Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Correlating low-energy electron microscopy and micro-Raman imaging of epitaxial graphene on SiC GUANGJUN CHENG, NIST, IRENE CALIZO, FUI, PATRICK MEADE, GUOWEI HE, Carnegie Mellon University, M.A. REAL, Instituto Nacional de Technología Industrial, R.E. ELMQUIST, NIST, R.M. FEENSTRA, Carnegie Mellon University, A.R. HIGHT WALKER, NIST —
Several techniques exist for determining the number of graphene layers grown on SiC such as low-energy electron microscopy (LEEM) and Raman spectroscopy. The method which is arguably the most definitive for SiC-grown graphene isLEEM. Low-energy (0 – 10 eV) electrons interfere with the graphene layers, yielding minima in the electron reflectivity vs. energy curve that can be used to determine the layer number.1 LEEM also provides the means of collecting selected-area diffraction on ?m-size surface regions (micro-LEED), giving access to further useful structural information. While Raman spectroscopy is also commonly used to determine graphene layer number on SiC substrates; such measurements have no definitive calibration for large-area graphene on SiC, unlike the case of exfoliated graphene on SiO2. In this talk, results of correlated LEEM/micro-Raman imaging of large-area, mono and multilayer graphene samples are presented. These initial findings show that LEEM can show the contrast between terrace regions and step edges at particular areas of monolayer-graphene surfaces. Micro-Raman imaging of these same locations show Raman shifts in the G' (2D) band. The influence of heterogeneities on electrical behavior of graphene will be discussed. Comparative studies of multilayer graphene are in progress, and will also be reported. 1. H. Hibino, et al., Phys. Rev. B 77, 075413 (2008). 2. L. I. Johansson, et al., Phys. Rev. B 84, 125405 (2011).

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Date submitted: 12 Dec 2012 Electronic form version 1.4