

# A Study of Structural and Electrical Properties of $\text{Cu}_x\text{O}$ Thin Films Prepared by r. f. Sputtering

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## Abstract

*In this study  $\text{Cu}_x\text{O}$  ( $0 < x < 1$ ) thin films were prepared on glass substrate using r. f. sputtering technique in an atmosphere of  $\text{O}_2$  and Ar. The effect of varying r. f. power, oxygen partial pressure and film thickness during deposition on the crystal size and electrical properties of  $\text{Cu}_x\text{O}$  thin films were studied. The films were characterised by XRD, TEM and four point electrical resistivity probe measurements. The results of XRD showed that crystal size in these films varied by varying deposition parameters. The electrical sheet resistance of the films was found to vary from  $6.5 \times 10^3 \ \Omega/\square$  for films prepared at 250W r. f. power to as high as  $5.78 \times 10^4 \ \Omega/\square$  for films prepared at 400W r. f. power. The variation in the electrical resistivity of the films with deposition conditions was explained in terms of stoichiometric changes induced by copper or oxygen ion vacancies and neutral defects.*

**Keywords:**  $\text{Cu}_x\text{O}$ , Thin film, r. f. Sputtering, Structural Properties, Electrical Properties

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