

열처리시 Si 기판과 zirconate 박막 사이에 형성되는 다층 구조 분석  
 Interfacial multi-layer formation between a thin zirconate film and a silicon  
 substrate during thermal treatment

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The ultrathin zirconium oxide films were grown with various gas flow ratios ( $O_2$ -Ar) by r.f-magnetron sputtering to investigate the interfacial properties between  $ZrO_2$  thin films and Si substrate by heat treatment. The stoichiometric  $ZrO_2$  films with the smooth surface could be obtained by controlling oxygen ratio to argon. The Zr-free  $SiO_2$  interfacial layer thickness abruptly increased at the annealing temperature of  $750^\circ C$ , due to rapid oxygen diffusion through the  $ZrO_2$ . Also, the Zr silicide layer was observed between  $ZrO_2$  and Zr silicate by X-ray photoelectron spectroscopy (XPS). This is explained by excess Si due to rapid diffusivity of Si into the structure resulting in forming the silicide layer on Zr silicate.