

**어닐링 조건이 RF Magnetron sputtering을 이용하여 증착된 undoped ZnO 박막의 결정 및 광학특성에 미치는 영향**

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**The effect of annealing conditions on the structural and optical properties of undoped ZnO thin films prepared by RF Magnetron sputtering**

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**Abstract :** In this study, the effects of annealing conditions on the structural and optical properties of ZnO films were investigated. ZnO oxide (ZnO) films were deposited onto SiO<sub>2</sub>/Si substrates by RF magnetron sputtering from a ZnO target. The substrate was not heated during deposition. ZnO films were annealed in temperature ranges of 500 ~ 650 °C in the O<sub>2</sub> flow for 5 ~ 20 min. The film average thicknesses were in the range of 291 nm. The surface morphologies and structures of the samples were characterized by SEM and XRD, respectively. The optical properties were evaluated by PL measurement at room temperature using a He-Cd 325 nm laser. According to the results, the optimal annealing conditions for the best photoluminescence (PL) characteristics were found to be oxygen fraction, (O<sub>2</sub>/O<sub>2</sub>+Ar) of 20%, RF power of 240W, substrate temperature of RT (room temperature), annealing condition of 600 °C for 20 min, and sputtering pressure of 20 mTorr. The obtained wavelength of light emission was found at 379 nm (ultraviolet—UV region). However, the optimal parameters for the best PL characteristics of ZnO thin films were not consistent with those obtained from the (002) intensities of XRD analyses. As a result, XRD pattern was not considered as the key issue concerning the intensity of PL of ZnO thin film. The intensity of the emitted UV light will correspond to the grain size of ZnO film.

**Key Words :** Sputtering, Photoluminescence, Ultraviolet, Zinc oxide.