1. Record Nr. UNINA9910140281403321

Titolo	Organic photovoltaics : materials, device physics, and manufacturing technologies / / edited by Christoph Brabec, Ullrich Scherf, and Vladimir Dyakonov ; Dechan Angmo [and fifty four others], contributors
Pubbl/distr/stampa	Weinheim, Germany : , : Wiley-VCH, , 2014 ©2014
ISBN	3-527-65693-6 3-527-65691-X 3-527-65694-4
Edizione	[Second edition.]
Descrizione fisica	1 online resource (638 p.)
Altri autori (Persone)	BrabecChristoph ScherfUllrich DyakonovVladimir AngmoDechan
Disciplina	621.31244
Soggetti	Photovoltaic cells Organic semiconductors Photovoltaic power generation
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 at the end of each chapters and index.
Nota di contenuto	Organic Photovoltaics: Materials, Device Physics, and Manufacturing Technologies; Contents; List of Contributors; Part One: Materials for Thin Film Organic Photovoltaics; 1 Overview of Polymer and Copolymer Materials for Organic Photovoltaics; 1.1 Introduction; 1.2 Early Efforts; 1.3 Toward Devices with 5% Efficiencies; 1.4 Novel Thiophene-Containing Polymers; 1.5 Fluorene-Containing Molecules; 1.6 Carbazole-Based Copolymers; 1.7 New Heterocyclic Polymers; 1.8 Polymers Based on Other Types of Building Blocks; 1.9 Conclusions; References 2 Thiophene-Based High-Performance Donor Polymers for Organic Solar Cells2.1 Introduction; 2.2 Bandgap Engineering; 2.3 Charge Generation in Bulk Heterojunction Organic Solar Cells; 2.4 Polyalkylthiophenes; 2.4.1 Synthesis; 2.4.2 Optical and Solid-State

Properties; 2.5 Polyalkylthiophene/PCBM Blends; 2.6 Polythiophene Copolymers; 2.7 Side Chain Functionalized P3AT Derivatives; 2.8 Third-Generation Polythiophenes; 2.9 Thiophene-Based Push-Pull Copolymers; 2.10 Benzo[1,2-b:4,5-b0]dithiophene-Based Polymers; 2.11 Cyclopenta[2,1-b:3,4-b0]dithiophene-Based Polymers
2.12 Indacenodithiophene-Based Polymers2.13 Conclusion and Outlook; References; 3 Molecular Design of Conjugated Polymers for High-Efficiency Solar Cells; 3.1 Introduction; 3.2 Structural Features of Conjugated Polymers; 3.3 "D-A" Approach; 3.3.1 Rational Design of Conjugated Backbones: "Weak Donor-Strong Acceptor" Copolymer; 3.3.1.1 "Weak Donor" Moieties to Improve VOC; 3.3.1.2 Balancing VOC and JSC: Interplay of Bandgap and Energy Levels; 3.3.1.3 From BT to 4DTBT: Why is a "Soluble Acceptor" Better?; 3.3.1.4 "Strong Acceptor" Moieties to Increase JSC; 3.3.2 Side Chains Are NOT Trivial
3.3.2.1 Chain Positions3.3.2.2 Shape and Size; 3.3.3 Substituents Do Matter: The Curious Case of Fluorine; 3.4 Quinoid Approach; 3.5 Summary and Outlook; References; 4 Solution-Processed Molecular Bulk Heterojunction Solar Cells; 4.1 Introduction; 4.2 Monochromophoric Molecules; 4.2.1 Conjugated Macrocycles and Polycycles; 4.2.2 Acenes and Heteroacenes; 4.2.3 Oligothiophenes; 4.3 Multichromophoric Molecules; 4.3.1 Colorant Chromophore-Containing Derivatives; 4.3.1.1 Diketopyrrolopyrrole and Isoindigo Derivatives; 4.3.1.2 Squaraine Derivatives
4.3.1.3 Merocyanine and Borondipyrromethene Derivatives4.3.2 Oligothiophene Derivatives; 4.3.3 Benzothiadiazole Analogue Derivatives; 4.3.4 Triphenylamine Derivatives; 4.4 Summary and Future Directions; References; 5 Vacuum-Processed Donor Materials for Organic Photovoltaics; 5.1 Introduction; 5.1.1 Basic Characterization of Organic Solar Cells; 5.2 Planar and Bulk Heterojunction Solar Cells; 5.3 Summary and Future Prospects; Acknowledgments; References; 6 Polymer-Nanocrystal Hybrid Solar Cells; 6.1 Introduction; 6.2 Semiconductor Nanocrystals; 6.3 Working Principles and Device Structure
6.3.1 Donor and Acceptor Materials

Sommario/riassunto

The versatility of organic photovoltaics is already well known and this completely revised,updated, and enlarged edition of a classic provides an up-to-date overview of this hottopic.The proven structure of the successful first edition, divided into the three key aspectsof successful device design: materials, device physics, and manufacturing technologies,has been retained. Important aspects such as printing technologies, substrates, and electrodesystems are covered. The result is a balanced, comprehensive text on the fundamentalsas well as th