange reactions. The motivation for fundamental research in heterogeneous catalysis is to identify the physicochemical characteristics of active centres for the reaction being studied to learn how these may be modified or manipulated to improve the desired behavior of the catalyst and to recognize and control those aspects of the catalyst's structure that limit its overall performance. By restricting the subject of the book to hydrocarbons, Bond has progressively developed the subject matter to include areas of importance both to researchers and to those working in the industry.

Metal-Catalysed Reactions of Hydrocarbons Geoffrey C. Bond, 2008-11-01 This unique book drawing on the author's lifetime experience critically evaluates the extensive literature on the field of Metal Catalysed Reactions of Hydrocarbons. Emphasis is placed on reaction mechanisms involving hydrogenation, hydrogenolysis, skeletal and positional isomerisation and exchange reactions. The motivation for fundamental research in heterogeneous catalysis is to identify the physicochemical characteristics of active centres for the reaction being studied to learn how these may be modified or manipulated to improve the desired behavior of the catalyst and to recognize and control those aspects of the catalyst's structure that limit its overall performance. By restricting the subject of the book to hydrocarbons, Bond has progressively developed the subject matter to include areas of importance both to researchers and to those working in the industry.

Base-Catalyzed Reactions of Hydrocarbons and Related Compounds Herman Pines, 2012-12-02 Base Catalyzed Reactions of Hydrocarbons and Related Compounds focuses on the use of bases as catalysts for the conversion of hydrocarbons and related compounds. In order to emphasize the broad scope of base catalyzed reactions, examples dealing with the conversion of non hydrocarbons are given. Comprised of 14 chapters, this book begins with a historical overview of base catalyzed conversions of hydrocarbons followed by a discussion on the isomerization of olefins, acetylenes and allenes as well as the dimerization and oligomerization of hydrocarbons. The reader is then introduced to a variety of reactions including those between aromatic hydrocarbons and olefins and between alkylpyridines and alkenylpyridines, homogeneous carbon-carbon addition reactions and reactions of aprotic solvents with olefins. Subsequent chapters explore carbon-carbon addition of olefins with miscellaneous compounds, addition of ammonia, amines and anilines to olefinic hydrocarbons, hydrogenation and oxygenation, dehydrogenation, aromatization and hydrogen transfer and dehydration of alcohols. This monograph will be of interest to chemists.

Metal Catalysed Reactions in Ionic Liquids Paul J. Dyson, Tilmann J. Geldbach, 2006-01-24 Metal Catalysed Reactions in Ionic Liquids is the first non edited book on the subject of metal catalyzed reactions in ionic liquids to cover the literature from its origins until early 2005. Following a general introduction to the field of biphasic multiphasic catalysis, the book moves on to describe the synthesis of the

functionalisation and fundamental properties of ionic liquids relevant to catalysis It then analyses the catalysed reactions according to their type encompassing hydrogenation hydroformylation oxidation C C coupling reactions metathesis dimerisation polymerisation and more Trends generalisations advantages and disadvantages of ionic liquids for specific reaction types are also examined as well as specific processes such as supported ionic liquid phase catalysis continuous processes using CO₂ extraction and nanoparticle catalysis Metal Catalysed Reactions in Ionic Liquids is of interest to those working in catalysis green chemistry in particular to advanced level undergraduate and graduate students and researchers in bi or multiphasic catalysis using ionic liquids Mechanisms In Heterogeneous Catalysis Rutger A Van Santen,2023-06-28

Heterogeneous catalysis has developed over the past two centuries as a technology driven by the needs of society and is part of Nobel Prize winning science This book describes the spectacular increase in molecular understanding of heterogenous catalytic reactions in important industrial processes Reaction mechanism and kinetics are discussed with a unique focus on their relation with the inorganic chemistry of the catalyst material An introductory chapter presents the development of catalysis science and catalyst discovery from a historical perspective Five chapters that form the thrust of the book are organized by type of reaction reactivity principles and mechanistic theories which provide the scientific basis to structure function relationships of catalyst performance Present day challenges to catalysis are sketched in a final chapter Written by one of the world s leading experts on the topic this definitive text is an essential reference for students researchers and engineers working in this multibillion dollar field **Supported Metals in Catalysis** James Arthur Anderson,2012 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 **March's Advanced Organic**

Chemistry Michael B. Smith,2020-02-19 The completely revised and updated definitive resource for students and professionals in organic chemistry The revised and updated 8th edition of March s Advanced Organic Chemistry Reactions Mechanisms and Structure explains the theories of organic chemistry with examples and reactions This book is the most comprehensive resource about organic chemistry available Readers are guided on the planning and execution of multi step synthetic reactions with detailed descriptions of all the reactions The opening chapters of March s Advanced Organic Chemistry 8th Edition deal with the structure of organic compounds and discuss important organic chemistry bonds

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The Oxidation of Hydrocarbons in the Liquid Phase N. M. Emanuel', 2013-11-19 Approx 424 pages

Catalysis. Volume 6 J. R. Anderson, M. Boudart, 2022-08-22 No detailed description available for CATALYSIS V 6 CATALYSIS E BOOK

