Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Aptasensor for label-free square-wave voltammetry detection of potassium ion based on gold nanoparticles amplification

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Table S1.

Relative standard deviations at specific concentrations of K^+ using the aptamer/gold electrode (n=4)

C	50 nM	0.1μM	0.5 μM	1μM	5 μM	10 μM	50 μM	0.1 mM
RSD (%)	1.01	1.00	0.84	1.11	1.01	1.15	1.31	1.77

Relative standard deviations at specific concentrations of K^+ using the aptamer/AuNP/*p*-ATP/gold electrode to K^+ (n=4)

C	10 pM	50 pM	0.1 nM	0.5 nM	1 nM	5 nM	10 nM	50 nM	0.1 μM	0.5 μM	1 μM	5 μM	10 μM	50 μM	0.1 mM	0.5 mM	1 mM
RSD (%)	2.00	2.99	2.02	2.00	3.51	3.84	2.85	4.51	4.30	2.98	3.80	3.73	3.00	4.30	3.31	4.98	4.16

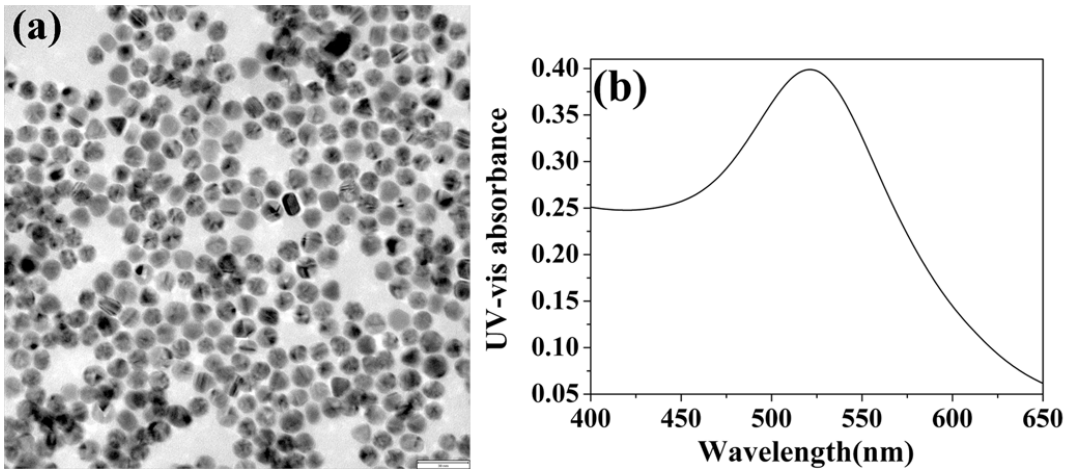

Fig. S1 (A) Typical TEM images and (B) absorption spectrum of the AuNPs prepared in this work. Scale bar in (A) is 50 nm.

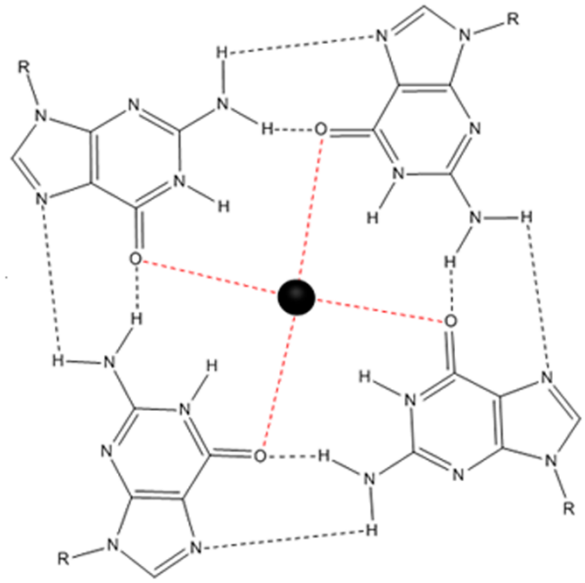

Fig. S2 K^+-induced a secondary structure, G-quadruplex.

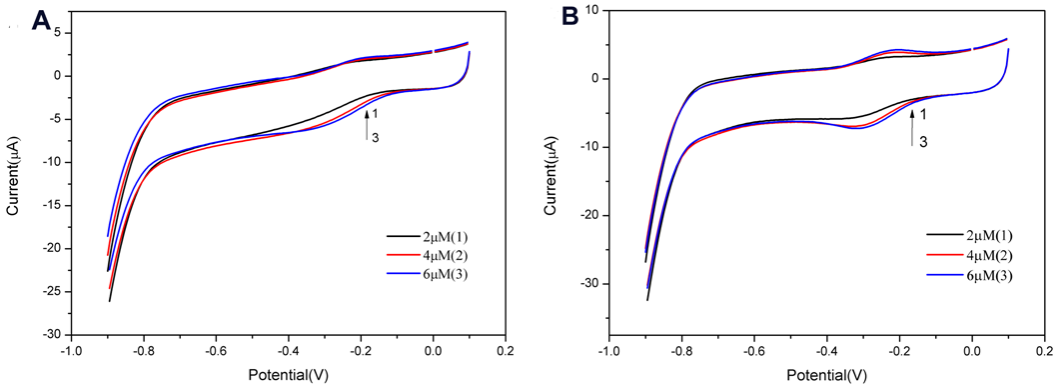

Fig. S3 CVs obtained from (A) DNA /gold electrode and (B) DNA/AuNPs/p-ATP/gold electrode in 10mM Tris buffer (pH 7.40) in the presence of $[Ru(NH_3)_6]^{3+}$ at different concentrations (1)2 μM, (2) 4 μM, (3) 6 μM.

