Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Direct growth of hexagonal boron nitride on epitaxial graphene[1]

PATRICK MENDE, JUN LI, RANDALL FEENSTRA, Carnegie Mellon University - Department of Physics — In this work, we demonstrate recent attempts at achieving the direct growth of hexagonal boron nitride (h-BN) on epitaxial graphene. By exposing our graphene samples (grown on Si-face SiC) to a low-pressure ($\sim 1\times10^{-4}$ Torr) background of borazine at temperatures exceeding 1000°C, we obtain *in-situ* low-energy electron diffraction patterns consistent with the presence of many randomly oriented grains of h-BN. We find that increasing the growth temperature leads to the development of a preferential orientation, with the h-BN aligning with the underlying SiC substrate. Atomic-force microscopy and low-energy electron microscopy (LEEM) show triangular crystals exceeding 1 μm in extent. Additionally, using a first-principles method for examining low-energy electron reflectivity spectra,[2] we are capable of determining the coverage of h-BN on our samples. We show that our method is sufficiently robust to discriminate between various combinations of numbers of h-BN monolayers (MLs) and graphene MLs based on unique features in their spectra. Prospects for improvement of the h-BN crystallinity, as well as the controlled growth of a specific number of MLs are discussed.

[1]This work was supported in part by the Center for Low Energy Systems Technology (LEAST), one of the six SRC STARnet Centers, sponsored by MARCO and DARPA.
[2]R. M. Feenstra et al., Phys. Rev. B 87, 041406(R) (2013).

Patrick Mende
Carnegie Mellon University - Department of Physics

Date submitted: 13 Nov 2014 Electronic form version 1.4