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Preparation of ZrO_2 layer on Si(111)

정현숙, 김창민
경북대학교 화학과

We studied the ALD (Atomic Layer Deposition) process of ZrO_2 in UHV. ZrO_2 layers have been produced by repeated cycles of $ZrCl_4$ and H_2O dosing on Si(111). We investigated the mechanism of ZrO_2 layer growth on a Si(111) surface using Low Energy Electron Diffraction (LEED) and X-ray Photoelectron Spectroscopy (XPS). We found that $ZrCl_4$ reacted with surface hydroxyl groups, and chlorine ligands were released as HCl in the temperature range of 300-500 K.