

Electrodeposition of CdTe thin films onto n-Si(1 0 0): Nucleation and growth mechanisms

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The mechanisms related to the initial stages of the nucleation and growth of cadmium telluride (CdTe) thin films on the rough face side of a (1 0 0) monocrystalline n-type silicon have been studied as a function of different potential steps that varied from an initial value of -0.200V to values comprised between -0.515 and -0.600V versus saturated calomel electrode (SCE). The analysis of the corresponding potentiostatic j/t transients suggests that the main phenomena involved at short times is the formation of a Te-Cd bi-layer (BL). For potentials below -0.540 V, the formation of this bi-layer can be considered independent of potential. At greater times, the mechanisms is controlled by two process: (i) progressive nucleation three dimensional charge transfer controlled growth (PN-3D)_{ct} and (ii) progressive nucleation three dimensional diffusion controlled growth (PN-3D)_{diff}, both giving account for the formation of conical and hemispherical nuclei, respectively. Ex situ AFM images of t