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Graphene oxide reduced directly by redox probes as immunosensing probes for multiplexed detection of tumor markers

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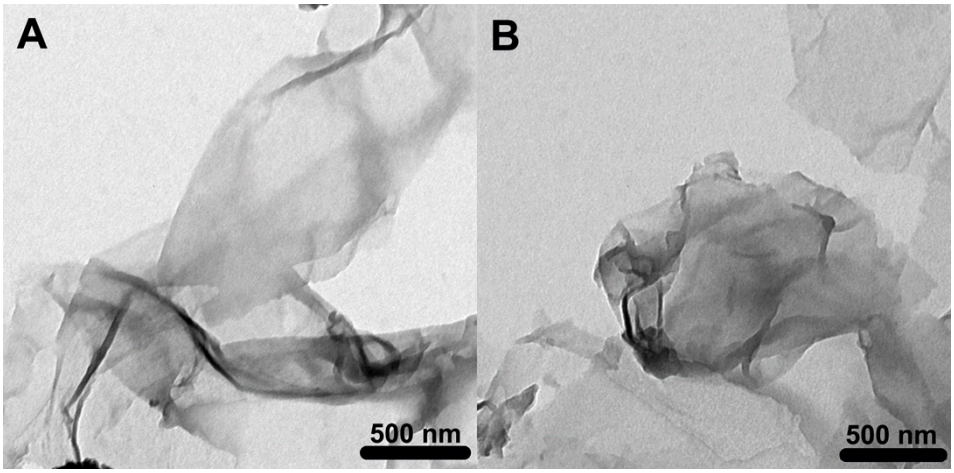

Fig. S1. TEM images of (A) TB-rGO and (B) Fc-rGO.

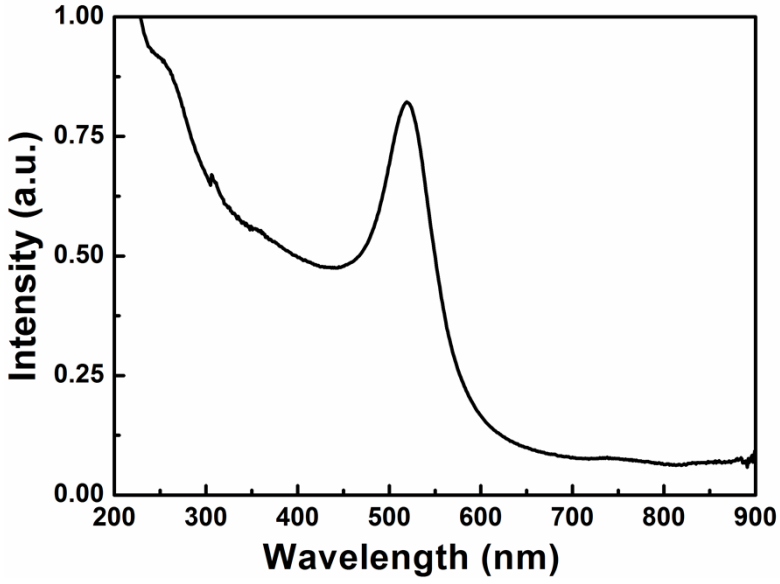

Fig. S2. UV-vis spectrum of the AuNPs.

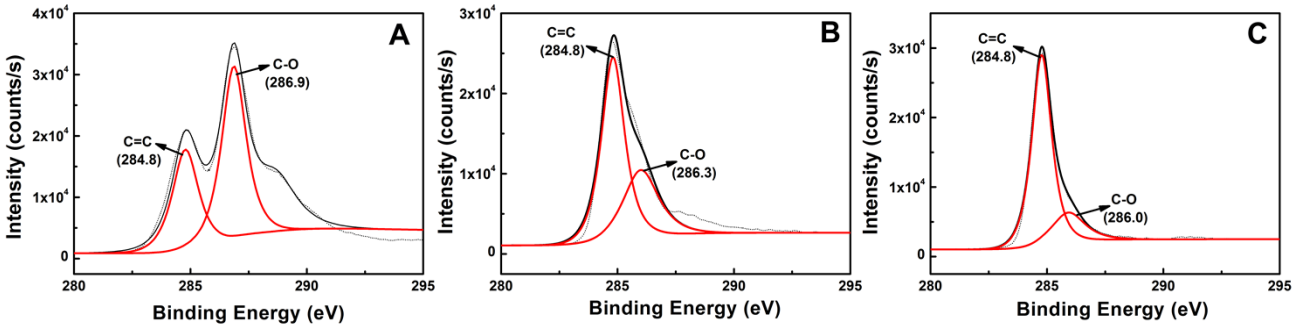

Fig. S3. High-resolution XPS of C 1s spectra of (A) GO, (B) TB-rGO and (C) Fc-rGO.

