ISSN: 1391-8796
Abstracts of Presentations
1st Ruhuna International Science & Technology Conference
University of Ruhuna, Matara, Sri Lanka
January 22-23, 2014

Optimizing growth process of CdS semiconductor thin films for efficiency enhancement in CdS/CdTe solar cells

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Thin film CdS/CdTe solar cells have emerged as a cost effective and high efficiency alternative to expensive silicon solar cells. Optimizing the growth process of CdS films is important in order to further enhance the efficiency of these solar cells. Transparent and homogenous cadmium sulfide (CdS) thin films were deposited by chemical bath deposition (CBD) technique on microscopic glass substrates by varying the deposition time from 20 to 60 min in a chemical bath containing cadmium chloride, ammonium chloride, ammonium hydroxide and thiourea and maintained at 65^0C. The effect of the film thickness on optical energy band gap was studied by measuring the absorbance from 190 nm to 1100 nm using a UV VIS- 2450 (SHIMADZU) spectrophotometer. It was observed that the optical energy band gap values of CdS thin films decrease with increasing the thickness (deposition time) of the films and approach the value of 2.42 eV for the films deposited for 60 min.

Key words: CBD method, CdS thin films, Optical energy band gap

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