

Supporting Information

Au-Luminol Decorated Porous Carbon Nanospheres for Electrochemiluminescence Biosensing of MUC1

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Supporting Information includes Figure S1-S7 and Table S1-S2.

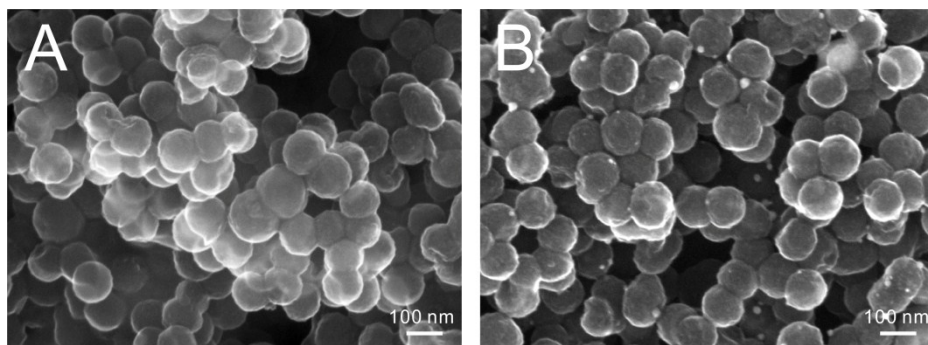


Figure S1. SEM images of different nanospheres including (A) PCNSs and (B) C-Au-Lum NSs.

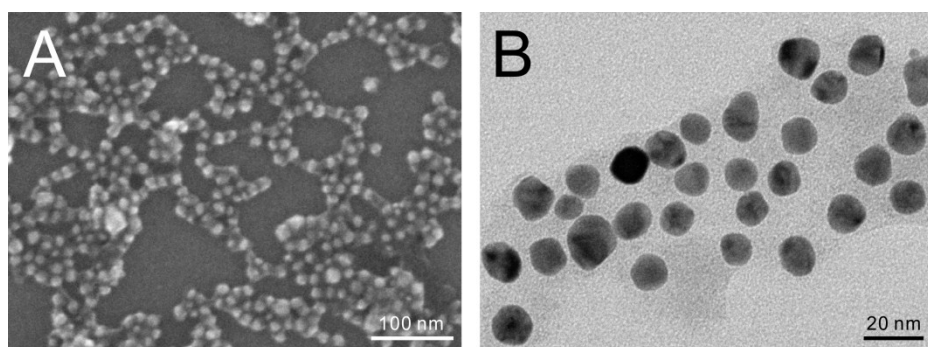


Figure S2. (A) SEM image and (B) HRTEM image of Au-Lum NPs.

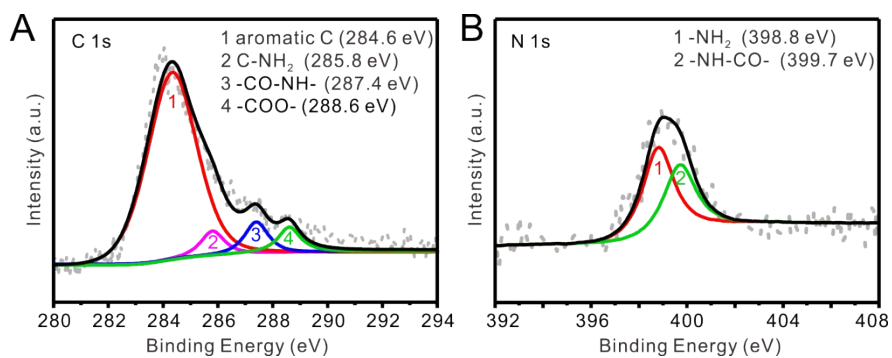


Figure S3. X-ray photoelectron spectra of C-Au-Lum NSs for (A) the C 1s and (B) the N 1s signals.

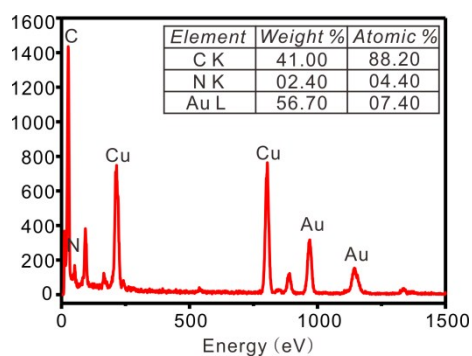


Figure S4. TEM-EDS spectrum and atomic percentages of C-Au-Lum NSs.

