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| Nota di contenuto | CARBON MATERIALS FOR CATALYSIS; Contents; Contributors; Preface; 1 Physicochemical Properties of Carbon Materials: A Brief Overview; 1.1. Introduction; 1.2. Formation of Carbons; 1.2.1. Gas Phase; 1.2.2. Liquid Phase; 1.2.3. Solid Phase; 1.3. Structure and Properties of Carbons; 1.3.1. Macrostructure; 1.3.2. Microstructure; 1.3.3. Nanostructure; 1.3.4. Bulk Properties; 1.3.5. Surface Properties; 1.4. Reactions of Carbons; 1.4.1. Gas Phase; 1.4.2. Liquid Phase; 1.4.3. Solid Phase; 1.5. Conclusions; References; 2 Surface Chemistry of Carbon Materials; 2.1. Introduction 2.2. Surface Functionalities2.2.1. Oxygen-Containing Functionalities; 2.2.2. Nitrogen-Containing Functionalities; 2.2.3. Hydrogen-Carbon Species; 2.2.4. Sulfur, Phosphorus, and Halogen Functionalities; 2.3. Surface Modifications; 2.3.1. Oxidation; 2.3.2. Introduction of Nitrogen-Containing Species; 2.3.3. Introduction of Sulfur Functionality; 2.3.4. Halogenization; 2.3.5. Impregnation and Dry Mixing; 2.3.6. Heat Treatment; 2.4. Characterization of Surface |

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2.4.4. Spectroscopic Methods 2.4.5. Calorimetric Techniques; 2.4.6. Inverse Gas Chromatography; 2.4.7. Temperature-Programmed Desorption; 2.4.8. Characterization of Surface Functionalities by Electrochemical Techniques; 2.5. Role of Surface Chemistry in the Reactive Adsorption on Activated Carbons; 2.6. Role of Carbon Surface Chemistry in Catalysis; References; 3 Molecular Simulations Applied to Adsorption on and Reaction with Carbon; 3.1. Introduction; 3.2. Molecular Simulation Methods Applied to Carbon Reactions; 3.2.1. Electronic Structure Methods (or Quantum Mechanics Methods) 3.2.2. Molecular Dynamics Simulations 3.2.3. Monte Carlo Simulations; 3.3. Hydrogen Adsorption on and Reaction with Carbon; 3.3.1. Atomic Hydrogen Adsorption on the Basal Plane of Graphite; 3.3.2. Reactivities of Graphite Edge Sites and Hydrogen Reactions on These Sites; 3.3.3. Hydrogen Storage in Carbon Nanotubes; 3.4. Carbon Reactions with Oxygen-Containing Gases; 3.4.1. Carbon Reactions with Oxygen-Containing Gases and the Unified Mechanism; 3.4.2. Catalyzed Gas-Carbon Reactions; 3.4.3. More Specific Studies on NO(x), H(2), CO(2), and O(2)-Carbon Reactions; 3.5. Metal-Carbon Interactions 3.6. Conclusions References; 4 Carbon as Catalyst Support; 4.1. Introduction; 4.2. Properties Affecting Carbon's Role as Catalyst Support; 4.2.1. Surface Area and Porosity; 4.2.2. Surface Chemical Properties; 4.2.3. Inertness; 4.3. Preparation of Carbon-Supported Catalysts; 4.3.1. Impregnation; 4.3.2. Other Methods; 4.4. Applications; 4.4.1. Ammonia Synthesis; 4.4.2. Hydrotreating Reactions; 4.4.3. Hydrogenation Reactions; 4.5. Summary; References; 5 Preparation of Carbon-Supported Metal Catalysts; 5.1. Introduction; 5.2. Impregnation and Adsorption
5.2.1. Interaction Between Support and Precursor

Sommario/riassunto

This is the first comprehensive book covering all aspects of the use of carbonaceous materials in heterogeneous catalysis. It covers the preparation and characterization of carbon supports and carbon-supported catalysts; carbon surface chemistry in catalysis; the description of catalytic, photo-catalytic, or electro-catalytic reactions, including the development of new carbon materials such as carbon xerogels, aerogels, or carbon nanotubes; and new carbon-based materials in catalytic or adsorption processes. This is a premier reference for carbon, inorganic, and physical chemists, materials sc
