

Reproducible formation of mixed halide perovskite thin-film using the pure mixed halide perovskite powder

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Since Kojima et al. reported $\text{CH}_3\text{NH}_3\text{PbI}_3$ (MAPbPbI₃) and $\text{CH}_3\text{NH}_3\text{PbBr}_3$ (MAPbBr₃) perovskite sensitized solar cells, intensive studies have been done to develop efficient solid-state perovskite hybrid solar cells. Organometal halide perovskite (RMX_3) materials have received great attention because of their unique properties such as high absorptivity, large dipole moment, and solution processibility. The mixed halide perovskite ($\text{CH}_3\text{NH}_3\text{PbI}_{3-x}\text{Cl}_x$, $\text{MAPbI}_{3-x}\text{Cl}_x$) is used for highly efficient photovoltaic material because of its improved charge transport property and diffusion length by Cl doping without band gap change. In terms of reproducibility, the long diffusion length of charge carriers is more desirable because the efficiency deviation is not large even though the thickness of perovskite layer is fluctuated by the coating process. To obtain uniform the film of $\text{MAPbI}_{3-x}\text{Cl}_x$ reproducibly, we separated the process to the formation of $\text{MAPbI}_{3-x}\text{Cl}_x$ and the film deposition of $\text{MAPbI}_{3-x}\text{Cl}_x$. Here, we tried to deposit mixed halide perovskite thin-film via single step spin-coating process.