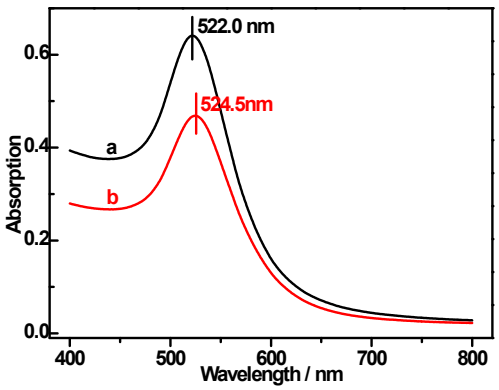
Electronic Supplementary Material (ESI) for Analyst.

Figure S1.UV-vis spectra of AuNPs (a) and AuNPs functionalized with 5'-SH 26-base oligonucleotide (AuNPs-ssDNA) (b) (left). TEM image of AuNPs (right).



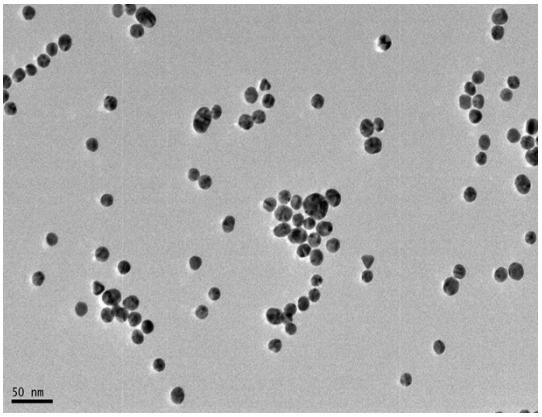


Figure S2. FTIR spectra of the graphene (GSs) (a), oxidized graphene into small pieces (ox-GSs) (b) and graphene quantum dots (GQDs) (c).

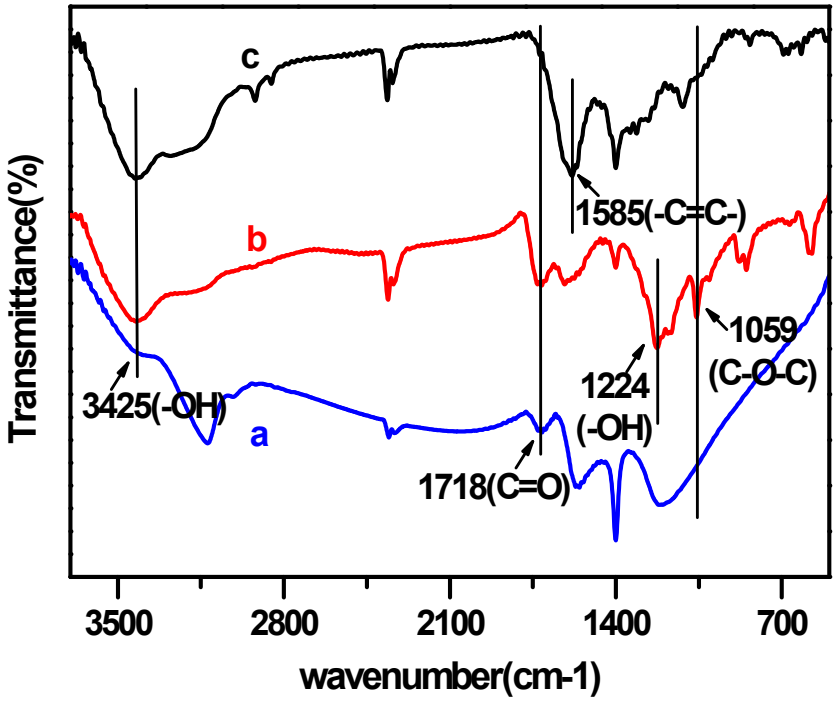


Figure S3. Raman spectra of the graphene (GSs) (a), oxidized graphene into small pieces (ox-GSs) (b) and graphene quantum dots (GQDs) (c).

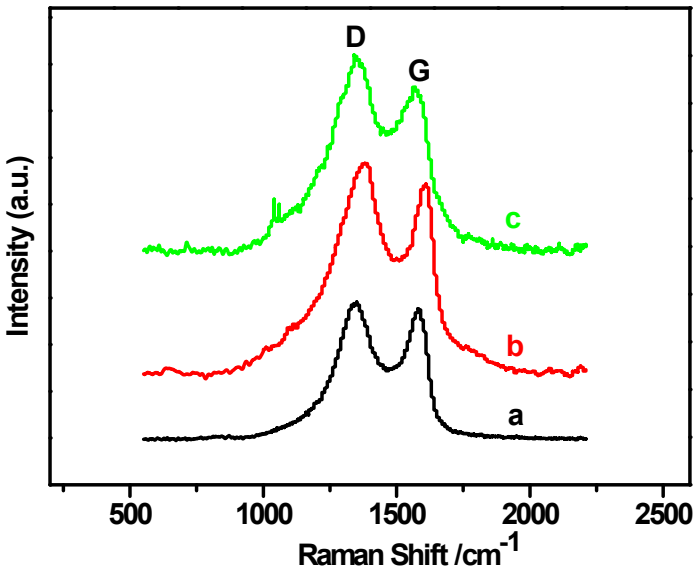


Figure S4. UV-vis absorption spectra of graphene (a) and GQDs (b).

