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CH₃NH₃PbI_{3-x}Br_x perovskite solar cells via spray assisted two-step deposition: Impact of bromide on stability and cell performance

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ABSTRACT: Fully converting the lead salt to perovskite is crucial for the performance of perovskite solar cells via the two-step deposition method. In this study, full conversion of PbI₂ to perovskite is achieved via a spray assisted two-step deposition method with excess CH₃NH₃I sprayed onto the PbI₂ layer. The influence of adding CH₃NH₃Br in the PbI₂ solution in the first step on the resulting solar cells is investigated. The perovskite solar cells show significant increase in power conversion efficiency after one-night storage where a process of Br ion diffusion from Br-rich to I-rich regions is proposed. The study provides an alternative approach for incorporating Br and may help explaining the contradiction of reported conversion efficiency trends.

Keywords: perovskite solar cells, CH₃NH₃PbI_{3-x}Br_x, spray deposition, two-step deposition, ion diffusion

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