Fabrication of Copper Oxide Thin Films by Galvanostatic Deposition from Weakly Acidic Solutions

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Copper oxide thin films are deposited low pH (<6) and low and high temperatures (10°C and 60°C), using cathodic electrochemical deposition. The effects of the deposition current densities are studied in a range including values high enough to electrolyze water, promoting hydrogen bubbles generation. The influences of deposition variables on film composition and structural, morphological, and optical properties are investigated. Auger electron spectroscopy results indicate the fabrication of both Cu₂O and CuO, which is consistent with the results of Raman spectroscopy. X-ray diffraction patterns show (111) and (220) peaks related to Cu₂O for the samples deposited at 60°C, whereas samples deposited at low temperatures are almost amorphous.

Keywords: electrochemical deposition, copper oxide, thin films, water electrolysis and band gap

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