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Abstract

Hole transport material free (HTM-free) perovskite solar cells (PSCs) with carbon counter electrode have the advantages of low-cost, good efficiency and high stability. Here in this work, we demonstrate that incorporating $Au@SiO_2$ core-shell NPs into TiO_2 scaffold layer increases the power conversion efficiencies (PCEs) of PSCs by improving the light absorption and facilitating carrier transfer or separation through SPR effect. With the optimal concentration of 0.3 wt % $Au@SiO_2$ incorporation, the average PCE of PSCs enhances to 13.85±0.45 % from the reference