Supplementary Information

Fluorescent biosensor for sensitive analysis of oxytetracycline based on an indirectly labeled long-chain aptamer

Fang Yuan, Huimin Zhao*, Zhinan Zhang, Lichen Gao, Jintao Xu, Xie Quan

Key Laboratory of Industrial Ecology and Environmental Engineering (Ministry of Education, China), School of Environmental Science and Technology, Dalian University of Technology, Linggong Road 2, Dalian 116024, P. R. China

*Corresponding author

*e-mail: zhaohuim@dlut.edu.cn

Tel. 86-411-84706263

Fax. 86-411-84706263

5'-CGTACGGAATTCGCTAGCCGAGTTGAGCCGGGCGCGGTACGGGTACTGGTATGTGTGGGGATCCGAGCTCCACGTG-3'
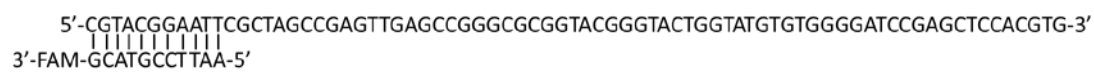 ||||||||||
3'-FAM-GCATGCCTTAA-5'

Fig. S1 Aptamer-based recognition probe which consisted of two parts, oxytetracycline long-chain aptamer and FAM-labeled short-chain ssDNA.
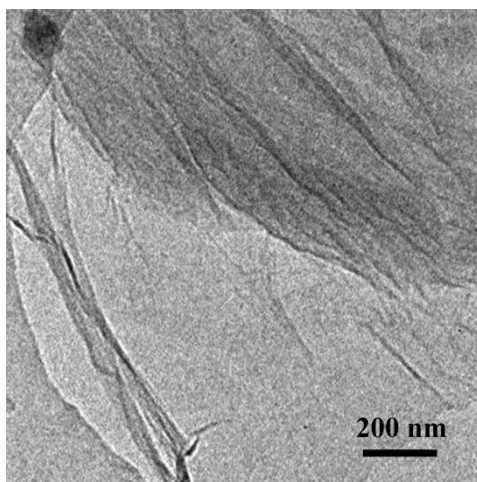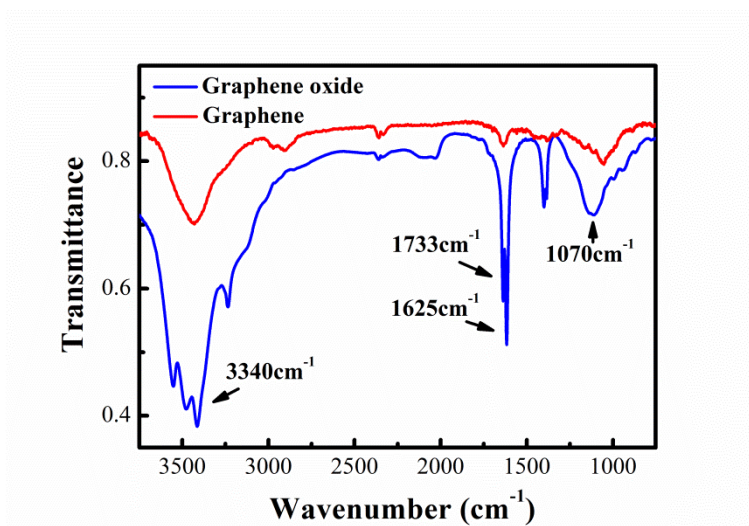
Fig. S2. TEM image of graphene.

Fig. S3. FT-IR spectra of graphene oxide and graphene.

Table S1. Sequence details of tested S1.

Sequence (5'-3')	Size	T_M (°C)
CCGTACG	7 mer	19.9
TTCCGTACG	9 mer	27.8
AATTCCGTACG	11 mer	33.6
CGAATTCCGTACG	13 mer	41.9
AGCGAATTCCGTACG	15 mer	48.6

Table S2. Comparison of available detection methods for oxytetracycline analysis.