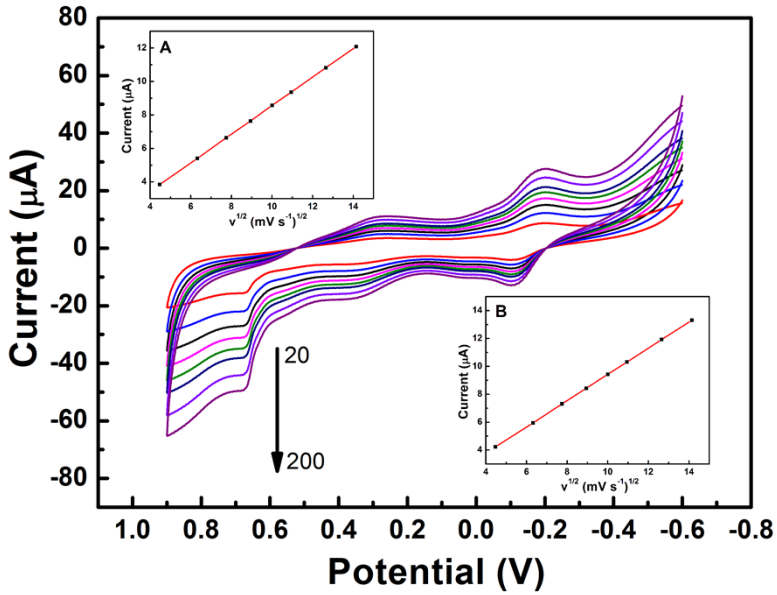

Fig. S4. CV of immunosensing probes at different scan rates of 20, 40, 60, 80, 100, 120, 160, 200 mV s^{-1} in 0.1 M PBS (pH=6.0). Insets showed the anodic peak currents of (A) CEA and (B) AFP proportional to the square root of scan rates.

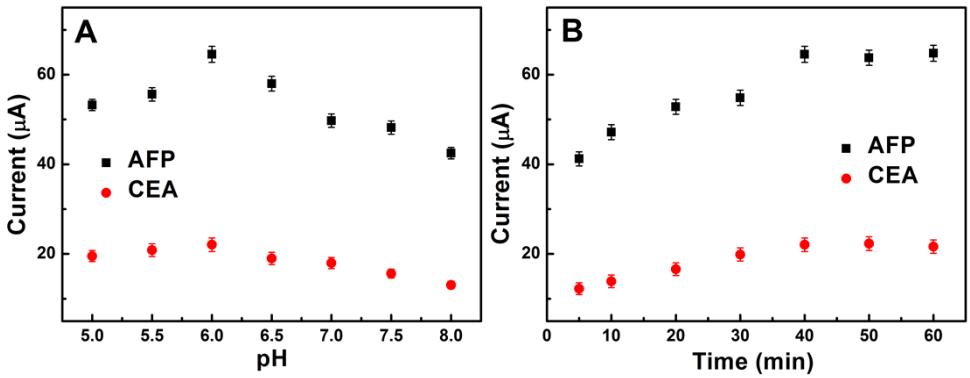

Fig. S5. Effect of pH of detection solution (incubation time 1 h) (A) and incubation time (detection solution pH=6.0) (B) on SWV responses to 1 ng mL^{-1} CEA and AFP at the immunosensor array.

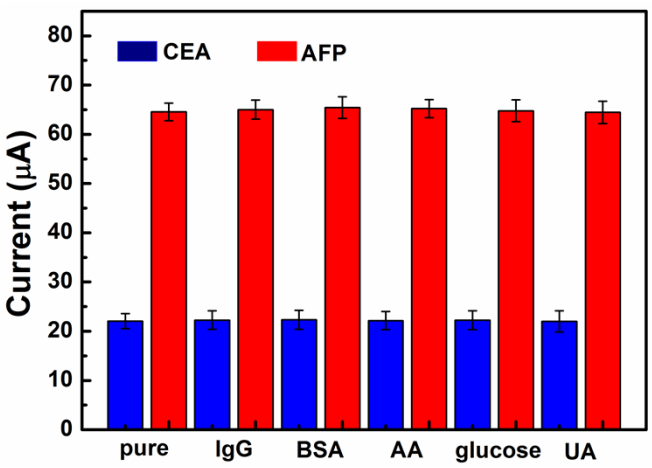

Fig. S6. Current responses of the immunosensor to 1 ng mL^{-1} CEA and AFP, 1 ng mL^{-1} CEA and AFP+100 ng mL^{-1} human immunoglobulin G (IgG), 1 ng mL^{-1} CEA and AFP+100 ng mL^{-1} albumin from bovine serum (BSA), 1 ng mL^{-1} CEA and AFP+100 ng mL^{-1} ascorbic acid (AA), 1 ng mL^{-1} CEA and AFP+100 ng mL^{-1} glucose, 5 ng mL^{-1} CEA and AFP+100 ng mL^{-1} uric acid (UA).

Table S1. Interference degree or cross-talk level.

sample type	concentration (ng mL^{-1})	current shift at CEA position (μA)[a, b]	RSD (%)	current shift at AFP position (μA)[a, c]	RSD (%)
CEA	1	22.11	1.67	0.07	3.03
	50	30.76	2.58	0.12	4.26
AFP	1	0.05	3.16	65.08	2.79
	50	0.10	4.98	93.37	3.83
CEA +AFP	1+1	22.04	1.53	64.55	3.72
	50+50	30.70	2.51	92.28	3.75

[a] The average value of three measurements in PBS, pH 6.0
[b] The SWV peak current was ~ 0.88 μA for zero CEA analyte.
[c] The SWV peak current was ~ 2.43 μA for zero AFP analyte.