Planar p-i-n perovskite solar cells based on MoO3/Ts-CuPC mixed PEDOT:PSS hybrid interfacial layer

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We introduce the mixture effect of PEDOT:PSS and TS-CuPc (copper phthalocyanine-3,4′,4″,4‴-tetra-sulfonated acid tetra-sodium salt) as a hole transport layer (HTL), and the interfacial effect of molybdenum oxide (MoO3) between an anode and a mixed HTL in p-i-n structured CH3NH3PbI3 perovskite solar cell. TS-CuPc mixed PEDOT:PSS enhanced the electrical conductivity. MoO3 layer prevented the direct contact between ITO and mixed organic HTL, and induced the energy level alignment by tuning the work function of anode. As a results, the device performance and the stability were increased in comparison with controlled devices. To elucidate the detail roles of TS-CuPc mixed PEDOT:PSS, we quantitatively analyzed the AFM images as well as GIWAXS patterns.