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**Efficient organic-inorganic hybrid perovskites and doped metal oxide heterojunction solar cells.** XIAOJUAN FAN, Marshall University — Organic-Inorganic hybrid perovskite CH3NH3PbI3 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 CH3NH3PbI3/TiO2 heterojunctions that use TiO2 as scaffold, and carbon as a back contact. We will report a double layer metal doped TiO2/Al2O3 mesoporous scaffold covered by the p-type semiconducting pigment to form a high efficient PSC through solution method. TiO2 and Al2O3 are both large band gap semiconductors that affect conducting and recombination rate in solar cells. One improvement work is doping other metal elements in TiO2 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 Ti4+ resulting better transportation. TiO2 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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