Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Imaging local potential and conductance variation around a tip gate in a graphene device with electrostatic force and scanning gate microscopes J.S. CHAE, Department of Physics and Astronomy, Seoul Nat'l Univ., Seoul 151-747, S. JUNG[1], N.B. ZHITENEV, J.A. STROSCIO, Y. KUK[2], CNST, National Institute of Science and Technology, Gaithersburg, MD 20899 — We fabricated graphene devices on a SiO_2 layer with 4-6 metallic contacts and a Si back gate. These devices revealed the well-known source-drain current versus gate-bias dependence with slight variation of the Dirac point upon gas adsorption on the graphene surfaces. They were inserted into an ultrahigh vacuum low temperature atomic force microscope (AFM), with which electrostatic force microscopy and scanning gate microscopy could be performed. The potential drops around the source and the drain contacts were carefully measured to estimate the barrier heights between the metallic contacts and the graphene. Using an AFM cantilever as a local gate, we measured the variation of source-drain current. This result showed some local variation, suggesting existence of electron and hole puddles. We also measured electron or hole scattering around defect states with nanometer resolution. These scanning probe microscopy results are compared with those performed by macroscopic transport measurement.

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Date submitted: 21 Nov 2008 Electronic form version 1.4