Perovskite cells and carbon nanotubes

One-dimensional carbon nanotubes (CNTs) are being used in a variety of perovskite solar cell designs because of their remarkable mechanical, optical, and electrical characteristics. These components include interface modifiers, charge-transporters, perovskite additives, hole-transporting techniques, and

Single-walled carbon nanotubes (SWCNTs) have been deployed in perovskite solar cells (PSCs) via a simple transfer route, achieving power conversion efficiencies of 19% and 18% on rigid and flexible s... Abstract The unprecedented advancement in power conversion efficiencies (PCEs) of perovskite solar cells (PSCs) has rendered them a promising game ...

The employment of cost-effective and durable structures is essential for the successful commercialization of perovskite solar cells (PSCs). Identifying a viable substitute for hole-selective materials (HSMs), which represent a significant expense in the production of PSCs, could provide a number of benefits. Carbon nanotube-based PSCs have shown promising ...

This paper will discuss the role of carbon nanotubes (CNTs) in improving the efficiency and stability of perovskite solar cells, in various components such as perovskite layer and hole transport layer, as well as the application of CNTs in unique aspects. These includes the use of CNTs fiber in making the perovskite solar cells ...

We propose a new hole transport layer (HTL) in a perovskite solar cell (PSC) using single-walled carbon nanotube (SWCNT) achieving a power conversion efficiency (PCE) up to 19.98%, for the first time. Owing to its exceptional quantum properties, this one-dimensional (1D) element is utilized in order to facilitate hole transport ...

The carbonization embracing nanomaterials such as carbon nanotubes (CNTs), graphene, and carbon quantum dots has shown an enormous impact on the establishment of perovskite solar cells (PSCs). These compounds present each types of unique characteristics ...

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Through this study, we demonstrate the function of carbon nanotubes as both the anode and the cathode in perovskite solar cells. Economic modeling suggests that this novel architecture reduces costs dramatically. This work realizes innovations in the materials, costs, and processing of inverted-type perovskite solar cells.

Metal halide perovskite solar cells (PSCs) have emerged as promising next-generation photovoltaic devices

with the maximum output efficiency exceeding 25%. Despite significant advances, there are many challenges to achieve high ...

Halide perovskites have been widely utilized as a light-absorbing layer in a wide range of optoelectronic devices. Incorporating carbon nanotubes (CNTs) into perovskite-based devices has important roles in enhancing device performance. Here, we systematically review the effect of CNT incorporation on the performance of perovskite solar cells, photodetectors, and light ...

Perovskite solar cell (PSC) has been one of the most promising photovoltaic technologies because of its low-cost large-scale manufacturing process and inspiring photovoltaic performance, with power conversion efficiency (PCE) over 25% [1-4].Towards commercialization of PSCs, further reducing the cost and increasing the stability are necessary.

The incorporation of p-type functionalized carbon nanohorns (CNHs) in perovskite solar cells (PSCs) and their comparison with p-type functionalized single- and double-walled carbon nanotubes (SWCNT...

In this review, we comprehensively summarize various functions of CNTs in PSCs, such as ...

In this perspective, we take a look back at the successful integration of carbon nanotubes (CNT) into high-efficiency solar cells based on metal-halide perovskites (MHPs). In addition to these successes, we identify critical questions and issues that remain to be addressed for the functionality of CNTs in MHP-based solar cells. Finally, we look ...

Triflic acid dispersed in an apolar solvent exhibited a superior doping effect and stability on carbon nanotube electrodes. By applying a high concentration of a hole-transporting material on the carbon nanotube top electrode in perovskite solar cells, higher power conversion efficiency than that of metal electrode-based perovskite solar cells was obtained.

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