

Surface Characteristics of Copper Oxide Thin Films with Different Oxygen Ratio

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Copper oxide thin films were deposited on the p-type Si(100) by r.f. magnetron sputtering as a function of different oxygen concentration. The deposited copper oxide thin films were investigated by atomic force microscopy (AFM), scanning electron microscopy (SEM), spectroscopic ellipsometry (SE), X-ray diffraction (XRD), and X-ray photoelectron spectroscopy (XPS). The SEM and SE data show that the thickness of the copper oxide films was in the range of 100-400 nm. AFM images show that the surface morphology was depended on the oxygen ratio. The crystal structure of copper oxide films was changed from metallic copper to copper oxide with increasing oxygen concentration. The oxidation states of Cu 2p and O 1s resulted from XPS were consistent with XRD results.