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Charge dynamics in thermally and doping induced insulator-metal transitions of $(Ti_{1-x}V_x)_2O_3$ MASAKI UCHIDA, JUN FUJIOKA, YOSHINORI ONOSE[1], YOSHINORI TOKURA[2], Department of Applied Physics, University of Tokyo — Charge dynamics of $(Ti_{1-x}V_x)_2O_3$ with $x = 0 - 0.06$ has been investigated by measurements of charge transport and optical conductivity spectra in a wide temperature range of $2 - 600$ K with the focus on the thermally and doping induced insulator-metal transitions (IMTs). The optical conductivity peaks for the interband transitions in the $3d$ t_{2g} manifold are observed in the both insulating and metallic states, while their large variation (by ~ 0.4 eV) with change of temperature and doping level scales with that of the Ti-Ti dimer bond length, indicating the weakened singlet bond in the course of IMTs. The thermally and V-doping induced IMTs are driven with the increase in carrier density by band-crossing and hole-doping, respectively, in contrast to the canonical IMT of correlated oxides accompanied by the whole collapse of the Mott gap.

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