Supporting Information

Improved Heterogeneous Electron Transfer Kinetics of Fluorinated Graphene Derivatives

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MAS ^{13}C NMR and ^{19}F NMR studies on FGO:

The Magic Angle Spinning (MAS) ^{13}C NMR spectrum of FGO is reported in our previous work, [1] and it showed a distinctive peak at 88 ppm that is not appeared in the ^{13}C NMR spectrum of graphene oxide. This peak at 88 ppm corresponds to tertiary alkyl fluoride environment and also eliminates the chances of the presence of primary or secondary alkyl fluoride or an aromatic fluoride.[1] Hence it indicates that most of the fluorine atoms are lying in the basal plane of graphene honeycomb lattice than at the edges. This has been reconfirmed by the ^{19}F NMR spectrum carried out after dispersing the FGO powder in chloroform.

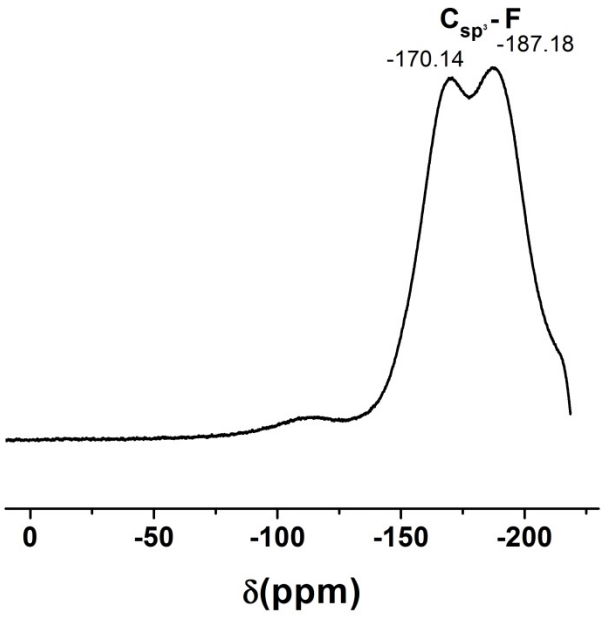

Figure S1: ^{19}F NMR spectrum of FGO.

Figure S1 shows the ^{19}F NMR spectrum of FGO. This contains two peaks placed near -180 ppm (-170.4 ppm and -187.18 ppm). The peaks placed near to -180 ppm indicate the presence of

covalent C-F bonds (C_{sp3}-F).[2] Moreover, signals corresponding to CF_3 (-56 ppm), CF_2 (-122 ppm) and C_{sp2}-F (-151 ppm) are also absent in the spectrum.[3] These indicate that most of the fluorine atoms are placed in the basal plane of graphene oxide than at the edges. The two peaks arising near -180 ppm may be due to the presence of basal plane alkyl fluorides in different chemical environments. A detailed MAS ^{19}F NMR is needed to understand the complete structure of FGO and these studies are on-going.

References:

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3. Fu-Gang Zhao; Gang Zhao; Xin-Hua Liu; Cong-Wu Ge; Jin-Tu Wang; Bai-Li Li; Qi-Gang Wang; Wei-Shi Li; Qing-Yun Chen. *J. Mater. Chem. A.* 2014, **2**, 8782.