The potential for carbon nanotubes in the field of photovoltaics is multifaceted and broad. This Progress Report examines their use in organic and silicon based solar cells and discusses the ???

This manuscript describes the use of nitrophenyl-functionalized single-walled carbon nanotubes (NP-SWNT) in organic photovoltaic cells for the first time. We mainly focus on these innovative materials to scout for the replacement or doping of the universal buckminsterfullerene PCBM acceptor in the active layer. An optimization of the functional degree was first ???

Photovoltaic effects in individual single-walled carbon nanotube (SWCNT) based Schottky diodes were investigated for infrared detection in this paper. Different contact conditions (symmetric and asymmetric CNT-metal contacts) have been studied for optimising the performance of SWCNT-based infrared detector. Experiments demonstrated that the ???

PHOTOVOLTAIC CARBON NANOTUBE

Carbon nanotube structured heaters show promise in replacing autoclaves and conventional ovens for composite curing because of their ability to reach high temperatures at fast ramping rates with high electrical efficiency and mechanical flexibility. in LCDs, touch screens and photovoltaic devices. Nanotube films show promise for use in

Recently, carbon nanotubes (CNTs) have been used in many types of solar cells with high photovoltaic performance [1,2,3,4,5,6,7] itially, the CNTs were incorporated into solar cells as electron acceptors in organic photovoltaic (OPV) devices.

Photovoltaic devices have rapidly developed in recent years as they seek to address the ever-increasing energy requirements and environmental issues. Due to their simple structure and easy, low-temperature fabrication, heterojunctions of carbon nanotube (CNT) films and silicon (Si) have been used in solar cells, photodetectors and

PHOTOVOLTAIC CARBON NANOTUBE

Carbon nanotube effects on electroluminescence and photovoltaic response in conjugated polymers Appl. Phys. Lett. (December 2005) Schottky diodes using as-grown single-walled carbon nanotube ensembles

A photovoltaic (PV) device based on "high-work-function metal/single-walled carbon nanotube/low-work-function metal" hybrid junction has been studied theoretically by the self-consistent nonequilibrium Green's function approach. The PV effect and power conversion efficiency (??) of the device under light illumination are simulated, with a monochromatic ?? of ???

A multifunctional device combining photovoltaic conversion and toxic gas sensitivity is reported. In this device, carbon nanotube (CNT) membranes are used to cover onto silicon nanowire (SiNW) arrays to form heterojunction. The porous structure and large specific surface area in the heterojunction structure are both benefits for gas adsorption. In virtue of these ???

PHOTOVOLTAIC CARBON NANOTUBE

A photovoltaic device based on a high-work-function metal/single-walled carbon nanotube (SWNT)/low-work-function metal hybrid junction was constructed to generate a strong built-in electric field

There is significant interest in using semiconducting single-walled carbon nanotubes (s-SWCNTs) as the photoabsorbing layer of photovoltaic (PV) cells 1???5 and photodetectors. 6 The strong exciton binding energy in SWCNTs can be overcome by employing a bilayer s-SWCNT/acceptor heterojunction with band offsets. 7 Promisingly, the internal ???

Due to their exceptional optoelectronic properties, halide perovskites have emerged as prominent materials for the light-absorbing layer in various optoelectronic devices. However, to increase device performance for wider adoption, it is essential to find innovative solutions. One promising solution is incorporating carbon nanotubes (CNTs), which have ???

PHOTOVOLTAIC CARBON NANOTUBE

photovoltaics [2a,22] and CNT:Si heterojunctions12c,23 already exist. We therefore focus on the challenges and future direc-tions for these technologies and attempt to draw a roadmap for the use of carbon nanotubes in the photovoltaics industry. 2. Separation and Purification After two decades of development, postsynthesis purification

Vertically aligned periodic arrays of carbon nanotubes (CNTs) are used to create topographically enhanced light-trapping photovoltaic cells. The CNTs form the back contact of the device and serve as a scaffold to support the photoactive heterojunction. Molecular beam epitaxy is used to deposit CdTe and CdS as the p/n-type materials and ion-assisted deposition is used ???

