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Eects of Post Deposition Treatments on Vacuum Evaporated CdTe Thin Films and CdS=CdTe Heterojunction Devices

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Abstract: CdTe, CdS thin films and n-CdS/p-CdTe heterostructures have been prepared by conventional vacuum evaporation technique. Some post deposition treatments to optimize the device efficiency have been analyzed and the effects of the individual process steps on the material and device properties were investigated. Annealing in air with and without $CdCl_2$-treatment decreased the CdTe resistivity. The $CdCl_2$-dip followed by annealing in air at 300°C for 5 min improved the grain size and polycrystalline nature of CdTe thin films. Solar efficiency improvements were achieved when heterojunctions were prepared on successively treated (i.e. etched, air annealed, $CdCl_2$-processed) CdTe surfaces. Etching of the CdTe surface with potassium dichromate solution prior to metal contact deposition lead to the formation of low-resistance Au contacts and increase in open circuit voltage and fill factor values.

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