Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Wafer-scale synthesis of defect-negligible monolayer graphene at reduced temperature on hydrogen-rich evaporated (111) copper films[1]
LI TAO, MILO HOLT, HARRY CHOU, JONGHO LEE, RODNEY S. RUOFF, DEJI AKINWANDE, The University of Texas at Austin — In contrast to commercially available copper foils, evaporated copper film on wafer scale supporting substrates holds great promise in chemical vapor deposition (CVD) of graphene for direct integration into device manufacturing processes. Monolayer graphene with negligible defects (<5%) was synthesized on evaporated copper films at temperatures < 900 °C using hydrogen-free methane precursor that has not been previously reported. In this work, high-quality monolayer graphene obtained on evaporated copper film was likely enabled by the distinct properties of hydrogen-rich (111) preferred crystal orientation as indicated by X-ray diffraction (XRD) and electron back scattering diffraction (EBSD). The distinct difference in the crystal orientation of copper films versus foils resulted in dissimilar interplay with the precursor gas, as confirmed by time-of-flight secondary ion mass spectroscopy (TOF-SIMS). This study demonstrates experimental evidence for differences in the growth dynamics of CVD graphene on copper film versus conventional foils.

[1]Support of our work from ONR is appreciated.

Li Tao
The University of Texas at Austin

Date submitted: 29 Nov 2011 Electronic form version 1.4