

MATERIALS SCIENCE

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# Organic Photovoltaics

Concepts  
and Realization



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# Organic Photovoltaics Concepts And Realization Springer Series In Materials Science

**DP Hallahan**



## **Organic Photovoltaics Concepts And Realization Springer Series In Materials Science:**

**Organic Photovoltaics** Christoph Joseph Brabec, Vladimir Dyakonov, Jürgen Parisi, Niyazi Serdar Sariciftci, 2003-04-23  
The present volume describes and explains the fundamentals of organic plastic solar cells in a manner accessible to both researchers and students. It provides an up to date and comprehensive account of these materials and corresponding devices which will play a key role in future solar energy systems.

**Organic Photovoltaics** Christoph Joseph Brabec, Vladimir Dyakonov, Jürgen Parisi, Niyazi Serdar Sariciftci, 2013-11-21  
The present volume describes and explains the fundamentals of organic plastic solar cells in a manner accessible to both researchers and students. It provides an up to date and comprehensive account of these materials and corresponding devices which will play a key role in future solar energy systems.

**Springer Handbook of Electronic and Photonic Materials** Safa Kasap, Peter Capper, 2007-08-01  
Electronic materials is a truly interdisciplinary subject that encompasses a number of traditional disciplines such as materials science, electrical engineering, chemical engineering, mechanical engineering, physics, and chemistry. This unique handbook provides broad coverage of a wide range of electronic and photonic materials, starting from fundamentals and building up to advanced topics and applications. Its wide coverage, with clear illustrations and applications, and its chapter sequencing and logical flow make this a very useful and useable handbook. Each chapter has been prepared either by expert researchers or instructors who have been teaching the subject at a university or in corporate laboratories. Unlike other handbooks that concentrate on a narrow field and have chapters that start at an advanced level, the present handbook starts at a senior undergraduate level and builds up the subject matter in easy steps and in a logical flow. Wherever possible, the sections are logically sequenced to allow those who need a quick overview of a particular topic immediate access to it. Additional valuable features include the practical applications used as examples, details on experimental techniques, useful tables that summarize equations and most importantly, properties of various materials. Each chapter is full of clear color illustrations that convey the concepts and make the subject matter enjoyable to read and understand. An extensive glossary aids readers from adjacent fields. The Handbook constitutes an essential reference for today's electrical engineers, materials scientists, and physicists.

**Advances in Solar Energy** D. Yogi Goswami, 2015-12-08  
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**SiC Power Materials** Zhe Chuan Feng, 2013-03-14 In the 1950s Shockley predicted that SiC would quickly replace Si as a result of its superior material properties In many ways he was right and today there is an active industry based on SiC with new achievements being reported every year This book reviews the progress achieved in SiC research and development particularly over the past 10 years It presents the essential properties of 3C 6H and 4H SiC polytypes including structural electrical optical surface and interface properties describes existing key SiC devices and also the challenges in materials growth and device fabrication of the 21st century Overall it provides an up to date reference book suitable for a broad audience of newcomers graduate students and engineers in industrial R D

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extremely complex and the relevant influences range from single point defects to macroscopic boundary conditions This book summarizes the different aspects of fatigue in ferroelectrics It is primarily concerned with bulk material effects Mechanical electrical and physico chemical processes are described reference data are given for different loading regimes and boundary conditions and various fatigue models are compared The monograph also demonstrates how the results of acoustic emission and of microscopy studies reveal the microscopic origins of fatigue in ferroelectric devices

**Impurities Confined in Quantum Structures** Olof Holtz, Qing Xiang Zhao, 2013-04-17 The dramatic impact of low dimensional semiconductor structures on current and future device applications cannot be overstated Research over the last decade has highlighted the use of quantum engineering to achieve previously unknown limits for device performance in research laboratories The modified electronic structure of semiconductor quantum structures results in transport and optical properties which differ from those of constituent bulk materials The possibility to tailor properties such as bandgap strain band offset etc of two dimensional 2D semiconductors e.g quantum wells for specific purposes has had an extensive impact on the electronics which has resulted in a dramatic renewal process For instance 2D structures are today used in a large number of high speed electronics and optoelectronic applications e.g detectors light emitting diodes modulators switches and lasers and in daily life in e.g LED based traffic lights CD players cash registers The introduction of impurities also in very small concentrations in a semiconductor can change its optical and electrical properties entirely This attribute of the semiconductor is utilized in the manifoldness of their applications This fact constitutes the principal driving force for investigation of the properties of the impurities in semiconductors While the impurities in bulk materials have been investigated for a long time and their properties are fairly well established by now the corresponding studies of impurities in quantum wells is a more recent research area

**Fundamentals of Ion-Irradiated Polymers** Dietmar Fink, 2013-03-14 Presented in two parts this first comprehensive overview addresses all aspects of energetic ion irradiation of polymers Earlier publications and review articles concentrated on selected topics only And the need for such a work has grown with the dramatic increase of research and applications such as in photoresists waveguides and medical dosimetry during the last decade The first part Fundamentals of Ion Irradiated Polymers covers the physical chemical and instrumental fundamentals treats the specific irradiation mechanisms of low and high energy ions including similarities and differences and details the potential for future technological application All the new findings are carefully analyzed and presented in a systematic way while open questions are identified The second volume Transport Processes in Ion Irradiated Polymers deals with transport processes in both unirradiated and irradiated polymers As both a review and a stimulus this work seeks to contribute substantially to the literature and advancement of polymeric devices from both the low and high energy regimes