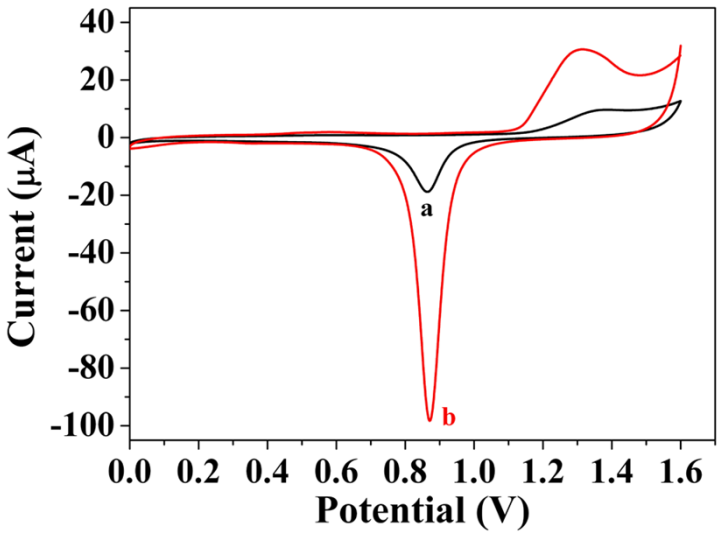

Fig. S4 CVs of (a) bare gold electrode and (b) AuNPs/gold electrode in 0.5 M H_2SO_4, scan rate was 50 mV/s.

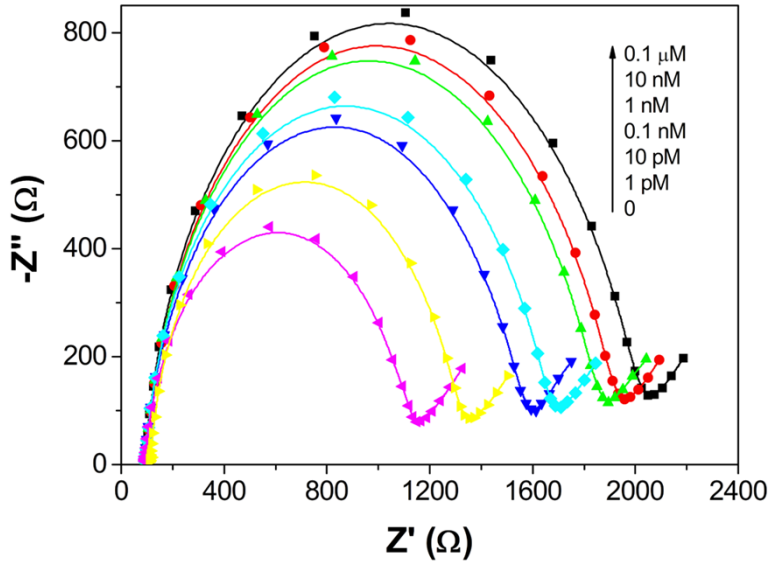

Fig. S5 The Nyquist plots of aptamer/AuNP/gold electrode for K^+ with different concentrations were obtained in 20 mM Tris-HCl buffer containing 1 mM $Na_3Fe(CN)_6$-1 mM $Na_4Fe(CN)_6$ (pH 7.40).

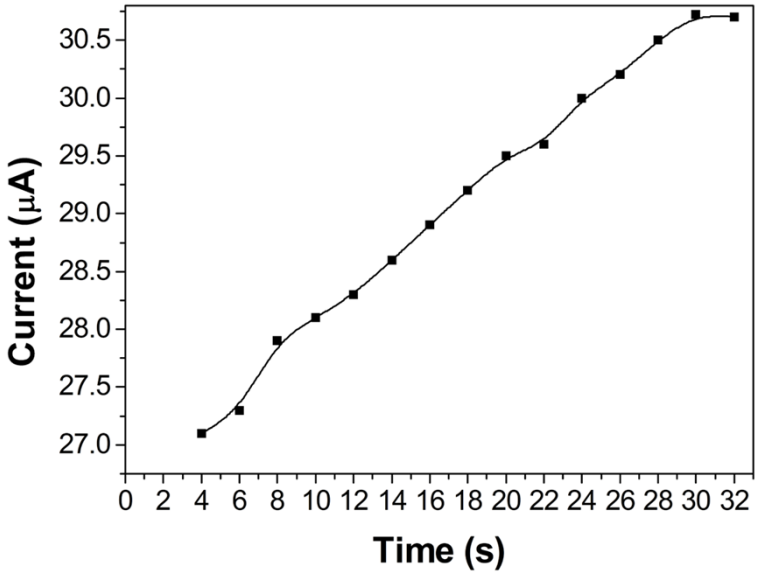

Fig. S6 Time dependence of SWV peak current. The electrochemical measurements were carried out in 20 mM Tris-HCl buffer containing 1 mM $Na_3Fe(CN)_6$-1 mM $Na_4Fe(CN)_6$ (pH 7.40), including 1 pM K^+.