Abstract Submitted
for the MAS14 Meeting of
The American Physical Society

Large-Area Si-Doped Graphene: Controllable Synthesis and Enhanced Molecular Sensing SIMIN FENG, Penn State University, RUITAO LV, Tsinghua University, China, MARIA CRISTINA DOS SANTOS, Universidade de Sao Paulo, Brazil, CLAIRE ANTONELLI, Universidad Carlos III de Madrid, Spain, KAZUNORI FUJISAWA, AYSE BERKDEMIR, Penn State University, RODOLFO CRUZ-SILVA, Shinshu University, Japan, ANA L. ELIAS, NESTOR PEREA-LOPEZ, Penn State University, FLORENTINO LOPEZ-URIAS, IPICYT, Mexico, HUMBERTO TERRONES, MAURICIO TERRONES, Penn State University
— Large-area Si-doped Graphene (SiG) sheets have been synthesized for the first time using methoxytrimethylsilane and hexane as precursors in a bubbler-assisted chemical vapor deposition setup. As a proof-of-concept, their application in probing different organic molecules was successfully demonstrated. We noted that significant enhanced molecular sensing was achieved when SiG was used as a probing surface in virtue of their enhanced Raman scattering effect. This unique enhancement of SiG was explained using *ab initio* calculations, in which local distortions caused by the presence of Si atoms increase the interaction of the dye molecules with the doped graphene surface, in addition to the presence of an incomplete valence electron caused by the Si atom. Subsequently, the laser electronic excitation generated in SiG is then transferred to the molecule, and give rise to the strong Raman scattering effect.

Simin Feng
Penn State University

Date submitted: 29 Aug 2014 Electronic form version 1.4