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Atomic-scaled characterization of graphene PN junctions XIAODONG ZHOU, Department of Physics, Columbia University, New York, New York 10027, USA, DENNIS WANG, Department of Applied Physics and Mathematics, Columbia University, New York, New York 10027, USA, ALI DADGAR, Department of Physics, Columbia University, New York, New York 10027, USA, PRATIK AGNIHOTRI, JI UNG LEE, College of Nanoscale Science and Engineering, The State University of New York, Albany, New York 12203, USA, MARK C. REUTER, FRANCES M. ROSS, IBM T.J. Watson Research Center, Yorktown Heights, New York 10598, USA, ABHAY N. PASUPATHY, Department of Physics, Columbia University, New York, New York 10027, USA — Graphene p-n junctions are essential devices for studying relativistic Klein tunneling and the Veselago lensing effect in graphene. We have successfully fabricated graphene p-n junctions using both lithographically pre-patterned substrates and the stacking of vertical heterostructures. We then use our 4-probe STM system to characterize the junctions. The ability to carry out scanning electron microscopy (SEM) in our STM instrument is essential for us to locate and measure the junction interface. We obtain both the topography and dI/dV spectra at the junction area, from which we track the shift of the graphene chemical potential with position across the junction interface. This allows us to directly measure the spatial width and roughness of the junction and its potential barrier height. We will compare the junction properties of devices fabricated by the aforementioned two methods and discuss their effects on the performance as a Veselago lens.

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