Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Superior Mobility in Chemical Vapor Deposition Synthesized Graphene by Grain Size Engineering NICHOLAS PETRONE, CORY DEAN, INANC MERIC, AREND VAN DER ZANDE, Columbia University, PINSHANE HUANG, Cornell University, LEI WANG, Columbia University, DAVID MULLER, Cornell University, KENNETH SHEPARD, JAMES HONE, Columbia University
— Chemical vapor deposition (CVD) offers a promising method to produce large-area films of graphene, crucial for commercial realization of graphene-based applications. However, electron transport in CVD grown graphene has continued to fall short of the performance demonstrated by graphene derived from mechanical exfoliation. Lattice defects and grain boundaries developed during growth, structural defects and chemical contamination introduced during transfer, and charged scatterers present in sub-optimal dielectric substrates have all been identified as sources of disorder in CVD grown graphene devices. We grow CVD graphene and fabricate field-effect transistors, attempting to minimize potential sources of disorder. We reduce density of grain boundaries in CVD graphene by controlling domain sizes up to 250 microns. By transferring CVD graphene onto h-BN utilizing a dry-transfer method, we minimize trapped charges at the interface between graphene and in the underlying substrate. We report field-effect mobilities up to 110,000 cm2V-1s-1 and oscillations in magnetotransport measurements below 1 T, confirming the high quality and low disorder in our CVD graphene devices.

Nicholas Petrone
Columbia University

Date submitted: 11 Nov 2011 Electronic form version 1.4