cell analysis, x-ray diffraction (XRD), energy dispersive x-ray analysis (EDXA) and scanning electron microscopy (SEM) techniques.

Keywords: electrodeposition, CdZnS, Tauc plot, undulation, doping

INTRODUCTION

The cadmium zinc sulphide (CdZnS) thin films have been studied as a potential wide band gap semiconductor to be used in solar cells, detectors and other optoelectronic devices (Panbude et al., 2018). The CdZnS is an n-type semiconductor which is basically produced by doping the CdS lattice with Zn atoms. The CdZnS is mostly deposited by chemical bath deposition and vapour deposition techniques (Sanap and Pawar 2011; Lee *et al*., 2003), while electrodeposition technique is used infrequently though it is a simple and low cost technique. The CdZnS has been electrodeposited by Jayachandran *et al.,* (1990), at high deposition voltages (-0.9 V to -1.1 V) and mostly the electrodeposition of CdZnS were carried out under room temperature conditions (Lokhande *et al.*, 1988; Jayachandran *et al.,* 1990; Nagalingam *et al.*, 2011). Morris and Vanderveen (1992) have electrodeposited CdZnS at high temperatures with the assistance of ZnS formation reaction in which $ZnCl_2$(aq) and $Na_2S_2O_3$(aq) were reacted to form ZnS. Further, the same reaction has also been followed by some other researchers (Clark 1974; John 1935). Kassim *et al.,* (2011) have carried out the chemical bath deposition of ZnS by reacting Zn^{2+} ions and $Na_2S_2O_3$. The reaction between Cd^{2+} and $Na_2S_2O_3$ was reported to be feasible only under UV radiation according to works of photochemical deposition technique (Kumar *et al.*, 2013; Pushpalatha and Ganesha 2015) while no such condition was required for ZnS formation in the reaction between Zn^{2+} ions and $Na_2S_2O_3$.

In Tauc plots of CdZnS thin films, undulations were observed in studies carried out elsewhere (Sanap and Pawar 2011; Kumar 2007) and these undulations revealed to be more pronounced when the materials were deposited at low temperature than at high temperatures (Sanap and Pawar 2011; Lee *et al.*, 2003). Similar undulation was also encountered in the present study, but a method has been developed to eliminate the formation of undulation near the band gap of CdZnS and hence to minimize the