

# **Ferroelectric properties of PZT films on LaNiO<sub>3</sub> bottom electrode deposited under different oxygen partial pressure**

**(Abbreviated running title: Effect of O<sub>2</sub> partial pressure on properties of LNO films)**

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## **Abstract**

LaNiO<sub>3</sub> (LNO) films were fabricated using rf magnetron sputtering of La metal chips and Ni metal target in an Ar and O<sub>2</sub> atmosphere with different oxygen partial pressures (20, 25, 30, 35, 40, 45, and 50 percent oxygen). To understanding the relationship between the properties of LNO films and O<sub>2</sub> partial pressure, the resistivity, X-ray diffraction, microstructure, and roughness were measured as a function of O<sub>2</sub> partial pressure. About 150nm thick Pb(Zr<sub>0.35</sub>Ti<sub>0.65</sub>)O<sub>3</sub> (PZT) ferroelectric thin films on the LNO films were synthesized by spin coating the alkoxide solution precursor with subsequent post annealing at 600□, 30min. It was found experimentally that the resistivity of LNO film is increased and the roughness is decreased according to the increasing O<sub>2</sub> partial pressure. It might be attributed to the reduction of the oxygen vacancies concentration. The maximum remanent polarization and lowest leakage current density of PZT film is acquired when deposited on the LNO film with 30 percent O<sub>2</sub> partial pressure. According to the microstructure of LNO films, the film deposited with 30 percent O<sub>2</sub> partial pressure has columnar structure, on the other hand, the others has granular structure. It is suggested that the electrical properties of PZT films are affected by the structure of LNO bottom electrode.

Keyword: Perovskite, PZT, LNO, Ferroelectric properties, Electrical properties

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