Imaging and analysis of liquid-phase-processable graphene nanoribbons

Joan Teyssandier,[1] Wout Frederickx,[1] Oleksandr Ivasenko,[1] Tatyana Balandina,[1] Kunal S. Mali,[1] Akimitsu Narita,[2] Søren A. Jensen,[2] Michael R. Hansen,[2] Xinliang Feng,[2] Klaus Müllen[2] and Steven De Feyter[1]

[1]Division of Molecular Imaging and Photonics, Department of Chemistry, KU Leuven-University of Leuven, Celestijnenlaan, 200 F, B-3001 Leuven, Belgium
[2]Max Planck Institute for Polymer Research, Ackermannweg 10, D-55128 Mainz, Germany
joan.teyssandier@chem.kuleuven.be

Abstract

One of the major hurdles in the implementation of graphene in present day electronics is its lack of bandgap. One way to overcome this challenge is the creation of graphene nanoribbons (GNRs). Since the magnitude of the bandgap strongly depends on the width and the edge structure of such ribbons, the 'bottom-up' synthesis of structurally well-defined GNRs is being actively pursued [1]. In this contribution, we present structural characterization of monolayer thick films of bottom-up synthesized GNRs on solid substrates using scanning probe methods, namely AFM and STM. We show that STM and AFM can be efficiently employed as complementary analytical tools for characterization of GNR together with conventional spectroscopic tools [1,2]. The highly controlled synthesis and liquid phase processability opens the way to GNR-based devices.

References

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Figure

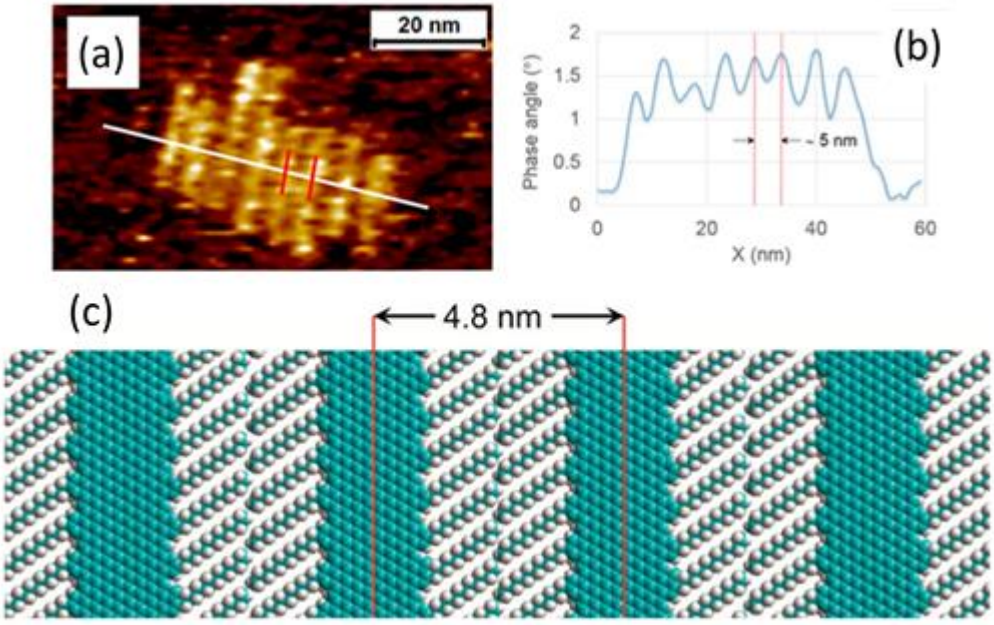

Figure 1: (a) AFM phase image of a self-assembled monolayer of GNRs on HOPG (dry film), showing a small isolated domain. (b) Representative line profile, which was measured along the white line in the phase image shown in panel a. (c) Molecular model of this GNR displaying the packing of the GNRs in the self-assembled monolayer.