

Adriamycin coated silica microsphere as labels for cancer biomarker alpha-fetoprotein detection

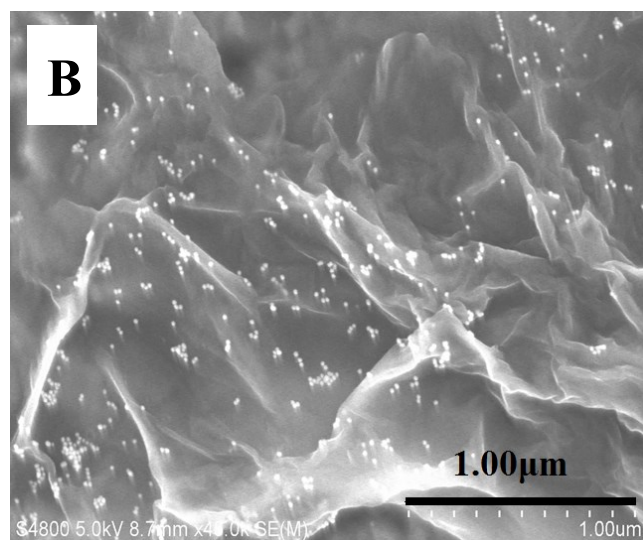
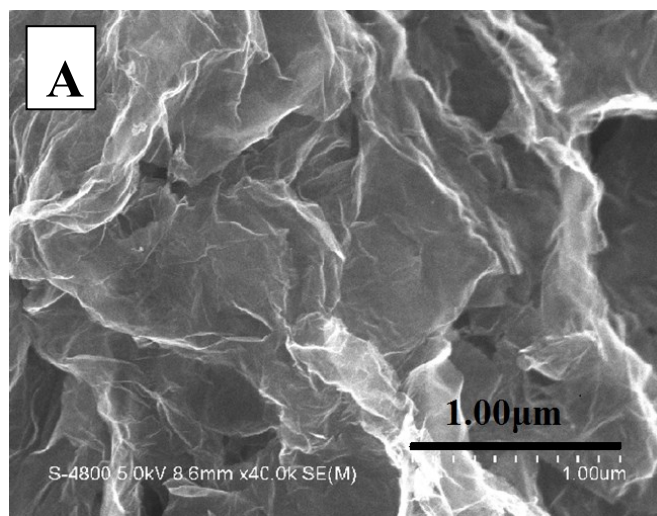
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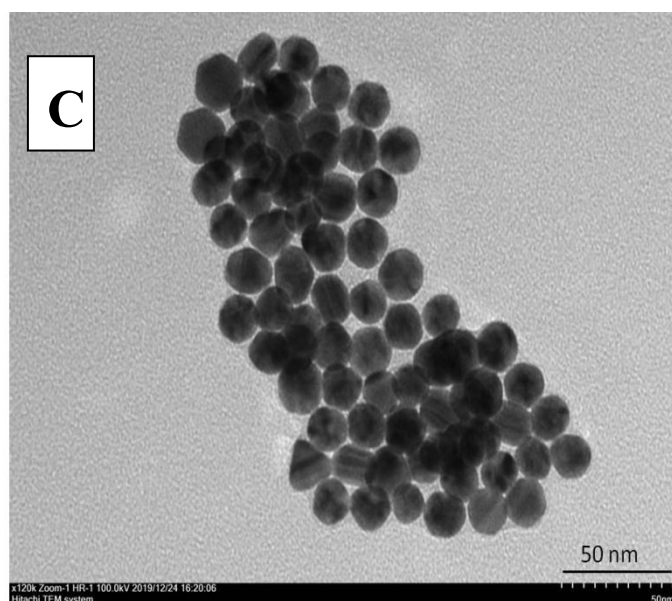
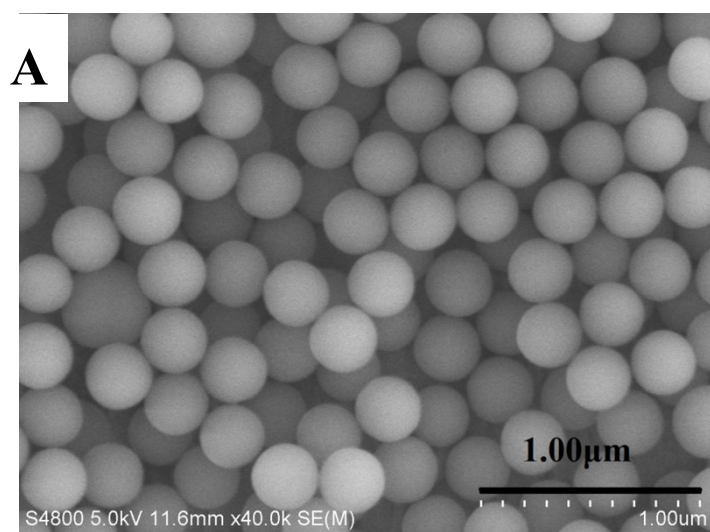


