

# 4<sup>th</sup> International Conference on Nanotek & Expo

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

## Evolution of Raman Spectrum of graphene with thickness of SiO<sub>2</sub> capping layer on Si substrate

Lun Dai

Peking University, China

We have grown large-scale high-quality monolayer and bilayer graphenes with chemical vapor deposition (CVD) method, transferred them on SiO<sub>2</sub>/Si substrates, and studied their Raman spectrum evolution with the thickness of the SiO<sub>2</sub> capping layer experimentally and theoretically. We found that for monolayer and bilayer graphenes, the intensities of D, G, 2D bands ( $I_D$ ,  $I_G$ ,  $I_{2D}$ ) and the intensity ratio of 2D band to G band ( $I_{2D}/I_G$ ) oscillates as SiO<sub>2</sub> thickness increases. Besides, their oscillation amplitudes vary with SiO<sub>2</sub> thickness. Theoretically, we used the Fresnel's equations based multi reflection model (MRM) to simulate the effect of SiO<sub>2</sub> thickness on  $I_D$ ,  $I_G$ ,  $I_{2D}$ , and  $I_{2D}/I_G$ . The result coincides with the experimental result. Besides, the simulated result in a wider range of SiO<sub>2</sub> thickness shows that the oscillation amplitudes of all the band intensities present kind of beat feature. We also studied the effect of incident light wavelength on  $I_D$ ,  $I_G$ ,  $I_{2D}$ , and  $I_{2D}/I_G$ . Our work has practical meaning in using the Raman footprints to identify the layer number of graphene on SiO<sub>2</sub>/Si substrate.

### Biography

Lun Dai has completed her PhD at the age of 33 years in Physics from Peking University at Beijing, China in 1999. She is now Professor in School Physics, Peking University. Her research career has focused primarily on nano-semiconductor material, nano-electronic and nano-photonics device physics. She has published more than 80 SCI papers in reputed journals, including *Nature*, *Nano Lett.*, *Adv. Mater.*, *JACS*, *ACS nano*, *J. Mater. Chem.*, *Appl. Phys. Lett.* etc. Total citation times for these papers are more than 1000.

[lundai@pku.edu.cn](mailto:lundai@pku.edu.cn)