1. Record Nr. UNINA9910827012603321

Autore	Likhtenshtein Gertz
Titolo	Solar energy conversion : chemical aspects / / Gertz Likhtenshtein
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, 2012
ISBN	1-280-66350-2 9786613640437 3-527-64766-X 3-527-64769-4
Edizione	[1st ed.]
Descrizione fisica	1 online resource (285 p.)
Disciplina	621.47 621.475
Soggetti	Solar energy Energy conversion
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	Solar Energy Conversion: Chemical Aspects; Contents; Preface; 1 Electron Transfer Theories; 1.1 Introduction; 1.2 Theoretical Models; 1.2.1 Basic Two States Models; 1.2.1.1 Landau-Zener Model; 1.2.1.2 Marcus Model; 1.2.1.3 Electronic and Nuclear Quantum Mechanical Effects; 1.2.2 Further Developments in the Marcus Model; 1.2.2.1 Electron Coupling; 1.2.2.2 Driving Force and Reorganization Energy; 1.2.3 Zusman Model and its Development; 1.2.4 Effect of Nonequilibrity on Driving Force and Reorganization; 1.2.5 Long-Range Electron Transfer; 1.2.6 Spin Effects on Charge Separation 1.2.7 Electron-Proton Transfer Coupling1.2.8 Specificity of Electrochemical Electron Transfer; 1.3 Concerted and Multielectron Processes; References; 2 Principal Stages of Photosynthetic Light Energy Conversion; 2.1 Introduction; 2.2 Light-Harvesting Antennas; 2.2.1 General; 2.2.2 Bacterial Antenna Complex Proteins; 2.2.2.1 The Structure of the Light-Harvesting Complex; 2.2.2.2 Dynamic Processes in LHC; 2.2.3 Photosystems I and II Harvesting Antennas; 2.3 Reaction Center of Photosynthetic Bacteria; 2.3.1 Introduction; 2.3.2 Structure of RCPB 2.3.3 Kinetics and Mechanism of Electron Transfer in RCPB2.3.4

Electron Transfer and Molecular Dynamics in RCPB; 2.4 Reaction Centers of Photosystems I and II; 2.4.1 Reaction Centers of PS I; 2.4.2 Reaction Center of Photosystem II; 2.5 Water Oxidation System; References; 3 Photochemical Systems of the Light Energy Conversion; 3.1 Introduction; 3.2 Charge Separation in Donor-Acceptor Pairs; 3.2.1 Introduction; 3.2.2 Cyclic Tetrapyrroles; 3.2.3 Miscellaneous Donor-Acceptor Systems; 3.2.4 Photophysical and Photochemical Processes in Dual Fluorophore-Nitroxide Molecules (FNO); 3.2.4.1 System 1
3.2.4.2 Systems 23.3 Electron Flow through Proteins; 3.3.1 Factors Affecting Light Energy Conversion in Dual Fluorophore-Nitroxide Molecules in a Protein; 3.3.2 Photoinduced Interlayer Electron Transfer in Lipid Films; References; 4 Redox Processes on Surface of Semiconductors and Metals; 4.1 Redox Processes on Semiconductors; 4.1.1 Introduction; 4.1.2 Interfacial Electron Transfer Dynamics in Sensitized TiO2; 4.1.3 Electron Transfer in Miscellaneous Semiconductors; 4.1.3.1 Single-Molecule Interfacial Electron Transfer in Donor-Bridge-Nanoparticle Acceptor Complexes
4.1.4 Redox Processes on Carbon Materials4.2 Redox Processes on Metal Surfaces; 4.3 Electron Transfer in Miscellaneous Systems; References; 5 Dye-Sensitized Solar Cells I; 5.1 General Information on Solar Cells; 5.2 Dye-Sensitized Solar Cells; 5.2.1 General; 5.2.2 Primary Gratzel DSSC; 5.3 DSSC Components; 5.3.1 Sensitizers; 5.3.1.1 Ruthenium Complexes; 5.3.1.2 Metalloporphyrins; 5.3.1.3 Organic Dyes; 5.3.1.4 Semiconductor Sensitizes; 5.3.2 Photoanode; 5.3.3 Injection and Recombination; 5.3.4 Charge Carrier Systems; 5.3.5 Cathode; 5.3.6 Solid-State DSSC; References
6 Dye-Sensitized Solar Cells II

Sommario/riassunto

Finally filling a gap in the literature for a text that also adopts the chemist?s view of this hot topic, Prof Likhtenshtein, an experienced author and internationally renowned scientist, considers different physical and engineering aspects in solar energy conversion. From theory to real-life systems, he shows exactly which chemical reactions take place when converting light energy, providing an overview of the chemical perspective from fundamentals to molecular harvesting systems and solar cells. This essential guide will thus help researchers in academia and industry better understa