

Improvement of the energy conversion efficiency of perovskite solar cells with nanoimprinted mesoporous TiO₂ light scattering layer

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Perovskite solar cells have recently attracted as their high energy conversion efficiency, low-cost production, simple process such as solution techniques at low temperatures, and flexibility. The increasing light harvesting is the best way to improve the energy conversion efficiency of solar cells. However, it is difficult to adapt the light harvesting materials in perovskite solar cells because the device architectures consist of thin film layers. Proper engineering of solar cell structure can improve the device performance. Here we used nanoimprint lithography technique to form well-ordered nanoimprinted layer of mesoporous TiO₂ on blocking TiO₂/FTO substrate. The nanoimprinted layer resulted in ideal scattering characteristics for optimum light trapping. Compared to the plain layer of mesoporous TiO₂, the nanoimprinted-layers device yielded 14.24% increase in power conversion efficiency.