Short Communication

Effect of TiCl_4 Treatment on Different TiO_2 Blocking Layer Deposition Methods

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Organolead halide perovskite $\text{CH}_3\text{NH}_3\text{PbI}_3$ solar cells with all-mesoporous device structure were fabricated with TiO_2 blocking layer created by two different methods. Three groups of devices were tested. The TiO_2 blocking layer of group 1 was spin-coated with conventional method, while that of groups 2 and 3 was grown by magnetron sputtering of metallic Ti and followed thermal oxidation. Different durations (0, 30, 45, and 60 minutes) of TiCl_4 treatment were used during fabrication to study how the performance of each group of solar cells was affected. For all groups of samples, it was obvious that treated samples had much better I-V characteristics than non-treated, with up to 50% improvement in PCE. The difference in the performance improvement was investigated.

Keywords: Perovskite Solar Cells (PSCs), TiO_2 blocking layer, TiCl_4 treatment

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