

Effects as Plasma Treatments on CdS Buffer Layers in CIGS Thin Film Solar Cells

Hyun-Jun Jo^{1,2}, Shi-Joon Sung¹, Dae-Kue Hwang¹, In-Ho Bae², Dae-Hwan Kim^{1*}

¹Daegu Gyeongbuk Institute of Science and Technology (DGIST), Daegu,

²Department of Physics, Yeungnam University, Gyeongsan, Korea

We have studied the effects of plasma treatments on CdS buffer layers in CIGS thin film solar cells. The CdS layers were deposited on CIGS films by chemical bath deposition (CBD) method. The RF plasma treatments of the CdS thin films were performed with Ar, O₂ and N₂ gases, respectively. After plasma treatments, the solar cells with Al:ZnO/i-ZnO/CdS/CIGS structures were fabricated. The surface properties of the CdS/CIGS thin films after plasma treatments were investigated with SEM, EDX and AFM measurements. The electrical properties of manufactured solar cell were discussed with the results of current-voltage measurements. The plasma treatments have a strong influence on the open circuit voltage (VOC) and the fill factor of the solar cells. Finally, a correlation between the surface properties of CdS layer and the efficiencies of the CIGS thin film solar cells is discussed.

Keywords: CIGS, CdS, plasma