Advances in Organometallic Chemistry Anthony F. Hill, Mark J. Fink, 2012-12-31 Almost all branches of chemistry and material science now interface with organometallic chemistry the study of compounds containing carbon metal bonds This widely acclaimed serial contains authoritative reviews that address all aspects of organometallic chemistry a field that has expanded enormously since the publication of Volume 1 in 1964 Contributions from leading authorities Informs and updates on all the latest developments in the field

Encyclopedia of Interfacial Chemistry, 2018-03-29 Encyclopedia of Interfacial Chemistry Surface Science and Electrochemistry Seven Volume Set summarizes current fundamental knowledge of interfacial chemistry bringing readers the latest developments in the field As the chemical and physical properties and processes at solid and liquid interfaces are the scientific basis of so many technologies which enhance our lives and create new opportunities its important to highlight how these technologies enable the design and optimization of functional materials for heterogeneous and electro catalysts in food production pollution control energy conversion and storage medical applications requiring biocompatibility drug delivery and more This book provides an interdisciplinary view that lies at the intersection of these fields Presents fundamental knowledge of interfacial chemistry surface science and electrochemistry and provides cutting edge research from academics and practitioners across various fields and global regions

Nonregular Nanosystems Yuri Shunin, Stefano Bellucci, Alytis Gruodis, Tamara Lobanova-Shunina, 2017-11-27 This book presents a systemic view of nanophenomena in terms of disordered condensed media with characteristics arising at various hierarchical levels from nanoagents nanoparticles through multiple technological interfaces to the creation of micro or mesostructures with essential nanodimensional effects These properties can be seen in various schemes for the functionalization of nanocarbon systems namely CNTs GNRs GNFs carbon based nanoaerogels nanofoams and so on where nonregularities characterize surface

nanointeractions and various nanointerconnects resulting in both predictable and unpredictable effects Beginning with nanosensing and finishing with other forms of functionalized nanomaterials these effects will define the prospective qualities of future consumer nanoproducts and nanodevices This book covers all aspects of nonregular nanosystems arising from the fundamental properties of disordered nanosized media from electronic structure surface nanophysics and allotropic forms of carbon such as graphene and fullerenes including defect characterization to spintronics and 3D device principles Nonregular Nanosystems will be of interest to students and specialists in various fields of nanotechnology and nanoscience experts on surface nanophysics and nanochemistry as well as managers dealing with marketing of nanoproducts and consumer behavior research

Heterogeneous Catalysis J. R. H. Ross, 2011-11-07 Julian R H Ross Advances in Transition-Metal Mediated Heterocyclic Synthesis Daniel Sole, Israel Fernandez, 2018-05-17 Advances in Transition Metal Mediated Heterocyclic Synthesis provides an overview of recent catalytic reactions involving transition metals to produce heterocyclic compounds The book is organized according to the type of transformation used to achieve the synthesis of the heterocyclic systems mainly aza and oxa heterocycles As such it covers recent applications on the synthesis of heterocycles also describing the details of the novel transformations in a didactic manner to motivate readers in search of new catalytic processes The editors have included state of the art strategies including transition metal reactions involving unsaturated systems reactions of allenes new gold I catalyzed reactions and Prins reaction Chapters highlight the versatility of organopalladium chemistry dealing with carbonylative transformations C H activation reactions coupling processes and the control of the ambiphilic character of organopalladium species Finally the book discusses new reactions leading to heterocycles based on C H activation processes catalyzed by other metals Rh Ru Co Written by an outstanding team of authors who are leading experts in organometallic chemistry and organic synthesis this book is a valuable resource not only for chemists mainly focused on synthesis but also for those interested in reaction mechanisms involving transition metals Helpfully organized by transformation type to stimulate the search for new synthetic processes Completely illustrated and written by global experts Includes thoughtfully selected strategies chosen by the editors to exemplify the state of the art of the subject including transition metal reactions involving unsaturated systems organopalladium chemistry and metal catalyzed C H activation

Stereochemistry of Catalytic Reactions on Metals M. Bartok, J. Czombos, K. Felföldi, L. Gera, Gy Göndös, Árpád Molnár, F. Notheisz, I. P?link?, Gy Wittman, A. G. Zsigmond, 1985-08-26 A survey of the stereochemistry of organic chemical reactions on metal catalysts Covers the steps preceding the surface reactions to promote an understanding of the catalytic reactions Presents the published results relating to the stereochemistry of the transformations of various organic compounds on metals

Catalysis John R. Anderson, Michel Boudart, 2013-11-11 For catalytic practitioners who are concerned with laboratory studies of reaction mechanisms as often as not catalyst deactivation is treated as a nuisance to be ignored or factored out of the experimental results However the engineer concerned with the design and operation of real catalysts

and processes cannot afford this luxury for him deactivation and the need for regeneration are inevitable facts of life which need to be treated as quantified design parameters The first chapter in this volume by Prof J B Butt deals with catalyst deactivation and regeneration as processes in their own right and shows how they are to be approached from kinetic and design points of view Catalytic olefin polymerization spans a very wide field in catalytic process chemistry and technology Processes of this sort range from the generation of high volume products such as polyethylene and polypropylene through more specialized commercial products to conversions that still remain laboratory curiosities The reaction chemistry is in detail often very complex However because of the insight provided by organometallic reaction chemistry many of the polymerization mechanisms are reasonably well understood and the way in which product stereospecificity may be obtained is also understood in considerable detail This highly complex subject is reviewed in detail in the second chapter of this volume by Prof I Pasquon and Dr G Giannini

