Electronic Supplementary Information (ESI)

A simple label-free aptamer-based method for C-reactive protein detection

Bin Wu, Nandi Chen, Qing Wang, Xiaohai Yang,* Kemin Wang,* Wenshan Li, Qing Li, Wenjing Liu, Hongmei Fang

State Key Laboratory of Chemo/Biosensing and Chemometrics, College of Chemistry and Chemical Engineering, Key Laboratory for Bio-Nanotechnology and Molecule Engineering of Hunan Province, Hunan University, Changsha, China 410082.

E-mail: yangxiaohai@hnu.edu.cn, kmwang@hnu.edu.cn; Tel/Fax: +86 731 88821566.

1 Fluorescence characteristic between 6th-62-40 and ThT.

The plot of fluorescence emission intensity of ThT with the aptamer 6th-62-40 provided in Figure S1. In the present of 100 nM 6th-62-40, the fluorescence emission intensity on 490 nm versus ThT concentration was obtained. It obtained a binding constant Ka = 1.63×10^5 M^{-1} between aptamer and ThT.

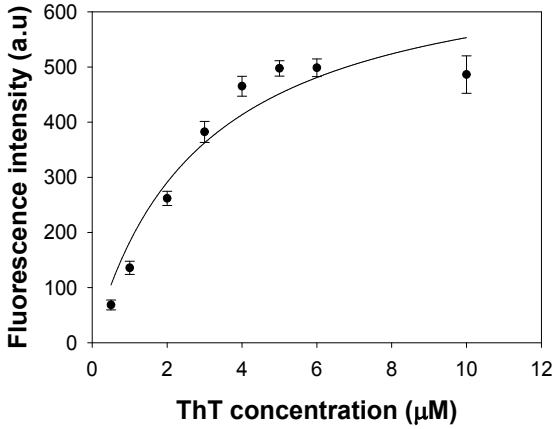

Fig. S1 The fluorescence emission intensity on 490 nm versus ThT concentration in the present of 100 nM G-rich aptamer 6th-62-40. λex = 425 nm. Error bars showed the standard deviation of measurement taken from three experiments.

2 Optimization of experimental conditions.

In order to obtain the highest sensitive response, ThT concentration, K^+ concentration, reaction temperature and incubation time were optimized. The concentration of CRP was 20 nM in all optimization experiment.

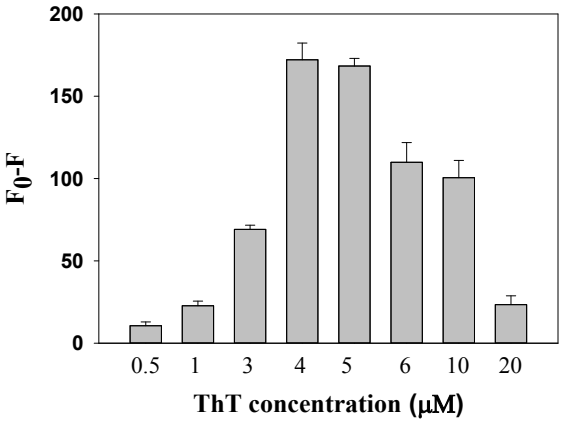

Fig. S2 Optimization of concentration ThT. The fluorescence emission intensity on 490 nm versus ThT concentration in the present of 100 nM 6th-62-40 and 20 nM CRP. λex = 425 nm. Error bars showed the standard deviation of measurement taken from three experiments. F_0 and F are the fluorescence intensity in the absence and presence of CRP respectively.

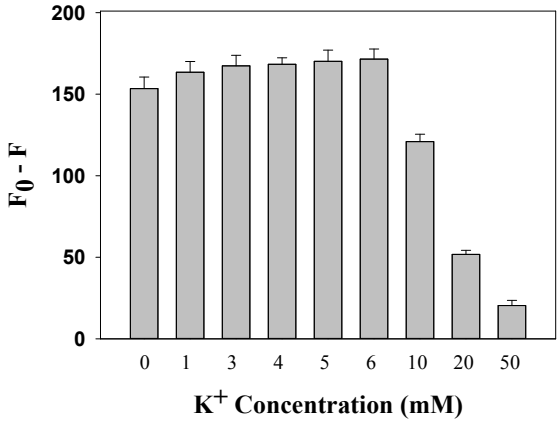

Fig. S3 Optimization of K^+ ions concentration. The change of fluorescence signal on 490 nm was not affected obviously K^+ concentration below 6 mM in the present of 100 nM aptamer and 4 μM ThT. λex = 425 nm.

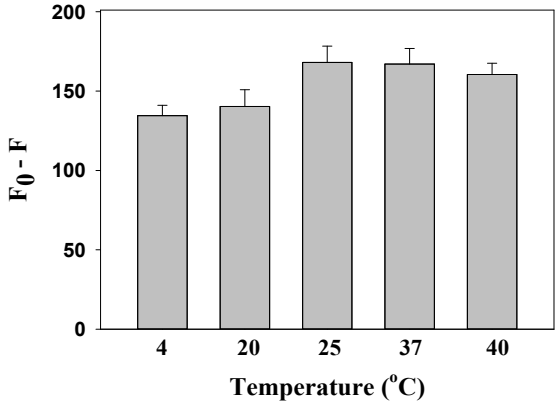

Fig. S4 Optimization of reaction temperature. The change of fluorescence on 490 nm was maximum at 25 °C. λex = 425 nm.

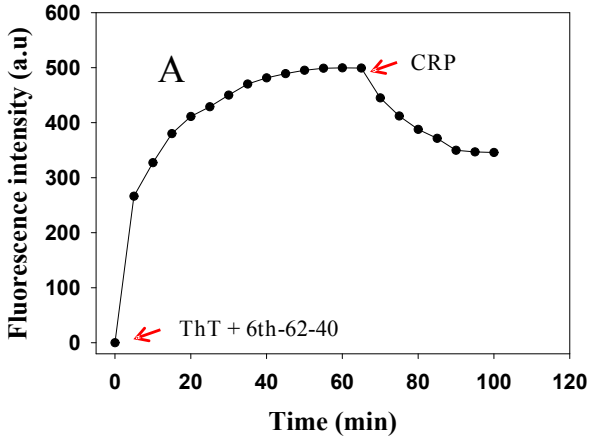

Fig. S5 Optimization of incubation time. Record the fluorescence intensity on 490 nm per 5 min in the present of 100 nM aptamer and 4 μM ThT. The fluorescence of 6th-62-40/ThT reached the maximum value after 1 h, then 20 nM CPR were added and record the fluorescence intensity on 490 nm per 5 min. λex = 425 nm.

Table S1 CRP detection performance comparison of our strategy with other methods.

Methods	Detection limit	Reference
Electrochemical	150 pM	*Anal. Chem.,* 2014, 86, 5553-5558
	0.87 nM	*Phys. Chem. Chem. Phys.*, 2010, 12, 9176-9182.
Fluorescence	10 pM	*Chem. Commun.,* 2016, 52, 3883-3886
	87 pM	*Biosens. Bioelectron.,* 2009, 24, 1456-1461.
SPR	10.4 pM	*Analyst,* 2015, 140, 4445-4452
	7 zM	*Sci. Rep.,* 2014, 4, 5129.
	10 pM	*Chem. Commun.*, 2016, 52, 3568-3571.
Chemiluminescence	1.1 nM	*Biosens. Bioelectron.,* 2009, 24, 3091-3096.
	8.1 pM	*ACS Nano,* 2012, 6, 2978–2983.
Fluorescence	380 pM	This work