Graphene Nanoribbons from Carbon Nanotubes

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Chemical functionalization of the outer graphene layer of carbon nanotubes (CNT) has been increasingly studied, aiming at the application of CNT in different areas. The functionalization of CNT using the 1,3-dipolar cycloaddition reaction, leading to the formation of cyclic amine groups on the CNT surface [1], was observed to induce the unzipping of the CNT under specific conditions. The CNTs thus functionalized were imaged by Scanning Tunneling Microscopy (STM) and the unzipping was observed under STM conditions. The unzipping process was also observed to occur in solution, in different solvents. The graphene nanoribbons thus formed were analyzed by UV-vis and Raman spectroscopy, and by transmission electron spectroscopy. A theoretical interpretation of the unzipping process is under study.

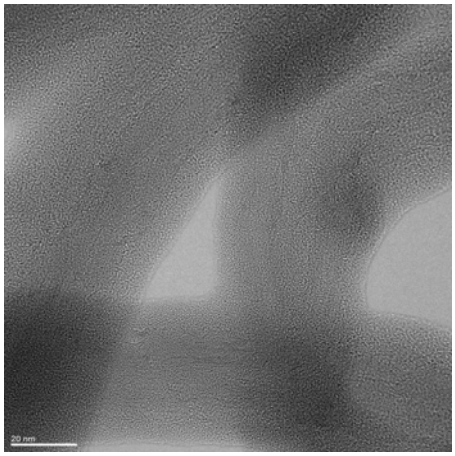


Figure: Bundles of graphene nanoribbons produced in solution imaged by transmission electron microscopy.

References

1. M. C. Paiva, F. Simon, R. M. Novais, T. Ferreira, M. F. Proença, W. Xu, F. Besenbacher, *ACS Nano*, **2010**, 4 (12) 7379.

Acknowledgments
The authors acknowledge the Institute for Nanostructures, Nanomodelling and Nanofabrication (I3N) for the research grant “Graphene nanoribbons for transistors”.

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