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Tuning the Band Gap of Graphene Nanoribbons Synthesized from Molecular Precursors CHEN CHEN, YEN-CHIA CHEN, Univ of California - Berkeley, DIMAS OTEYZA, Centro de Fisica de Materiales CSIC/UPV-EHU-Materials Physics Center, San Sebastian, Spain, ZAHRA PEDRAMRAZI, FELIX FISCHER, MICHAEL CROMMIE, Univ of California - Berkeley, CROMMIE GROUP COLLABORATION[1], FISCHER GROUP COLLABORATION[2] — A prerequisite for future graphene nanoribbon (GNR) applications is the ability to fine-tune the electronic band gap of GNRs. Such control requires the development of fabrication tools capable of precisely controlling width and edge geometry of GNRs at the atomic scale. Here we report a technique for modifying GNR band gaps via covalent self-assembly of a new species of molecular precursors that yields n = 13 armchair GNRs, a wider GNR than those previously synthesized using bottom-up molecular techniques. Scanning tunneling microscopy and spectroscopy reveal that these n = 13 armchair GNRs have a band gap of 1.4 eV, 1.2 eV smaller than the gap determined previously for n = 7 armchair GNRs. Furthermore, we observe a localized electronic state near the end of n = 13 armchair GNRs that is associated with hydrogen-terminated sp2-hybridized carbon atoms at the zigzag termini.

[1]Condensed matter research group
[2]Organic functional materials research group

Chen Chen
Univ of California - Berkeley

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