This article considers first-principles predictive modeling of carbon nanotube photovoltaic (PV) devices, with the objective being to increase predictive capabilities to the point that systems engineering approaches can be applied. After covering some background, the state of the art in first-principles modeling is reviewed and extended to

PHOTOVOLTAIC CARBON NANOTUBE

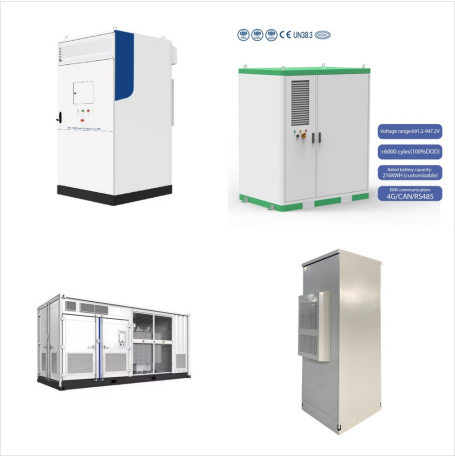
The photovoltaic properties of carbon nanotube/Si heterojunction solar cells were investigated using network films of high-quality single-walled carbon nanotubes (SWNTs) grown by atmospheric-pressure ??? Expand

Carbon-nanotube-based electrodes in photovoltaic devices are also introduced. Carbon-nanotube-based light-harvesting devices are reviewed in terms of fabrication and material processing as well as performance. Finally, advanced emerging methods and the future outlook for carbon-nanotube-based solar cells are discussed.

Here we present photocurrent measurements on a single suspended carbon nanotube p-n junction. The p-n junction was induced by electrostatic doping by local gates, and the E11 and E22 resonances in the nanotube could be probed using photocurrent spectroscopy. Current-voltage characteristics were recorded, revealing an enhanced optoelectronic response ???

PHOTOVOLTAIC CARBON NANOTUBE

This chapter provides an in-depth coverage of recent advances in the areas of the development and characterization of electro-optically active, device-grade carbon nanotube (CNT)???polymer blends. These new organic???inorganic multifunctional nanocomposites share many advanced characteristics which make them ideally suited for industrial scale, high-throughput ???



We also recorded the photovoltaic effect in WS 2 nanotube device 2 with a x10 objective. For the laser with a wavelength of 532 nm, the spot size is 45.2 um???about one order of magnitude larger

We demonstrate that individual single-walled carbon nanotubes (SWNTs) can form ideal p-n junction diodes. An ideal behavior is the theoretical limit of performance for any diode, a highly sought after goal in all electronic materials development. We further elaborate on their properties by examining photovoltaic effects, an application where its performance is intimately ???

PHOTOVOLTAIC CARBON NANOTUBE

Abstract : Recent developments in carbon nanotube technology have allowed for semi-transparent electrodes to be created which can possibly improve the efficiency of solar cells. A method for simulating the use of semi-transparent carbon nanotube networks as a charge collector for solar cells in Silvaco ATLAS software is presented in this thesis. Semi-transparent ???

Organic photovoltaic devices based on the bulk heterojunction concept, containing a blend of single-wall carbon nanotubes (SWNTs) and soluble polythiophenes (P3OT) were studied. The open circuit voltage Voc of the devices was found to be 0.75 V, which is larger than the theoretical limit calculated by the metal???insulator???metal (MIM) model. In order to ???

Deep-subwavelength carbon nanotube photovoltaic cascading diode has been realized with typical feature size being reduced to ?>> /12 and photovoltage output larger than 10 V. Together with carbon nanotubes-based electronics, a proof-of-concept optoelectronic integrated circuit has been demonstrated via a CMOS-compatible doping-free technique.

PHOTOVOLTAIC CARBON NANOTUBE

Their high surface area, together with the unique ability to carry any chemical compounds after surface modification, offers carbon nanotubes the potential to be used as nanoscale catalyst supports with high catalytic reactivity and chemical sensors.

DOI: 10.1038/ncomms7305 Corpus ID: 1097363; Considerably improved photovoltaic performance of carbon nanotube-based solar cells using metal oxide layers @article{Wang2015ConsiderablyIP, title={Considerably improved photovoltaic performance of carbon nanotube-based solar cells using metal oxide layers}, author={Feijiu Wang and Daichi ???