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The Effects of Residual Lead Iodide on the Stability of Perovskite Solar Cells

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Over the past few years, hybrid perovskite materials have attracted tremendous interest due to its excellent photovoltaic properties in perovskite solar cells (PSCs) resulting in record power conversion efficiencies. The residual lead iodide is easy to form during the fabrication of perovskite layers, especially in case of the two-step deposition method. In addition, residual lead iodide has been universally used in the state-of-the-art devices to boost the device performance. However, the effects of residual lead iodide on the stability of PSCs has not been fully understood and, therefore, needs to be deeply investigated for further improvement of device performance. Herein, it is shown that residual lead iodide exhibits insufficient stability under continuous light radiation and heating. The photodecomposition products of lead iodide pose a threat to the efficiency and stability of devices. Thus, unstable lead iodide under light radiation and heating is one of the main reasons for the degradation of perovskite device. Therefore, carefully controlling or eliminating the residual lead iodide in perovskite film is one of the critical methods to improve the long-term stability of PSCs.

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