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Effect of substrate strain on the charge dynamics of $Nd_{0.5}Sr_{0.5}MnO_3$ investigated by pump-probe technique MUNKHBAATAR PUREVDORJ, J.S. KIM, Institute of Photonics and Information Technology, Chonbuk National University, Korea, H.Y. HWANG, Department of Advanced Material Science, University of Tokyo, Japan, K. MYUNG-WHUN, Institute of Photonics and Information Technology, Chonbuk National University, Korea — We present the polarization and time dependent transmittance of $Nd_{0.5}Sr_{0.5}MnO_3$ (NSMO) thin films grown on $SrTiO_3$ (STO) (100) and STO (110) substrates. We used the normal transmission technique and the pump-probe technique for the measurement. While the transmittance of NSMO film on STO (100) is isotropic, the transmittance of NSMO on STO (110) measured with the electric field parallel to [-110] direction (E//[-110]) is larger than that of E//[100]. The time dependent transmittance change of NSMO film on STO (100) shows a sharp increase near the zero time delay and exponential decreases as the time delay between the pump and the probe pulse increases. The transmittance change of NSMO film on STO (110) shows almost the same time dependence. The time dependent transmittance change of NSMO film on STO (100) shows no significant polarization direction dependence, however the magnitude of time dependent transmittance change of NSMO on STO (110) is different depending on the polarization direction. The mechanism of the polarization dependence of transmittance change and the polarization direction independent relaxation will be discussed in terms of the substrate strain and its effect on the charge dynamics.

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