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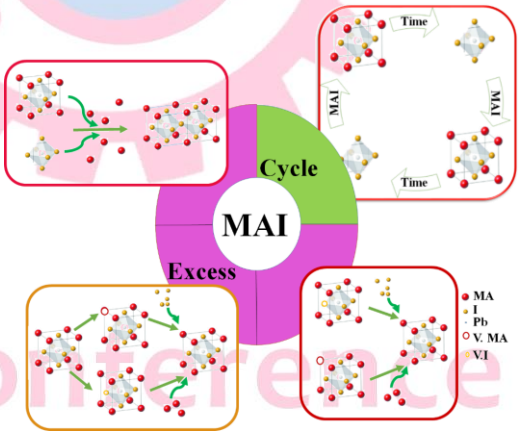
Mechanistic insights of the key role of methylammonium iodide in the stability of perovskite material

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The possible mechanisms damaging perovskite solar cells have attracted considerable attention in the photovoltaic community[1-3]. This paper specifically answered some open problems regarding the critical role of methylammonium iodide (MAI) in informing and stabilizing perovskite cells. Surprisingly, by using Ultraviolet–visible (UV−vis) spectra, X-ray diffraction analysis (XRD), Field emission scanning electron microscope (FE-SEM) images, and X-ray photoelectron spectra) XPS, we found that when the molar ratio between PbI_2: MAI precursor solution increased from 1:5 to 1:25, the stability of perovskite cells dramatically increased over time. The stability of perovskite on air without any masking in the average stoichiometry was about five days, while when the value of MAI precursor solution increased to 5, the perovskite film was unchanged for about 13 days, eventually, when the value of MAI precursor solution enhanced to 25, the film of perovskite was stayed intact for 20 days. The outstanding XRD results indicated that the intensity of perovskite's Indices Miler was Increased significantly after 24 h, and the MAI's Indices Miler was decreased, which means that the amount of MAI was consumed to produce perovskite cells. This proposed mechanism is challenging because pieces of evidence claim that the charging of MAI continuously produces the perovskite cell, which significantly avoided damage to the perovskite material.



Keywords: Perovskite, Methylammonium iodide, Stability

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