Cooperative Catalysis Designing Efficient Catalysts For Synthesis

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Written by experts in the field, this is a much-needed overview of the rapidly emerging field of cooperative catalysis. The authors focus on the design and development of novel high-performance catalysts for applications in organic synthesis (particularly asymmetric synthesis), covering a broad range of topics, from the latest progress in Lewis acid / Br?nsted base catalysis to e.g. metal-assisted organo catalysis, cooperative metal/enzyme catalysis, and cooperative catalysis in ...

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An Efficient Titanium Catalyst for Enantioselective Cyanation of Aldehydes: Cooperative Catalysis †. Dr. Zhipeng Zhang. State Key Laboratory of Organometallic Chemistry, Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences, 345 Lingling Road, Shanghai 200032 (P. R. China), Fax: (+86) 21?6416?6128.

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e . Cooperative Catalysis. 1. Definition. The term cooperative catalysis is used when “two catalysts and two catalytic cycles work in concert to create a single new bond”. In other words, a single chemical transformation is achieved by activating both the nucleophile and the electrophile by two different catalysts.

Cooperative Catalysis - ETH Z

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The rational design and construction of efficient electrocatalysts play a leading role for water splitting, but very rarely Pt-like activity has been obtained by non-noble metal catalysts. It is obvious that the cooperative coupling of non-noble metal catalysts could be regarded as a preferred alternative to Pt-based materials in hydrogen evolution reaction (HER).

CoP nanowires coupled with CoMoP nanosheets as a highly ...

cooperative catalysis designing efficient catalysts for cooperative catalysis designing efficient catalysts for synthesis rene peters ed written by experts in the field this is a much needed overview of the rapidly emerging field of cooperative catalysis the authors Cooperative Catalysis Of Nickel And Nickel Oxide For

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The series Topics in Organometallic Chemistry presents critical overviews of research results in organometallic chemistry. As our understanding of organometallic structure, properties and mechanisms increases, new ways are opened for the design of organometallic compounds and reactions tailored to the needs of such diverse areas as organic synthesis, medical research, biology and materials science. Thus the scope of coverage includes a broad range of topics of pure and applied organometallic chemistry, where new breakthroughs are being achieved that are of significance to a larger scientific audience. The individual volumes of Topics in Organometallic Chemistry are thematic. Review articles are generally invited by the volume editors. All chapters from Topics in Organometallic Chemistry are published OnlineFirst with an individual DOI. In references, Topics in Organometallic Chemistry is abbreviated as Top Organomet Chem and cited as a journal

The series Topics in Current Chemistry Collections presents critical reviews from the journal Topics in Current Chemistry organized in topical volumes. The scope of coverage is all areas of chemical science including the interfaces with related disciplines such as biology, medicine and materials science. The goal of each thematic volume is to give the non-specialist reader, whether in academia or industry, a comprehensive insight into an area where new research is emerging which is of interest to a larger scientific audience.Each review within the volume critically surveys one aspect of that topic and places it within the context of the volume as a whole. The most significant developments of the last 5 to 10 years are presented using selected examples to illustrate the principles discussed. The coverage is not intended to be an exhaustive summary of the field or include large quantities of data, but should rather be conceptual, concentrating on the methodological thinking that will allow the non-specialist reader to understand the information presented. Contributions also offer an outlook on potential future developments in the field.The chapter "Enamine/Transition Metal Combined Catalysis: Catalytic Transformations Involving Organometallic Electrophilic Intermediates" is available open access under a CC BY 4.0 License via link.springer.com.

Visible light is an abundant source of energy. While the conversion of light energy into electrical energy (photovoltaics) is highly developed and commercialized, the use of visible light in chemical synthesis is far less explored. Chemical photocatalysts that mimic principles of biological photosynthesis utilize visible light to drive endothermic or kinetically hindered reactions.

