1. Record Nr. UNINA9910132214703321

Titolo	Bridging heterogeneous and homogeneous catalysis : concepts, strategies, and applications / / edited by Can Li and Yan Liu
Pubbl/distr/stampa	Weinheim an der Bergstrasse, Germany : , : Wiley-VCH, , 2014 ©2014
ISBN	3-527-67592-2 3-527-67590-6 3-527-67593-0
Descrizione fisica	1 online resource (651 p.)
Disciplina	541.395
Soggetti	Heterogeneous catalysis - Data processing Catalysis - Industrial applications
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Bridging Heterogeneous and Homogeneous Catalysis; Contents; Preface; List of Contributors; Chapter 1 Acid-Base Cooperative Catalysis for Organic Reactions by Designed Solid Surfaces with Organofunctional Groups; 1.1 Introduction; 1.2 Bifunctional Catalysts Possessing Both Acidic and Basic Organic Groups; 1.2.1 Urea-Amine Bifunctional Catalyst; 1.2.2 Sulfonic or Carboxylic Acid-Amine Bifunctional Catalyst; 1.3 Bifunctional Catalysts Possessing Basic Organic Groups and Acid Sites Derived from Their Support Surface; 1.3.1 Organic Base-Catalyzed Reactions Enhanced by SiO2 1.3.2 Amine-Catalyzed Reactions Enhanced by Acid Site on Silica-Alumina1.3.3 Control of Acid-Base Interaction on Solid Surface; 1.3.4 Cooperative Catalysis of Acid Site, Primary Amine, and Tertiary Amine; 1.4 Prospect; References; Chapter 2 Catalytic Reactions in or by Room-Temperature Ionic Liquids: Bridging the Gap between Homogeneous and Heterogeneous Catalysis; 2.1 Introduction and Background; 2.2 Catalysis with IL-Supported or Mediated Metal Nanoparticles; 2.2.1 Preparation of MNPs in ILs; 2.2.1.1 IL Itself as the Reducing Agent; 2.2.1.2 Molecular Hydrogen as Reducing Agent

2.2.1.3 NaBH4 as the Reducing Agent2.2.1.4 Other Reducing Agents; 2.2.2 Characterization of IL-Supported or Mediated MNPs; 2.2.2.1 XPS and NMR; 2.2.2.2 SEM and TEM; 2.2.2.3 Molecular Dynamics Simulations; 2.2.3 Hydrogenation Reactions; 2.2.4 IL-Supported Pd NPs; 2.2.5 IL-Supported Pt and Ir NPs; 2.2.6 IL-Supported Ru NPs; 2.2.6.1 IL-Supported Rh NPs; 2.2.7 C-C Coupling Reactions; 2.2.7.1 Suzuki Reaction; 2.2.7.2 Mizoroki-Heck Reaction; 2.2.7.3 Stille Reaction; 2.2.7.4 Sonogashira Reaction; 2.2.7.5 Ullmann Reaction; 2.2.8 Brief Summary
2.3 Reactions Catalyzed by Solid-Supported IL: Heterogeneous Catalysis with Homogeneous Performance2.3.1 Introduction; 2.3.1.1 Design, Preparation, and Properties of Supported IL-Phase Catalysis; 2.3.2 Design, Preparation, and Properties of Silica Gel-Confined IL Catalysts; 2.3.2.1 Design, Preparation, and Properties of Covalently Supported IL Catalysts; 2.3.3 Catalytic Reaction with Supported IL Catalysts; 2.3.3.1 Catalytic Hydrogenation; 2.3.3.2 Selective Oxidation; 2.3.3.3 Catalytic Carbonylation Reaction; 2.3.3.4 Water-Gas Shift Reaction; 2.3.3.5 Isomerization and Oligomerization
2.3.3.6 Alkylation and Esterification Reactions2.3.3.7 Asymmetric Catalysis; 2.3.3.8 Enzyme Catalysis; 2.3.4 Brief Summary; 2.4 Outlook; References; Chapter 3 Heterogeneous Catalysis with Organic-Inorganic Hybrid Materials; 3.1 Introduction; 3.1.1 Ordered Mesoporous Silica; 3.1.2 Organic-Inorganic Hybrid Materials; 3.1.3 Heterogeneous Catalysis; 3.2 Organic-Inorganic Hybrid Materials; 3.2.1 General Advantages of Organic-Inorganic Hybrid Materials; 3.2.2 Grafting and Co-Condensation; 3.2.2.1 Amine Groups; 3.2.2.2 Ionic Liquids (ILs); 3.2.2.3 Others
3.2.3 Periodic Mesoporous Organosilicas (PMOs)

Sommario/riassunto

There are two main disciplines in catalysis research -- homogeneous and heterogeneous catalysis. This is due to the fact that the catalyst is either in the same phase (homogeneous catalysis) as the reaction being catalyzed or in a different phase (heterogeneous catalysis). Over the past decade, various approaches have been implemented to combine the advantages of homogeneous catalysis (efficiency, selectivity) with those of heterogeneous catalysis (stability, recovery) by the heterogenization of homogeneous catalysts or by carrying out homogeneous reactions under heterogeneous conditions.