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STM studies of graphite microdevices ELENA POLYAKOVA, Chemistry Department, Columbia University, GEORGE FLYNN, Chemistry Department, Columbia University, YUANBO ZHANG, Physics Department, Columbia University, MINA FAZLOLLAHI, Physics Department, Columbia University, PHILIP KIM, Physics Department, Columbia University — A novel scanning tunneling microscope (STM) has been designed and built to study transport phenomena in mesoscopic conductive films, self-assembled monolayers, and nanostructures on insulating substrates under ambient conditions. In this work we present experimental STM studies of monocrystalline ultrathin graphite films including single graphite sheets (graphene) at the atomic scale. Electronic transport is possible only in the lateral direction for graphene. Graphite microscopic devices (~ 10 μm) have been prepared by mechanical exfoliation followed by deposition of macroscopic gold electrodes over the graphite film and its surrounding insulator. Evolution of STM images during the transition from multilayer to single graphene sheets as well as the dependence of STM images on tunneling conditions near the Fermi energy will be discussed.

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