【T-26】

Deposition of ZrO_2 Thin Films Using RF Magnetron Sputtering and Characterization of Their Properties on Different O_2 Concentrations

S. H. Jeong*, Y. S. Shin*, , I. S. Bae**, H. T. Kwak**, J. W. Lee*, S. B. Lee*, J. H. Boo*
*Department of Chemistry, Sungkyunkwan University, Suwon 440-746, Korea
**Department of Chemistry, Kookmin University, Seoul 136-702, Korea

Thin films of ZrO_2 were deposited on Si(100) and substrates using RF magnetron sputtering technique. To study an influence of the sputtering parameters such as RF power magnitude, annealing temperature and reactive gas effect, etc. on the film structure and electrical properties, a systematic study using I-V and C-V was mainly carried out in this study. Moreover, the as-grown thin films were characterized with FT-IR, SEM, Ellipsometry, XPS measurements to analyze their surface characteristics. XPS analysis of Zr3d5/2 line has been performed on ZrO_2 films in the amorphous state before annealing. After annealing, charging effect appeared in the ZrO_2 film and this binding energy shift was correlated with the insulating property. FT-IR spectra show that the oxygen stretching peaks become strongly after annealing. And we observed that inter diffusion after annealing caused oxygen of ZrO_2 surface. Refractive index of ZrO_2 thin film is improved by annealing. The leakage current density and capacitance property were also increased by O_2 flux. From the I-V and C-V measurements, dielectric constant and leakage current density were also observed to be 25.75 and 1×10^{-7} A/cm^2.