Tailoring Mixed-Halide, Wide-Gap Perovskites via Multistep Conversion Process

Wide-band-gap mixed-halide CH$_3$NH$_3$PbI$_{3-x}$Br$_x$-based solar cells have been prepared by means of a sequential spin-coating process. The spin-rate for PbI$_2$ as well as its repetitive deposition are important in determining the cross-sectional shape and surface morphology of perovskite, and, consequently, J–V performance. A perovskite solar cell converted from PbI$_2$ with a dense bottom layer and porous top layer achieved higher device performance than those of analogue cells with a dense PbI$_2$ top layer. This work demonstrates a facile way to control PbI$_2$ film configuration and morphology simply by modification of spin-coating parameters without any additional chemical or thermal post-treatment.

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