

1. Record Nr.	UNINA9910830311903321
Titolo	Nanomaterials in catalysis [[electronic resource] /] / edited by Philippe Serp and Karine Philippot ; with a foreword by Gabor A. Somorjai and Bruno Chaudret
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, 2013
ISBN	3-527-65687-1 1-299-15718-1 3-527-65690-1 3-527-65689-8
Descrizione fisica	1 online resource (516 p.)
Altri autori (Persone)	SerpPhilippe PhilippotKarine
Disciplina	620.5
Soggetti	Catalysis Nanostructured materials
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 and index.
Nota di contenuto	Nanomaterials in Catalysis; Contents; Foreword; Preface; List of Contributors; 1 Concepts in Nanocatalysis; 1.1 Introduction; 1.2 The Impact of the Intrinsic Properties of Nanomaterials on Catalysis; 1.2.1 Metallic Nanoparticles; 1.2.2 Metal Oxide Nanoparticles; 1.2.3 Carbon Nanoparticles; 1.3 How can Nanocatalyst Properties be Tailored?; 1.3.1 Size, Shape and Surface Chemistry of Nanoparticles; 1.3.2 Assembling Strategies to Control Active Site Location; 1.4 Nanocatalysis: Applications in Chemical Industry; 1.4.1 Fuel Cells; 1.4.2 Nanostructured Exhaust Catalysts; 1.4.3 Gas Sensors 1.4.4 Photocatalysis1.4.5 Enantioselective Catalysis; 1.5 Conclusions and Perspectives; References; 2 Metallic Nanoparticles in Neat Water for Catalytic Applications; 2.1 Introduction; 2.2 Synthesis of Nanoparticles in Water: The State of The Art; 2.3 Water-Soluble Protective Agents and their use in Nanocatalysis; 2.3.1 Electrosteric Stabilization by Surfactants; 2.3.2 Steric Stabilization by Cyclodextrins; 2.3.2.1 Hydrogenation Reactions; 2.3.2.2 Carbon-Carbon Coupling Reactions; 2.3.3 Steric Stabilization by Polymers and Derivatives; 2.3.4 Steric

Stabilization by Ligands

2.4 Conclusion and PerspectivesReferences; 3 Catalysis by Dendrimer-Stabilized and Dendrimer-Encapsulated Late-Transition-Metal

Nanoparticles; 3.1 Introduction; 3.2 Synthesis; 3.3 Homogeneous Catalysis with DENs Generated from PAMAM and PPI Dendrimers; 3.3.1 Ole.n and Nitroarene Hydrogenation; 3.3.2 PdNP-Catalyzed Carbon-Carbon Cross Coupling; 3.3.3 Heterobimetallic Catalysts; 3.4 Highly Efficient 'click'-Dendrimer-Encapsulated and Stabilized Pd Nanoparticle Pre-Catalysts; 3.5 Heterogeneous Catalysis; 3.6 Electrocatalysis; 3.7 Conclusion and Outlook; References

4 Nanostructured Metal Particles for Catalysts and Energy-Related Materials4.1 General Survey; 4.2 Nanostructured Clusters and Colloids as Catalyst Precursors; 4.2.1 Selected Applications in Energy-Related

Processes; 4.2.1.1 Size-Selective Fischer-Tropsch Nanocatalysts;

4.2.1.2 Nanocatalysts for Fuel Cell Devices; 4.2.1.3 Partial Methane Oxidation with NO; 4.2.2 Nanocatalysts for Specific Organic Reactions;

4.3 Nanostructured Materials in Energy-Related Processes; 4.3.1 Nanomaterials for High-Performance Solar Cells; 4.3.2 Nanocomposites for Batteries

4.3.3 Applications for Energy and Hydrogen Storage4.3.3.1 Nano for Hydrogen Production; 4.3.3.2 Nano for Hydrogen Storage; 4.4

Characterization of Nanostructured Metallic Catalyst Precursors and their Interaction with Coatings and Supports Using X-ray Absorption Spectroscopy; 4.4.1 X-ray Absorption Spectroscopy (XANES and EXAFS)

as an Analytical Tool for Nanostructures; 4.4.2 The Electronic and Geometric Properties of Monometallic Systems; 4.4.3 The Geometric and Electronic Structure of Bimetallic Systems; 4.4.4 The Specific Interaction of Metallic Nanoparticles with Coatings and Supports

4.4.5 Resonant Elastic and Inelastic X-ray Scattering: Site and/or Valency Specific Spectroscopy

4.4.5 Resonant Elastic and Inelastic X-ray Scattering: Site and/or Valency Specific Spectroscopy

Sommario/riassunto

Edited by rising stars in the community, the team of prominent expert authors provides here authoritative first-hand information on the fundamental principles of nanomaterials, as well as their application in catalysis. As a result, the book defines the concepts of nanocatalysis and gives a comprehensive overview of the science of colloidal nanoparticles in particular. Chapters cover micelles, nanoparticles in ionic liquids, dendrimers, nanotubes, nanooxides as well as microreactors, modeling, and characterization of nanocatalysts. An indispensable reference for both researchers at unive