**Applications of the Isotopic Effect in Solids** Vladimir G. Plekhanov, 2004-07-21 Readers intent on mastering the basics should start by reading the first few overview chapters and then delve into the descriptions of specific current applications to see how they actually

work Important future applications are also outlined including information storage materials for computer memories quantum computers isotopic fibers isotopic optoelectronics and quantum electronics **Dissipative Phenomena in Condensed Matter** Sushanta Dattagupta, Sanjay Puri, 2004-02-20 A reference and text Dissipative Phenomena treats the broadly applicable area of nonequilibrium statistical physics and concentrates the modelling and characterization of dissipative phenomena A variety of examples from diverse disciplines such as condensed matter physics materials science metallurgy chemical physics are discussed Dattagupta employs a broad framework of stochastic processes and master equation techniques to obtain models for a range of experimentally relevant phenomena such as classical and quantum Brownian motion spin dynamics kinetics of phase ordering relaxation in glasses and dissipative tunnelling This book will serve as a graduate research level textbook since it offers considerable utility to experimentalists computational physicists and theorists

**Organic Photovoltaics** Sam-Shajing Sun, Niyazi Serdar Sariciftci, 2017-12-19 Recently developed organic photovoltaics OPVs show distinct advantages over their inorganic counterparts due to their lighter weight flexible shape versatile materials synthesis and device fabrication schemes and low cost in large scale industrial production Although many books currently exist on general concepts of PV and inorganic PV materials and devices few are available that offer a comprehensive overview of recently fast developing organic and polymeric PV materials and devices Organic Photovoltaics Mechanisms Materials and Devices fills this gap The book provides an international perspective on the latest research in this rapidly expanding field with contributions from top experts around the world It presents a unified approach comprising three sections General Overviews Mechanisms and Modeling and Materials and Devices Discussions include sunlight capture exciton diffusion and dissociation interface properties charge recombination and migration and a variety of currently developing OPV materials devices The book also includes two forewords one by Nobel Laureate Dr Alan J Heeger and the other by Drs Aloysius Hepp and Sheila Bailey of NASA Glenn Research Center Organic Photovoltaics equips students researchers and engineers with knowledge of the mechanisms materials devices and applications of OPVs necessary to develop cheaper lighter and cleaner renewable energy throughout the coming decades

**Multifunctional Barriers for Flexible Structure** Sophie Duquesne, Carole Magniez, Giovanni Camino, 2007-08-29 This is the first complete overview of the present state of the art of flexible barrier materials such as textile paper and leather including methods for barrier evaluation It will be of interest to readers in industries consumers and members of the scientific community The scope of the field is clearly delineated here for the first time and it deals with a number of specific topics such as barrier to fire and antibacterial properties

**Fullerenes and Other Carbon-Rich Nanostructures** Jean-François Nierengarten, 2014-05-16 Yanfei Shen and Takashi Nakanishi Exotic Self Organized Fullerene Materials Based on Uncommon Hydrophobic Amphiphilic Approach Yuming Zhao and Guang Chen C60 Fullerene Amphiphiles as Supramolecular Building Blocks for Organized and Well Defined Nano scale Objects Anna Troeger Vito Sgobba and Dirk M Guldi Multilayer Assembly for Solar Energy Conversion

Delphine Felder Flesch Self or Induced Organization of 60 Fullerene Hexakisadducts Andr s de la Escosura Olga Trukhina and Tom s Torres Dual Role of Phthalocyanines in Carbon Nano structure Based Organic Photovoltaics Riccardo Marega Davide Giust and Davide Bonifazi Supramolecular Chemistry of Carbon Nano tubes at Interfaces Toward Applications Stephanie Frankenberger Johanna A Januszewski and Rik R Tykwinski Oligomers from sp Hybridized Carbon Cumulenes and Polyynes      **Transparent Conductive Zinc Oxide** Klaus Ellmer, Andreas Klein, Bernd Rech, 2007-12-29 Zinc oxide ZnO belongs to the class of transparent conducting oxides that can be used as transparent electrodes in electronic devices or heated windows In this book the material properties of the deposition technologies for and applications of zinc oxide in thin film solar cells are described in a comprehensive manner Structural morphological optical and electronic properties of ZnO are treated in this review      *Carbon Nanotubes and Related Structures* Dirk M. Guldi, Nazario Mart n, 2010-01-26 Written by the most prominent experts and pioneers in the field this ready reference combines fundamental research recent breakthroughs and real life applications in one well organized treatise As such both newcomers and established researchers will find here a wide range of current methods for producing and characterizing carbon nanotubes using imaging as well as spectroscopic techniques One major part of this thorough overview is devoted to the controlled chemical functionalization of carbon nanotubes covering intriguing applications in photovoltaics organic electronics and materials design The latest research on novel carbon derived structures such as graphene nanooxides and carbon pea pods round off the book



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