Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Sum-Frequency Vibrational Spectroscopic Studies of Polymer/Graphene Interface HUI-LING HAN, Department of Physics, University of California, Berkeley, CHUANSHAN TIAN, Department of Physics, Fudan University, China, FENG WANG, YUEN-RON SHEN, Department of Physics, University of California, Berkeley — The interest in alignment of polymer on graphene surfaces has been motivated by a desire to gain a fundamental understanding the interaction between molecule and graphene, and for possible application of graphene for surface chemistry. Graphene-polymer interactions also play an important role in graphene-polymer composites, which exhibit greatly improved electrical conductivity, strength, and thermal stability compared with pure polymer material. Theoretical investigation of graphene-polymer interface has been performed previously using molecular dynamics simulations [1]. However, experimental studies of the interfacial characteristics of graphene-polymer composite has been challenging. Here we investigate the molecular orientation at polymer/graphene interface using phase-sensitive-sum-frequency generation spectroscopy. The sum-fequency spectrum shows clear vibration signatures of CH_2 groups. In particular, it suggests that CH_2 groups pointing toward the graphene surface interact with graphene strongly, which leads to a red shift of vibration frequency as large as 15 cm^{-1}. In this talk I will discuss the implications of our experimental findings.

[1] C. Lv, Q. Xue, D. Xia, M. Ma, J. Xie, and H. Chen, *J. Phys. Chem. C*, **2010**, 114 (14), 6588–6594.

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Date submitted: 27 Nov 2011 Electronic form version 1.4