Supplementary information

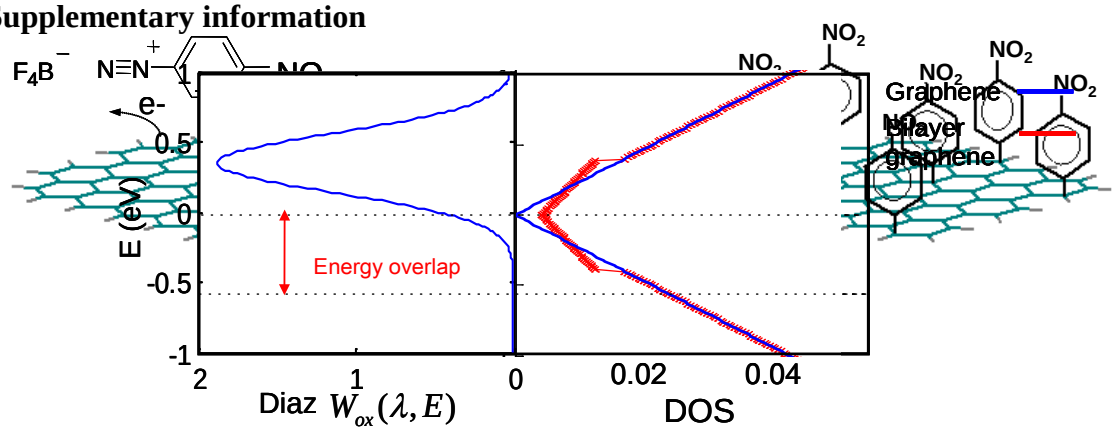

Figure S1: Energy overlap of the electronic states of single and bilayer graphene (DOS) and vacant oxidation states of the electron withdrawing species (W_{ox}). (Energy overlap is calculated in between the dotted lines.)

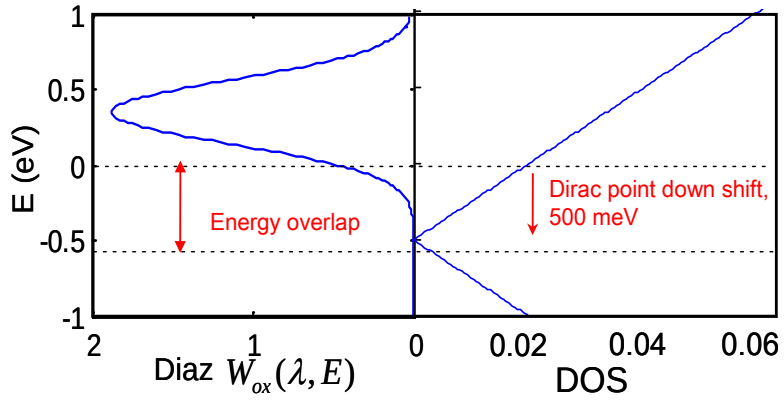

Figure S2: Energy overlap of the electronic states of single layer graphene with a Dirac point down shift by 500meV and vacant oxidation states of the electron withdrawing species (W_{ox}). (Energy overlap is calculated in between the dotted lines.)

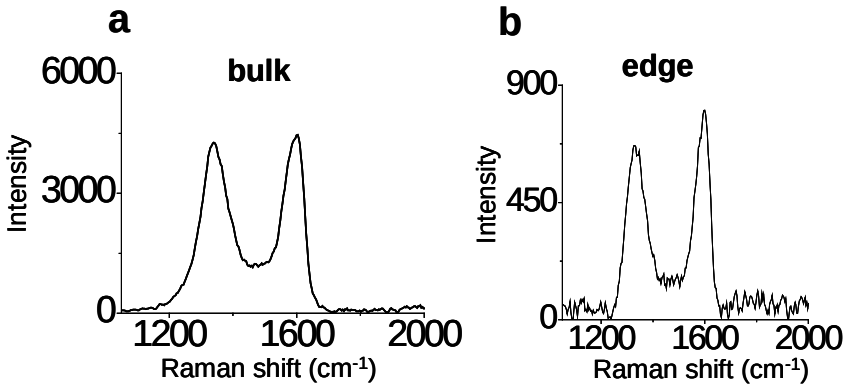

Figure S3: Raman spectra of single graphene oxide sheet at (a) bulk and (b) edge. The D/G ratio of bulk and edge is similar.

Figure S4: Picture of the reactor setup employed for the on chip chemistry. The silicon wafer and the stir bars are at of the bottom of the reactor dipped in water with 17-25 mM 4-nitrobenzene diazonium water and 1 wt% SDS.

Table T1: The number of layers of graphene, D/G ratio before and after normalization.

N (# of layers)	D/G (actual)	D/G normalized
3	0.008858	0.046236
2	0.017553	0.091623
3	0.009385	0.04899
50	0	0
1	0.181249	0.946095
1	0.185025	0.965804
2	0.012483	0.065159
1	0.191576	1
1	0.178644	0.932499
1	0.17623	0.919895
50	0.00146	0.007621
50	0.004065	0.021216
50	0.004461	0.023284
1	0.417496172	1
3	0.012016021	0.028781
5	0.012609859	0.030204
1	0.400041434	0.958192
1	0.382759256	0.916797
2	0.021181611	0.050735
2	0.02480315	0.059409
5	0.00923045	0.022109
2	0.013504754	0.032347