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# CZTS Thin Film Solar Cell by using Electrochemical Deposition method

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**Abstract:** *World has been facing energy crises due to increase in the energy demand and depletion in the reserves of conventional sources like fossil fuels. Hence the development and harnessing non-conventional sources is a need. Solar energy is the largest source of energy which if harnessed can provide 1000 times the current energy demand. Converting this energy into electricity through solar cell is one of the best ways. Silicon solar cells have been traditionally used to harness solar energy. Due to high cost and depleting reserves of Si; CIGS and CdTe solar cells came in picture which have less efficiency but at low cost. But these cells contain elements like Cd which is toxic and Te, In, Ga are costly and scarce. CZTS thin films have been deposited on conducting glass plate / glass substrates using low-cost electrode position method. In different deposition techniques for CZTS absorber layer electro deposition is an effective and low-cost alternative deposition method. CZTS solar cell can prove a substitute for those solar cell as they contain novel and earth abundant material which are easily at low cost. The synthesis of CZTS thin film using electroplating method was carried out by depositing Sn, Cu, and Zn one after the other on a single substrate. The aim of this study is to fabricate $Cu_2ZnSnS_4$ (CZTS) thin film by electrodepositing the metal precursor. Important electroplating variables of the electro deposition are current distribution, pH, temperature, agitation and solution composition. The process is in two steps 1) comprised the electroplating of metallic precursors. As all precursors were first fabricated on stainless steel (SS) for optimization of process then it was synthesized on FTO coated glass. 2) Second process step was sulphuration of precursors. The FE-SEM and EDS gives the concentration then XRD shows the particle size. The XRD patterns of the precursor showed the preferred orientation of the phases.*

**Keywords:** Diffusion limited aggregation (DLA), kesterite structure of CZTS, Sulphurization, SEM

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