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Temperature Dependent of the Optical Spectral Weight in Correlated Metal $Nd_{1-x}TiO_3$(x=0.095) JING YANG, JUNGSEEK HWANG, THOMAS TIMUSK, Department of Physics and Astronomy, McMaster University, ATHENA SAFA-SEFAT, JOHN E. GREEDAN, Department of Chemistry, McMaster University — We investigated the infrared reflectance of $Nd_{1-x}TiO_3$, which is a hole-doped transition-metal-oxide system. In the metallic sample with x=0.095 (hole concentration=3x=0.285), the partial optical spectral weight, $\omega(\Omega,T) = \int_0^\Omega \sigma_1(\omega,T)d\omega$, turns out to be a linear function of T^2at different cutoff frequencies. Recent optical studies of LSCO [1] and BSCCO [2] also found that the optical spectral weight varies quadratically with temperature, i.e. $\omega(\Omega,T) \simeq \omega_0 - B(\Omega)T^2$, in both superconductors and nonsuperconducting metals. The coefficient $B(\Omega)$ was considered as a "thermal response" of the carriers. In our study, for $Nd_{1-x}TiO_3$(x=0.095), $B(\Omega)$ exhibits distinct features which we compare to both cuprates and conventional metals. [1] M. Ortolani *et al.*, Phys. Rev. Lett. **94**, 067002 (2005). [2] H. J. A. Molegraaf *et al.*, Science **295**, 2239 (2002).

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