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DEVELOPMENT AND CHARACTERISATION OF N-CDS THIN FILM

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ABSTRACT

CdS thin film in the range of certain nanometer can be developed by chemical bath deposition on molybdenum substrate by non-aqueous method. In this method, we use ethylene glycol as solvent. The deposited thin films are stoichiometric in nature and it is found to be 1:1 in the ratio. Also, it can be easily seen that the band gap of thin film is found to be 2.43 eV which is in well agreement with the reported results.

Keywords: *Chemical bath deposition; Cadmium Sulphide; Characterisation; Non- aqueous method; Stoichiometric.*

I. INTRODUCTION

We know that the Cadmium Sulphide (CdS), which is a semi conducting material with a band gap of 2.42 eV. Using this property we can use CdS as window materials. Due to their wider use in opto-electronics e.g. LEDs, solar cells, LDR, can easily be seen that semiconducting material is most important in our daily life [1-17].

Though these CdS thin films are made by several techniques e.g. vaccum evaporation process, sputtering, electro-depositions, spray pyotysis, LASER abalation and chemical bath deposition. But chemical bath deposition method is most common and low cost method in comparison to others.

In our paper we have reported characterisation as:-
1 The as deposited films were undergone scanning electron microscope (SEM) to study the surface morphology and it was examined by JEOL JSM 840A SEM.

And finally it was tested for the various conditions for solar cells under different etching conditions.
2 I-V characteristics of CdS based Photo electrochemical solar cell [18-24].

II. EXPERIMENTAL PROCEDURE

The electrolyte was prepared by taking Ar-grade of $CdCl_2$ in 40 ml of ethylene glycol. The temperature of bath was maintained at 150^0C. This deposition was carried out on molybdenum substrate of dimension 1.5cm X 1cm X 0.2cm on grinded with 600 number grit carborandum paper, properly washed with surf excel and finally with distilled water. Our substrate was suspended by a rigid support and after loading the sample 0.4M thiourea was introduced in electrolyte for 15 minutes. After the completion of deposition the sample were properly washed by distilled water to remove some unwanted materials and to check the adhesion.

III. RESULT AND DISCUSSION

Figure no 1 shows the SEM photographs of CdS thin film. From the SEM photographs it is clear that the grains are uniformly distributed and densely packed. And no charging effect was reported.

Figure no 2 shows the I-V characteristics of CdS based solar cell under different etching conditions. From graph also we conclude that the optimised solar cell is 10 second etching.

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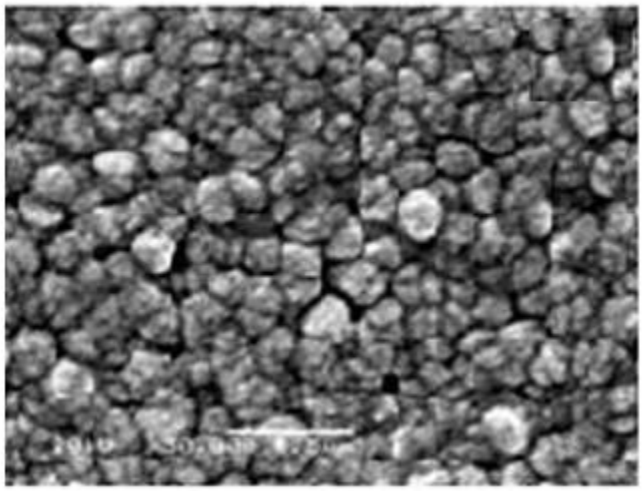

Figure 1

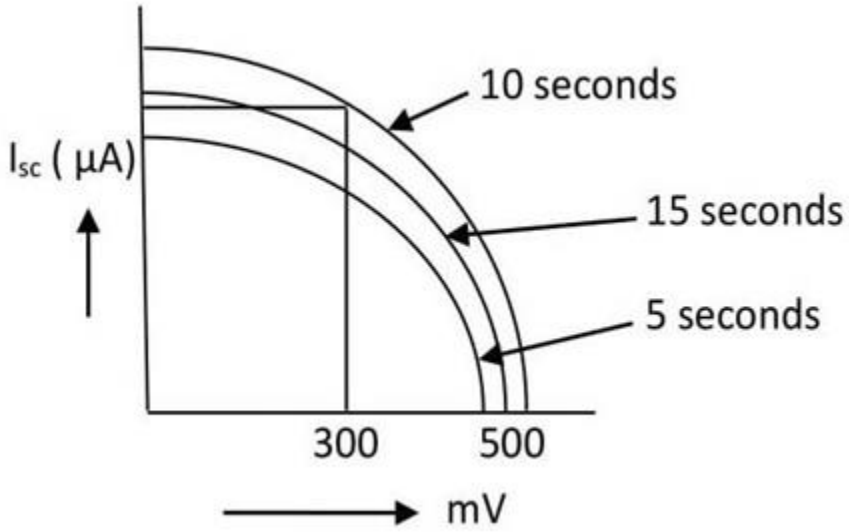

Figure 2

IV. CONCLUSION

The CdS films can be deposited by chemical bath deposition also by non-aqueous method using ethylene glycol as solvent. From the characterisation we observed that the SEM graph is correct. And also we observed that the I-V characteristics are optimum in case of etched for 10 seconds. Though, we have to optimise the conditions for more and more efficient value of conversion.

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