Artificial, Switchable K^+-gated Ion Channels based on Flow-Through Titania-Nanotube Arrays

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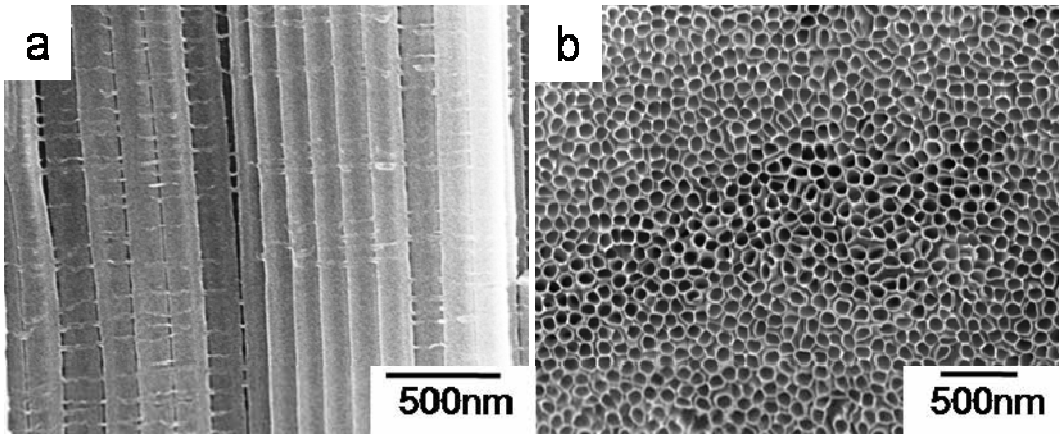

Fig. S1: SEM side view of free-standing TNT arrays anodized in ethylene glycol: (a) cross-sectional view, and (b) top view.

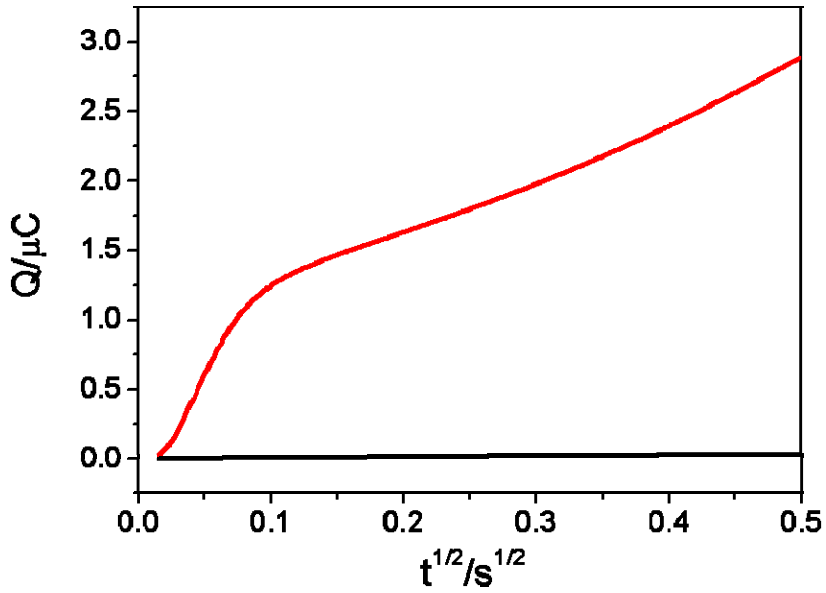

Fig. S2: Chronocoulometry of G-rich DNA modified TNT-Au NPs electrode in Tris-HCl (black) and in 50 μM $Ru(NH_3)_6Cl_3$(red).

