Cathode modification of solar cells

Can organophosphonic acid modify the cathode interface layer in inverted organic solar cells?
We use a single-molecule self-assembled layer of an aromatic organophosphonic acid (2PACz)to modify the cathode interface layer in inverted organic solar cells (OSCs). The modified OSCs not only have an obvious improvement in power conversion efficiency (PCE),but also demonstrate greatly enhanced air stability.

What are organic solar cells?
Organic solar cells (OSCs) have attracted a considerable attention in the last decade on account of their potentials such as flexibility, light-weight and capability of being manufactured over large areas , , .

Why is cathode interlayer more suitable for electron extraction?
Ultraviolet photoelectron spectroscopy shows that the work functionof cathode interlayer after modification by 2PACz is more suitable for electron extraction. In addition,the surface energy is reduced without affecting the film deposition,which will be beneficial to reduce the interfacial traps.

Does a 2pacz Sam improve photovoltaic performance of inverted OSCs?
After 96h,the ZnO/PEIE/2PACz-based OSC retains ~75% of its initial PCE; while PCEs of ZnO-only and ZnO/PEIE-based OSCs deteriorate to 55% and 65% of their initial values,respectively (Fig. S8 in Supporting information). In summary,we modified the ZnO layer with a 2PACz SAM to improve the photovoltaic performance of inverted OSCs.

Do modified OSCs improve power conversion efficiency?
The modified OSCs not only have an obvious improvementin power conversion efficiency (PCE),but also demonstrate greatly enhanced air stability. Ultraviolet photoelectron spectroscopy shows that the work function of cathode interlayer after modification by 2PACz is more suitable for electron extraction.

ABSTRACT A ultrahydrophobic polylectrolyte (PVPy-F) based on poly(4-vinylpyridine) is applied to polymer solar cell (PSC) as a cathode buffer layer. The Kelvin probe microscopy measurement support the formation of favorable interface dipole between the active layer and the cathode. PSC with the PVPy-F as a cathode buffer layer demonstrate the power conversion efficiency (PCE) ...

A non-conjugated zwitterionic polylectrolyte (PVPy-ZW) based on poly(4-vinylpyridine) is applied to polymer solar cells (PSCs) as a cathode buffer layer either inverted or conventional type polymer solar cells. The Kelvin probe microscopy measurement support the formation of favorable interface dipole at the cathode interface ...

2 ???· Recently, the power conversion efficiency (PCE) of organic solar cells (OSCs) has been reported over 19% due to the development of novel electron donor polymers and acceptor molecules such as PM6:Y6. In addition, cathode interlayers (CILs) based on non-fullerene structure (e.g., PNDIT-F3NBr and

PDINN) have been employed in conventional OSCs to ...

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A new amino-functionalized polymer, PN 4 N, was developed and applied as an efficient interlayer to improve the cathode interface of fullerene/perovskite (CH 3 NH 3 PbI x Cl 3-x) planar heterojunction solar cells.The PN 4 N polymer is soluble in IPA and n-BuOH, which are orthogonal solvents to the metallohalide perovskite films, and therefore they can be spuncast on the ...

In organic solar cells (OSCs), cathode interfacial materials are generally designed with highly polar groups to increase the capability of lowering the work function of cathode. However, the ...

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The PDI-M CIL is not only compatible with various active layers in solar cells, but also show good cathode modification performance over a wide thickness range from ?5 to ?33 nm (Figure 3g). The PCE of PDI-M-modified OSC can reach 17.98% (Figure 3h,i), which is among the highest PCE values in OSCs.

In inverted perovskite solar cells (PSCs), effective modification of the interface between the metal cathode and electron transport layer (ETL) is crucial for achieving high performance and ...

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This paper reviews the use of graphene, reduced graphene oxide (rGO) and their modification as cathode for dye-sensitized solar cell (DSSC). Graphene and rGO can be modified via several ways, namely, doping, composing and coating with other materials in order to enhance their electrical property and catalytic activity when applied in DSSC. The composite ...

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(OSCs) and improving their stability. Herein, we innovatively introduced a double cathode modification layer (SnO 2 /ZnO) into a non-fullerene OSCs based on PM7:IT-4F and explored the mechanisms.

Cathode interlayers (CILs) play crucial roles in boosting the performance of organic solar cells (OSCs). Herein, a class of novel electron-deficient electrolytes, namely BDOPV-1 and BDOPV ...

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