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Direct visualization of atomically precise nitrogen-doped graphene nanoribbons. HONG-LIANG LU, University of Chinese Academy of Sciences and Institute of Physics, Chinese Academy of Sciences, Beijing 100049, China, YI ZHANG, YANFANG ZHANG, GENG LI, JIANCHEN LU, Institute of Physics and University of Chinese Academy of Sciences, Chinese Academy of Sciences, Beijing 100190, China, XIAO LIN, University of Chinese Academy of Sciences and Institute of Physics, Chinese Academy of Sciences, Beijing 100049, China, SHIXUAN DU, Institute of Physics and University of Chinese Academy of Sciences, Chinese Academy of Sciences, Beijing 100190, China, REINHARD BERGER, XINLIANG FENG, KLAUS MULLEN, Max Planck Institute for Polymer Research, Ackermannweg 10, D-55128 Mainz, Germany, HONG-JUN GAO, Institute of Physics and University of Chinese Academy of Sciences, Chinese Academy of Sciences, Beijing 100190, China — We have fabricated atomically precise nitrogen-doped chevron-type graphene nanoribbons by using the on-surface synthesis technique combined with the nitrogen substitution of the precursors. Scanning tunneling microscopy and spectroscopy indicate that the well-defined nanoribbons tend to align with the neighbors side-by-side with a band gap of 1.02 eV, which is in good agreement with the density functional theory calculation result. The influence of the high precursor coverage on the quality of the nanoribbons is also studied. We find that graphene nanoribbons with sufficient aspect ratios can only be fabricated at sub-monolayer precursor coverage. This work provides a way to construct atomically precise nitrogen-doped graphene nanoribbons.

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