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Influence of sputtering parameter on the properties of silver-doped zinc oxide sputtered films

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Silver doped ZnO (SZO) films were prepared by rf magnetron sputtering on glass substrates with extraordinary designed ZnO target. With the doping source for target, use $AgNO_3$ powder on a various rate (0, 2, and 4 wt.%). We investigated dependence of coating parameter such as dopant content in target and substrate temperature in the SZO films. The SZO films have a preferred orientation in the (002) direction. As amounts of the Ag dopant in the target were increased, the crystallinity and the transmittance and optical band gap were decreased. And the substrate temperature were increased, the crystallinity and the transmittance were increased. But the crystallinity and the transmittance of SZO films were retrograde at 200 °C. Upside facts were related with composition. In addition, the Oxygen K-edge features of the SZO films were investigated by using near edge X-ray absorption fine structure (NEXAFS) spectroscopy. Changes of optical band gap of the SZO films were explained compared with XRD, XPS and NEXAFS spectra.

Keywords : Siver doped ZnO (SZO) film, physical properties, RF magnetron sputtering, NEXAFS.

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