Method	Read-out	Analytical ranges	LOQ	Homogeneous	Immobilization	Ref
Aptamer-based light scattering agglutination assay	Photon count	10^2-10^4 ppb	100 ppb	No	Yes	[1]
Aptamer-based cantilever array sensor	Differential deflection	1.0-100 nM	1.0 nM	No	Yes	[2]
Electrochemiluminescence sensor based on silica/Nafion-modified electrode	ECL intensity	1-100 µM	1 µM	No	Yes	[3]
Electrochemical sensor based on aptamer-immobilized array electrode chip	Electric current	1-100 nM	1 nM	No	Yes	[4]
Colorimetric sensor based on growth of AuNPs	Absorbance	0.42-16 µg/mL	0.42 µg/mL	Yes	No	[5]
Colorimetric aptamer-based sensor using AuNPs	Absorbance	0.025-1 µM	0.025µM	Yes	No	[6]
Fluorescent sensor based on carbon nanoparticles	Fluorescence intensity	0.06-6 µM	0.06 µM	Yes	No	[7]
Fluorescent assay based on interaction between aptamer and graphene	Fluorescence intensity	0.1-2 µM	0.1 µM	Yes	No	[8]
Our assay	Fluorescence intensity	0.01-0.2 µM	0.01 µM	Yes	No	

Reference

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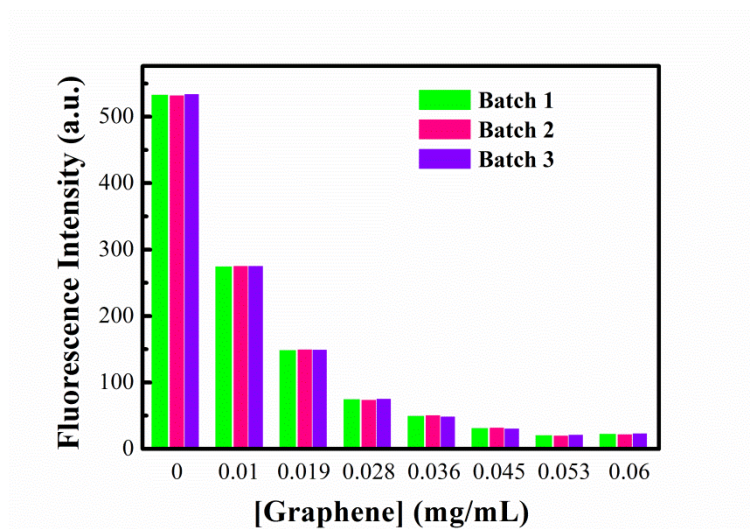8 H. M. Zhao, S. Gao, M. Liu, Y. Y. Chang, X. F. Fan and X. Quan, *Microchim. Acta*, 2013, **180**, 829.

Fig. S4. Fluorescence quenching based on three batches of graphene. Experiments were carried out in 20.0 mM PBS (pH 7.4) containing 0.66 μM aptamer-based recognition probe and different concentration of graphene.
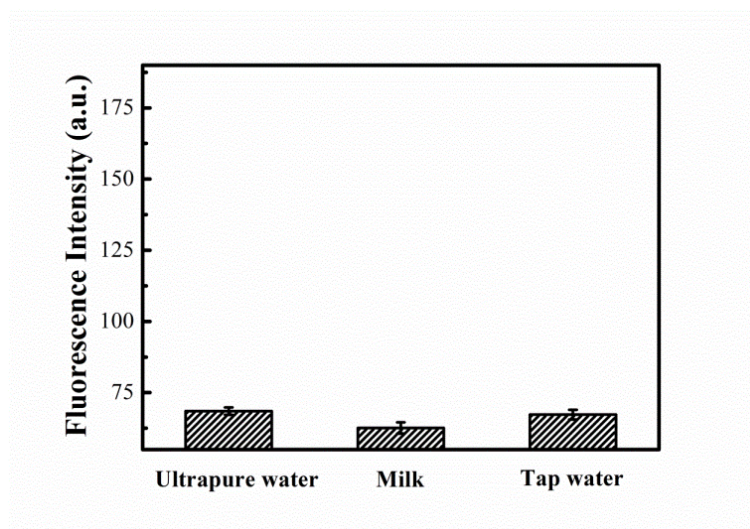
Fig. S5. Fluorescence intensity in actual samples. Experiments were carried out in 20.0 mM PBS (pH 7.4) containing 0.66 µM aptamer-based recognition probe, 0.036 mg mL^{-1} graphene and 1.1 µM C1.