



Solar cell liquid junction

Tunnel Junctions, as addressed in this review, are conductive, optically transparent semiconductor layers used to join different semiconductor materials in order to increase overall device efficiency. The first monolithic multi-junction solar cell was grown in 1980 at NCSU and utilized an AlGaAs/AlGaAs tunnel junction. In the last 4 decades both the ...

In this paper, Schottky junction solar cells fully based on Al_{0.3}Ga_{0.7}As with optical band gap energy of 1.8 eV are designed, fabricated, and characterized. In solar cells based on AlGaAs/GaAs ...

DOI: 10.1002/adfm.201200365 Corpus ID: 55533490; High Efficiency Semiconductor-Liquid Junction Solar Cells based on Cu/Cu₂O @article{Shao2012HighES, title={High Efficiency Semiconductor-Liquid Junction Solar Cells based on Cu/Cu₂O}, author={Fang Shao and Jing Sun and Lian Gao and Jianqiang Luo and Yangqiao Liu and ...

A liquid junction photoelectrochemical (PEC) solar cell based on p-type methylammonium lead iodide (p-MeNH₃PbI₃) perovskite with a large open-circuit voltage is developed. MeNH₃PbI₃ perovskite is readily soluble or decomposed in many common solvents. However, the solvent dichloromethane (CH₂Cl₂) can ...

A Cu nanowire (NW)/cuprous oxide (Cu₂O)-based semiconductor-liquid junction solar cell with a greatly enhanced efficiency and reduced cost was assembled. The Cu NWs ...

Dual Ligand Capped Quantum Dots Improving Loading Amount for High-Efficiency Quantum Dot-Sensitized Solar Cells. ACS Energy Letters 2023, 8 (1), ... Selenium Nanoparticle-decorated Silicon Nanowires ...

In order to better apply direct liquid-immersion cooling (LIC) method in temperature control of solar cells in high concentrating photovoltaic (CPV) systems, electrical characteristics of GaInP/GaInAs/Ge triple-junction solar cells immersed in dimethyl silicon oil of 1.0-30.0 mm thickness were studied experimentally under 500 suns and 25 °C. Theoretical ...

Today, the realm of semiconductor-based solar cells is dominated (up to 85%) by "classic" photovoltaic systems based on single-crystal and polycrystalline silicon with a light conversion ...

To potentially resolve the above-mentioned issue and explore an alternative to solid-state perovskite solar cells, in this paper, we studied a liquid-junction perovskite solar cell that employs ...

The Bi₂S₃-coated SnO₂ electrodes were fabricated to form liquid-junction solar cells. The best cell yielded a short-circuit current density J_{sc} of 4.20 mA/cm², an open-circuit voltage of 0.16 V ...

To the best of our knowledge, this is the highest efficiency reported for solar cells based on electrodeposited Cu₂O. For comparison purposes, pure Cu₂O films are also synthesized. The performance of the solar cells



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based on pure Cu₂...

Furthermore, the PCE of the novel Cd-substituted liquid junction solar cell underwent a four-fold increase, reaching 1.1%. These results highlight the importance of substitutional doping strategies in optimizing existing CZTS-based materials to achieve improved device characteristics.

Generally, the electrolytes used in DSCs can be categorized into: liquid, quasi-solid and solid states. 26,195,196 The electrolyte in a liquid junction solar cell consists of a solvent, which can be organic or aqueous, with a redox mediator such as I³⁻/I⁻, copper or cobalt coordination complexes or small organic molecules. 17,26 A...

cal contacts in a solid-state solar cell with a solid/liquid junction to improve the solar-to-H₂ conversion efficiency and reduce system cost. The wireless configuration can fully use the advantage of the PEC by removing all electrical contacts; however, the wired configuration with the electrical contact on its back side has been widely

Liquid crystals (LCs) have recently gained significant importance in organic photovoltaics (PVs). Power-conversion efficiency up to about 10% has reached in solar cells incorporating LCs. This ...

The liquid junction dye-sensitized solar cell (DSSC) has reached laboratory solar efficiencies of 11%. In contrast, the semiconductor-sensitized analogue (SSSC) has, up to now, exhibited a maximum efficiency of 2.8%. This begs the questions: is this difference fundamental? Will SSSCs always be inferior to DSSCs? We discuss the differences between ...

PEC solar cells The solar-to-electrical conversion efficiency (η) in a semiconductor/liquid junction solar cell is given as, $\eta = [(P_{\text{max}}/P) \times 100]$, where P_{max} is the maximum output power of the solar cell and P the optical power input⁵. In addition to η , a parameter namely fill factor (FF) is defined in a PEC solar cell as: $FF = (P_{\text{max}}/P_{\text{oc}})$

This strategy provides an alternative way to achieve a full-spectrum liquid-junction solar cell via the integration of plasmon-enhanced electrocatalysis into photovoltaics. Full-spectrum solar energy utilization is the ultimate goal of high-performance photovoltaic devices. However, the present approaches to enhance sunlight ...

III-V semiconductors are the materials that most enable multi-junction solar cells. Image Modified from Source. ... In 1991, Gratzel and Regan realized a low-cost solar cell that used liquid dye on a titanium (IV) oxide film. The overall scheme is shown below, and has come to be known as a general approach of dye-sensitized solar cells. ...

A Cu nanowire (NW)/cuprous oxide (Cu₂O)-based semiconductor-liquid junction solar cell with a greatly enhanced efficiency and reduced cost was assembled. The Cu NWs function as a transparent electrode as well



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as part of the Cu NWs/ Cu₂O coaxial structures, which remarkably benefit the charge separation. The best solar cell reached a conversion ...

The semiconductor liquid junction cell n-GaAs/0.8M K₂Se-0.1M K₂Se-2-1M KOH/C has been shown to attain 9 percent photovoltaic power conversion efficiency in sunlight. Accelerated ...

Liquid-junction semiconductor-sensitized solar cells were fabricated from the synthesized nanoparticles using a polysulfide electrolyte. The best cell yielded a short-circuit ...

An alternative device architecture for utilizing QD absorbers is the liquid-junction-sensitized solar cell pioneered by O'Regan and Grätzel ...

To potentially resolve the above-mentioned issue and explore an alternative to solid-state perovskite solar cells, in this paper, we studied a liquid-junction perovskite solar ...

We have demonstrated Bi₂S₃-sensitized liquid-junction solar cells, prepared by the SILAR process using Bi₂S₃ on nanoporous SnO₂ electrodes. The cells ...

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