Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Controlled growth of monolayer graphene on silicon carbide[1]
DAVID TORRANCE, DAVID MILLER, MADELEINE PHILLIPS, HOLLY TINKEY, EVAN GREEN, PHILLIP FIRST, Georgia Institute of Technology, GEORGIA TECH GRAPHENE TEAM — Controlled thermal decomposition of silicon carbide is so far the most effective method for growing graphene epitaxially and at the wafer scale. In this work we study the graphenization of SiC(0001) and SiC(000$\bar{1}$) as a function of temperature and buffer-gas pressure in a custom-built ultrahigh vacuum (UHV) induction furnace. In-situ characterization by both Auger electron spectroscopy and low-energy electron diffraction (LEED) was used to determine the pressure-temperature "phase boundary" for the formation of monolayer graphene, and the transient growth rate of graphene layers otherwise. Sample quality was further assessed ex-situ using a variety of techniques such Raman spectroscopy and scanning tunneling microscopy. The effect of buffer gas was modeled with kinetic theory.

[1]Work supported by the NSF, NRI-INDEX, W. M. Keck Foundation, and the Georgia Tech MRSEC.

David Torrance
Georgia Institute of Technology

Date submitted: 11 Dec 2009 Electronic form version 1.4