Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Sorting Category: 12.7 (E)

Directed Assembly of Molecules on Graphene/Ru(0001)[1] L.Z. ZHANG, H.G. ZHANG, J.T. SUN, Y. PAN, Q. LIU, J.H. MAO, H.T. ZHOU, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, T. LOW, IBM Thomas J. Watson Research Center, New York 10598, USA, H.M. GUO, S.X. DU, H.-J. GAO, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, INSTITUTE OF PHYSICS, CHINESE ACADEMY OF SCIENCES TEAM, IBM THOMAS J. WATSON RESEARCH CENTER COLLABORATION — Recently, the graphene monolayers have been seen to adopt a superstructure - moiré pattern - on Ru(0001). By using low temperature scanning tunneling spectroscopy, we identified the laterally localized electronic states on this system. The individual states are separated by 3 nm and comprise regions of about 90 carbon atoms. This constitutes a highly regular quantum dot-array with molecular precision. It is evidenced by quantum well resonances with energies that relate to the corrugation of the graphene layer. By using scanning tunneling microscopy/spectroscopy, we demonstrate the selective adsorption and formation of ordered molecular arrays of FePc and pentacene molecules on the graphene/Ru(0001) templates. With in-depth investigations of the molecular adsorption and assembly processes we reveal the existence lateral electric dipoles in the epitaxial graphene monolayers and the capability of the dipoles in directing and driving the molecular adsorption and assembly. When increasing the molecular coverage, we observed the formation of regular Kagome lattices that duplicate the lattice of the moiré pattern of monolayer graphene.

L. Z. Zhang
Lzzhang@iphy.ac.cn
Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China

[X] Prefer Oral Session
[ ] Prefer Poster Session

[1]Supported by MOST (2009CB929103, 2011CB932700) of China

Date submitted: 20 Dec 2011 Electronic form version 1.4