Fabrication of p-type Transparent (CuZn)O Thin Films by the Electrochemical Deposition Method

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Copper zinc oxide (CuZn)O thin films were fabricated on indium tin oxide-coated glass substrates using the cathodic electrochemical deposition method under various conditions. These included different temperatures, deposition times, and potentials. The deposition solution contained 1 mM $\text{Cu}(\text{NO}_3)_2$ and various concentrations of $\text{Zn}(\text{NO}_3)_2$. X-ray diffraction demonstrated that wurtzite structure for films deposited at 60°C, whereas samples that deposited at room temperature were amorphous. In the visible region, the samples exhibited high optical transmission, i.e., larger than 65%. Conductivity was found to be p-type by photoelectrochemical characterizations for the samples fabricated at room temperature. In contrast, the films fabricated at 60°C were n-type or close to intrinsic.

Keywords: electrochemical deposition, thin films, transparent, (CuZn)O

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