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Resonant Localized Nanoplasma in Oblique Far Infrared Reflectivity of Transition Metal Granular Films N.E. MASSA, LANAIS EFO-CEQUINOR, UNLP, CC 962, 1900 La Plata, Argentina, J.C. DENARDIN, Dpto de Física, USACh, Santiago, Chile, L.M. SOCOLOVSKY, ITCI ,UBA, Buenos Aires, Argentina, M. KNOBEL, Inst. de Física, UNICAMP, Campinas, Brazil, X.X. ZHANG, INST- HKUST, Hong Kong, China — We report on near normal and angle dependent specular infrared reflectivity of transition metal and SiO_2 cosputtered nanogranular $\sim$550 nm thick films in the insulating regime. Their reflectivity is characterized by well defined vibrational bands, an overdamped Drude contribution, due to carriers denoting the existence of conducting critical paths not yet truncated, and a distinctive band at $\sim$1450cm^{-1} originating in electron promotion, localization, and polaron formation. (TM) P-polarized oblique reflectivity, as from globally insulating $Co_{0.38}(SiO_2)_{0.62}$, $Fe_{0.34}(SiO_2)_{0.66}$ or $Ni_{0.28}(SiO_2)_{0.72}$, reveals a remarkable resonance at the $\sim$1450cm^{-1} band threshold. Its maximum intensity is reached at the radiation tangential component null condition allowing for a collective electronic excitation induced as localized plasma. It is attributed to carriers that are not able to overcome the metal-dielectric rough interface. As the angle of incidence increases the longitudinal highest frequency vibrational band merges with the P-polarized resonance inducing broadening and softening reminiscent to lattice modes undergoing strong electron-phonon interactions.

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