Probing the Ni(111)-graphene interface using Raman spectroscopy

Guangjun Cheng, Irene Calizo, Angela R. Hight Walker

Physical Measurement Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, MS 8443, Gaithersburg, MD 20899, USA
guangjun.cheng@nist.gov

Abstract

Theoretical simulations have shown that due to the hybridization of Ni d-electrons with the π-orbitals of graphene, graphene phonon dispersion is significantly altered [1]. There is no Raman signal from graphene on Ni(111) due to the suppression of the Kohn anomaly. In our work, we deposit a Ni thin film by thermal evaporation onto mechanically exfoliated graphene, few-layer graphene (FLG), and graphite, and probe the Ni-graphene interface using Raman spectroscopy. When the sample is annealed in forming gas, a Ni(111) thin film is produced on graphene, FLG, and graphite. We observe the disappearance of Raman signals from graphene underneath Ni(111) when using low laser power and the re-appearance of the Raman signals from the graphene with a higher power excitation laser. This work provides direct experimental evidence for the strong interaction between Ni(111) and graphene.

References

[1] Adrien A., Ludger W., Nano Lett, **10** (2010) 4335-4340

Figures

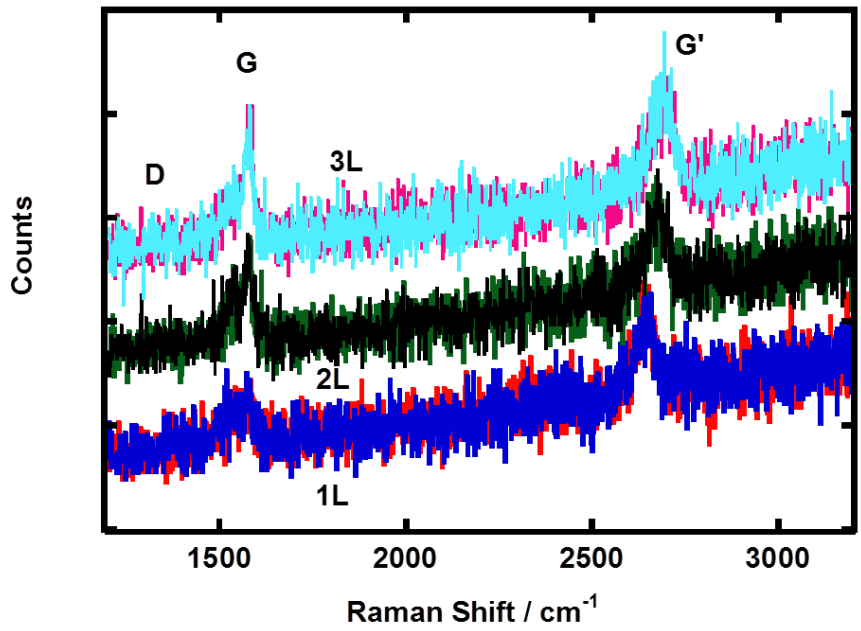

Figure1. Representative micro-Raman spectra collected from 1L, 2L and 3L graphene regions after the deposition of 10 nm Ni thin film.