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Electron Dynamics in Transition Metal Granular Films N.E. MASSA, LANAIS EFO-CEQUINOR, UNLP, CP 962, 1900 La Plata, Argentina, J.C. DENARDIN, Dpto de Física, USACh, Santiago, Chile, L.M. SOCOLOVSKY, Inst. de Física, UFG, Goiânia, Brazil, M. KNOBEL, Inst. de Física, UNICAMP, Campinas, Brazil, X.X. ZHANG, Inst. of Nanoscience and Technology, UST, Hong Kong, China — Near normal incidence reflectivity spectra of transition metal ∼500 nm thick cosputtered granular films on SiO_2 subtracts were measured from 30 to 11000 cm^{-1} and at temperatures from 30 to 490 K. The reflectivity for $Co_{0.85}(SO_2)_{0.15}$ has a frequency and temperature behavior according to conducting metal oxides. The electron scattering rate denotes an unique relaxation time characteristic of a single type of carriers and has a very strong temperature dependence due to strong electron-phonon interactions. Using small polaron fits we individualize these as related to glass stretching vibrational modes. The optical conductivity of $Ni_{0.61}(SO_2)_{0.39}$, undergoing a metal-insulator transition at ∼77 K, has a Drude mode (freer carriers) and a mid-IR band (mid-infrared "carriers"). This last disorder related strong resonance drives the phase transition by localization decreasing in magnitude as the temperature is lowered and points to a double relaxation process (two different scattering mechanisms). On the other hand, $Co_{0.51}(SO_2)_{0.49}$ has an insulator reflectivity in which a distinctive band at ∼1450cm^{-1} originates in electron promotion, localization, and defect induced quasiparticle formation.

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