Model Systems in Catalysis Robert Rioux, 2009-11-11 This book is an excellent compilation of cutting edge research in heterogeneous catalysis and related disciplines surface science organometallic catalysis and enzymatic catalysis In 23 chapters by noted experts the volume demonstrates varied approaches using model systems and their successes in understanding aspects of heterogeneous catalysis both metal and metal oxide based catalysis in extended single crystal and nanostructured catalytic materials To truly appreciate the astounding advances of modern heterogeneous catalysis let us first consider the subject from a historical perspective Heterogeneous catalysis had its beginnings in England and France with the work of scientists such as Humphrey Davy 1778 1829 Michael Faraday 1791 1867 and Paul Sabatier 1854 1941 Sabatier postulated that surface compounds similar to those familiar in bulk to chemists were the intermediate species leading to catalytic products Sabatier proposed for example that NiH moieties on a Ni surface were able to hydrogenate ethylene whereas NiH was not In the USA Irving Langmuir concluded just the opposite namely that chemisorbed surface species are chemically bound to surfaces and are unlike known molecules These chemisorbed species were the active participants in catalysis The equilibrium between gas phase molecules and adsorbed chemisorbed species yielding an adsorption isotherm produced a monolayer by simple site filling kinetics

Organic Reaction Mechanisms 1982 A. C. Knappe, W. E. Watts, 2008-04-30 The only book series to summarize the latest progress on organic reaction mechanisms Organic Reaction Mechanisms 1982 surveys the development in understanding of the main classes of organic reaction mechanisms reported in the primary scientific literature in 1982 The 18th annual volume in this highly successful series highlights mechanisms of stereospecific reactions Reviews are compiled by a team of experienced editors and authors allowing advanced undergraduates graduate students postdocs and chemists to rely on the volume's continuing quality of selection and presentation

Chemistry of Dehydrogenation Reactions and Its Applications Syed Shahabuddin, Rama Gaur, Nandini Mukherjee, 2024-02-21 The present book focuses on advancement in the application of heterogeneous catalytic materials for the dehydrogenative synthesis of valuable organic compounds from substrates such as

alcohols and simple aliphatic compounds Several heterogeneous transition metals based catalytic materials are explored for the synthesis of valuable chemicals for industrial applications The book provides insight into the application of state of the art technology for energy utilization and clean chemical synthesis Features Offers a wide overview of dehydrogenation catalytic chemistry catalyzed by transition metals and their compounds Helps design novel and more benign and uncomplicated protocols for the synthesis of valuable chemicals from readily available raw materials Provides deeper insight into the aspect of dehydrogenation reactions for clean chemical synthesis via a cascade process Summarizes new mechanistic details of dehydrogenation reactions experimental side development and applications of dehydrogenation techniques Explores alternative solutions for the assimilation and transportation of clean energy in the form of hydrogen energy utilization This book is aimed at graduate students and researchers in chemical engineering chemistry catalysis organic synthesis

pharmaceutical chemistry and petrochemistry **Chemistry and Technology of Lubricants** Roy M. Mortier, Malcolm F. Fox, Stefan Orszulik, 2011-04-14 Chemistry and Technology of Lubricants describes the chemistry and technology of base oils additives and applications of liquid lubricants This Third Edition reflects how the chemistry and technology of lubricants has developed since the First Edition was published in 1992 The acceleration of performance development in the past 35 years has been as significant as in the previous century Refinery processes have become more precise in defining the physical and chemical properties of higher quality mineral base oils New and existing additives have improved performance through enhanced understanding of their action Specification and testing of lubricants has become more focused and rigorous Chemistry and Technology of Lubricants is directed principally at those working in the lubricants industry as well as individuals working within academia seeking a chemist s viewpoint of lubrication It is also of value to engineers and technologists requiring a more fundamental understanding of the subject

The Top Books of the Year Metal Catalysed Reactions Of Hydrocarbons The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of top-selling books, exploring the captivating narratives that have enthralled audiences this year. Metal Catalysed Reactions Of Hydrocarbons : Colleen Hoover's "It Ends with Us" This touching tale of love, loss, and resilience has gripped readers with its raw and emotional exploration of domestic abuse. Hoover masterfully weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can succeed. Uncover the Best : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This spellbinding historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids absorbing storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic : Delia Owens "Where the Crawdads Sing" This evocative coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens crafts a tale of resilience, survival, and the transformative power of nature, entrancing readers with its evocative prose and mesmerizing setting. These popular novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of engaging stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a masterful and suspenseful novel that will keep you guessing until the very end. The novel is a warning tale about the dangers of obsession and the power of evil.

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