

## 무선 화학센서용으로 다결정 AlN 위에 성장된 나노결정질 ZnO 막의 특성

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### Characteristics of nanocrystalline ZnO films grown on polycrystalline AlN for wireless chemical sensors

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**Abstract :** In this work, the nanocrystalline ZnO/polycrystalline (poly) aluminum nitride (AlN)/ Si structure was fabricated for humidity sensor applications based on surface acoustic wave (SAW). In this structure, the ZnO film was used as sensing material layer. These ZnO and AlN(0002) were deposited by so-gel process and a pulse reactive magnetron sputtering, respectively. These experimental results showed that the obtained SAW velocity on AlN film was about 5128 m/s at  $h/\lambda = 0.0125$  ( $h$  and  $\lambda$  is thickness and wavelength, respectively). For ZnO sensing layers coated on AlN, films have hexagonal wurtzite structure and nanometer particle size. The crystalline size of ZnO films annealed at 400, 500, and 600 °C is 10.2, 29.1, and 38 nm, respectively. Surface of the film exhibits spongy which can adsorb steam in the air. The best quality of the ZnO film was obtained with annealing temperature at 500 °C. The change in frequency response (127.9~127.85 MHz) of the SAW humidity sensor based on ZnO/AlN structure was measured along the change in humidity (41~ 69%). The structural properties of thin films were investigated by XRD and SEM.

**Key Words :** Nanocrystalline ZnO SAW sensor AlN thin film.