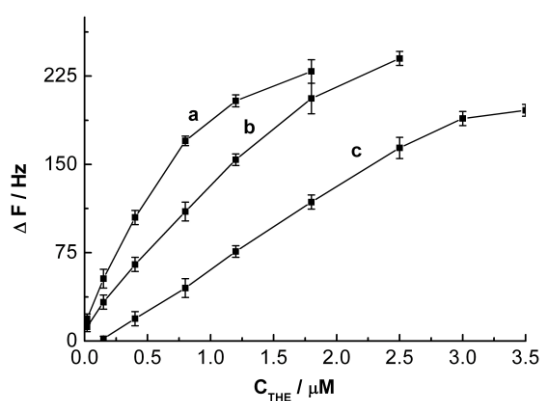


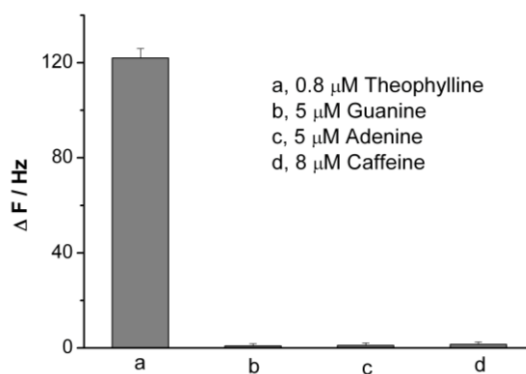
## Supplementary information:

### A theophylline quartz crystal microbalance biosensor based on recognition of RNA aptamer and amplification of signal

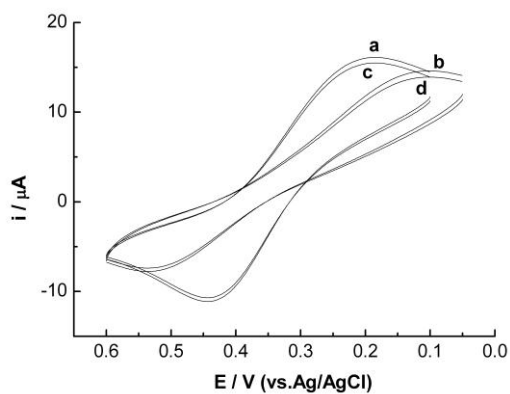
Zong-Mu Dong, Guang-Chao Zhao\*



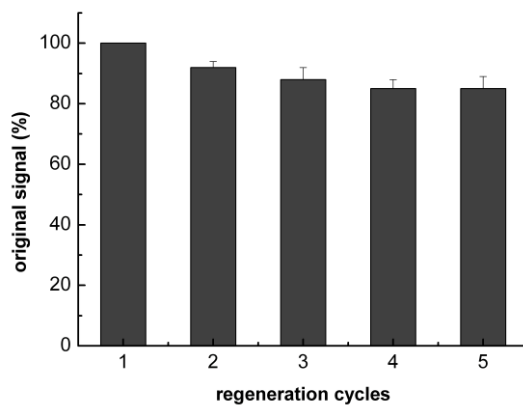
**Fig.S1.** The size effect of AuNPs on the sensitivity of the QCM-based biosensor for theophylline detection (a, 30 nm; b, 13 nm; c, 8 nm AuNPs binding with RNA2)



**Fig.S2.** The selectivity of the QCM-based biosensor (0.8  $\mu M$  theophylline, 5  $\mu M$  guanine, 5  $\mu M$  adenine and 8  $\mu M$  caffeine, respectively).



**Fig. S3.** The CV responses of the designed biosensor for regeneration process (a) after immobilization of RNA1 probe, (b) incubation with 1  $\mu M$  RNA2-AuNPs solution containing 0.05  $\mu M$  theophylline for 10 min, (c) after in hot water regeneration process, (d) was incubated again with 1  $\mu M$  RNA2-AuNPs solution containing 0.05  $\mu M$  theophylline for 10 min.



**Fig. S4.** Reusability of the QCM-based biosensor challenged with 0.05  $\mu M$  theophylline.