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Monomer Doping of Self-Assembled Graphene Nanoribbons for Band Gap Alignment CHRISTOPHER BRONNER, STEPHAN STREMLAU, Ruprecht-Karls-Universität Heidelberg, MARIE GILLE, FELIX BRAUßE, Humboldt-Universität zu Berlin, ANTON HAASE, Freie Universität Berlin, STEFAN HECHT, Humboldt-Universität zu Berlin, PETRA TEGEDER, Ruprecht-Karls-Universität Heidelberg — In order to exploit the technologically interesting electronic properties of graphene, several concepts have been discussed which would lead to the opening of a band gap. One approach is spatial confinement of the charge carriers in quasi-one-dimensional graphene nanoribbons (GNRs). The band gap of a GNR scales inversely with its width and particularly nanometer-scale widths are desirable for application e.g. in transistor devices. Since the electronic properties of GNRs depend critically on their structure, precise synthesis is necessary but challenging for conventional methods such as lithography. In contrast, self-assembly from molecular precursors is an intriguing approach which has been employed to fabricate defect-free GNRs with well-defined widths and edge structures. Only this high level of structural precision allows introduction of dopant atoms at specific doping sites and concentrations in the graphene lattice. Nitrogen doping has been known to shift the band structure of GNRs with respect to the Fermi level which is interesting for GNRs in contact with electrodes and other device materials. Using surface-sensitive electron spectroscopies we demonstrate a continuous down-shift of the band structure with increased nitrogen doping of the monomers.

Christopher Bronner
Ruprecht-Karls-Universitat Heidelberg

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