Supporting Information for：

Extracellular Electron Transfer Enhanced Electrochemiluminescence Aptasensor for *Escherichia coli* analysis

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Synthesis procedure of cadmium sulfide:

50 mL 0.01 M Cadmium chloride hemi(pentahydrate) was added to the 250 mL three necked bottle, and added the 250 μL mercaptopropionic acid. Subsequently, the solution was heated and stirred to reflux for reaction with 30 min, and then supplement with 5.5 mL 0.1 M Na_2S when the pH of reaction solution was adjusted to 11. After two hours of heating and stirring, the reaction solution that naturally cooled to room temperature was transferred to a centrifuge tube. An appropriate amount of isopropanol was added and centrifuged at 1000 rpm/min for 10 min, then the supernatant was discarded, repeated the operation three times. Finally, pure water was used as solvent disperse precipitation, and the sample were characterized and refrigerated at 4 ℃.

Table S1 Oligonucleotide sequences in the experiment

Oligonucleotides	Sequences
Aptamer-1 [1]	CCGGACGCTTATGCCTTGCCATCTACAGAGCAGGTGTGACGG-NH_2
Aptamer-2 [2]	NH_2-TGAGCCCAAGCCCTGGTATGCGGATAACGAGGTATTCACGA CTGGTCGTCAGGTATGGTTGGCAGGTCTACTTTGGGATC
Anti-apt-1	NH_2-TTTTTTATCCGTCACACCTGCTCTGTAGATGGCAAGGCATAA GCGTCCGG
Forward primer	GTGCCAGCMGCCGCGGTAA
Reverse primer	CCGTCAATTCMTTTRAGTTT

Table S2 PCR Reagent specification*

Reagents	Usage/μL
2x SuperReal Premix Plus	10
Forward Primer (10μM)	0.6
Reverse Primer (10μM)	0.6
ROX Reference Dye II (50 x)	2
DNA templates	2
RNase-free water	4.8
Total	20

*: PCR protocols were 95 ℃, 30 s; 95 ℃, 5 s; 65 ℃, 34 s and cycling 40 times.

Table S3 A comparison of other biosensors

Title	Range of linear (CFU/mL)	LOD (CFU/mL)	ref
Electrochemiluminescence Detection of *Escherichia coli O157:H7* Based on a Novel Polydopamine Surface Imprinted Polymer Biosensor	$10\text{-}10^7$	8	3
NaBiF4 upconversion nanoparticle-based electrochemiluminescent biosensor for *E. coli O157 : H7* detection	200-100000	138	4
Electrogenerated Chemiluminescence on Smartphone with Graphene Quantum Dots Nanocomposites for *Escherichia Coli* Detection	$10\text{-}10^7$	5	5
Electrochemiluminescent detection of *Escherichia coli O157:H7* based on Ru(bpy)(3)(2+)/ZnO nanorod arrays	200-100000	143	6
Electrogenerated chemiluminescence biosensors for the detection of pathogenic bacteria using antimicrobial peptides as capture/signal probes	$1.0\times10^3\text{-}5.0\times10^5$ (I) $5.0\times10^2\text{-}5.0\times10^5$ (II)	2.3×10^2 (I) 1.2×10^2 (II)	7
Potentiometric aptasensing of *Escherichia coli* based on electrogenerated chemiluminescence as a highly sensitive readout	5-1000	2	8
Electrochemiluminescence detection of *Escherichia coli O157:H7* based on mesoporous Ca-doped MgAl2O3-G-SiO2 biosensor	$10\text{-}10^{10}$	10	9
This work	$10^2\text{-}10^7$	10	

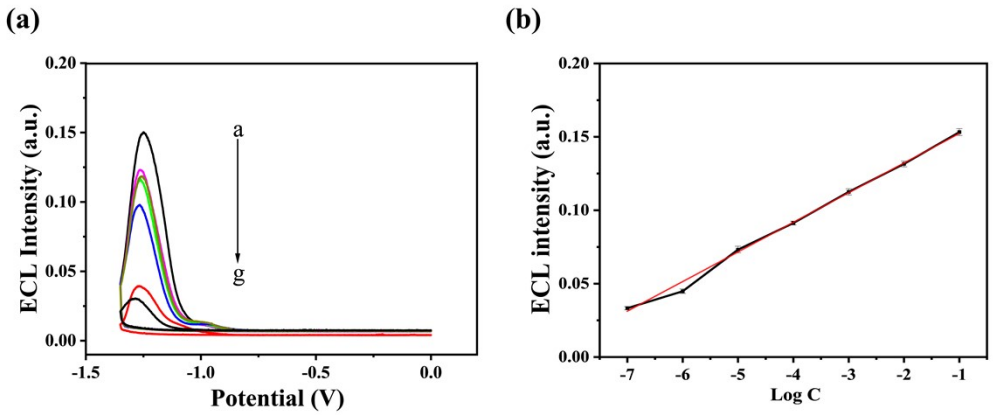

Figure.S1 Characterization of Cadmium sulfide. (a) The ECL intensity of CdS with different dilution ratios. (b) The linear relationship between different dilution ratios of

CdS and ECL intensity (in 0.05 M potassium persulfate, 10×PBS).