Fig. S1 SEM image of rGO (A) and Au NPs-rGO nanocomposites (B) ; TEM of Au NPs (C)



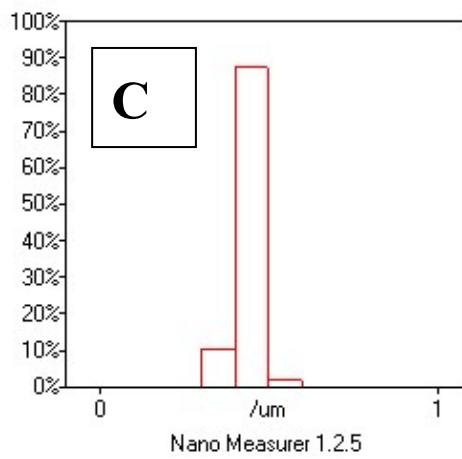
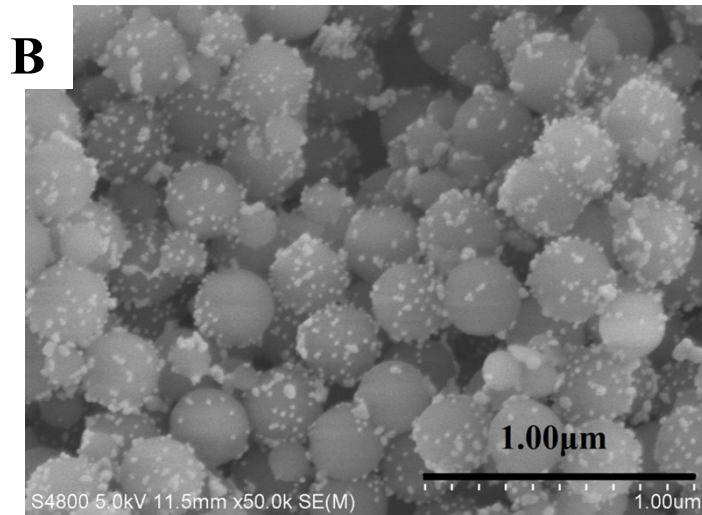


Fig .S2 SEM of SiO₂ (A) ,SiO₂-Au NPs composites (B) and histogram of SiO₂ diameter

