반응성 RF 마그네트론 스퍼터링으로 증착한 AlN 박막의 특성에 질소농도 변화가 미치는 영향

임동기, 김병균, 정석원, 노용한
성균관대학교

Effect of nitrogen concentration on the microstructures of AlN thin films fabricated by reactive RF sputtering

Dong-Ki Lim, Byoung-Kyun Kim, S-W jeong and Yonghan Roh
Sungkyunkwan University.

Abstract : Aluminum nitride (AlN) thin films have been deposited on Si substrate by using reactive RF magnetron sputtering method in a gas mixture of Ar and N_2 at different N_2 concentration. It was found that N_2 concentration was varied in the range up to 20-100%, highly c-axis oriented film can be obtained at 50% N_2 with full width at half maximum (FWHM) 4.5 °. Decrease in surface roughness from 7.5 nm to 4.6 nm found to be associated with decrease in grain size, with N_2 concentration; however, the AlN film fabricated at 20% N_2 exhibited a granular type of structure with non-uniform grains. The absorption peak was observed around 675 cm^{-1} in fourier transform infrared spectroscopy (FTIR). It is concluded that the AlN film deposited at N_2 concentration of 50% exhibited the most desirable properties for the application of high-frequency surface acoustic devices.

Key Words : aluminum nitride, c-axis orientation, nitrogen concentration