P-37

Effect of substrate temperature on the electrical, structural and optical properties of Ag doped ZnO thin films

정은경, 김인수, 김대현, 최세영†

연세대학교 신소재공학과

(sychoi@yonsei.ac.kr†)

The effect of substrate temperature on the structural, electrical and optical properties of Ag doped ZnO (SZO) thin films were investigated. All of the films were deposited with targets of 2 wt.% of Ag_2O content using an e-beam evaporator and the substrate temperature varied from room temperature to 250°C. All of the deposited films were annealed in a temperature range between 350 - 650°C for 5 h in air. As deposited SZO thin films showed p-type conductivity except a sample fabricated at room temperature, and the films fabricated at 150°C showed the highest hole concentration of 3.98×10^{19} cm^{-3}. As deposited thin films were randomly oriented and intensities of peaks increased as the heat treatment temperature increased. The thin films deposited at 150°C showed the highest UV emission intensity.

Keywords: ZnO, Ag doping, thin film, luminescence, e-beam evaporator

P-38

Changes in properties of ZnO:Al Films with deposition temperature fabricated by E-beam evaporation

김대현, 김도윤, 정은경, 김인수, 최세영†

연세대학교 신소재공학과

(sychoi@yonsei.ac.kr†)

Recently, ZnO films have attracted much interest as transparent conducting films attributed to low material cost, non-toxicity, relatively low deposition temperature, and stability in hydrogen plasma compared to ITO films.

We investigated the effect of deposition temperature on the properties of Al doped ZnO transparent electrode as a substitute for ITO. Al doped ZnO thin films were deposited on alumino-borosilicate glass and Si-wafer substrates by E-beam evaporation. Only (002) diffraction peak was detected from X-ray diffractometer (XRD), so we concluded that the thin films were highly c-axis-oriented. The SEM images showed that the films had faceted surface structure and atomic force microscopy (AFM) image revealed that root mean square roughness was below 200 Å. The optical transmittance of the films was increased as deposition temperature was increased in the visible range. The optical band gap energy of the films was above 3.3 eV. We achieved the lowest resistivity of 5.5×10−4 Ω·cm from the thin films.

Keywords: Zinc oxide, E-beam evaporator deposition, Crystal structure, Optical and electrical properties