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Optical Properties of $Nd_{1-x}TiO_3$ JING YANG, JUNGSEEK HWANG, THOMAS TIMUSK, Department of Physics and Astronomy, McMaster University, Hamilton, Ontario L8S 4M1, Canada, ATHENA SAFA-SEFAT, JOHN E. GREEDAN, Department of Chemistry, McMaster University, Hamilton, Ontario L8S 4M1, Canada — Infrared optical measurements were performed on the $Nd_{1-x}TiO_3$ system of chemically doped transition-metal oxides. By introducing vacancies (x) on Nd sites, the degree of filling of the d-band on Ti can be controlled. For x=0.0, $NdTiO_3$, the compound is a Mott-Hubbard insulator, while for x=1/3, $Nd_{2/3}TiO_3$, there are no d electrons and the compound is a charge-transfer insulator. Two metal-insulator-transitions are expected at x$\sim$0.10 and 0.20. In this paper, we use the infrared spectroscopy to investigate the optical properties and the low-lying electronic structures of the titanium oxide system. The absolute reflectance of the single crystals was measured via an *in situ* gold evaporation technique using a Bruker *IFT 66v/s* spectrometer between 50 and 40 000 cm^{-1}. In the metallic phase (x=0.10), we observed an unusual temperature dependence of the Drude and midinfrared spectral weight. Temperature-dependent optical properties of the $Nd_{1-x}TiO_3$ system at different doping levels will be presented.

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