

Abstract Submitted
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Tuning the conductivity at n -type LAO/STO heterointerface by Au(111) nanoparticles¹ TRA VU THANH, Institute of Physics, National Chiao Tung University, Hsinchu, Taiwan, J.-Y. LIN TEAM², W. J. CHEN, Y. C. CHEN TEAM³, N. V. CHIEN, W. S. CHANG, Y. H. CHU TEAM⁴ — The observation of a two-dimensional electron gas (2DEG) at the LaAlO₃/SrTiO₃ heterostructure is a well-known example of interface physics. While most studies are aiming at exploring new interfaces by combining different materials, another key to real device applications is the interface control through external stimuli. In this paper, we propose a generic approach to use Au(111) nanoparticles on the LAO/STO interface as an external stimulus in pumping the free electrons into the 2DEG of the LAO/STO heterointerface. Our results show that the conductivity of the LAO/STO interface increases with the density and size of Au nanoparticles. In order to reveal the insight, the change of the interface band structure was investigated by combining both the ferroelectric pattern assisted x-ray photoelectron spectroscopy and the scanning tunneling spectroscopy with modeling calculations. This study opens a new venue of controlling the conduction of complex oxide interfaces.

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