The atomic and electronic structure of well-defined graphene nanoribbons studied by scanning probe microscopy

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Recently, graphene nanostructures have gained a lot of recent interest since they introduce a bandgap in graphene, which is important for (opto-) electronics applications. Graphene nanoribbons can have a bandgap as large as 3 eV, which can be tuned by varying its width.

By using a chemical bottom-up approach we synthesized graphene nanoribbons (GNR) on an Au(111) substrate[1].

By combining scanning tunneling microscopy (STM) and atomic force microscopy (AFM) with reactive and non-reactive tips, we can relate the electronic properties of the GNRs with their atomic structure. Furthermore, we can use the STM tip to (i) deliberately create well-defined atomic scale defects and (ii) control the interaction with the substrate. Hence, we are able to directly study the robustness of the properties of the graphene nanostructures[4].

References

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