Characterization of Perovskite solar cell with copper oxide seed layer synthesized by hydrothermal synthesis

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Copper oxide seed layer synthesized by hydrothermal synthesis was used to understand the effects of the copper oxide nano-structured on the seed layer in the Perovskite solar cell. Copper oxide is a more stable and less-expensive suitable material for PEDOT:PSS, Spiro-MeOTAD as hole transfer layer.
The structure of this device is FTO / CuO / Cu_2O / $CH_3NH_3PbI_3$ / PCBM / Ag. The CuO ,Cu_2O, $CH_3NH_3PbI_3$ and PCBM were used as a seed layer, a hole transfer layer, an active layer, and an electron transfer layer, respectively. The morphology, the chemical bonding and component, thickness of hole transfer layer was measured by using SEM, XRD and EDX, Alpha step photometer. The electrical characteristics of the device were measured using a solar simulator.
Due to the thickness of the seed layer, photoelectric conversion efficiency is not improved.