**Copper oxide thin films grown by dc magnetron sputtering for solar cell applications**

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**Abstract:**

Solar energy is a form of clean energy we received from the Sun, which can be harnessed using a range of technologies. It includes photovoltaics, solar thermal heating, artificial photo synthesis etc. An ideal photovoltaic material is the one which helps in absorbing most of the radiation incident on it. In the present work, we have utilized copper oxide thin films and they were grown by a direct current magnetron sputtering technique. A 2 inch copper target of 99.99% purity was used as the sputter target and the depositions were carried by using argon as sputter gas and oxygen as reactive gas. All the depositions were carried out room temperature. The ratio of sputter and reactive gas during deposition was tuned to get the desired physical properties. We have studied the structural details and absorption behavior of the grown films. It was observed that the deposition conditions play a major role in obtaining a desired crystalline phase. The deposition conditions were optimized for achieving the cupric oxide phase, since they offer high absorption coefficient and desired electrical properties. Optical energy gap of the grown films obtained from the spectrophotometric studies was found to be 1.6 eV. Carrier type and the resistivity values of the films were obtained with the help of Hall effect measurements. Based on our results, we found that the films are suitable for solar energy applications.