Supporting information for

A Graphene Oxide–Rhodamine 6G Nanocomposite as Turn-on Fluorescence Probe for Selective Detection of DNA

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EXPERIMENTAL SECTION

Materials and Reagents. All reagents used were of analytical grade. Graphite power， Doxyribonucleic acid (DNA), Ribonucleic acid (RNA), Na_2CO_3, $KMnO_4$ and Rhodamine 6G were purchased from Asbury Carbons Ltd. (Shanghai, China), Biosharp, Bo'ao Biotechnology Co., Ltd. (Shanghai, China), Bodi Chemical Holding Co., Ltd (Tianjin, China) , Jiaozuo Chemical Plant (Henan, China) and Merck, respectively.

Synthesis of Graphene Oxide. GO was synthesized from graphite via a modified Hummers and Offeman's method[4]. 1 g of graphite flakes, 0.5 g of $NaNO_3$ was taken in 250 mL round bottom flask and 23 mL of conc. H_2SO_4 was added to it. Then 3 g of $KMnO_4$ was added slowly to the mixture at ice bath, to avoid rapid heat evaluation. After 2 hours the reaction mixture was allowed to stir at 35 °C for 30 minutes. Finally, the reaction mixture was added to 50 mL of water and allowed to stirr at 98 °C for 30 ministers, which resulted change of color from yellow to brown. Then 85 mL of water allowed to stir, and the reaction was ended by the addition of 4 mL of 30% H_2O_2 .The warm solution was then filtered and washed with 5% HCl and then with water. The dry product was dissolved in water sonicated to exfoliate oxidesed graphene.

Synthesis of the complex $R6G^+GO^-$. 100 mg of GO was dissolved in 30 mL of DI water by sonicator (100 Hz), then 10 mL of 2% Na_2CO_3 was added to it. The mixture was well stirred and sonicated for a while. Excess Na_2CO_3 was removed by

dialysis till pH is 7-8. Then 30 mL of Rhodamine 6G (3×10^{-3} M) aqueous solution was added the above Na^+GO^- sediment. Resulting mixture was sonicated at 15-20 °C for 3 hrs, excess dye was removed by dialyzing with DI water for several days. The resultant product was dried for further use.

Apparatus. The crystalline structure and composition of the GO were identified respectively by a D/max-IIIC X-ray diffractometer (Shimadzu, Japan). Fourier Transform Infra-Red (FTIR) spectra were taken with a Spectrum One FTIR spectrophotometer (Perkin-Elmer, America) at room temperature. Atomic force microscopy images were collected in the tapping mode using Nanoscope NanoscopeIIIa. The UV-vis absorption measurements were performed on ZF-I Three-operating UV analyzer (Gucun Electricity Light Instrumental Factory, China). The fluorescence measurements were carried out by RF-540 fluorophotometer (Tokyo, Japan). AWH-2 vortex mixer (Huxi Instrumental Co., China) was used to blend the solution. A pHB-4 pH meter (Ruosull Technology Co., China) was used to measure the pH.

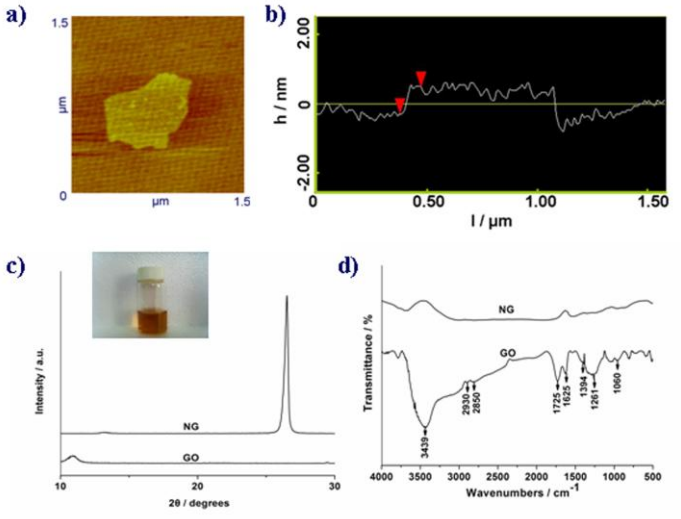

Figure S1 Characterization of GO. a) AFM image and b) height profile of GO. c) XRD and d) IR spectra of GO and natural graphite.

