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Graphene Nanoribbons Encapsulated inside Boron Nitride Nanotubes. HAMID REZA BARZEGAR, Department of Physics, University of California, Berkeley, CA 94720, USA, EDUARDO GRACIA-ESPINO, Department of Physics, Umea University, 90187 Umea, Sweden, THANG PHAM, Department of Physics, University of California, Berkeley, CA 94720, USA, ALEXANDR V. TALYZIN, Department of Physics, Umea University, 90187 Umea, Sweden, ALEX ZETTL, Department of Physics, University of California, Berkeley, CA 94720, USA — We report on bottom-up synthesis of graphene nanoribbons inside boron nitride nanotubes, using small molecules as building blocks. The small molecules are inserted in the inner cavity of the nanotube in vapor phase and further fused to each other at high temperature. The width of the synthesized nanoribbon is equal to the width of the used small molecule and can be tuned by tuning the width of the small molecules. We employ theoretical modeling and calculation to study the possible interaction between the synthesized graphene nanoribbons and boron nitride nanotube as well as electronic properties of the hybrid structure. The encapsulated carbon nanostructures can be eliminated from the inner cavity of the filled boron nitride nanotube via oxidation without any damage to the nanotube structure.

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