

Poster Presentation

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Optical Properties of Ag₃O₄/Ag₂O Films Synthesized From Recovered Ag Solution

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Silver was recovered from x-ray films by dissolving the silver compounds with three different solvents (concentrated nitric acid, cassava juice and NaCN solution) and the resultant solutions were labeled Electrolyte B, C, and D. A fourth solution comprising of silver nitrate made from commercial product was labeled Electrolyte A. The solution thus formed was used as electrolyte in the electrodeposition of silver oxide. Silver oxides (Ag₃O₄, AgO and Ag₂O) thin films of optical thicknesses, 0.2 μ m to 1.25 μ m were electrodeposited on a transparent FTO conducting glass substrates at room temperature from the silver solutions. The FTO conducting glass served as cathode while a carbon electrode served as the anode. Electrodeposition was done under dc current of 0.2A, 4V for 20seconds at 26oC. From the results, prominent peaks of orientation (031) and (111) planes of reflection of high intensity gave monoclinic structures of Ag₃O₄ and AgO in the films produced from all the four electrolytes with intergrowth of cubic structure of Ag₂O in the film produced from electrolyte C. The average crystalline grain size calculated gave a range of 5.274 Å – 5.432Å. Optical measurements show ultra violet range of 0.36-0.45 microns and have almost zero absorbance in VIS-IR regions of the spectrum. The films have a band gap range of 2.3 – 2.7eV. Transmittance and reflectance data have been used to calculate the spectral variation of their optical constants. From the results films produced from electrolyte C compared well with others.

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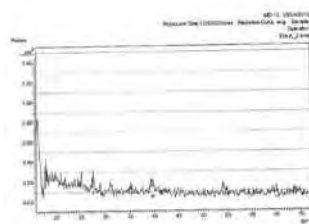


Fig. 1a: The XRD pattern of the deposited Ag₂O films from Electro. A

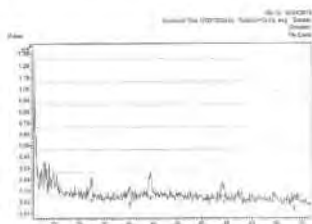


Fig. 1b: The XRD pattern of the deposited Ag₂O films from Electro. B



Fig. 2a: The XRD pattern of the deposited Ag₂O films from Electro. A



Fig. 2b: The XRD pattern of the deposited Ag₂O films from Electro. B

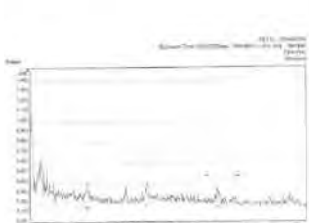


Fig. 1c: The XRD pattern of the deposited Ag₂O films from Electro. C

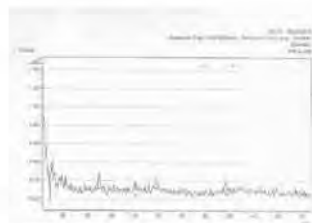


Fig. 1d: The XRD pattern of the deposited Ag₂O films from Electro. D



Fig. 2c: The XRD pattern of the deposited Ag₂O films from Electro. C

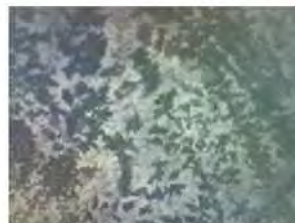


Fig. 2d: The XRD pattern of the deposited Ag₂O films from Electro. D

Keywords: X-ray films, Silver oxide, Deposition