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Band Structure Measurements of Bottom-up Fabricated Graphene Nanoribbons

CHRISTOPHER BRONNER, FELIX LEYSSNER, STEPHAN MEYER, Fachbereich Physik, Freie Universität Berlin, Berlin, Germany, MANUEL UTECHT, TILLMANN KLAMROTH, PETER SAALFRANK, Universität Potsdam, Institut für Chemie, Potsdam, Germany, PETRA TEGEDER, Fachbereich Physik, Freie Universität Berlin, Berlin, Germany — Along with the growing interest in graphene, other low-dimensional carbon nanostructures are currently in the focus of research since these materials offer a wide variety of properties interesting e.g. for nanotechnology application. Among these carbon systems, quasi-one-dimensional graphene nanoribbons (GNR) introduce a possibility to tune the electronic structure - for example, GNRs exhibit a band gap which is inversely proportional to their width and can thus be adjusted over a wide range. While many theoretical studies have been published on the band structure of GNRs, experiments are usually limited by the quality of the GNRs' fabrication, e.g. using lithography or unzipping of carbon nanotubes. In order to avoid defects and irregular edges that are inevitable in these methods, lately a surface-assisted bottom-up synthesis has been demonstrated which yields quasi-perfect GNR structures. [1] In the present study we employ complementary surface-sensitive spectroscopies to investigate occupied and unoccupied bands and the band gap in an armchair GNR which has been synthesized on the Au(111) surface. DFT calculations were performed to obtain a thorough understanding of the nature of the observed states.

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[1] J. Cai *et al.*, Nature (London) **466**, 470-473 (2010)

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