Electronic Supplementary Information (ESI) for RSC Advances

A split G-quadruplex DNAzyme based magnetic graphene oxide platform for sensitive authentication of *Pseudostellaria heterophylla*

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EXPERIMENTAL

Preparation of graphene oxide

Graphene oxide was prepared from natural graphite powder by a modified Hummers method.[1,2] 0.5 g of graphite powder was initially mixed with 23 mL of H_2SO_4 (98%) at 0℃, and then 0.5 g of $NaNO_3$ and 3 g of $KMnO_4$ were dropwise added. The well-mixed solution was stirred in a water bath at 35℃ for 1 h. Successively, 140 mL of H_2O was added in the mixture, and the temperature was raised to 90℃. Following that, 3 mL of H_2O_2 (30%) was added and the color of the mixture turned to light brown. At last, the mixture was repeated washed with 1:10 HCl aqueous solution and then H_2O. The resultant dispersion was sonicated under ambient condition for 4 h and centrifuged to obtain exfoliated graphene oxide.

Synthesis of magnetic graphene oxide

Graphene oxide nanoparticles coated with Fe_3O_4 were synthesized according to the literature with some modification.[3] To prepare 10 mg mL^{-1} NaOH/DEG stock solution,

200 mg NaOH was firstly added into 20 mL DEG, then the mixture was heated for 1 h at a 120 °C oil bath under the protection of N_2, and then allowed to cool to 70 °C. After that, 15 mg graphene oxide and 60 mg $FeCl_3$ were added into 10 mL of the NaOH/DEG solution. The mixture was stirred for 1 h at room temperature, and then transferred to a 220 °C oil bath for 30 min under N_2. Following that, 5 mL NaOH/DEG stock solution at 70 °C was added rapidly into the above 220 °C mixture, and then heated for another 1 h. Consequently, the product was washed with ethanol and centrifuged several times to obtain Fe_3O_4/GO composites.

Table S1. Sequences of Oligomers used in the G-quadruplex DNAzyme based Fe_3O_4/GO platform

oligomer	Sequence (From 5’ to 3’)
probe a	GGGTTGGGCAGGTTTCGACAATGATCCTTCCGCAG
probe b	CGCTGGTCGTTCTGCTGGGCTGGGTAGGG
T-DNA	CTGCGGAAGGATCATTGTCGAAACCTGCCCAGCAGAACGACCAGCG
JSYX	CTGCGGAAGGATCATTGTCGAAACTGCCCAGCAGAACGACCAGCG
JSNJ	CTGCGGAAGGATCATTGTCCAATACTGGCCAGCAGAACGGACCAGCG
JSZJ	TGCGGAAGGATCATTGTCAAACTGGCCAGCAGAACGACCAGCG
AHCZ	CTGCGGAAGGATCATTGTCGAAACCTGCCCAGCTGAACGACCAGCG
AHXC	CTGCGGAAGGATCATTGTCGAAACTGCCCAGACAGAACGACCAGCG

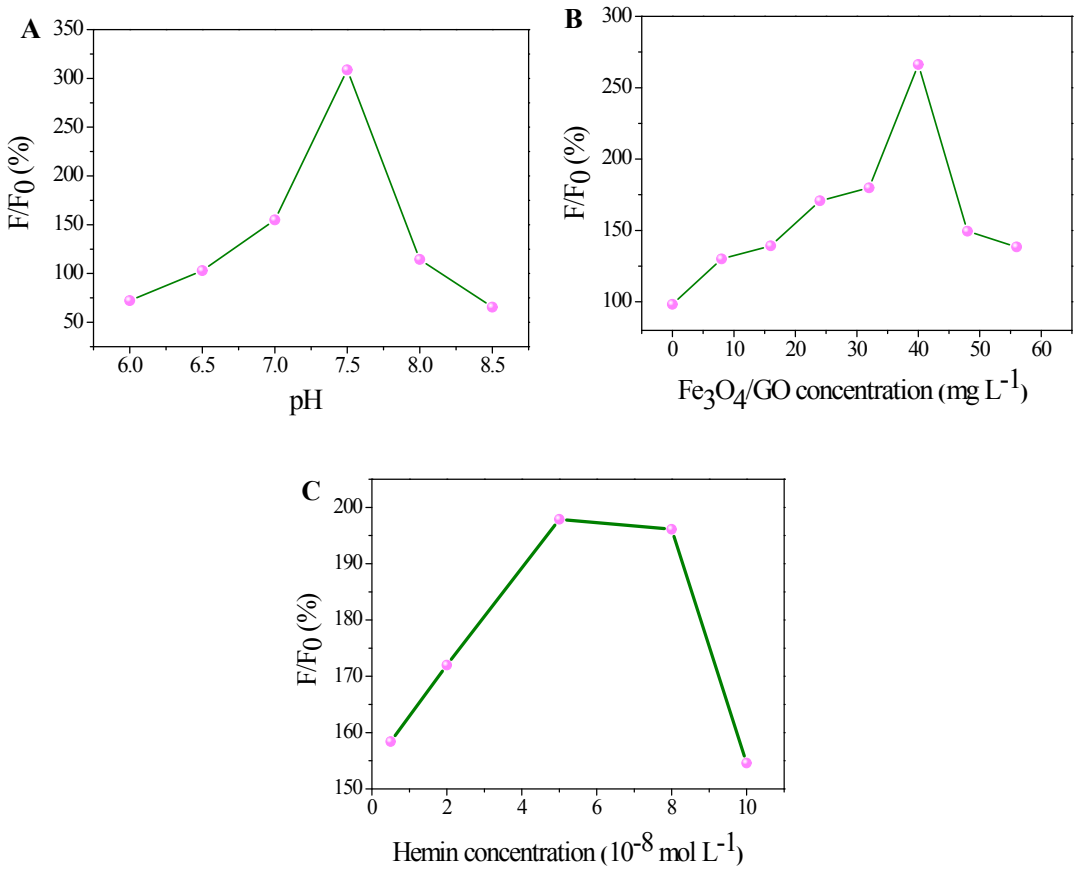

Fig. S1 (A) F/F_0 *versus* pH from 6.0 to 8.5; (B) F/F_0 *versus* Fe_3O_4/GO concentration from 0 to 56 mg L^{-1}; (C) F/F_0 *versus* hemin concentration from 5.0×10^{-9} to 1.0×10^{-7} mol L^{-1}; F_0 is the fluorescence intensity in the absence of T-DNA, F is the fluorescence intensity in the presence of 3.0×10^{-8} mol L^{-1} T-DNA. The other conditions are the same as those in Section *2.3*.

References

1. W. S. Hummers and R. E. Offeman, *J. Am. Chem. Soc.*, 1958, **80**, 1339.
2. B. Zhang, Y. L. Cui, H. F. Chen, B. Q. Liu, G. N. Chen, D. P. Tang, *Electroanalysis*, 2011, **23**, 1821-1829.
3. D. P. Tang, J. Tang, Q. F. Li, B. L. Su, G. N. Chen, *Anal. Chem.*, 2011, **83**, 7255-7259.