

ADVANCES IN GRAPHENE CHEMISTRY

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We have recently demonstrated the high density functionalization of epitaxial graphene wafers with nitrophenyl groups (NP). [Bekyarova, E.; Itkis, M. E.; Ramesh, P.; Berger, C.; Sprinkle, M.; de Heer, W. A.; Haddon, R. C., Chemical Modification of Epitaxial Graphene: Spontaneous Grafting of Aryl Groups. *J. Am. Chem. Soc.* **2009**, 131, 1336-1337] The chemical formation of covalent carbon-carbon bonds involving the basal plane carbon atoms offers an alternative approach to the control of the electronic properties of graphene; the transformation of the carbon centers from sp^2 to sp^3 introduces a barrier to electron flow by saturating the carbon atoms and opening a band gap which allows the generation of insulating and semiconducting regions in graphene wafers. This prototype chemistry when applied to carbon nanotubes allowed the covalent modification of the electronic structure, with clear evidence for introduction of a band gap into the metallic single-walled carbon nanotubes (SWNTs).

In this talk I will discuss our recent results on the electronic and magnetic properties of chemically modified graphene and its relationship to SWNTs.