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Photoelectrochemical Properties of CdSe:Sb Thin Film based Solar Cells: Influence of Electrode Thickness

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**Abstract:** CdSe:Sb (0.1 mol%) thin films of varying thicknesses (423--1838 nm) have been deposited onto the glass and stainless steel substrates in an alkaline medium (pH = 10) using a solution growth technique. The photoelectrochemical activities of these films have been examined using CdSe:Sb (0.1 mol%)/0.25 M NaOH - 0.25M Na<sub>2</sub>S- 0.25M S/graphite cell configuration. The films were characterized under illumination of 20 mW/cm<sup>2</sup> intensity to evaluate various cell parameters such as  $\eta$ , ff,  $R_s$ ,  $R_{sh}$  etc. It is found that the efficiency  $\eta$  and fill factor ff increased from 0.24% to 0.45%, and 51% to 52.9%, respectively, with increase in the film thickness from 423 nm to 1826 nm. The I-V characteristics in dark revealed that the junctions formed in these cells are of rectifying nature. The magnitude of flat band potentials  $V_{fb}$  were determined from the C-V characteristics in dark and found to increase from 1080 mV to 1370 mV. The improvement in the cell performance has been explained in terms of the modified crystal size, surface features and film transport characteristics.

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