Solar cell interface regulation

Do buried interfaces matter in perovskite solar cells?

Broad processing window (atmospherically applicable and scale-up) for efficient and stable perovskite solar devices/modules. Buried interface in perovskite solar cells (PSCs) is currently a highly focused study area due to their impact on device performance and stability. However,it remains a major challenge to rationally design buried interfaces.

Can a 2D/3D heterostructure improve the PSC performance of WBP solar cells?

Another approach is to construct a 2D/3D heterostructure through in situ fabricating 2D perovskite on the 3D perovskite surface,which could increase VOC and thus improve the PSC performance for conventional bandgap perovskites ,,,. This strategy is also proved effectivefor some WBP solar cells ,,,.

Are WBP solar cells able to achieve higher photovoltaic performance?

For all of these perovskite based tandem solar cells, WBPs with bandgap of 1.7-1.9 eV play a crucial role in the overall device performance, and thus advancement of WBP solar cells in terms of PCE and stability is of great significance to achieve higher photovoltaic performance for these tandem devices.

Can cobalamin buried electron-transport layer improve perovskite solar cells?

A strategy for planar-type perovskite solar cells by natural bio-functional interfaces that uses a buried electron-transport layer made of cobalamin complexed tin oxide (SnO 2 @B 12) is provided. Cobalamin could chemically link SnO 2 layer and perovskite layer, resulting in improved perovskite film quality and interfacial defect passivation.

How can interfacial passivation agents improve the performance of WBP solar cells?

Among these methods,interfacial passivation agents such as amines ,,,guanidines ,metal oxide and fullerene derivatives have exhibited good capacities to not only passivate defects but also improve the interfacial energy level alignment,thus effectively reducing VOC deficit and boosting PCEof WBP solar cells ,,.

Can modified ZrO 2 NPS modulate the buried interface of PSCs?

To investigate the ability of modified ZrO 2 NPs to modulate the buried interface of PSCs,we prepared SnO 2 ETL layer (Control) and modified ETL with HL-ZrO 2 and TACA-ZrO 2 NPs. X-ray diffraction (XRD) patterns (Fig. 1E) validate the successfulintroduction of ligand-modified ZrO 2 NPs to the buried interface.

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Interface regulation is a simple and commonly used method to decrease nonradiative recombination in inverted perovskite solar cells (PSCs). Here, a wide-bandgap halide was used to regulate the PTAA/$MAPbI_3$ interface, in which n -hexyltrimethylammonium bromide (HTAB) was used to modify the upper surface of poly[bis(4-phenyl)-(2,4,6 ...

Optimizing the buried interface in flexible perovskite solar cells to achieve over 24% efficiency and long-term stability

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The interfacial energy level mismatch between the functional layers of perovskite solar cells (PSCs), especially between the perovskite layer (PVK) and the hole ...

stability of perovskite solar cells (PSCs) thisstudy,wepropose the molecule-triggered strain regulation and interfacial passivation strategy via the [2 + 2] cycloaddition reaction of 6-bromocoumarin-3-carboxylic acid ethyl ester (BAEE), achieving perovskite strain regulation, interface passivation, and the enhancement of efficiency and

Efficiency and stability are key factors determining the final cost of electricity that perovskite solar cells (PSCs) generate. To date, effective strategy to progress in achieving efficient and stable PSCs is still a difficult problem that researchers continue to explore. This study reports a useful way to improve the quality of SnO

Because interfacial nonradiative recombination (NRR) has a significant influence on device performance, the minimization of interfacial NRR losses through interface ...

Herein, a heterointerface energetics regulation (HER) strategy is proposed by introducing potassium trifluoroacetate (KTFA) in the perovskite precursor solution to eliminate ...

Herein, we propose the molecule-triggered strain regulation and interfacial passivation strategy via the [2 + 2] cycloadditions reaction (the photo-induced [2 + 2] reaction triggered by UV 365 nm irradiation and photocleavage of the cross-link with UV 254 nm) of 6-bromocoumarin-3-carboxylic acid ethyl ester (BAEE), achieving perovskite strain regulation, ...

These beneficial effects significantly improve the heterojunction interface and consequently enable the flexible CZTSSe solar cell to achieve a record total-area efficiency of 12.84% and excellent bending performance. Overall, the heterojunction interface regulation strategy employed in this work, along with the obtained remarkable ...

Alkylammonium bromides regulate the interfacial properties between wide-bandgap perovskites (WBPs) and hole transport layers. Improved hole transport induced by HABr treatment reduces interfacial capacitance and eliminates hysteresis. Hydrophobicity of 2D perovskite and suppressed ion migration enhance the moisture stability.

Herein, a heterointerface energetics regulation (HER) strategy is proposed by introducing potassium trifluoroacetate (KTFA) in the perovskite precursor solution to eliminate the trap defects and optimize surface potential and Fermi level.

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