

GEC15-2015-000033

Abstract for an Invited Paper  
for the GEC15 Meeting of  
the American Physical Society

### **Plasma Functionalized Nanocarbon Materials and Their Applications**

YONGFENG LI, China University of Petroleum

The plasma treatment method is important for modifying carbon nanomaterials since it has the advantage of being nonpolluting. It has the possibility of scaling up to produce large quantities necessary for commercial use. The liquid-related plasma is especially advantageous in avoiding use of toxic stabilizers and reducing agents during the nanoparticle formation process. In this work, both gas phase and liquid phase plasmas are used to modify nanocarbon materials including graphene and carbon nanotubes. The synthesis of metal nanoparticles functionalized nanocarbon materials including carbon nanotubes and graphene has been realized by an environmentally-friendly gas-liquid interfacial method. Furthermore, the new catalysts based on hybrid of nanocarbon materials and metal nanoparticles have been proved to be stable and high catalytic performance in organic molecule transformation reactions. In addition, the modification of few-layer graphene grown by chemical vapour deposition via the nitrogen plasma ion irradiation has been performed, and the modified graphene sheets as counter electrodes in bifacial dye-sensitized solar cells exhibit high performance.