

Abstract Submitted
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Efficient organic-inorganic hybrid perovskites and doped metal oxide heterojunction solar cells. XIAOJUAN FAN, Marshall University — Organic-Inorganic hybrid perovskite $\text{CH}_3\text{NH}_3\text{PbI}_3$ has recently attracted much attention for its high efficient solar energy conversion. This semiconducting pigment with a direct bandgap of 1.55 eV has made it an interesting optical and electronic material over the whole visible solar emission spectrum. The role of hole conducting has been found in this semiconductor that allows perovskite solar cell (PSC) to be formed by $\text{CH}_3\text{NH}_3\text{PbI}_3/\text{TiO}_2$ heterojunctions that use TiO_2 as scaffold, and carbon as a back contact. We will report a double layer metal doped $\text{TiO}_2/\text{Al}_2\text{O}_3$ mesoporous scaffold covered by the p-type semiconducting pigment to form a high efficient PSC through solution method. TiO_2 and Al_2O_3 are both large band gap semiconductors that affect conducting and recombination rate in solar cells. One improvement work is doping other metal elements in TiO_2 to raise the mobility while extend the recombination time. It has suggested that optimal amounts of doped metals such as Cu, Co, Mn can suppress the reduction of Ti^{4+} resulting better transportation. TiO_2 thin films doped with metals are subjected to the EPR analysis and the results will be correlated with measurements of electronic-optical properties.

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