INFLUENCE OF THIOUREA CONCENTRATION, DEPOSITION TEMPERATURE AND MAGNETIC FIELD ON THE PROPERTIES OF CdS THIN FILMS CHEMICALLY DEPOSITED

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The influence of a constant D.C. magnetic field, deposition temperature and thiourea concentration on the properties of CdS films grown by Chemical Bath Deposition (CBD) are presented. The aim of this work is to find the optimal values of the above parameters in order to obtain the highest value of the band-gap in CdS-CBD. For solar cells applications using CdS as window material with a band-gap of 2.43 eV, photons below 510 nm are absorbed by the CdS films and do not contribute to the photocurrent. In this case we report 2.6 eV for the CdS gap and the number of photons that reach the absorber material increases about 16%. From optical and structural characterization this behavior is discussed.

1 Introduction

The low temperature used in the Chemical Bath Deposition (CBD) technique and the possibility to change some parameters as temperature, time deposition, pH, concentration of reactants allow the variation of the CdS thin films properties [1]. At the same time, the application of external agents gives the possibility to improve the quality of the films. Recently, we reported changes in the structural, optical and electrical properties of the films grown under an external magnetic field [2,3]. The aim of this work is to establish the optimal values of the growth parameters in order to obtain the highest value of the band-gap. When CdS with a band-gap of 2.43 eV is used as a window material for solar cells applications, photons below 510 nm are absorbed in the CdS films and do not contribute to the photocurrent.

2 Experimental

CdS thin films were deposited on glass substrates utilizing an experimental set up described in an earlier paper [3]. The chemical bath was prepared in a 100 ml beaker containing 0.003 M CdCl₂, 0.02 M NH₄Cl, 2.3 M NH₃ and varying the