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Effects of Cd Interlayer on CdS/CdTe Thin Film Photovoltaics

DAVID RIVELLA, LUIS CERQUEIRA, M. ALPER SAHINER, Seton Hall University — CdS/CdTe thin films are well known for their photovoltaic effects. However, it is also known that there are various factors that limit the output of the photovoltaic cells. In these particular thin films, a limiting factor is the interaction of CdS and the CdTe layers. By adding a Cd layer between CdS and CdTe, a buffer zone was created. Therefore, the interaction between the aforementioned layers was changed. In this study, the buffer zone was added to the photovoltaic cells, while the ratio of Cd to Te in the CdTe layer was varied, in order to observe the effects of the buffer in regards to the diffusion of Te in traditional CdTe/CdS photovoltaics. The samples were created on ITO coated glass using pulsed laser deposition. This created uniform samples with an approximate thickness of 0.75 microns. In order to test the effect of the Cd buffer layer, the CdTe layers were deposited with varying ratios of Cd to Te. XRD analysis confirmed that the deposited Cd and Te formed crystalline CdTe. The active carrier concentrations were then determined using Hall Effect measurements. The photovoltaic properties were measured using Keithley source meter set-up. The effect of structural modifications on the active carrier concentrations and photovoltaic properties will be discussed.

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