Contribution (Poster)

Nano-Raman (Tip Enhanced Raman) and co-localized AFM-Raman characterization of graphene and related materials

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Co-localized AFM-Raman studies of graphene and related materials are presented. While Raman is used to indicate number of layers in graphene, advanced AFM modes characterize its various physical properties as a function of number of layers. We show how number of layers in graphene affects its surface potential (work function), friction coefficient, elastic modulus, capacitance, conductivity, charge distribution, Raman and Rayleigh light scattering etc. Results for graphene flakes are qualitatively compared to those for carbon nanotubes of different diameters. AFM surface potential measurements are performed at different environmental humidity, indicating effect of water adsorption. Measurements in vacuum and at different temperatures are reported. The new Hybrid mode (fast force-distance curve AFM measurements together with co-localized Raman mapping) is used to characterize adhesion and stiffness of pure and contaminated graphene samples with nm-scale resolution.

Nano-Raman (Tip Ehanced Raman) characterization of graphene, graphene oxide and carbon nanotubes is presented characterizing sample structure and defects. Spatial resolution of nano-Raman maps comes close 10 nm.

References

[1] www.ntmdt.com/afm-raman

Figures

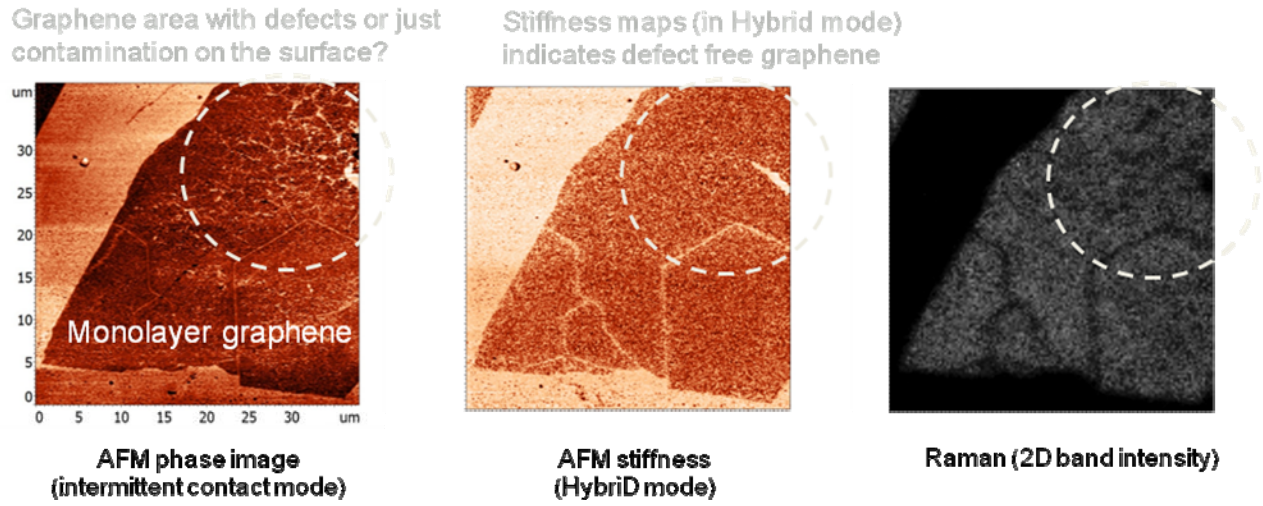

Fig. 1. Characterization of contaminated graphene monolayer by intermittent contact AFM, AFM stiffness measurement (HybriD mode) and Raman imaging.

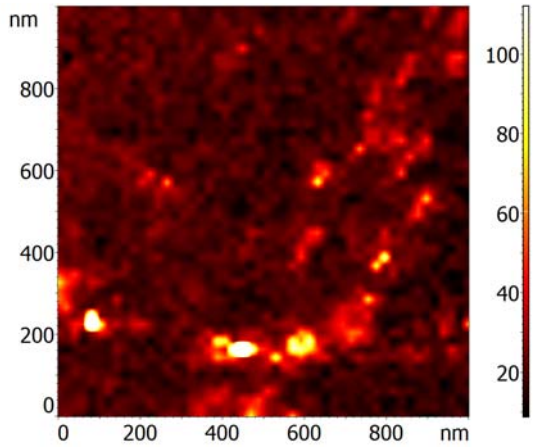

Fig. 2. Nano-Raman (Tip Enhanced Raman) mapping of graphene oxide D-band. Scan size: 1x1 µm.

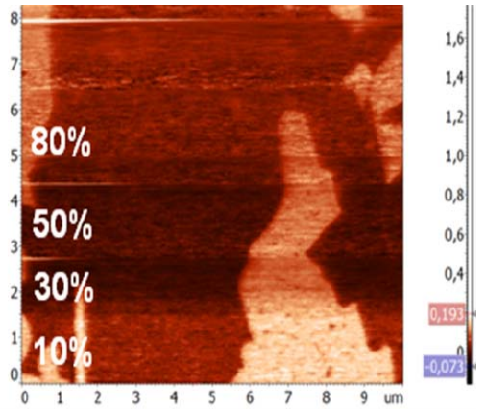

Fig. 3. Graphene surface potential maps at different environmental humidity (from 10% to 80%).