

Characterization of Chemically Deposited CdS Thin Films Annealed in Different Atmospheres

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Abstract : Cadmium sulfide films were deposited onto glass substrates by chemical bath deposition (CBD) from a bath containing cadmium acetate, ammonium acetate, thiourea, and ammonium hydroxide. The CdS thin films were annealed in air, argon, hydrogen and nitrogen for 1 h at various temperatures (300, 350, 400, 450 and 500 °C). The changes in optical and electrical properties of annealed treated CdS thin films were analyzed. The results showed that, the band-gap and resistivity depend on the post-deposition annealing atmosphere and temperatures. Thus, it was found that these properties of the films, were found to be affected by various processes with opposite effects, some beneficial and others unfavorable. The energy gap and resistivity for different annealing atmospheres was seen to oscillate by thermal annealing. Recrystallization, oxidation, surface passivation, sublimation and materials evaporation were found the main factors of the heat-treatment process responsible for this oscillating behavior. Annealing over 400 °C was seen to degrade the optical and electrical properties of the film.

Keywords : cds, thin films, annealing, optical, electrical properties

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