

Keeping Phase Stability of Formamidinium Lead Iodide for Highly Efficient Perovskite Solar Cells

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Nowadays, researches for renewable and sustainable energy including solar energy are actively carried out due to various environmental problems. Among them, Perovskite solar cells (PSCs) are getting a lot of attention because of its great photoelectric properties and low process cost. Formamidinium lead iodide (FAPbI₃) is the most efficient perovskite material for PSCs to date. But, it has two types of phase, cubic perovskite phase (alpha phase) which has high photoelectric performance and hexagonal non-perovskite phase (delta phase) which has low photoelectric performance. Unfortunately, delta phase is more favorable than alpha phase in room temperature (RT). Therefore we should keep FAPbI₃ to alpha phase in RT for highly efficient solar cells. We can do it by not only substituting some ions of FAPbI₃ but also protecting from moisture. It is because smaller ions can reduce strain which causes the phase transition of FAPbI₃ and moisture accelerates the phase transition by reducing activation energy.