

Abstract Submitted
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Ga Nanoparticle/Graphene Platforms: Plasmonic and Charge Transfer Interactions CONGWEN YI, TONG-HO KIM, ECE, Duke University, YANG YANG, Physics, Duke University, MARIA LOSURDO, Institute of Inorganic Methodologies and of Plasmas, IMIP-CNR, Italy, APRIL S. BROWN, ECE, Duke University — Metal nanoparticle (NP) – graphene multifunctional platforms are of great interest for numerous applications, such as sensing and catalysis, and for fundamental studies on charge transfer and light-matter interactions. To understand platform-photon interactions, it is important to articulate the coupling of photon-based excitations, such as the interaction between plasmons in each of the material components, as well as their charge-based interactions dependent upon the energy alignment at the metal/graphene interface. Herein, we use liquid metal Ga nanoparticles, which can be deposited at 300K on graphene, to explore the surface-enhanced Raman spectroscopy modulation induced by the NPs,. The localized charge transfer between Ga NPs and graphene are investigated, and enhancement of the graphene Raman modes is correlated with metal coverage the transfer of electrons from Ga to graphene creating local regions of enhanced electron concentration which modify the electron-phonon interaction in graphene.

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