Photovoltaics and photodetectors

Surface reconstruction strategy improves the all-inorganic CsPbIBr 2 based perovskite solar cells and photodetectors performance. Author links open overlay panel Jian He a, Jie Su a b, Jiayu Di a, Zhenhua Lin a b, Siyu Zhang a, Jing Ma a, Jincheng Zhang a, Shengzhong Liu c d, Jingjing Chang a b, Yue Hao a b. Show more.

His current research interests are in the areas of photonics, optical sensors, photovoltaics, optical flow visualization, imaging biophotonics, nanofabrication, and opto-microfluidics. Dr. Debiprosad Roy Mahapatra is an Associate Professor of Aerospace Engineering and currently holds the DRDO Chair at the Indian Institute of Science (IISc).

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Fig. 1 a represents the schematic of TiO 2-based transparent photovoltaic device.Two types of n-type TiO 2 (Anatase or Rutile polymorphs) structures were prepared and investigated as the light absorber. The cross-section SEM image of both TiO 2 devices are shown in Fig. S1 (Supporting Information). This result shows average thicknesses of TiO 2 films ...

The same functions are required in the infrared for telecommunications (1,300-1,600 nm), thermal imaging (1,500 nm and beyond), biological imaging (transparent tissue windows at 800 nm and 1,100 ...

Bulk heterojunction (BHJ) of electron donor (D) and acceptor (A) has been widely adapted in the formation of active blend for organic optoelectronics [1, 2].Particularly, organic solar cells (OSCs) consisting of BHJ blends have experienced fast development in recent years [[3], [4], [5]].Still, the usual BHJs consisting of one D and one A utilise a limited portion of the overall ...

Nonfullerene organic solar cells (OSCs) and photodetectors have received tremendous interest due to their rapidly progressed power conversion efficiency (PCE) and wide range photoresponse to near-infrared region, respectively.

Near-infrared (NIR)-absorbing organic semiconductors have opened up many exciting opportunities for organic photovoltaic (OPV) research. For example, new chemistries and synthetical methodologies have been developed; especially, the breakthrough Y-series acceptors, originally invented by our group, specifically Y1, Y3, and Y6, have contributed immensely to ...

Just as in the case of a photovoltaic device, photodetectors or photodiodes have performance parameters. These parameters relate firstly to electrical behavior--the presence of parasitic shunts, electrical noise, response time, electrical bandwidth, and secondly to optical behavior--the spectral characteristics such as spectral range and ...

Photodetectors are devices that sense photons with specific wavelengths and convert them to electrical signals via photon/matter interaction 1.They are an essential branch of optoelectronics with ...

The proposed layered dielectric structures operate across a wide range of incident angles and could enable applications for atomically thin photodetectors or solar cells. Atomically thin materials such as graphene and transition metal dichalcogenides are being developed for a range of optoelectronic devices, but their applications are currently ...

Although promising progress has been made in near-infrared (NIR) electron acceptors for broadening photoresponse of optoelectronics, there are still strong needs for efficient NIR materials with low synthetic complexities. In this work, three simple NIR acceptors are developed with absorption up to 1000 nm and possessing the same dithiophene cores with ...

Near infrared (NIR) acceptors are the key components for the construction of efficient organic photovoltaics (OPVs) and organic photodetectors (OPDs). Herein, a near-infrared acceptor named 6TSe-OFIC incorporating selenium heterocycles has been designed, which shows an absorption onset around 1000 nm with a low optical bandgap of 1.29 eV.

We demonstrated P3HT: ICBA-based OPDs that functioned both as indoor photovoltaics and high-performance photodetectors. Our OPDs demonstrated reasonable indoor PV performance with a PCE of (11.6 ± 0.5)% under an LED lamp with a luminance of 1000 lx, and preferable photodetection properties with 400-600 nm spectral photo response with a ...

In the second part, we provide an overview on the progress in optoelectronic device applications, such as electrically driven light emitters, photovoltaic solar cells, photodetectors, and opto ...

Perovskite photodetectors have attracted much research and attention because of their outstanding photoelectric characteristics, such as good light harvesting capability, excellent carrier migration behavior, tunable band gap, and so on. Recently, the reported studies mainly focus on materials synthesis, device structure design, interface engineering and physical ...

The integration of photodetectors with photovoltaic units has been demonstrated as a sustainable alternative to improve the performance of photodetectors [17], [18], [19]. The enhanced built-in potential of the photodetector is governed by the photogenerated power of the photovoltaic devices, which corresponded to the higher photosensitivity of ...

Most solution-processed organic photodetectors and solar cells have been developed with a BHJ configuration. The efficiency of BHJ solar cells now approaches 19%, and quasi-PHJ designs by sequential D/A deposition approach 18% power conversion efficiency.

Photovoltaic performance of mixed AgBiS 2 solar cells. (a) Statistical data of the open-circuit voltage (V OC), ... Thick AgBiS 2 layers for photodetectors. In contrast to photovoltaics, the use of AgBiS 2 nanocrystals in photodetector applications has been little studied. 26,27 In this work, we fabricated devices with various absorbing layer ...

Whereas application of dissipative metals in solar cells is challenging based on the current emphasis on very high efficiency cells, new opportunities are emerging in solar fuel generation and for the harvesting of hot carriers. ... Plasmonic Photodetectors, Photovoltaics, and Hot-Electron Devices @article{Brongersma2016PlasmonicPP, title ...

Perovskite Photovoltaics and Optoelectronics Discover a one-of-a-kind treatment of perovskite photovoltaics In less than a decade, the photovoltaics of organic-inorganic halide perovskite materials has surpassed the efficiency of semiconductor compounds like CdTe and CIGS in solar cells. In Perovskite Photovoltaics and Optoelectronics: From Fundamentals to ...

Photodetectors Devices, Circuits and Applications Second Edition Silvano Donati University of Pavia. ... Chapter 9 Solar Cells 265 9.1 Electrical Parameters 266 9.2 Solar Spectrum and Quantum Efficiency 269 9.3 System Efficiency 271 9.4 Solar Cell Structures and Materials 271

Herein, the recent progresses in organic- and perovskite-based photovoltaics and photodetectors with integration of judicious optical structure designs are summarized. The characterization ...

Emerging Photovoltaics and Photodetectors Chien-Yu Chen, Guang-Hsun Tan, Hsiang-Lin Hsu, Chih-Ping Chen,* and Hao-Wu Lin* 1. Introduction The continued integration of optoelectronic technologies for energy consumption, environmental monitoring, machine vision, automated unmanned driving and factories, image proc-

1. Introduction. Organic semiconductors have several attractive features for use in the fabrication of optoelectronic devices: light weight, low-cost, mechanical flexibility, and ease of processing [[1], [2], [3]].As a result, several organic semiconductors have been applied in organic field-effect transistors, light-emitting diodes, photovoltaics (OPVs), and photodetectors (OPDs) ...

Finally, the photovoltaics and photodetector performance for n-i-p planar heterojunction devices have been investigated. The efficiency is up to 1%, highest for Cu 2 AgBiI 6 solar cells and comparable with other lead-free bismuth ...

Photodetectors and Solar Cells 3.1 Photodetectors Photodetectors come in two basic flavors: i)

Photoconductors ii) Photovoltaics A photoconductor is a device whose resistance (or conductivity) changes in the presence of light. A photovoltaic device produces a current or a voltage at its output in the presence of light. In this Chapter,

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