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Nota di contenuto	Cover; Contents; Preface; Table of Boxes; Chapter 1 The Electronic Structure of Organic Semiconductors; 1.1 Introduction; 1.1.1 What Are "Organic Semiconductors"?; 1.1.2 Historical Context; 1.2 Different Organic Semiconductor Materials; 1.2.1 Molecular Crystals; 1.2.2 Amorphous Molecular Films; 1.2.3 Polymer Films; 1.2.4 Further Related Compounds; 1.2.5 A Comment on Synthetic Approaches; 1.3 Electronic States of a Molecule; 1.3.1 Atomic Orbitals in Carbon; 1.3.2 From Atomic Orbitals to Molecular Orbitals; 1.3.3 From Orbitals to States; 1.3.4 Singlet and Triplet States 1.4 Transitions between Molecular States 1.4.1 The Potential Energy Curve; 1.4.2 Radiative Transitions: Absorption and Emission; 1.4.2.1 The Electronic Factor; 1.4.2.2 The Vibrational Factor; 1.4.2.3 The Spin Factor; 1.4.3 A Classical Picture of Light Absorption; 1.4.3.1 The Lorentz Oscillator Model and the Complex Refractive Index; 1.4.3.2 Relating Experimental and Quantum Mechanical Quantities: The Einstein Coefficients, the Strickler-Berg Expression, and the Oscillator Strength; 1.4.4 Non-Radiative Transitions: Internal Conversion and Intersystem Crossing 1.4.4.1 The Franck-Condon Factor F and the Energy Gap Law 1.4.4.2

The Electronic Coupling J; 1.4.4.3 Accepting Modes, Promoting Modes, and the Isotope Rule; 1.4.4.4 Implications of the Energy Gap Law; 1.4.4.5 The Strong Coupling Limit; 1.4.5 Basic Photophysical Parameters: Lifetimes and Quantum Yields; 1.5 Spectroscopic Methods; 1.5.1 Photoluminescence Spectra, Lifetimes, and Quantum Yields; 1.5.1.1 Steady State Spectra and Quantum Yields; 1.5.1.2 Spectra and Lifetimes in the Nanosecond to Second Range; 1.5.1.3 Spectra and Lifetimes in the Picosecond to Nanosecond Range; 1.5.1.4 Spectra and Time Scales below the Picosecond Range; 1.5.2 Excited State Absorption Spectra; 1.5.2.1 Steady State Spectra (Photoinduced Absorption); 1.5.2.2 Spectra in the Nanosecond Range (Flash Photolysis); 1.5.2.3 Spectra in the Femtosecond Range (fs Pump-Probe Measurements); 1.5.3 Fluorescence Excitation Spectroscopy; 1.6 Further Reading; References; Chapter 2 Charges and Excited States in Organic Semiconductors; 2.1 Excited Molecules from the Gas Phase to the Amorphous Film; 2.1.1 Effects due to Polarization; 2.1.2 Effects due to Statistical Averaging; 2.1.3 Effects due to Environmental Dynamics; 2.1.4 Effects due to Electronic Coupling between Identical Molecules - Dimers and Excimers; 2.1.4.1 Electronic Interaction in the Ground State; 2.1.4.2 Electronic Interaction in the Excited State; 2.1.4.3 Oscillator Strength of Dimer and Excimer Transitions; 2.1.4.4 Singlet and Triplet Dimers/Excimers; 2.1.5 Effects due to Electronic Coupling between Dissimilar Molecules - Complexes and Exciplexes; 2.1.6 Electromers and Electroplexes; 2.2 Excited Molecules in Crystalline Phases - The Frenkel Exciton; 2.2.1 The Frenkel Exciton Concept for One Molecule per Unit Cell

Sommario/riassunto

Anna Koehler has been Professor and Chair of Experimental Physics II at the University of Bayreuth since 2007. After completing her PhD 1996 with Sir Richard Friend at the University of Cambridge, UK, she held Research Fellowships by Peterhouse, Cambridge, and by the Royal Society, UK. She was appointed Professor at the University of Potsdam, Germany, in 2003. Her research centres on the photophysical properties of organic semiconductors, with a focus on energy and charge transfer processes in singlet and triplet excited states. Heinz Baessler is retired Professor at the Bayreuth Institute of