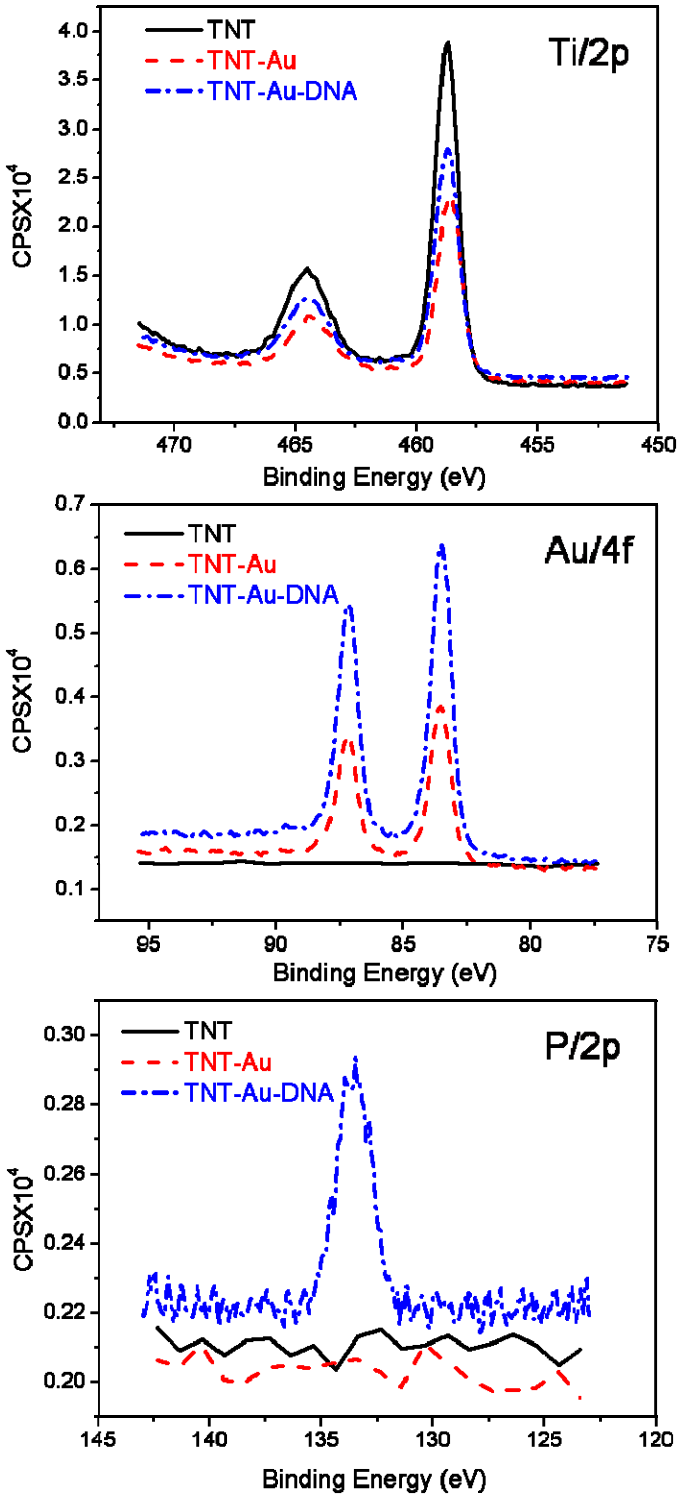

Fig. S3: XPS characterization of Au loading and DNA modification on TNT. These data confirm the success of Au NPs loading (Au/4f) in the TNT and DNA modification (P/2p) on the TNT-Au electrode.

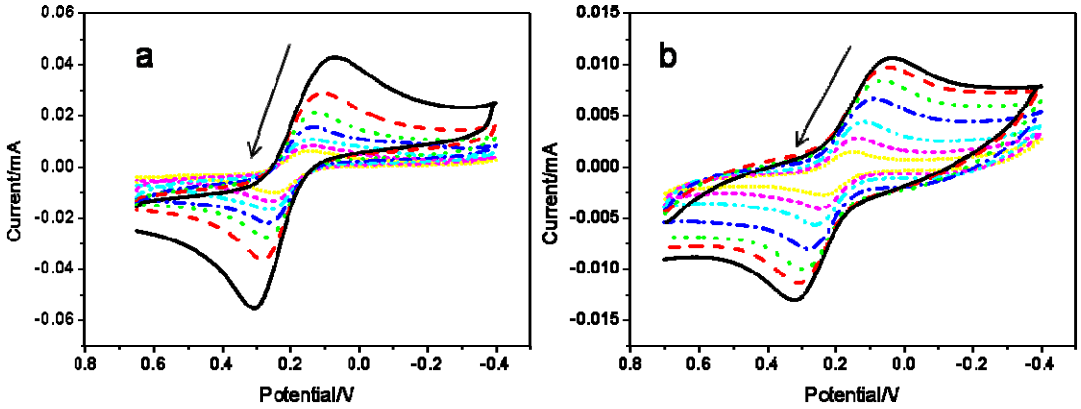

Fig. S4: Cyclic voltammetry of the TNT-Au NPs electrode (**a**) and the TNT-Au NPs electrode modified with G-rich DNA (**b**) in 5mM $Na_4Fe(CN)_6$ with 0.2M NaCl as supporting electrolyte. Scan rate: 500mV/s, 200 mV/s, 100 mV/s, 50 mV/s, 20 mV/s, 10 mV/s, 5mV/s.

