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Observation of dopant-induced impurity states in bottom-up graphene nanoribbons ZAHRA PEDRAMRAZI, CHEN CHEN, TOMAS MARANGONI, RYAN CLOKE, TING CAO, STEVEN LOUIE, FELIX FISCHER, MICHAEL CROMMIE, Univ of California - Berkeley — Graphene nanoribbons (GNRs) provide a means for inducing energy gaps in graphene and are a promising candidate for many nanotechnological applications. New bottom-up fabrication techniques allow the structure of GNRs to be tuned with atomic precision, thus providing new opportunities for modifying their electronic structure. Here we report the synthesis of bottom-up armchair GNRs (AGNRs) with isolated substitutional boron-dopant centers; thus creating localized impurity states in the GNR. These impurities are realized via dilute doping of pristine n=7 AGNRs with sparse boron-containing monomer units, resulting in uniform-width n=7 AGNR segments where only two carbon atoms have been substitutionally replaced by boron atoms. Scanning tunneling microscopy (STM) and spectroscopy (STS) were performed to study the electronic structure of these AGNR impurity systems, enabling us to observe localized mid-gap impurity states.

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