

ReRAM 응용을 위한 NiO 박막의 저항 변화 특성
Reproducible Resistance Switching in NiO Films for ReRAM Applications

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NiO films were deposited on Pt/Ti/SiO₂/Si substrates by RF reactive sputtering. The voltage-current characteristics of NiO-based metal-oxide-metal structures showed a reproducible memory switching behavior. The high-resistance (OFF-state resistance) to low-resistance (ON-state resistance) ratio is larger than 10² and both the high- and the low-resistance states were retained without applying an external bias voltage. As the film growth temperature was increased from room temperature to 400°C, the crystallinity of NiO film was increased but the switching voltages increased due to the decrease of defects in NiO film. From RBS and XPS analysis, it was found that the NiO films were Ni-deficient and Ni had three different bonding states caused by various defects in NiO films. These results suggest that the mechanism of resistance switching in NiO film is related to the structural defects.