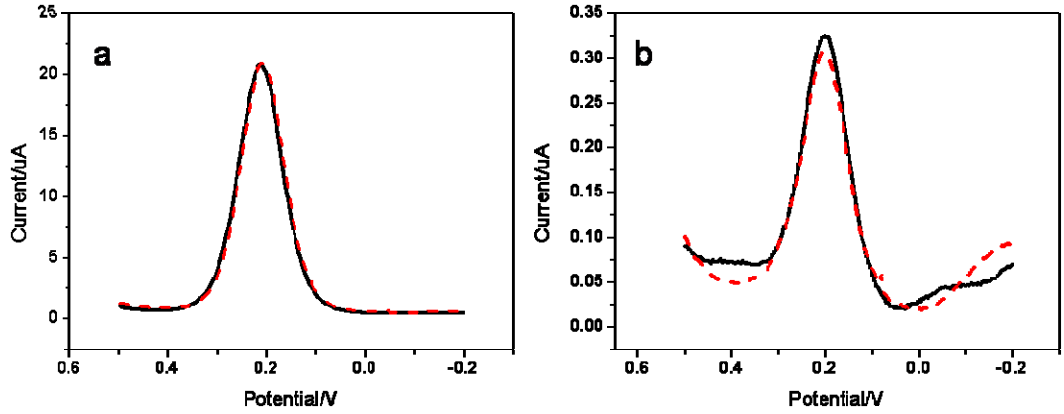

Fig. S5: DPV of the control groups in solution A (Na, black solid) and solution B (K, red dash): (**a**) TNT-Au NPs electrode without DNA modified; (**b**) TNT-Au NPs eletrode modified with random DNA. Baseline had been deducted.

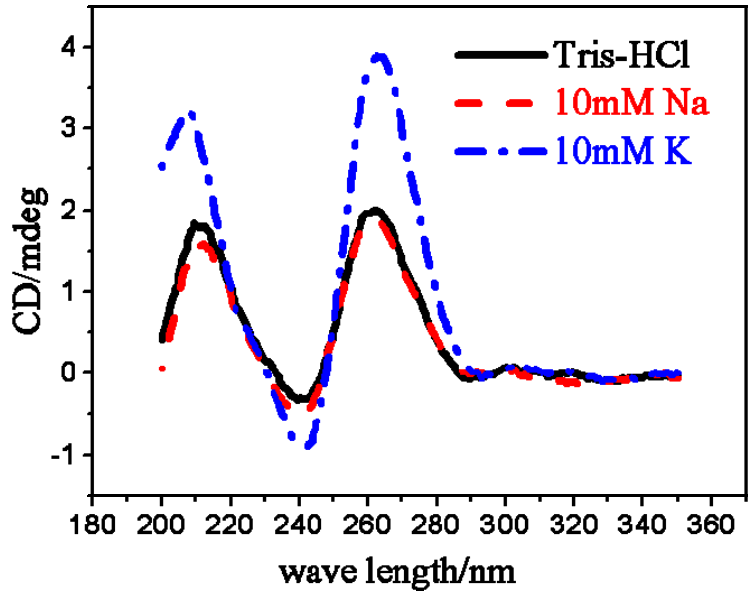

Fig. S6: CD spectra recorded over 200-350 nm on 2 μM G-rich DNA in 10 mM Tris-HCl (pH 7.4) (black), 10 mM NaCl in 10 mM Tris-HCl (red) and 10 mM KCl in 10mM Tris-HCl (blue). All these curves had a positive ellipticity maximum at 264 nm and a negative minimum at 240 nm, which belonged to the DNA quadruplex.[1]

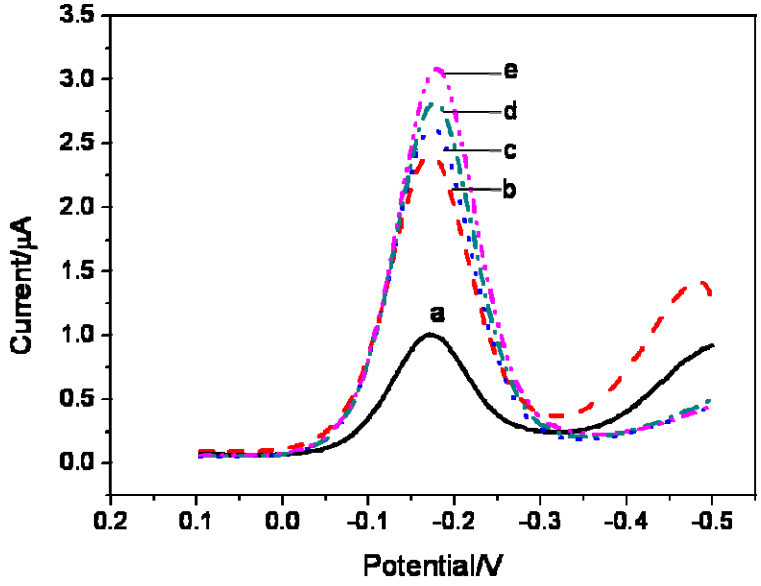

Fig. S7: DPV of the TNT-Au NPs electrode in 50 μM $Ru(NH_3)_6Cl_3$ with 200 mM NaCl (**a**); 50 μM $Ru(NH_3)_6Cl_3$ with 10mM KCl and different concentration of NaCl (**b-e**); 200 mM (**b**), 300 mM (**c**), 400 mM (**d**), 500 mM (**e**).

References：

1. M. Lu, Q. Guo, N. R. Kallenbach, *Biochemistry*, 1992, **31**, 2455-2459.