

Highly efficient H_3PO_4 treated CuS counter electrodes for improving photovoltaic performance of quantum dot sensitized solar cells

Mohammed Panthakkal Abdul Muthalif, 최영선[†], 박주미,
박한규, 최지훈
부산대학교
(choe@pusan.ac.kr[†])

This study describes the effect of H_3PO_4 treatment on CuS counter electrodes (CEs) to enhance the photovoltaic performance of quantum dot sensitized solar cells (QDSSCs). The chemical bath deposition (CBD) method was used to prepare H_3PO_4 treated CuS CEs and solar cell device fabricated with the help of $\text{TiO}_2/\text{CdS}/\text{CdSe}/\text{ZnS}$ photoanodes and polysulfide electrolytes. The structural, optical, and electrochemical properties of the prepared samples were analyzed using scanning electron microscope, UV-visible spectrophotometer, and impedance spectroscopy. The photovoltaic parameters showed significant improvement after the addition of H_3PO_4 on CuS thin film surface. The catalytic activity of prepared samples was evaluated using cyclic voltammetry and the results shows that H_3PO_4 treated CuS CEs can effectively catalyze the reduction of polysulfide electrolyte.