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Optical spectroscopic investigation in Nb:SrTiO₃/SrTiO₃ oxide heterostructures D.W. JEONG, W.S. CHOI, Seoul National Univ., M. KIM, The University of Tokyo, H. OHTA, Nagoya Univ., H.Y. HWANG, The University of Tokyo, Y.S. LEE, Soongsil Univ., T.W. NOH, Seoul National Univ. — SrTiO₃ based heterostructures show various fascinating properties ranging from anomalous magnetism to field effect controlled superconductivity. In this talk, we used optical spectroscopy to study electron-phonon coupling in Nb:SrTiO₃/SrTiO₃ heterostructures, which governs the electrodynamics of the system. First, we will discuss on the heavily doped SrTiO₃ superlattices (SrTi_{0.8}Nb_{0.2}O₃/SrTiO₃), which show large enhancement of thermoelectric Seebeck coefficient.[1] As the conducting Nb:SrTiO₃ layer thickness decreases, the polaron effective mass and relaxation time increase due to the dimensional crossover of polaron. It is shown that such changes due to the electron-phonon coupling can benefit the thermoelectric properties. Second, we will discuss on electrodynamics of the δ -doped SrTiO₃ (SrTiO₃/SrTi_{0.99}Nb_{0.01}O₃/SrTiO₃) heterostructures.[2] As the temperature decreases, these heterostructures show a large enhancement of mobility, while charge carrier density remains almost constant. The role of strong electron-phonon coupling in the quasi 2-dimensional SrTiO₃ heterostructure will be also discussed. [1] H. Ohta, *et al.*, Nature materials **6**, 129 (2007) [2] Y.Kozuka, *et al.*, unpublished

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