Supramolecular perovskite solar cells

Does supramolecular modulation enhance the stability of perovskite solar cells?
We elucidate its binding mode using two-dimensional solid-state 19 F NMR spectroscopy in conjunction with density functional theory calculations. As a result,we demonstrate a stability enhancementof the perovskite solar cells upon supramolecular modulation,without compromising the photovoltaic performances.

Can host-guest complexation reduce surface defects in perovskite solar cells (PSCs)?
Host-guest complexation offers a promising approachfor mitigating surface defects in perovskite solar cells (PSCs). Crown ethers are the most widely used macrocyclic hosts for complexing perovskite surfaces,yet their supramolecular interactions and functional implications require further understanding.

Are molecular modulators effective in perovskite solar cells?
Molecular modulators have been demonstrated to be an effectual strategyfor reducing the defect at the interface and in bulk of perovskite and ameliorating the performance and stability of perovskite solar cells (PSCs).

Are perovskite solar cells better than crystalline silicon solar cells?
Similar to organic solar cells 9, 10, 11 and dye-sensitized solar cells 12, perovskite solar cells (PSCs) have a shorter energy payback time (more than 4 times) and lower equivalent greenhouse gas emissions than state-of-art crystalline silicon (c-Si) solar cells (less than 2 times) over their lifecycle 13.

Could supramolecular systems be used to control perovskite precursor chemistry?
The formation of a supramolecular system between v-CD and perovskite holds promiseas a strategy to control perovskite precursor chemistry,material structure,and subsequent device performance and stability.

How does supramolecular network interact with perovskite?
We revealed the potential interaction mechanism between supramolecular network and the perovskite by a series of tests: the formation of adductsbetween S-DTF and perovskite precursor retards crystallization,resulting in high crystallinity and significantly enlarged grains.

Perovskite solar cells" lead toxicity and leakage are key obstacles to commercialization. Here, we introduce a diazapolyoxamacrobicycle structure of cryptand 222 ...

Considering the well-understood and essential nature of non-covalent interactions in supramolecular chemistry, our discovery unlocks a design principle for tuning ...

In the context of perovskite solar cells (PSCs), enhancing device performance often involves adding a small excess of lead iodide (PbI2) to the precursor solution. However, the presence of unreacted PbI2 can lead to ...

solar cells with a tailored supramolecular interface Chenxu Zhao 1,2,3,10, Zhiwen Zhou1,4,10, ... stability of perovskite solar cells (PSCs). Addressing this issue, we introduce a

In this work, the ligand-to-metal charge transition and Förster resonance energy transfer process is exploited to derive lanthanide organic framework (Tb-cpon) ...

As a result, we demonstrate a stability enhancement of the perovskite solar cells upon supramolecular modulation, without compromising the photovoltaic performances.

Benefiting from the self-sealing effect of the S-DTF, the perovskite solar cells with hydrophobic S-DTF exhibits a high long-term stability (maintaining 93% of their original ...

Multiple supramolecular synergistic interaction between A15C5 and perovskite dramatically suppress and passivate defects, resulting in a 38% decrease in electron trap-state density in perovskite. The formation of two ...

Lanthanide Three-Dimensional Supramolecular Framework Boosts Stable Perovskite Solar Cells with High Uv Utilization. Wei Wang, Wei Wang. MIIT Key Laboratory of ...

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perovskite solar cells. Additional tests with maltose as a non-cyclic control were conducted and confirm the superior ability of b-CD to enhance perovskite film stability under harsh ...

Reducing lead toxicity of perovskite solar cells with a built-in supramolecular complex. ... Perovskite solar cells (PSCs), as an emerging renewable energy technology, are ...

There has been an ongoing effort to overcome the limitations associated with the stability of hybrid organic-inorganic perovskite solar cells by using different organic agents as additives to ...

Supramolecular interface design and structural characterizations. Figure 1a shows the concept of the supramolecular interface design in this work. First, the perovskite ...

2D perovskite passivation strategies effectively reduce defect-assisted carrier nonradiative recombination losses on the perovskite surface. Nonetheless, severe energy ...

We fabricated n = 1 2D perovskite solar cells to demonstrate how altering the properties of 2D perovskites

impact solar cell performance and find that solar cell performance...

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One of the critical issues in perovskite solar cells (PSCs) is the open-circuit voltage (VOC) deficit due to surface or grain boundary defects. A dual-ion passivation strategy using TFA- and DPA+ achieved supramolecular ...

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