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수소화된 ZnO:Al 박막 특성연구

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Properties of transparent and conductive hydrogenated Al-doped ZnO films

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Key words : ZnO(산화아연), Al doping(알루미늄 첨가),hydrogenated(수소화), rf magnetron sputtering(rf 마그네트론 스퍼터링)

Abstract : This study examined the effect of the hydrogen ratio on the electrical and optical properties of hydrogenated Al-doped zinc oxide (AZO) thin films deposited by rf magnetron sputtering using a ceramic target (98 wt. % ZnO, 2 wt.% Al_2O_3). Various AZO films on glass were prepared by changing the $H_2/(Ar+H_2)$ ratio at room temperature. The AZO:H films showed a lower resistivity and a highercarrier concentration and mobility than the AZO films. However, the resistivity and mobility of the AZO:H films increased and decreased with increasing H_2 flow ratio, respectively. As a result, the AZO:H films grown with 2% H_2 addition showed excellent electrical properties with a resistivity of 4.98×10^{-4} Ω cm. The UV-measurements showed that the optical transmission of the AZO:H films was > 85% in the visible range with a wide optical band gap. In addition, the effect of H_2 flow ratio on the structure and composition of hydrogenated AZO thin films have also been studied.

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