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## Reversible hydrophobic to hydrophilic transition of graphene under UV irradiation: Experimental and first principle studies

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The mechanism of dissociating and adsorbing water molecules on graphene by ultraviolet irradiation has been investaged by experiments and confirmed by first principle studies, which realized the reversible transition of graphene from hydrophobic to hydrophilic. It is found that UV, acted as an excitation, can split $H_2O$ molecules into hydrogen and hydroxyl radicals and then hold them on the graphene surface. It is the concentration of hydrophilic hydroxyl groupschemical adsorbed on the surface that effects the wettability of graphene significantly, which can be controlled by UV irradiation duration. In addition, after air storage for several days, this transition can recover spontaneously. Hence, UV can act as a switch to change the hydrophilicity of graphene reversibly.

### Biography

Zhemi Xu is doing her Masters from University of New South Wales, Australia in Materials Science and Engineering. *She will finish masters degree in June 2014.*

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## Hollow polymeric capsules: Size exclusive fishing of gold nanoparticles and universal carrier for precious metal nanoparticles

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Hollow polymeric capsules of nanometer to micrometer dimensions have been endowed with variety of applications. They can be used for drug and gene delivery, as microreactor and as templates for inorganic and organic nanoparticles. We present here polymer bound hollow capsules that are capable to fish gold nanoparticles within a certain size range and encapsulate other precious metal nanoparticles. Polymer bound hollow capsules of a sulfur containing polymer were prepared by dissolving gold core of an analog gold nanoparticle containing hybrid material, which was prepared by free radical copolymerization of methyl methacrylate and mono-functionalized gold nanoparticle with vinyl group as artificial monomer. The size exclusive fishing of gold nanoparticles has been carried out by using simple ligand exchange reaction. Citrate stabilized gold nanoparticles of different sizes ranging from 56 nm to 4 nm in the aqueous phase were used as "fish". Successful fishing process was proven by UV-vis spectroscopy and transmission electron microscopy (TEM). The hollow capsules can encapsulate gold nanoparticles under 15 nm effectively. When a mixture of citrate stabilized gold nanoparticle in different sizes was used as "fish", the hollow capsules caught more small "fish" (3 nm) than large "fish" (15 nm) and the oversize "fish" was excluded. The hollow capsules can also act as universal carrier for precious metal nanoparticles. Silver, palladium, platinum nanoparticles have been successfully refilled in the hollow capsules via *in-situ* reduction route, which have promising future in the field of catalysis.

### Biography

Ziyin Fan has completed her bachelor and master from Philipps University of Marburg in Germany (2008-2012). In 2009 she won the DAAD (German Academic Exchange Service) price. She is now Ph.D. student in groups of Prof. Dr. Andreas Greiner from University Bayreuth, Macromolecular Chemistry II. She has scholarship from FCI (Fund of chemical industry) for her Ph.D. Her research interest is stoichiometric functionalization of gold nanoparticles and synthesis of novel hollow capsules for various applications.

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