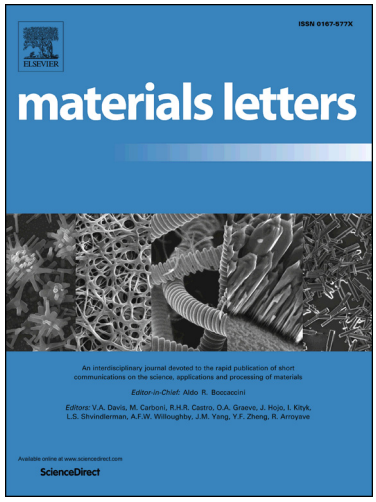

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Optimization of chemical bath deposited cadmium sulfide buffer layer for high-efficient CIGS thin film solar cells

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ABSTRACT:

An optimization of CdS chemical deposition process is presented in order to fabricate high quality CdS buffer layer for high-performance CIGS thin film solar cells. It is found that the heterogeneous and homogeneous reaction can be regulated conveniently by changing the concentration of cadmium acetate. No obvious large CdS particles on the surface of CdS film can be observed due to the dominant heterogeneous reaction and suppressed homogeneous precipitation under the suitable concentration of cadmium acetate. The device with CdS buffer layer deposited at 0.052 M cadmium acetate shows the best efficiency of 11.42%. The performance of the device can be further improved by post-annealing treatment in air. An improved champion efficiency of 12.57% is achieved at the annealing temperature of 180 ºC.

Keywords: CdS buffer layer; $Cu(In,Ga)Se_2$; Raman; Annealing treatment; Thin films.

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