Electronic structure of single graphene nanoribbons determined by scanning tunnelling microscopy and spectroscopy

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Due to the high carrier mobility graphene nanoribbons (GNR) are promising candidates for molecular wires in future nanotechnology. The electronic properties of a GNR are controlled by its edge-structure and width [1]. Bottom-up approaches like on-surface synthesis allow the formation of extended conjugated electronic systems [2]. Moreover, they lead to atomically defined edges which are required for charge transport studies as structural defects have been predicted to modify the electronic structure and to reduce the conductance. We have used low temperature scanning tunneling microscopy (STM) to investigate the formation, adsorption properties and electronic structure of graphene nanoribbons. 10,10'-Dibromo-9,9'-bianthryl molecules were used as molecular building blocks to form GNR's after linking of the monomers and subsequent cyclodehydrogenation [3]. In addition to intact ribbons, the influence of various defects on the electronic states is also investigated.

References:

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