## Abstract Submitted for the MAR11 Meeting of The American Physical Society

Aromatic molecule-like fluorescence from Graphene Oxide CHARUDATTA GALANDE, Rice University, ADITYA MOHITE, Los Alamos National Laboratory, ANTON NAUMOV, WEI GAO, LIJIE CI, ANAKHA AJAYAN, HUI GAO, Rice University, ANCHAL SRIVASTAVA, Banaras Hindu University, R. BRUCE WEISMAN, PULICKEL M. AJAYAN, Rice University — Graphene Oxide (GO) is a functionalized derivative of graphene, obtained by chemical exfoliation and chemical oxidation of graphite. Recent NMR studies on GO have revealed presence of hydroxyl, epoxy, carbonyl, carboxyl and lactols. Although there have been several studies on electronic and optical properties of GO, the role of functional groups in determining the electronic density of states is still unclear. Here we report pH dependent fluorescence and excitation spectra of GO, with spectroscopic signatures indicating the presence of molecule-like fluorophores in GO. In acidic medium, a single, broad emission peak is observed at ca. 660nm. In contrast, relatively sharp emission at lower wavelengths (480nm-515nm) appears in a short pH range between 7.6 and 8.0, while the broad peak is completely quenched in basic conditions. The fluorescence and excitation spectra have pH-dependence strikingly similar to several aromatic carboxylic acids. The observed spectral features are proposed to arise from quasi-molecular fluorophores, similar to polycyclic aromatic compounds that are formed by the electronic coupling of carboxylic acid groups with nearby carbon atoms of the graphene.

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Date submitted: 17 Nov 2010

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