

Effect of solvent blends on the morphology and efficiency of Perovskite solar cells

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Although the most popular method currently used to fabricate perovskite active layer is a two-step method, one of biggest issues of the two-step method is the difficulty in controlling the morphology of the perovskite thin films. Here, we focused on improving the quality of the perovskite thin films by adding isobutyl alcohol as an additive into CH₃NH₃I solution used for spin coating onto PbI₂ / (DMF+ DMSO) film in the second step, resulting in uniform and pinhole-free film. According to the SEM study, when the ratio of isobutyl alcohol additive in the mixed solvents reached to 5%, perovskite film morphology was significantly improved, due probably to the evaporation rate of isobutyl alcohol being higher than isopropanol, leading to a slow crystallization process of the perovskite films. The enhancement on CH₃NH₃PbI₃ thin film quality is beneficial for increasing the absorption of perovskite film and the photovoltaic performance of perovskite solar cell.

Keywords: perovskite solar cell, additive, isobutyl alcohol, two-step method, film morphology.