Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Investigation of the Band Alignment at h-BN/SiX Dielectric Interfaces utilizing X-ray Photoemission MARC FRENCH, SEAN KING, JEFF BIELEFELD, Intel Corporation, JOE OTTO, MICHELLE PAQUETTE, ANTHON CARUSO, Dept. of Physics and Astronomy, Univ. Missouri, Kansas City — Due to a wide band gap ($\sim$ 6 eV), close lattice matching (<2%) and atomic planarity, hexagonal boron nitride (h-BN) is of interest as a potential substrate and gate dielectric in graphene channel transistor devices. A key property for the success of h-BN as a gate dielectric in such devices is its interfacial band alignment with graphene, the gate contact metallization and the surrounding insulating dielectric materials. In this regard, we have utilized x-ray photoelectron spectroscopy (XPS) to determine the Schottky barrier and valence band offsets present at the interfaces between plasma enhanced chemically vapor deposited amorphous h-BN:H and a variety of materials including graphene, Cu, SiO_2, a-SiN_x:H, a-SiC:H, and Si. We show that in many instances the valence and conduction band offsets are significant ($\geq$ 2 eV) and favorable for a variety of possible h-BN/graphene transistor devices.

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Date submitted: 15 Nov 2013 Electronic form version 1.4