NeaSNOM: Real-Space Mapping of Graphene Plasmons

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Abstract

sSNOM technology makes now possible high-resolution optical mapping of nanostructured graphene samples.

The performance of the next-generation electronic devices based on graphene is strongly influenced by the structure-function relationship, requiring an analytical tool for investigation and characterization which is able to provide nano-scale resolution and monolayer sensitivity. sSNOM fulfills this requirements by combining the best of two worlds: the high spatial resolution of atomic force microscopy (AFM) and the analytical power of infrared spectroscopy.

The spatial resolution of about 10 nm of our unique NeaSNOM microscope opens a new era for modern nano-analytical applications such as chemical identification, free-carrier profiling and plasmonic vector near-field mapping. New technical improvements now enable real-space graphene mapping of big areas with industrial speeds at high resolution.

Recent research demonstrated the power of the NeaSNOM microscope for graphene plasmonics and graphene based devices, including contact-free direct access to local conductivity, electron mobility and intrinsic doping in graphene via plasmon interferometry imaging.

References

[1] Z. Fei et al. Nature Nanotechnology **8** (2013) 821.
[2] J. Chen et al. Nano Letters **13** (2013) 6210.
[3] Z. Fei et al. Nature **487** (2012) 77.
[4] J. Chen et al. Nature **487** (2012) 82.

Figures

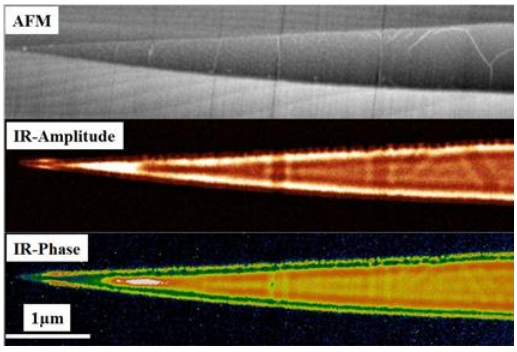

Fig 1. Plasmon interferometry imaging of a graphene sheet with NeaSNOM: Contact-free direct access to local conductivity, electron mobility and intrinsic doping [4].

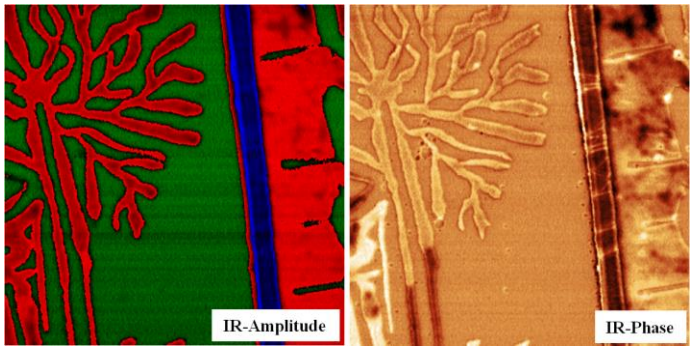

Fig 2. Epitaxial grown graphene. NeaSNOM measurements with 10 nm resolution of near-field phase (left) and amplitude (right) components. Graphene monolayer appears red, areas of bilayer blue, and substrate green.