

La_xAl_yO_z nanolaminate films on TiN substrates grown by atomic layer deposition

김수영¹, 박원태², 김병호², 하정숙^{1*}

¹고려대학교 화공생명공학과, ²고려대학교 재료공학과

* E-mail : jeongsha@korea.ac.kr

La_xAl_yO_z nanolaminate thin films were grown on TiN substrates at 270 °C via atomic layer deposition (ALD) technique using lanthanum 2,2,6,6-tetramethyl-heptadione [La(TMHD)³], trimethyl aluminum [TMA], and H₂O as precursors. The structural and electrical properties of the ALD grown nanolaminate films were investigated by TEM, AES, XRD, I-V and C-V measurements.

The relative ratio of Al to La was varied to optimize the electrical properties of the laminate films. Nanolaminate films with chemical compositions of LaAlO_{2.3} and La_{2.4}AlO_{3.3} were grown with film thicknesses of 12 and 25 nm, respectively. Post-annealing of the grown films improved electrical properties of leakage current and capacitance. After post-annealing at 500 °C, the metal-insulator-metal capacitors with LaAlO_{2.3} and La_{2.4}AlO_{3.3} nanolaminate films showed leakage current densities of 7×10⁻⁷ A/cm² and 3×10⁻⁷ A/cm² at 1 V, and dielectric constants of 17 and 24, respectively.