

# Quasi-solid-state solar container devices

What are the power conversion efficiencies achieved by quasi-solid-state dye-sensitized solar cells?

Power conversion efficiencies reaching 36% under indoor lighting and surpassing 10% under 1-sun illumination are achieved by quasi-solid-state dye-sensitized solar cells utilizing copper polymer gel electrolytes.

Can freeze-dried hydrogel be a quasi-solid-state electrolyte adsorbent carrier for DSSC?

This study introduces a "hydrogen-bond-enhanced" strategy from freeze-dried hydrogel with a dual-network porous structure, as a novel quasi-solid-state electrolyte adsorbent carrier for DSSCs.

Are DSSC solar cells a viable alternative to conventional p-n junction solar cells?

Since its inception in 1991 by O'Regan and Grätzel, DSSCs have offered an attractive alternative to conventional p-n junction solar cells due to their lower manufacturing costs, ease of fabrication, potential for high energy conversion efficiency, and versatility in application [1,2,3,4].

Are DSSCs sustainable adsorption-based quasi-solid electrolytes?

The hydrogen-bond-enhanced adsorption-based quasi-solid electrolyte enables DSSCs to retain more than 95% of their initial efficiency even after 1000 h of operation. This approach offers a new perspective for the sustainable operation of DSSCs. The authors declare no conflict of interest.

Why is a quasi-solid electrolyte important?

The quasi-solid electrolyte, while offering advantages in terms of stability and leakage prevention, introduces additional complexities. The slower diffusion of ions within the more viscous medium necessitates a highly efficient charge transfer process at the dye-semiconductor interface.

We developed a quasi-solid-state Zn-HPSCs device using manganese-doped zinc oxide (Mn:ZnO) nanoparticles as the photoactive material and Zn<sup>+2</sup>-treated Nafion™ 115 (N115) ionomer as the ...

We investigated the performance of quasi-solid-state dye-sensitized solar cells (qs-DSSCs) employing Polyvinylpyrrolidone/Polyethylene glycol (PVP/PEG) blends over a wide temperature range.

Solar energy is one of the most appealing clean energies to replace fossil fuel. However, the low power output i... Solar energy is one of the most appealing clean energies to replace fossil ...

This work provides valuable insights into interface engineering strategies and material incorporation for quasi-solid-state DSSCs, paving the way toward more efficient, stable, and practical photovoltaic ...

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The flexible quasi-solid-state ECD possesses excellent modulation transmittance range (approximately 66%), high coloration efficiency and steady response time. Thanks to the stability of the PAA-HPMC ...

Advancing the stability and efficiency of quantum dot-sensitized solar cells through a novel, green, and water-based thixotropic biopolymer/ordered nanopores silica designed quasi-solid ...

A Quasi-Solid-State Tristate Reversible Electrochemical Mirror Device with Enhanced Stability Alice Lee-Sie Eh, Jingwei Chen, Shu Hearn Yu, Gurunathan Thangavel, Xinran Zhou, Guofa Cai, Shaohui ...

We have developed a quasi-solid-state self-assembly of randomly oriented nanostructures for overcoming this challenge, demonstrated by the re-assembly of randomly packed ZnSe/ZnS QRs into ...

Fabrication of quasi-solid state dye-sensitized solar cells For the fabrication of the quasi-solid state cells, two drops of the electrolyte were placed on the top of a dye-covered TiO<sub>2</sub> ...

For traditional dye-sensitized solar cells, one method to increase the long-term stability and enhance the power conversion efficiency (PCE) is to explore the use of bifacial and quasi ...

The current advancement of PGEs-based quasi-solid-state (QSS) DSSCs ensures their high feasibility for commercial indoor applications as a clean energy source for the Internet of ...

For this reason, replacing the liquid state electrolytes of DSSCs with quasi-solid state or solid state materials has nowadays been a major ongoing field of research (Wu et al., 2015). Several ...

We developed dye-sensitized solar cells (DSSCs) employing quasi-solid state electrolytes and low-cost pencil graphite counter electrode (CE), unlike the conventional DSSCs that use liquid electrolyte and ...

A quasi-solid-state sensitized solar cell with configuration of FTO/ m -TiO<sub>2</sub> /PQDs/dye/long persistence phosphor/gel electrolyte/Pt/FTO is fabricated, yielding an impressive power conversion efficiency as ...

Abstract Self-charging perovskite solar capacitors (SPSCs) that harvest and store solar energy simultaneously can offer sustainable, off-grid power supply for electrical devices. In particular, flexible ...

Thus, the scientific community has been ready to fabricate a quasi-solid electrolyte assembly. This review explores the use of biomaterials, specifically cellulose-based materials, as a ...

Highlights o The quasi-solid-state self-assembly of randomly oriented 1-D nanostructures to close packed paralleled monorail alignment. o A general fabrication strategy for ...

Solar energy is one of the most appealing clean energies to replace fossil fuel. However, the low power output is the bottleneck that hinders the effective usage of solar energy. Herein, we propose quasi ...

Gel polymer electrolytes (GPEs) are crucial in quasi-solid-state dye-sensitized solar cells (DSSCs) due to their chemical and physical stability, enhanced safety, and improved ...

The results demonstrate the effectiveness of a p-type  $\text{La}_2\text{O}_3$  layer in boosting device performance by reducing charge recombination. To our knowledge, this is the first report demonstrating the ...

The open-circuit voltage ( $V_{oc}$ ) in a solar cell is influenced by the difference between a semiconductor's quasi-Fermi level and the potential of redox shuttles. The quasi-Fermi level ...

Recently, solar energy has received considerable momentum, predominantly in the dominance of its consistency in electricity. In a new generation, solar devices are fabricated by ...

Various redox shuttle-mediated polymer gel electrolytes (PGEs) were utilized individually to fabricate quasi-solid-state (QSS) dye-sensitized solar cells (DSSCs) for outdoor and indoor applications. The ...

Abstract Electrolytes, especially the gel polymer electrolytes (GPEs) play an important role in an electrochromic device (ECD), and have received extensive attention in recent years. GPEs ...

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