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**A STUDY ON CUPROUS OXIDE / CUPROUS SULPHIDE
THIN FILM SOLAR CELLS.**

A PROJECT REPORT PRESENTED BY

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ABSTRACT

Cuprous oxide is an attractive material for solar cell applications because it is low cost, non-toxic and has a direct band gap of 2eV. In this research work Cu_2O thin films were deposited on titanium substrate by electrodeposition method. Films were investigated by the method of spectral response to ensure that the deposited films were n-type and SEM to obtain surface morphology of the film. Annealing treatment was used to enhance the quality of the films. Partial sulphidation of the Cu_2O films was done with S^{2-} containing chemicals (Sodium sulphide and Ammonium sulphide) using five chemical methods in order to make a p-type Cu_xS thin layer on the Cu_2O film. Using above methods, $\text{Ti}/\text{Cu}_2\text{O}/\text{Cu}_x\text{S}/\text{gold}$ heterojunction solar cell was fabricated and heat treatment was done to enhance the quality of the device. I-V characteristics were obtained in both dark and illuminated conditions and final device was tested in natural day light conditions. The best $\text{Cu}_2\text{O}/\text{Cu}_x\text{S}$ cell exhibited an open circuit voltage of 310mV and short circuit current density of $990\mu\text{A}/\text{cm}^2$ under natural light condition. The efficiency of the solar cell is 0.3%. The study reveals the potential application of electrodeposited Cu_2O thin films in low-cost thin film solar cells.