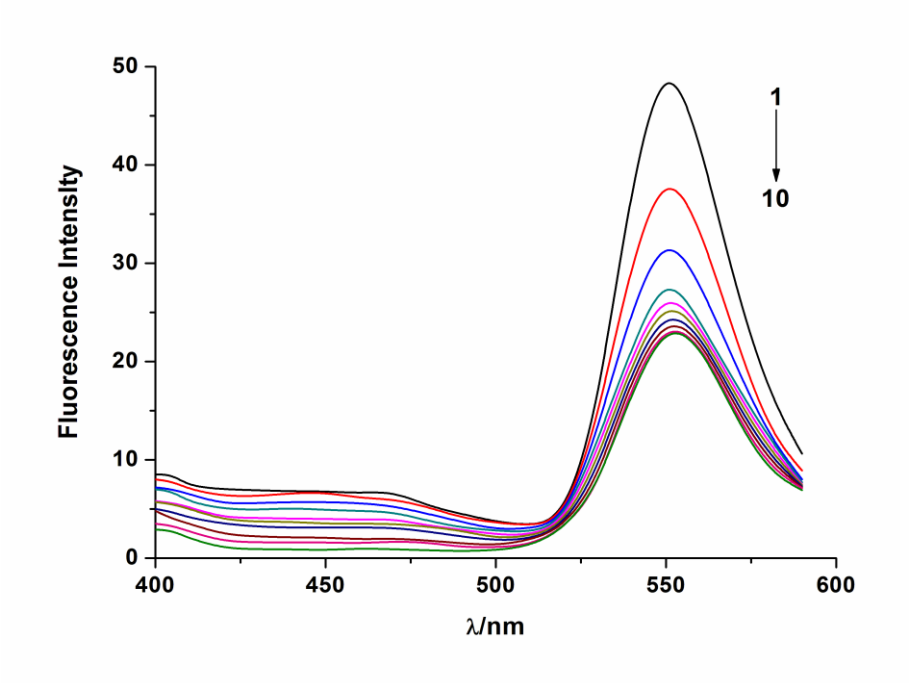

Figure S2. Fluorescence spectra of R6G-DNA system. C_{R6G} = 20 μM, C_{DNA} = 0–90nM.

Table S1. Binding constant K and the number of binding sites n for R6G-DNA

Temperature/^{o}C	lgK	n	R	K(L/mol)
31	4.38344	0.60591	0.97781	2.42×10^{4}
41	4.66355	0.63134	0.98377	4.61×10^{4}

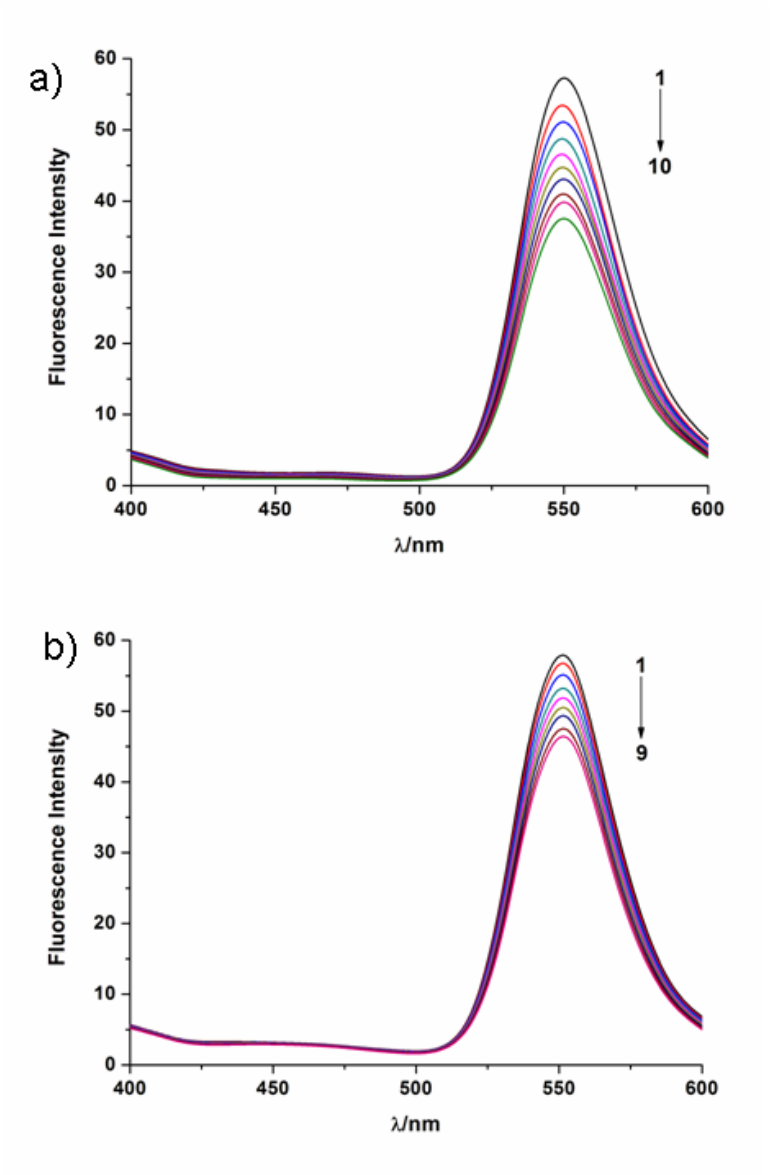

Figure S3. a) Fluorescence quenching of R6G with KI. b)Fluorescence quenching of R6G-DNA with KI. C_{R6G} = 20 μM, C_{DNA} = 30 nM, C_{KI} = 0–800 μM .

Table S2. Quenching efficiency of R6G with KI

KI(μL)	F_0	Quenching efficiency of R6G with KI in the absence of DNA	F	Quenching efficiency of R6G with KI in the present of DNA
0	61.3		61.7	
100	57.1	6.85155	60.6	1.78282
200	54.3	11.41925	58.8	4.700162
300	52	15.17129	56.6	8.265802
400	49.8	18.7602	55.2	10.53485
500	47.7	22.18597	53.8	12.80389
600	45.9	25.12235	52.7	14.58671
700	43.8	28.54812	50.6	17.99028
800	42.8	30.17945	49.6	19.61102