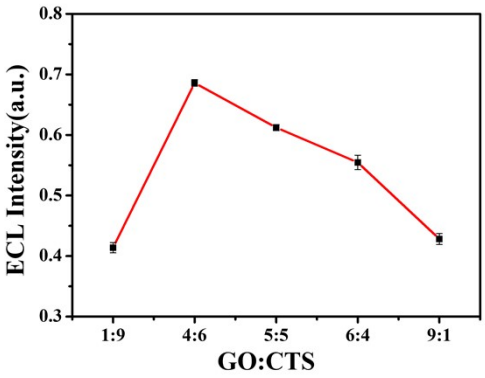

Figure.S2 Optimization of GO and CTS ratio on the GCE. The ECL intensity of biosensor with different molar ratios of graphene oxide and chitosan composites modified on GCE (in 0.05 M potassium persulfate, 10×PBS).

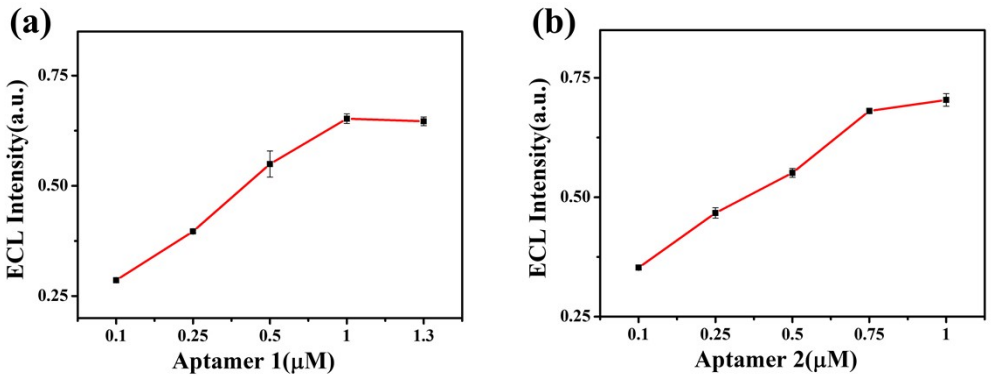

Figure.S3 Optimization of the aptamer concentration. (a) The ECL intensity of biosensor with different aptamer-1 concentrations. (b) The ECL intensity of biosensor with different aptamer-2 concentrations.

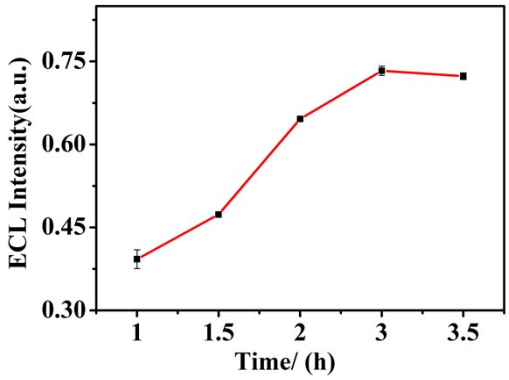

Figure.S4 Optimization of the time of aptamer-1 capturing *E.coli*. The ECL intensity of biosensor at different times of aptamer-2 capturing *E.coli*.

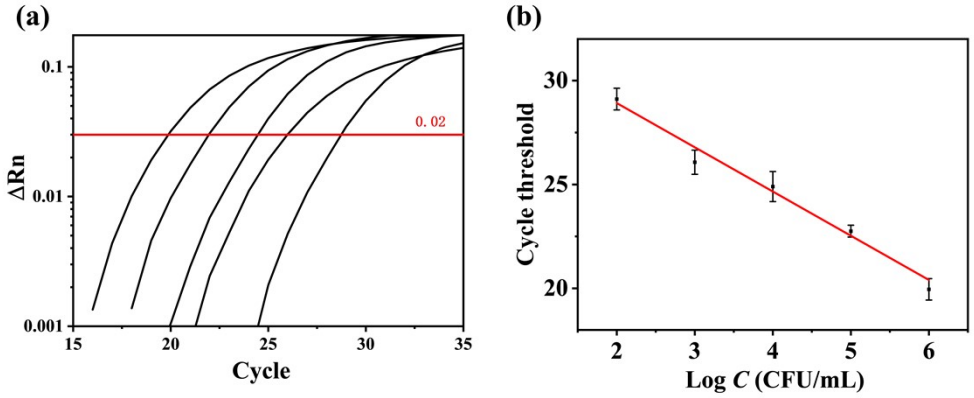

Figure.S5 The amplification curves and standard fitted curve of PCR. (a) The black lines are standard samples (10^2, 10^3, 10^4, 10^5, 10^6 CFU/mL). (b) The logarithmic calibration curve of the standard samples with different concentrations.

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