

FORMATION, INVESTIGATION AND APPLICATION ABILITIES OF Cu_2O THIN FILMS

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Copper oxide (Cu_2O) is a promising material with unique physical and chemical properties. It has applications in photocatalysis, photoelectrochemical systems, sensors, and antibacterial surfaces. It is a p-type semiconductor with a bandgap of approximately 2.2 eV, enabling absorption of light in the visible spectrum ranging from approximately 400 to 570 nanometers (nm) [1]. The properties of Cu_2O depend strongly on the synthesis method and conditions. In this study, Cu_2O thin films and powders were formed using the chemical bath deposition method. Further, the coatings and powders were decorated with Ag nanoparticles to improve their properties. The influence of pH on the crystallinity and morphology of Cu_2O was investigated. Finally, the thin films and powders were applied to photocatalysis to decompose methylene blue dye.

Copper oxide thin films and powders were characterized using X-ray diffraction (XRD), scanning electron microscopy (SEM), and Fourier transform infrared (FTIR) spectroscopy. Methylene blue dye decomposition was carried out under light illumination, and the decomposition efficiency was evaluated using UV-vis spectrometry. The XRD results showed that the thin films and powders contained a pure Cu_2O phase (Fig. 1).

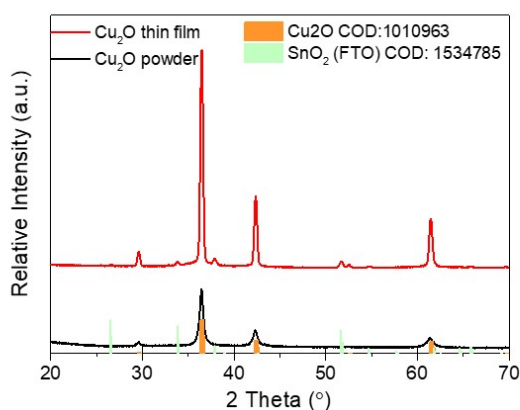


Fig. 1. XRD of thin film and powders of Cu_2O

The influence of synthesis pH on the crystallinity and morphology of the coatings and powders will be presented. Additionally, comparative studies will be carried out to determine how different synthesis conditions affect the decomposition efficiency of methylene blue dye

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