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Nota di contenuto	Half Title; Title Page; Copyright; Contents; Introduction; Contributors; 1 Heterogeneous Photocatalysis: Basic Approaches and Terminology; 1.1 Introduction; 1.2 Photophysical Processes in Solid Photocatalysts and Photoinduced Molecular Transformations on Their Surface; 1.2.1 Absorption of Light By Solid Photocatalysts; 1.2.2 Quantities Describing Light Absorption Used in Heterogeneous Photocatalysis; 1.2.2.1 Absorbance, Reflectance, Transmittance, Linear Absorption Coefficient, Absorption Cross-Section; 1.2.2.2 Absorbance and Reflectance of Powders Used in Heterogeneous Photocatalysis 1.2.2.3 Intrinsic and Extrinsic Absorption of Solids 1.2.2.4 Intrinsic Low-Coordinated Surface States; 1.2.2.5 Intrinsic Structural Point Defects; 1.2.2.5.1 Defects Related to Oxygen Vacancies (Family of {V0}); 1.2.2.5.2 Defects Related to Cation Vacancies (Family of {VM}); 1.3 Photogeneration, Recombination, and Trapping of Charge Carriers in Photoactive Solids; 1.3.1 Diffusion and Drift of Charge Carriers; 1.3.2 Trapping of Carriers by Defects; 1.3.3 Stationary Concentration of Photocarriers and Band-To-Band Recombination; 1.3.4 Recombination of Carriers Via Defects 1.3.5 Trapping of Carriers With Formation of Centers Similar to Color Centers 1.3.6 Lifetime and Concentration of the Free Charge Carriers;

1.4 Impact of Catalysis on Photocatalysis; 1.5 Impact of Photochemistry on Photocatalysis; 1.6 Concluding Remarks and Notes; References; 2 Light Activated Processes with Zeolites: Recent Developments; 2.1 Introduction; 2.2 Organic Photochemistry within Zeolites; 2.3 Zeolite-Based Quantum Dot (QD) Materials Relevant to Solar Energy Applications; 2.4 Photocatalysis Facilitated by Zeolite; 2.5 Environmental Photochemistry with Zeolites
2.6 Novel Optical Materials Using Zeolites References; 3 Photocatalysts for Solar Energy Conversion; 3.1 Introduction; 3.2 CO2 Photoconversion Into Light Hydrocarbons; 3.3 Hydrogen Production by Water Splitting; 3.3.1 Two-Step Systems; 3.3.2 One-Step Systems; 3.3.3 Noble Metal Doping; 3.3.4 Transition Metal Ion Doping; 3.3.5 Anion Doping; 3.3.6 Alkaline-Earth Titanate Based Compounds; 3.3.7 Composite Photocatalysts; 3.3.8 Non-TiO2 Photocatalysts; 3.3.9 The Role of Sacrificial Agents and Carbonate Salts; 3.3.10 Photoelectrochemical Water Splitting; 3.4 Hydrogen Production by Biomass Conversion
3.5 Hydrogen Production by Glycerol Conversion 3.6 Conclusions; References; 4 Solar Energy Conversion Using Single-site Photocatalysts; 4.1 Introduction; 4.2 Characterizations and Photocatalytic Reactions on Single-Site Ti4+-Containing Catalysts; 4.2.1 Single-Site Ti4+-Containing Mesoporous Silica; 4.2.2 Photocatalytic Reduction of CO2 With H2O; 4.2.3 Effect of Hydrophilic-Hydrophobic Natures; 4.2.4 Photocatalytic Reduction of NO; 4.3 Characterizations and Photocatalytic Reactions on Single-Site Cr6+-Containing Catalysts; 4.3.1 Single-Site Cr6+-Containing Mesoporous Silica
4.3.2 Photocatalytic Performances of Single-Site Cr6+-Containing Catalyst

Sommario/riassunto

New and Future Developments in Catalysis is a package of seven books that compile the latest ideas concerning alternate and renewable energy sources and the role that catalysis plays in converting new renewable feedstock into biofuels and biochemicals. Both homogeneous and heterogeneous catalysts and catalytic processes will be discussed in a unified and comprehensive approach. There will be extensive cross-referencing within all volumes. The use of solar energy during various catalytic chemical processes for the production of an array of chemical products is the theme of this volume.