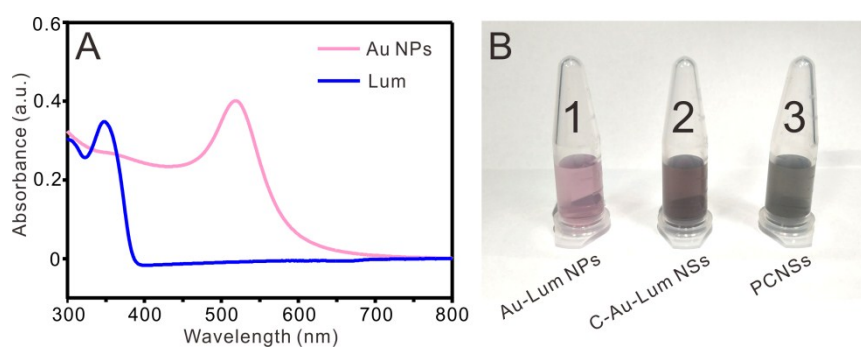


Figure S5. (A) UV-vis spectra of 1 mM luminol solution and Au NPs suspension. (B) The photographs of (1) Au-Lum NPs, (2) C-Au-Lum NSs and (3) PCNSs dispersed in water.

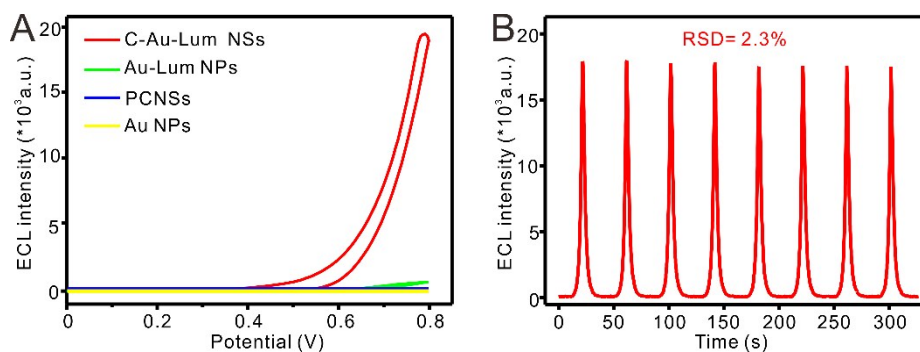


Figure S6. (A) ECL-potential spectra of different materials modified ITO electrodes; (B) ECL stability of the prepared C-Au-Lum NSs under consecutive scanning for 8 cycles. ECL measurements were detected in 0.1 M PBS (pH 8.0) containing 5 mM H_2O_2 .

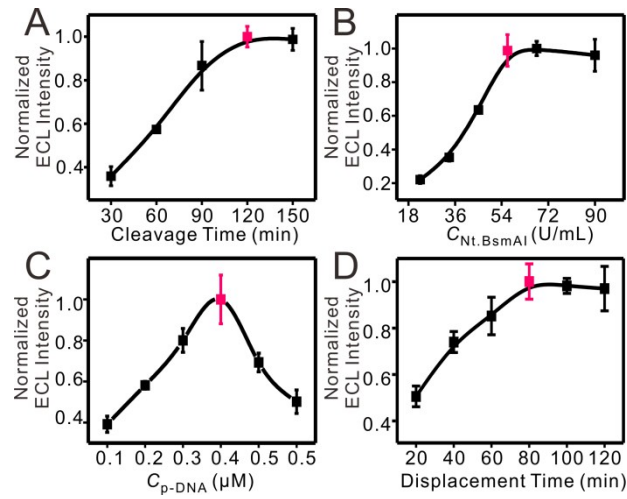


Figure S7. Effect of (A) cleavage time, (B) concentration of Nt.BsmAI endonuclease for enzymatic circulation and (C) concentration of p-DNA, (D) incubation time in C-Au-Lum-DNA solution for strand displacement on ECL responses of biosensors.

Table S1. List of oligonucleotide sequences.

Name	Sequence
Aptamer (for MUC1)	5'- GCAGTTGATCCTTTGGATACCCTGGCGATCAACT GCGAGAGACTT-3'
Auxiliary-DNA (a-DNA)	5'-AAGTCTCT▼CGCAGTTTAGAC-3'
Capture DNA (c-DNA)	5'-SH-GTCTAAACTGCGGCCACAGAACTGCAGT-3'
Probe-DNA (p-DNA)	5'-SH-AAAACTGCAGTTCTGTGGCCGCAGTTTAGAC-3'

Table S2. Comparison of the proposed ECL biosensor with other methods in MUC1 detection.

Detection method	Linear range	Detection limit	References
Colorimetry	50–1000 nM	5.08 nM	[1]
Fluorescence	0.001–20 ng/mL	0.23 pg/mL	[2]
Photoluminescence	1 nM–5 μ M	0.3 nM	[3]
Alternating Current Voltammetry	1 pM–1 μ M	0.25 pM	[4]
Differential Pulse Voltammetry	1.0 pg/mL–50 ng/mL	0.40 pg/mL	[5]
Electrochemiluminescence	0.1 pg/mL–1 ng/mL	47.6 fg/ mL	This work
	(0.33 fM–3.3 pM) ^a	(0.16 fM) ^a	

^a Calculated supposing the formula weight of MUC1 as 300 kDa mol⁻¹ [6].

Reference:

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