



INVESTIGATION OF ELECTROPHYSICAL PROPERTIES OF CADMIUM SULPHIDE THIN FILMS

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ABSTRACT

CdS has wide band gap (2.4 eV) and CdS thin films are used as a buffer and n-type window layers in CdTe and CIGS based solar cells.

Electrical properties as a function of temperature of CdS films (sheet resistance, carrier concentration and mobility) and a roll of chlorine doping were studied with the aim of understanding how deposition conditions influence on properties of CdS films. All CdS films were deposited on glass substrate by chemical bath deposition (CBD) technique. Films were deposited in a standard bath with thiourea from ammoniacal solution of CdSO_4 and for chlorine doping NH_4Cl was used. After deposition, films were annealed in hydrogen atmosphere at different temperatures between 200 and 400°C. Duration of deposition was taking into account as well (5 – 120 min). Thermal annealing in H_2 atmosphere is a convenient and appropriate method for precise control of CdS film electrical properties.

The electrical properties of the annealed CdS films were characterized using a four probes van der Pauw Hall effect measurement method. The measurement of carrier concentration and mobility as a function of temperature was performed by applying 0.875 Tesla magnetic field and passing a 0.50 mA direct current through the sample.

Keywords: Cadmium Sulphide, Solar Cells, Chemical Bath Deposition, Thin films, Resistivity