Characteristics of Perovskite solar cell with nano-structured MoO_3 hole transfer layer prepared by hydrothermal synthesis

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In order to increase the hole mobility in Perovskite solar cell, a MoO_3 nano-structured hole transfer layer was synthesised by hydrothermal synthesis. The structure of the device is FTO / CuO / MoO_3 / $CH_3NH_3PbI_3$ / P3HT / Ag. The CuO, MoO_3, $CH_3NH_3PbI_3$ and P3HT were used as a seed layer, a hole transfer layer(HTL), an active layer, and an electron transfer layer, respectively. The morphology of the MoO_3 HTL was confirmed as like flower shape by SEM. The chemical bonding of the MoO_3 nano-structured was measured by using XPS and Raman spectroscopy. As a result, MoO_3 peak and Mo=O and O-Mo-O bonding were confirmed. The electrical characteristics of the device were measured using a solar simulator. The photoelectric conversion efficiency of 5.3% was obtained in the Perovskite solar cell with MoO_3 nano-structured HTL.