

Graphene under the eyepiece: spectromicroscopy studies on epitaxial and exfoliated graphene @ Elettra

T. O. Mentş

Elettra- Sincrotrone Trieste, Italy

From the experimental view, spectromicroscopic methods are indispensable in probing the chemical, electronic and structural aspects of graphene at microscopic length scales. Synchrotron radiation, reinforced with the developments in x-ray optics and potent microscopy methods, has a central role in this respect. Elettra - Sincrotrone Trieste has a strong tradition in spectromicroscopy field with several beamlines dedicated to different aspects of x-ray microscopy. I will give an overview of recent activity in graphene research carried out at three experimental stations at Elettra: SPELEEM at the Nanospectroscopy, SPEM at the ESCA Microscopy, and nano-focus microscopy and ARPES at the Spectromicroscopy beamlines [1-4]. Particular attention will be devoted to the XPEEM-LEEM study on graphene/Ir(100). As revealed by a combination of structural and electronic probes at the nanoscale, the interactions with the square symmetry substrate drives a reversible transformation between different graphene phases with subsequent changes in the electronic structure [4].

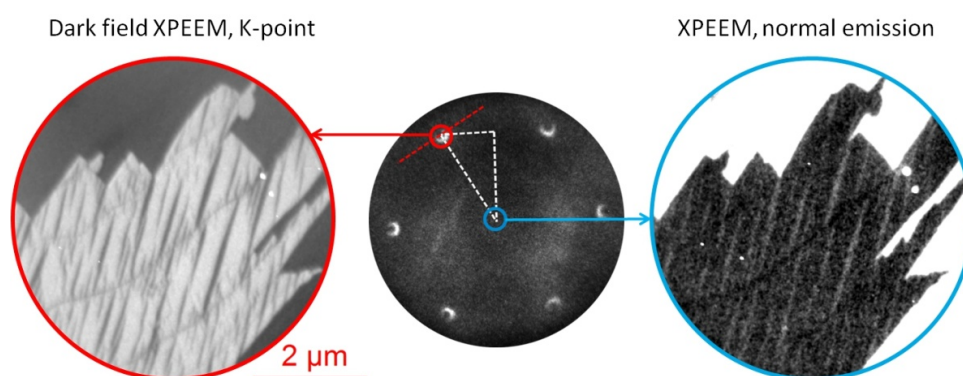


Fig. 1 Angle-resolved XPEEM imaging of graphene on Ir(100). The left and right panels show the XPEEM images of the graphene flake at the Γ and K points near the Fermi level, respectively. The μ -ARPES pattern is displayed in the center. (Adapted from Ref.[4]).

REFERENCES

1. *Nitrogen-doped graphene: efficient growth, structure, and electronic properties*, **Nano Letters**, 10, 5401 (2011)
2. *Graphene oxide windows for in situ environmental cell photoelectron spectroscopy*, **Nature Nanotechnology**, 6, 651 (2011)
3. *Making angle-resolved photoemission measurements on corrugated monolayer crystals: suspended exfoliated single-crystal graphene*, **Physical Review B**, 84, 115401 (2011)
4. *Temperature-driven reversible rippling and bonding of a graphene superlattice*, **ACS Nano**, 7, 6955 (2013)