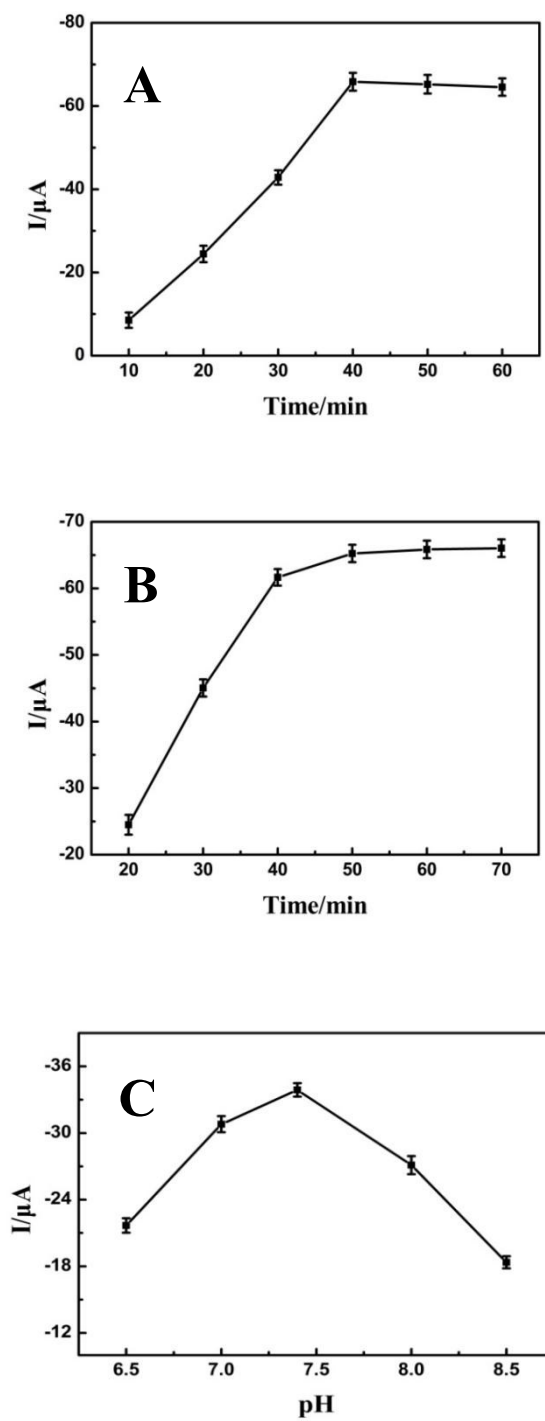


Fig.S3. Optimization of experimental conditions:(A) Incubation time between Ab₁ and antigen; (B) Incubation time of antigen and Ab₂/ADM/Au NPs @SiO₂ labels; C_{AFP} = 75 ng mL⁻¹. (C) pH values, C_{AFP} = 0.05 ng mL⁻¹

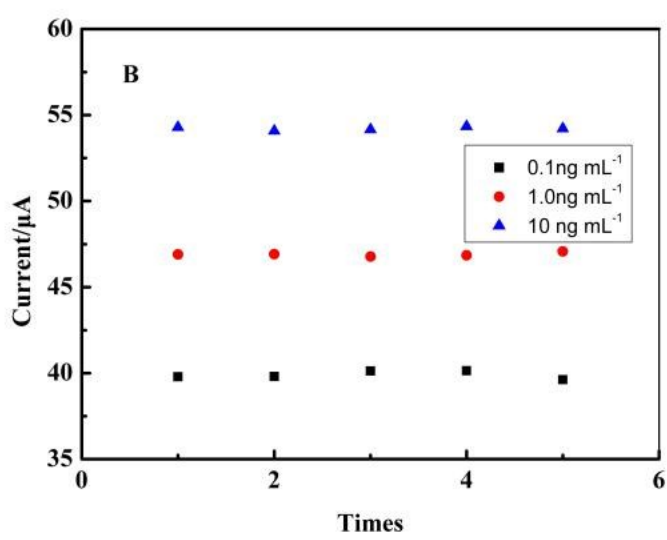
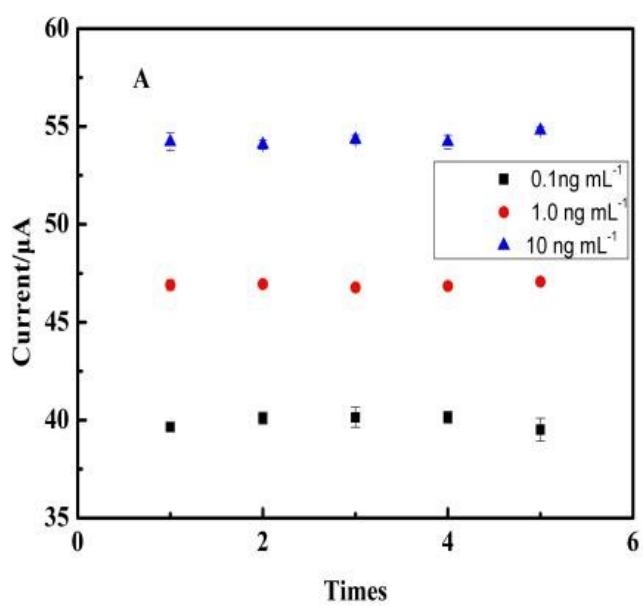


Fig.S4. Reproducibility of immunoassay

A- intra -assay (the same batches electrodes) B inter-assay (different batches electrode)

Table.S1. Analytical performance of several electrochemical immunosensors of AFP

	Line arrange (ng mL ⁻¹)	Detection limit (ng mL ⁻¹)	References
Glucose oxidase functionalized nanocomposites	$2.5 \times 10^{-3} - 25$	2.2×10^{-3}	[10]
Graphene sheets and multienzyme functionalized carbon nanospheres	0.05 - 6	0.02	[11]
HCR amplification signal	$5.0 \times 10^{-3} - 50$	2.5×10^{-4}	[14]
Conductive carbon nanoparticles labeled enzyme-linked antibodies	0.02 - 4	0.01	[22]
Carbon nanotube/manganese dioxide	0.2 -100	0.04	[23]
Horseradish peroxidase functionalized gold nanorods as a label	0.1-100	0.03	[24]
Functionalized polypyrrole microspheres nanocomposites as a trace label	$1.0 \times 10^{-3} - 50$	3.3×10^{-4}	[25]
ADM functionalized Si as label	$5.0 \times 10^{-3} - 75$	1.7×10^{-4}	This work