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Structural and Optical Characterisation of Vacuum Deposited CdTe Thin Films

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Abstract: The structural and optical properties of vacuum deposited CdTe thin films on glass substrates were investigated. The effect of the heat treatment in air over the former properties of the layers was also examined. Grain sizes of air heated layers estimated by net broading in the XRD spectra were found to be larger than as-grown layers, confirming that grain growth had occurred during the heat treatment. RHEED patterns of the layers grown at substrate temperatures between 150°C and 170°C had a distinct $\{111\}$ preferred orientation. As-grown CdTe layers were slightly p-type, but highly resistive. Air heat treated layers were p-type and slightly less resistive than as-grown layers, possibly due to oxygen related Cd vacancy formation. Optical bandgap values, determined by envelope function model, were found to be 1.53 eV and 1.51 eV for as-grown and heat treated layers, respectively.

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