Elaboration and Characterization of Cadmium Sulfide (CdS) Thin Films Prepared by Chemical Bath Deposition (CBD)

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Abstract : Our work consists in elaboration and characterization of cadmium sulfide (CdS) thin films. Indeed, in order to deposit a series of these films, we have adopted a simple and cheap technique, such as the chemical bath Deposition (CBD). The series of samples of CdS was deposited on glass substrates by varying the deposit bath temperature from 55 to 75 ° C and by keeping the deposition time fixed (25 min). Our investigation is focused on the understanding and study of the effect of the deposition temperature on the physical properties of the thin films to which it was referred. For this purpose, we used two characterization techniques which are: the X-ray diffraction (PANalytical X-ray diffractometer) for determining the structure of the films and also, the UV-Vis spectroscopy (UV-3101 PC-SHIMADZU double beam spectrophotometer) for determining their optical properties. Thicknesses (d) of CdS films was measured with gravimetric weight different method using a sensitive electronic microbalance and were confirmed by using a profilometer of the type KLATENCORP6. The structural characterization indicates that the structure of CdS films obtained is cubic or hexagonal with preferential orientation in accordance with the plane (111) or (002), respectively. The optical characterization shows that these films have a fairly high transparency which varies between 55 and 80% in the visible range of the optical spectrum, the optical gap value of which can reach 2.2 eV. It can be suggested that these properties make these films perfectly suitable for their use as window film in solar cells in thin films.

Keywords : Thin films, chemical bath, Cadmium Sulfide, optical properties, Structural properties