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**Local characterization and charge modification of  $\text{LaAlO}_3/\text{SrTiO}_3$  heterointerface: influence of gas environment** HAERI KIM, DONG-WOOK KIM, Ewha Womans University, SEON YOUNG MOON, SEUNG HYUP BAEK, Korea Institute of Science and Technology, HO WON JANG, Seoul National University — The discovery of high-mobility 2D electron gas (2DEG) at the interface between two band insulators,  $\text{LaAlO}_3$  and  $\text{SrTiO}_3$  (LAO/STO) has stimulated researches for both applications and fundamental understanding of the intriguing phenomena. Recent experimental and theoretical studies have elucidated roles of charged surface adsorbates on the modification of the resistance of the LAO/STO system. Thus, manipulation and characterization of the surface charges on the LAO/STO surface can be crucial step for unveiling the mechanism of the peculiar physical phenomena. In this work, we used scanning probe microscopy (SPM) to investigate how the ambient gas, such as  $\text{H}_2/\text{Ar}$ , Ar, and  $\text{O}_2$ , could influence the work function and resistance of the LAO/STO system. Also, we studied how the SPM tip-induced charge writing affected the surface potential,  $V_{\text{surf}}$ , and resistance of the LAO/STO. Quantitative measurement of the influence of ambient gas and the charge writing on the surface potential led us to develop a model to explain the unique transport properties of the oxide-based 2DEG.

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