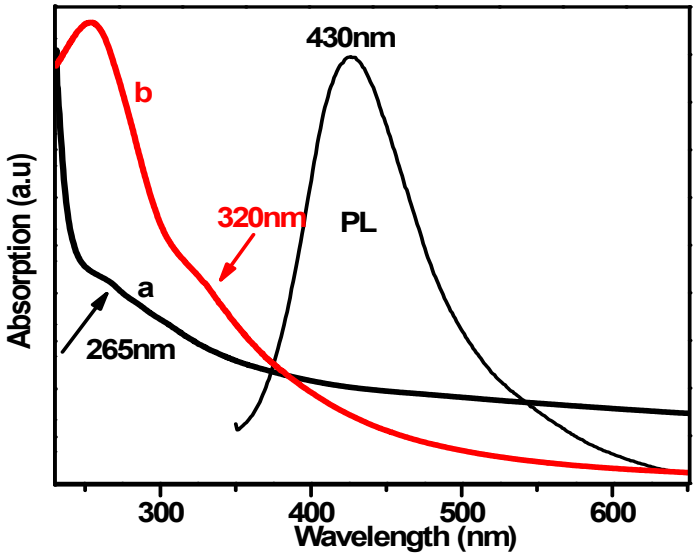


Figure S5. Dependence of fluorescence intensity on the excitation time for GQDs in deionized water (continuous exposure to a 150 w Xenon arc-lamp).

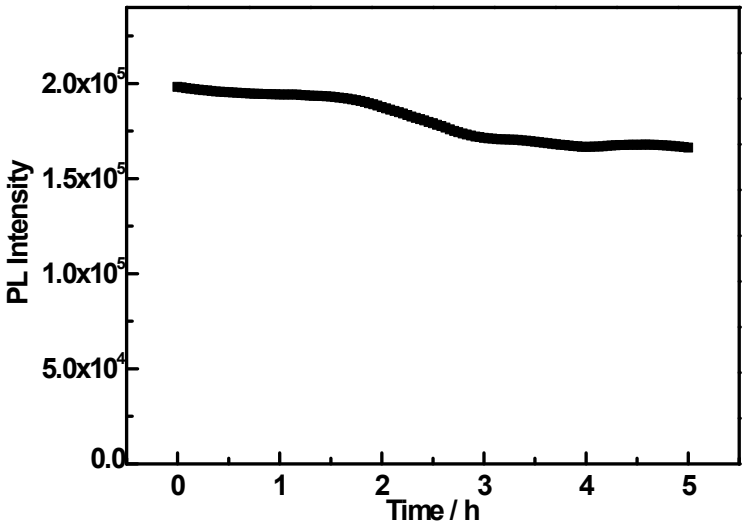


Figure S6. ECL emission spectra of PBS buffer (100 mM, pH=7.4) 10 μg/mL GQDs add $K_2S_2O_8$ 0, 1.00, 2.00, 3.00, 4.00, 5.00, 6.00, 7.00, 8.00, 9.00, 10.00, 100, 174 mM (a-m).

