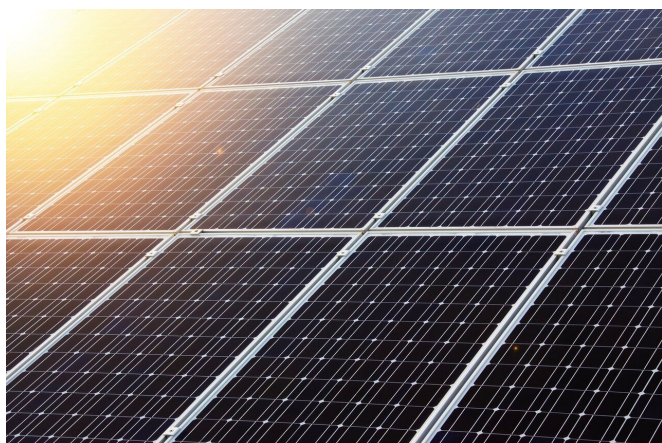


Fluoroethylamine engineering for effective passivation improves efficiency of perovskite solar cells

17 August 2021, by Li Yuan



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Perovskite film, a key layer of the perovskite solar cell (PSC), determines the performance and stability of the device.

In the preparation process of PSCs, many defects will inevitably be introduced at the [grain boundaries](#) and interfaces, which will act as non-radiative recombination centers and seriously damage the performance and stability of PSCs.

Recently, a research group led by Prof. Liu Shengzhong from the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences (CAS) and his cooperators incorporated fluoroethylamine (FEA) cations into the perovskite film to form highly efficient and stable perovskite solar cells (PSCs).

This study was published in *Advanced Energy Materials* on June 23.

The researchers found that [perovskite](#) film with

FEA passivation improved photoluminescence (PL) intensity, prolonged carrier-lifetime, suppressed nonradiative recombination, enlarged [grain size](#) and hydrophobicity, and hence delivered high device performances.

By engineering of different amounts of fluorine in the molecule, they revealed that different amounts of fluorine additives presented a gradient distribution in the film. The device employing 2-fluoroethylamine (1FEA) achieved an efficiency of 23.40%, while the device employing 2, 2, 2-trifluoroethylamine (3FEA) showed the best environmental stability, maintaining 87% of their initial efficiencies after 1200 h.

"This research paves a new way to fabricate high-efficiency and stable PSCs," said Prof. LIU.

More information: Hang Su et al, Fluoroethylamine Engineering for Effective Passivation to Attain 23.4% Efficiency Perovskite Solar Cells with Superior Stability, *Advanced Energy Materials* (2021). [DOI: 10.1002/aenm.202101454](#)

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