An expert overview of current research, applications, and economic and environmental advantages The study and development of new homogeneous catalysts based on first-row metals (Mn, Fe, Co, Ni, and Cu) has grown significantly due to the economic and environmental advantages that non-noble metals present. Base metals offer reduced cost, greater supply, and lower toxicity levels than noble metals?enabling greater opportunity for scientific investigation and increased development of practical applications. Non-Noble Metal Catalysis provides an authoritative survey of the field, from fundamental concepts and computational methods to industrial applications and reaction classes. Recognized experts in organometallic chemistry and homogeneous catalysis, the authors present a comprehensive overview of the conceptual and practical aspects of non-noble metal catalysts. Examination of topics including non-innocent ligands, proton-coupled electron transfer, and multi-nuclear complexes provide essential background information, while areas such as kinetic lability and lifetimes of intermediates reflect current research and shifting trends in the field. This timely book demonstrates the efficacy of base metal catalysts in the pharmaceutical, fine-chemical, and agrochemical industries, addressing both environmental and economic concerns. Providing essential conceptual and practical exploration, this valuable resource: -Illustrates how unravelling new reactivity patterns can lead to new catalysts and new applications -Highlights the multiple advantages of using non-noble metals in homogenous catalysis -Demonstrates how the availability of non-noble metal catalysis reduces costs and leads to immense savings for the chemical industry -Reveals how non-noble metal catalysis are more sustainable than noble metals such as palladium or platinum Non-Noble Metal Catalysis: Molecular Approaches and Reactions is an indispensable source of up-to-date information for catalytic chemists, organic chemists, industrial chemists, organometallic chemists, and those seeking to broaden their knowledge of catalytic chemistry.

This volume provides an insight into the future strategies for commercial biocatalysis with a focus on sustainable technologies, together with chemoenzymatic and biotechnological approaches to synthesize various types of approved and new active pharmaceutical ingredients (APIs) via proven and latest synthetic routes using single-step biocatalytic or enzyme cascade reactions. Many of these drugs act as enzyme inhibitors, as discussed in a chapter with a variety of examples. The targeted enzymes are involved in diseases such as different cancers, metastatic and infectious diseases, osteoporosis, and cardiovascular disorders. The biocatalysts employed for API synthesis include hydrolytic enzymes, alcohol dehydrogenases, laccases, imine reductases, reductive aminases, peroxygenases, cytochrome P450 enzymes, polyketide synthases, transaminases, and halogenases. Many of them have been improved with respect to their properties by engineering methods. The book discusses the syntheses of drugs, including alkaloids and antibiotics, non-ribosomal peptides, antimalarial and antidiabetic drugs, prenylated xanthones, antioxidants, and many important (chiral) intermediates required for the synthesis of pharmaceuticals.

This volume highlights the latest research in frustrated Lewis pair (FLP) chemistry and its applications. The contributions present the recent developments of the use of FLPs in asymmetric catalysis, polymer synthesis, homogeneous and heterogeneous catalysis, as well as demonstrating their use as a pedagogical tool. The book will be of interest to researchers in academia and industry alike.

Explore the latest advances involving organo/metal combined catalysts from leading contributors in the field In Asymmetric Organo-Metal Catalysis: Concepts, Principles, and Applications, accomplished chemist Liu-Zhu Gong delivers a comprehensive discussion of how to design efficient organo/metal combined catalyst systems, new cooperatively catalyzed asymmetric reactions, relay catalytic cascades, and multicomponent reactions. The distinguished author covers critical topics, like the combined catalysis of chiral phase transfer catalysts, enamine, iminium, nucleophilic Lewis base, or Bronsted acids with metal complexes, while also covering the cooperative catalysis of photocatalysts and organocatalysts. The book offers readers an exploration of the general concepts and principles of bond activation and reorganization, together with a comprehensive introduction to the historical developments and recent advances in the field. Readers will also benefit from the descriptions of new chemistry and new synthetic methods included within. Asymmetric Organo-Metal Catalysis also provides: Thorough introductions to chiral PTC-metal cooperative catalysis and enamine-metal cooperative catalysis Comprehensive explorations of iminum-metal relay catalysis and cooperative catalysis of bronsted acids and transition metals Practical discussions of metal-bronsted acid relay catalysis and Lewis base–Lewis acid cooperative catalysis In-depth examinations of Lewis base-transition metal cooperative catalysis and photocatalysis combined with organocatalysis Perfect for organic, catalytic, and pharmaceutical chemists, Asymmetric Organo-Metal Catalysis: Concepts, Principles, and Applications is also an invaluable resource for chemists working with or on organometallics.