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Narrow graphene nanoribbons with atomically precise armchair edges: Solution synthesis and characterization ALEXANDER SINITSKII, University of Nebraska - Lincoln — Although graphene is a semimetal, a substantial electronic band gap could be found in narrow graphene nanoribbons (GNRs) with atomically precise armchair edges and widths less than 2 nm. Different top-down approaches typically yield ribbons with widths >10 nm and have a limited control over the edge structure in GNRs. Much narrower GNRs with atomically precise edges could be synthesized by a surface-assisted bottom-up approach. This method provides small amounts of GNRs of exceptional quality, but it cannot be used to produce large quantities of GNRs for bulk applications. Therefore, a complimentary chemical approach for bulk quantities of high-quality GNRs is in order. This talk will be focused on a recently developed bottom-up approach for gram quantities of narrow GNRs that are less than 2 nm wide and have atomically precise armchair edges. STM studies of these GNRs show that their structural quality is comparable to that of surface-synthesized GNRs. These nanoribbons have a bandgap of about 1.3 eV, which makes them promising for applications in field-effect transistors with high on-off ratios, as well as bulk applications, including coatings, composites and photovoltaic devices.

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