Carbon electrodes for perovskite solar cells

Can carbon electrodes replace metal electrodes in perovskite solar cells?
Carbon electrodeshave gained significant attention as a cost-effective,sustainable,stable,and scalable replacement for metal electrodes in perovskite solar cells (PSCs). However,traditional ca...

Can carbon-based perovskite solar cells improve photovoltaic conversion efficiency?
Carbon-based perovskite solar cell development faces a challenge in modifying its electrode's work function for hole extraction and transport. To overcome this,we optimized the carbonization process,resulting in a dendritic graphite surface extension structure that increased photovoltaic conversion efficiency from 15.16 % to 18.19 %.

How to make a perovskite solar cell?
It can be fabricated by either directly blade-coating of wet paste on perovskite substrates , or transferring an as-formed carbon tape from carbon paste . With carbon paste electrode, the spin-coated perovskite solar cells obtained a high efficiency of 20.04% while the blade-coated cells generated 18.5% [26, 28].

Can a perovskite charge transfer to a carbon electrode?
The feasibility of the charge exchange between the perovskite and the carbon electrode was examined through electrochemical impedance spectroscopy,where the low charge transfer resistance in the high-frequency region was reported to demonstrate a favourable charge transferto the low-temperature carbon electrode. [108]

Why should a carbon electrode be aligned with a perovskite layer?
Moreover, the band alignment of the carbon electrode with the perovskite layer must be engineered to create an ohmic contact for efficient hole (electron) extraction and prevent electron (hole) backscattering in an n- i -p (p- i -n) architecture.

What are carbon-based perovskite solar cells (c-PSCs)?
Carbon-based perovskite solar cells (C-PSCs) have been extensively researched as alternatives to fabricate cost-effective energy conversion devices. The interface of the perovskite film and the car...

Of all work found using the Scopus search equation ""carbon-based perovskite solar cells"", it was possible to identify that once again, China occupies first place in countries with most academic publications. This country is responsible for about 60% of the articles published in this field, and approximately 43% of these publications were made by, Huazhong University of ...

Carbon-based electrodes have been widely applied in perovskite solar cells (PSCs) because of their chemical inertness and compatibility with up-scalable techniques, signifying their solid potential for mass-production. The material scarcity and complexity of metal ore extraction further highlights that conve

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Employing 2D-perovskite as an electron blocking layer in highly efficient (18.5%) perovskite solar cells with printable low temperature carbon electrode Adv. Energy Mater., 12 (2022), Article 2200837

The review shows that three main carbon materials, namely, carbon black, graphenes and carbon nanotubes display high photoelectric conversion efficiencies when being mixedly used as rigid electrodes and show excellent robustness in mechanical deformation as flexible carbon electrodes in carbon-based perovskite solar cells. Moreover, the ...

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Carbon electrode-based perovskite solar cells (PSCs) with low-cost and long-term stability have been recognized as a competitive candidate toward future practical applications. However, energy level mismatch and ...

Towards commercialization of perovskite solar cells (PSCs), further reducing the cost and increasing the stability of PSCs have been the most important tasks of researchers, as the efficiency of single-junction PSCs has reached a competitive level among all kinds of single-junction solar cells. Carbon-electrode-based PSCs (CPSCs), as one of the ...

Hole transporting layers between carbon electrodes and perovskite improves the performance of perovskite solar cells. Here, four interlayer materials are assessed and compared for their ...

Carbon electrodes have gained significant attention as a cost-effective, sustainable, stable, and scalable replacement for metal electrodes in perovskite solar cells (PSCs). However, traditional carbon-electrode-based PSCs (C-PSCs) lack a hole-selective layer (HSL) due to their incompatibility with the most effective organic HSLs employed in ...

Carbon-based perovskite solar cells (C-PSCs) possess the beneficial attributes of a simple fabrication process, superior stability, and cost-effectiveness. However, flexible C ...

Carbon-based perovskite solar cells (PSCs) have the advantages of a long lifetime and are compatible with highly scalable manufacturing processes. The use of carbon electrodes and the absence of a ... Skip to Article Content; Skip to Article Information; Search within. Search term. Advanced Search Citation Search. Search term. Advanced Search ...

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Carbon electrode-based perovskite solar cells (PSCs) with low-cost and long-term stability have been recognized as a competitive candidate toward future practical applications. However, energy level mismatch and ineffective hole extraction at the carbon electrode/perovskite interface limit device performance. Herein, we develop a low-cost ...

Adding a charge selective polythiophene (P3HT) layer between perovskite and nickel oxide (NiOx) can reduce charge transfer recombination loss, inhibit moisture infiltration, ...

Compared with traditional rigid perovskite solar cells fabricated on glass, flexible perovskite solar cells have a wider range of applications due to their lightweight and bendability, which have attracted great attention. Besides, carbon materials have shown some advantages of abundance, long-term stability and appropriate energy level as top electrode in perovskite ...

1. Introduction In recent decades, great attention has been paid to perovskite solar cells (PSCs), owing to their facile manufacture and low-cost solution processing. 1-7 Halide perovskite materials with the ABX 3 structure have the ...

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