
THE EFFECT OF TiCl_4 TREATMENT ON THE INTERFACE ROUGHNESS TO THE ELECTRON TRANSPORT LAYER OF PEROVSKITE SOLAR CELL AND THEIR PERFORMANCE.

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Perovskite solar cell (PSCs), have been attracting a massive attention, due to their photovoltaic performance and reasonable cost compared to prevailing photovoltaic technologies [1]. In PSCs, the interface between Perovskite layer (general formula as RPbX_3) and electron transport layers (ETLs) play a significant role in power conversion efficiency (PCE). TiO_2 has been considered as one of the most popular compounds using as the electron transport layers among the metal oxides utilized in PSCs [2]. In order to enhance the PSCs performance, various efforts have been considered to the modification of TiO_2 . To improve the carrier transport ability, this study focuses on TiO_2 treated with TiCl_4 solution because of its surface roughness-reduced ability leading to high transmittance in the UV-Vis region so that a photon can pass through easily and be absorbed by the perovskite layer. Investigating various concentrations of TiCl_4 solution at a fixed time and different step-by-step processes at unchanged annealing temperature also has been studied in this work to find out the optimal TiCl_4 concentration as well as optimal process. Atomic Force Microscopy (AFM), X-ray Diffraction (XRD) and Scanning Electron Microscope (SEM) has been measured in this paper. This study promises a significant enhancement of light-to-current efficiency of perovskite solar cells and draw scientist's inspiration for synthesis the best ETLs in the near future.

This research was supported by Korea Electric Power Corporation. (Grant number: R17XA05-10) and Creative Materials Discovery Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science and ICT (2017M3D1A1040828) and by the grants from the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT, and Future Planning (NRF-2016R1C1B1014649).