Liquid junction photovoltaic device

Liquid-Junction Photovoltaic Cells 4 The liquid-junction photovoltaic cell is an electrochemical system with one or two semiconducting electrodes. This system has undergone intense study since the early 1970"s as a means of converting solar energy to chemical or electrical energy.l-B A number of articles review the physics of the liquid ...

A typical single-junction OPV device usually consists of a "sandwich" structure: the active layer, where the photon-to-free charge-carrier conversion occurs, is sandwiched between the anode and cathode layers. ... in situ technologies can also be employed to study the formation process of morphology from liquid state to solid state ...

Moreover, the steadiness of the developed counter electrode in the electrolyte indicated excellent performance. Introducing WO 3 into Pt CEs is a hopefully strategic approach for the fabrication of CEs in liquid-junction PV devices that are productive, stable, and achieve appropriate prices.

Provided by the Springer Nature SharedIt content-sharing initiative This article presents an overview of the developments in the field of organic photovoltaics (PVs) with liquid crystals (LCs). A brief introduction to the PV and LC fields is given first, followed by application of various LCs in organic PVs.

Conventional techniques. High-efficiency OPV devices reported recently have been fabricated by spin-coating with a small area (<0.1 cm 2) in a N 2-glovebox.Although spin-coating is a coating ...

This study focuses on the synthesis of nanoporous NiO nanosheets hybridized with PEDOT:PSS, Cdot and Pt nanoparticles and screening the catalytic activities for the regeneration of iodide ions from triiodide ions in liquid-junction photovoltaic devices.

Overall, this work provides the first example of a BiVO4-liquid photovoltaic cell and an analysis of its limitations. Even though the larger band gaps of metal oxides constrain their solar energy conversion efficiency, their transparency to visible light and deep valence bands makes them suitable for tandem photovoltaic devices.

Dye-sensitized solar cells (DSCs) are considered a third-generation photovoltaic (PV) device [1] due to their low-cost fabrication, transparency, good flexibility, simple assembly procedure, and high conversion efficiency.Thus far, the champion efficiency of a DSC is 14.3% [2], which is still lower than the theoretical value (20%) [3] general, Pt is well known to be the ...

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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 ...

convert light energy into electricity.7-10Unlike solid state photovoltaic solar cells such as silicon-based photovoltaics, liquid-junction solar cells employ photoactive anode and/or cathode. The redox electrolyte which separates the anode and cathode regenerates the photoactive component of the electrodes.

AN alternative to conventional solid-state photovoltaic devices is the semiconductor/liquid junction. Liquid-junction cells not only offer the possibility of integrating energy conversion and ...

We further constructed photovoltaic devices using CdS as a buffer layer with a typical p-n junction configuration (Fig. 1). The devices showed promising photovoltaic response in solid state configuration, while in liquid junction cell, using polysulfide electrolyte, the photovoltaic performance was doubled.

Cu/Cu2O photoelectrodes are synthesized by a simple electrodepositing process at low temperature. The values of the electrolyte pH have great influence on the morphology and the compositions of the obtained films, and thus affect the performance of the electrodes. The best device based on Cu/Cu2O and I-/I3- electrolyte gives a high conversion efficiency of ...

A plasmonic liquid junction photovoltaic cell with greatly improved power conversion efficiency is described, and when illuminated with simulated sunlight, the device reproducibly and sustainably produces an VOC and JSC. A plasmonic liquid junction photovoltaic cell with greatly improved power conversion efficiency is described. When illuminated with ...

An integrated approach to realizing high-performance liquid-junction quantum dot sensitized solar cells. Nat. Commun. 4:2887 doi: 10.1038/ncomms3887 (2013). Kamat, P. V. Quantum dot solar cells. the next big thing in photovoltaics.

Liquid junction solar cell as one of the most cost-effective solar devices could provide a simplified structure of photovoltaic device in which the photoactive junction is formed ...

A double-junction InGaP/GaAs-based photovoltaic device, ... is the maximum efficiency that can be achieved with a PEC water splitting system that has at least one semiconductor-liquid junction . Commercial PV cells still have opportunity for incremental efficiency improvements, but the Shockley-Queisser ...

This design is highly attractive since, in theory, this solid-liquid Schottky-type junction device should function like a solid-state PV junction, generating photovoltage as a function of the absorber band gap energy. Thus, we put the semiconductor in water to enable solar energy conversion to fuels with a device design that is significantly ...

Liquid junction solar cells sensitized with quantum dots are promising structures as low cost and high

efficiency photovoltaic devices. However, the reported short circuit current and open circuit voltage is lower than the theoretical values. The performance of these cells can be improved by the use of defect-free photoelectrodes and absorbing materials. In this work, hydrothermally ...

Utility of Pt in PtNi alloy counter electrodes as a new avenue for cost effective and highly efficient liquid junction photovoltaic devices. Author links open overlay panel Kyung-Ho Bae a, Van-Duong Dao b, Ho-Suk Choi a b. Show more. Add to Mendeley ... The photovoltaic measurement results reveals that the DSSC based PdSe CE demonstrates ...

architectures in light energy conversion devices has emerged as an alternative to single-crystalline based photovoltaic devices. Both dye sensitized and quantum dot sensitized solar cells are examples of such devices. Photoelectrochemical cells are liquid-junction solar cells that typically employ a photoactive electrode that can directly

Experimental measurements on NWs grown by a vapor-liquid-solid mechanism yield VOC of 0.23 and 0.44 V for axial and radial NWs, respectively, and show that axial devices are limited by a SRV of ~7 × 103 cm/s while radial devices are limited by a bulk lifetime of ~3 ns. ... Analysis of radial p-i-n junction photovoltaic device ...

Cost-effective CoPd alloy/reduced graphene oxide counter electrodes as a new avenue for high-efficiency liquid junction photovoltaic devices. J. Alloys Compd. (2017) Z. Zang et al. Tunable photoluminescence of water-soluble AgInZnS-graphene oxide (GO) nanocomposites and their application in-vivo bioimaging.

Inspired by these results, we construct FTO/BiVO4/KI(I2)aq/Pt sandwich photoelectrochemical cells from electrochemically grown 0.5 × 0.5 cm2 BiVO4 and Mo-doped ...

DOI: 10.1016/J.JALLCOM.2018.01.278 Corpus ID: 104206214; Pt-free counter electrode based on FeNi alloy/reduced graphene oxide in liquid junction photovoltaic devices @article{Sim2018PtfreeCE, title={Pt-free counter electrode based on FeNi alloy/reduced graphene oxide in liquid junction photovoltaic devices}, author={Eun Seob Sim and Van ...

Future Outlook: A Promise for a Better Tomorrow Liquid-junction photoelectrochemical solar cells make use of the principles of photochemistry, electrochemistry, and semiconductor physical chemistry. The field of photoelec- trochemistry has nurtured the development and design of next-generation solar cells.

architectures in light energy conversion devices has emerged as an alternative to single-crystalline based photovoltaic devices. Both dye sensitized and quantum dot sensitized solar ...

The incorporation of N& GO on the working electrode of liquid-junction photovoltaic devices was developed, which showed an efficient strategy to design high-performance DSCs. N doping helped to increase the dye loading and GO played a crucial role to decrease the charge recombination, which was proved by EIS studies.

Liquid junction solar cell as one of the most cost-effective solar devices could provide a simplified structure of photovoltaic device in which the photoactive junction is formed by immersing the semiconductor in solution [3].