Carbon nanotube network photovoltaic application

Other features that are also important for photovoltaic applications include high mobility9,10 and the availability of ohmic contacts for both electrons11,12 and holes13. ... Carbon nanotubes are ...

This work presents the 2-aminofluorene polymer matrix based on the multi-walled carbon nanotube module for an alternative energy conversion system as a photovoltaic solar cell. The properties of the MWCNT-PAF composite were taken characterized by thermogravimetric methods, differential scanning calorimetry, fourier-transform infrared spectroscopy analysis, ...

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 ...

Single walled carbon nanotubes (SWCNTs) can be considered as a single long wrapped graphene sheet. Nanotubes generally have a length to diameter ratio of about 1000 and hence considered nearly one-dimensional structures. SWCNTs generally have a diameter close to 1 nm and are multiple thousand times longer in length.

In organic photovoltaic (OPV) device applications the preferred diameter is up to 20 nm, and the typical diameter of SWCNTs and MWNTs are in the range of 2-10 nm ... Cho D.-Y., Eun K., ...

See additional applications in: Optical properties of carbon nanotubes. Carbon nanotube photoluminescence (fluorescence) can be used to observe semiconducting single-walled carbon nanotube species. Photoluminescence maps, made by acquiring the emission and scanning the excitation energy, can facilitate sample characterization.

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 ...

Large area graphene sheets grown by chemical vapor deposition can potentially be employed as a transparent electrode in photovoltaics if their sheet resistance can be significantly lowered, with minimal loss in transparency. Here, we report the fabrication of a graphene-conducting-carbon-nanotube (CCNT) hybrid material with a sheet resistance considerably ...

In organic photovoltaic (OPV) device applications the preferred diameter is up to 20 nm, and the typical diameter of SWCNTs and MWNTs are in the range of 2-10 nm ... Cho D.-Y., Eun K., Choa S.-H., Kim H.-K.

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Highly flexible and stretchable carbon nanotube network electrodes prepared by simple brush painting for cost-effective flexible organic ...

Request PDF | On Dec 14, 2015, Ahmed A. Maarouf and others published A Graphene-Carbon Nanotube Hybrid Material for Photovoltaic Applications | Find, read and cite all the research you need on ...

Photovoltaic devices based on nanotechnology have attracted much attention because of their great potential for application in electronic and energy fields. Here, a photovoltaic device based on a high-work-function metal/single-walled carbon nanotube (SWNT)/low-work-function metal hybrid junction was investigated. In the device, asymmetric metal electrodes ...

A graphene-carbon nanotube hybrid material for photovoltaic applications for Carbon by Ahmed A. Maarouf et al. ... Moreover, the chemically doped hybrid is more stable than a standalone chemically doped graphene sheet, as the CCNT network enhances dopant binding. In order to understand the results, we develop a 2D resistance network model in ...

Carbon nanotubes (CNTs) were proposed during the nascency of the emerging perovskite PV field as potential p-type contact, 12,13 setting off several years of exciting research in this area. Rectification in MHP solar cells is achieved through extraction of electrons and holes on opposite sides of the device at the interfaces with charge-selective contacts [CSCs, Fig. 1(a)].

Carbon Nanotubes as an Alternative to ITO. CNTs have exceptional electrical and physical characteristics besides conductivity of 1 to 3 × 10 6 (S/m) as well as electron mobility of 100,000 cm 2 /V.s. (Novoselov et al. 2004; Avouris et al. 2010).CNTs are regarded as excellent transparent conducting electrodes (TCEs) in photovoltaic devices applications considering ...

Single-walled carbon nanotubes (SWCNTs), which can be considered as seamless cylinders of graphene, have been at the forefront of nanotechnology research for the past two decades. (1-3) They possess a range of exceptional properties including high strength (~37 GPa), thermal conductivity (~3500 W/m/K), and ballistic electronic transport.

In order to understand the results, we develop a 2D resistance network model in which we couple the CCNT layer to the graphene sheet and demonstrate the model accounts quantitatively for the resistance decrease. Our results show that a graphene-CCNT hybrid system has high potential for use as a transparent electrode in photovoltaic applications.

The quantum dot sensitized solar cell based on a VACNT/CdS hexagonal network shows a short circuit current density of 4.7 mA/cm(2), which is almost twice of that based on screen-printed CdS thin film with the same thickness. A vertically aligned carbon nanotube (VACNT) hexagonal network was fabricated by plasma enhanced chemical vapor deposition ...

Carbon nanotube network photovoltaic application

Carbon nanotubes and fullerenes have a cylindrical and hollow spherical molecular structure with outstanding mechanical and electronic properties. Their versatility is outstanding and envisioned by the wide application range from field emission displays to impregnated metal composites, battery storage media, and nano-electronic devices. The combination of simple ...

CARBON NANOTUBES FOR SPACE PHOTOVOLTAIC APPLICATIONS Brian J. Landi, Patrick L. Denno, Roberta A. DiLeo, William VanDerveer, and Ryne P. Raffaelle Rochester Institute of Technology, Rochester, NY Harry Efstathiadis and Pradeep Haldar University at Albany, Albany, NY Introduction Carbon nanotubes (CNTs) can be envisioned as an individual graphene sheet ...

Carbon nanotubes in high-performance perovskite photovoltaics and other emerging optoelectronic applications. In this perspective, we take a look back at the successful ...

NETWORKS FOR PHOTOVOLTAIC APPLICATIONS USING SILVACO ATLAS SOFTWARE . by Adam R. Garfrerick June 2012 ... The performance of a cell with and without the carbon nanotube network is compared, taking into account the limitations of the simulation software. 14. SUBJECT TERMS. Carbon Nanotubes, Solar Cells, Photovoltaics, Transparent Contact ...

This perspective aims to highlight the progress in and the advantages of CNT/Si heterojunctions in photovoltaic applications, and to provide clues/hints that might further help ...

Download Citation | Carbon Nanotube-Based Polymer Nanocomposites for Coating and Photovoltaic Applications | The emerging photovoltaic technology has been regarded as a promising green energy ...

(3)(4)(5) In P3HT-based organic photovoltaic devices, carbon nanotube (CNT) incorporation was found to increase the dissociation rate of excitons as well as the charge carrier collection efficiency.

Carbon nanotubes (CNTs) are seamless cylinders of one or more layers of graphene (denoted single-wall, SWNT, or multiwall, MWNT), with open or closed ends (1, 2).Perfect CNTs have all carbons bonded in a hexagonal lattice except at their ends, whereas defects in mass-produced CNTs introduce pentagons, heptagons, and other imperfections in ...

We present a systematic review of nanostructured organic materials, including synthesis methods, functionalization, and applications. First, we report the chemical and physical procedures used for preparing the polymer/carbon nanotube composites described in the literature over the last decade. We compare the properties of different polymer-based ...

Carbon nanotubes are a versatile material with multiple potential functions for photovoltaics. In principle, all elements of a solar cell, from the light sensitive component to carrier selective ...

Carbon nanotube network photovoltaic application

High-density carbon nanotubes are needed for achieving sufficiently high total surface area for light sensing applications. A SWNT-based photovoltaic device requires high-density SWNTs to efficiently capture light. In this work, we designed and tested simple photovoltaic devices which consist of a semitransparent

With the substantial progress of the purification and sorting of semiconducting single-walled carbon nanotubes (SWNTs), 1-3 their potential for the application in electronic and optoelectronic devices has come into sharper focus. Aligned arrays and random networks of purely semiconducting SWNTs are now true competitors to silicon 4,5 and other ...