

Effect of Ammonia Water Rinsing on the Performance of CIGS Solar Cells With Cd-Compound Buffer Layers

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Cd-compound buffer layers grown by the chemical bath deposition (CBD) method are the best n-type partners of p-type CIGS absorber layers. Especially, cadmium sulphide (CdS) is an excellent material because of its intermediate band gap (~ 2.42 eV), high absorption coefficient, electron affinity and low resistivity [1]. However, chemical bath deposited CdS layers usually contain many oxygen-related impurity phases such as Cd(OH)₂ and H₂O etc., which lead to poor performance of solar cell, mainly responsible for a distorted I-V curve and low fill factor [2, 3]. So, it is essential to remove these impurity phases for a good buffer function as well as for good photovoltaic performance. Therefore a post-deposition treatment such as, ammonia water (ammonium hydroxide) rinsing had been proposed to successfully remove these phases [4]. In this work, CdS thin layers were prepared by chemical bath deposition (CBD) using 0.0015 M of cadmium sulphate (CdSO₄) and 0.05 M of thiourea (NH₂CSNH₂) as Cd and S-precursors with 5 M of ammonium hydroxide (NH₄OH) as the complexing agent. Immediately the as-prepared layers were immersed in 7 % of ammonia water solution at room temperature for 1 min. Further, CIGS based solar cell was fabricated using rinsed CdS layer as buffer. Finally, effect of ammonia water rinsing on the performance of CIGS solar cells was studied. The details of results will be presented and discussed.

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