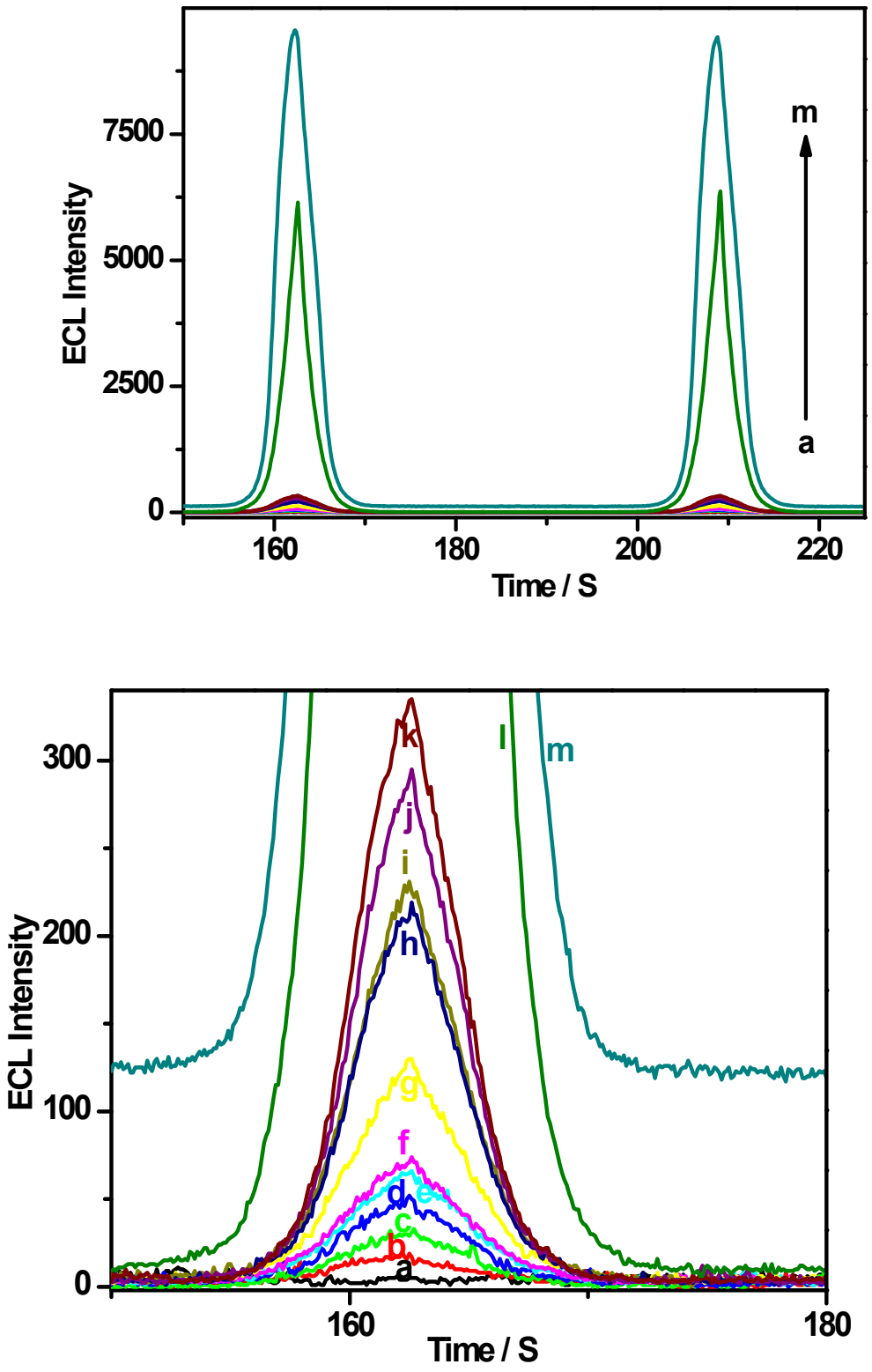


Figure S7. ECL responses of GQDs-$K_2S_2O_8$ system obtained during a continuous potential scan between −1.6 and 0.75 V.

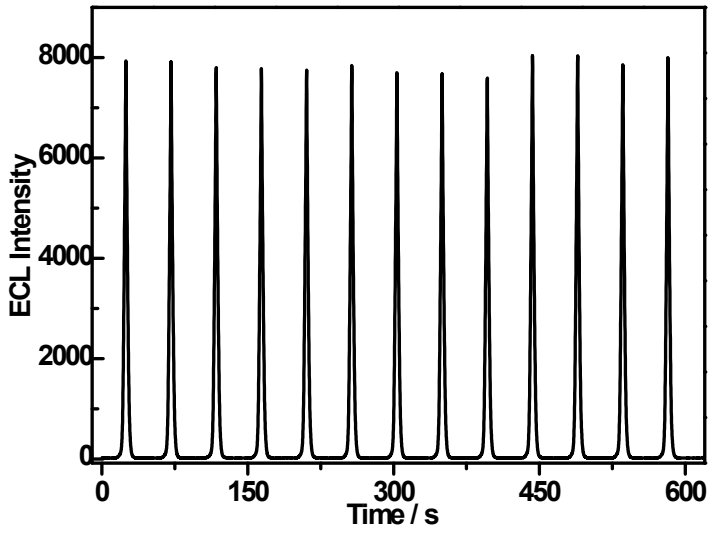


Figure S8. The photograph of control experiment, in 100 uL PBS buffer (100 mM, pH=7.4) solution containing 10 μg/mL GQDs with 9, 4.5, 2.25, 1.125 nM AuNPs-ssDNA (a-d); with 9, 18 nM AuNPs (e,f), with 500 nM cp53 (g). 9 nM AuNPs (h). Placed in dark after10 mins (A) and 2 days(B).