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Electrical and Optical Properties of RF Sputtered Copper Oxide Thin Films and their Suitability for Solar Cell Applications.[1] ELIJAH RHOAD, PRATHEESH JAKKALA, Illinois College — In this study, we present electrical and optical properties of Copper Oxide thin films grown by RF magnetron sputtering method for solar cell applications. Copper Oxide thin films are deposited on high temperature boro-aluminosilicate glass and Si (111) substrates at varying substrate temperatures and ($Ar+O_2$) gas flow ratios. Absorption spectrum is measured from UV-Visible spectrophotometer. Using Tauc plots, average bandgap values are calculated to be between 1.54 and 2.1 eV. Fourier-Transform Infrared Spectroscopy (FTIR) measurements are obtained to verify the absorption spectrum. Aluminum(Al) metal contacts are deposited at four corners of the films using DC sputtering method to calculate electrical properties. Resistivity, conductivity, and mobility values are calculated using Hall-Effect Measurement system. Average Hall-coefficient of Copper oxide films is measured to be + 6.42 x 10^{-5} cm^3/C indicating deposited films are p-type semiconductors. Suitability of these thin films for solar cell applications is verified from the perspective of electrical and optical properties.

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