Supporting Information

β-Cyclodextrin-functionalized graphene and metal-organic framework composites for ultrasensitive electrochemical detection of chloramphenicol

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Experimental section

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Chemicals and Reagents

All chemicals were of at least analytical grade and used without further purification. 1,3,5-Benzenetricarboxylic acid (BTC) was purchased from Sinopharm Chemical Reagent Co. Copper(II) nitrate trihydrate and Graphene were purchased from Anaiji Chemical Reagent Co., Ltd. β-Cyclodextrin was purchased from Tianjin BASF Chemical Co., Ltd. Chloramphenicol was purchased from Aladdin Reagent Shanghai Co., Ltd. Ethanol absolute was purchased from Beijing Balinwei Technology Co., Ltd. All reagents were of analytical grade and used as received. Ultrapure water from a Millipore water purification system (≥18 MΩ, Milli-Q, Millipore) was used throughout the experiment.

Apparatus

Transmission electron micrograph (TEM) image was acquired using a JEM-2100 instrument (JEOL, Japan). Scanning electron microscopy (SEM) image was acquired using a S-4800 instrument (Hitachi, Japan) with the voltage of 20 kV. Electrochemistry and ECL measurements were obtained on a CHI 660E electrochemical workstation(Shanghai Chenhua Instruments, China). X-ray photoelectron spectroscopy (XPS) was obtained on Multifunctional imaging electron spectrometer (Thermo ESCALAB 250Xi). X-ray diffraction (XRD) analysis was performed with Cu Kα radiation on a D/Max 2500V/PC Rigaku diffractometer.

Results and discussion

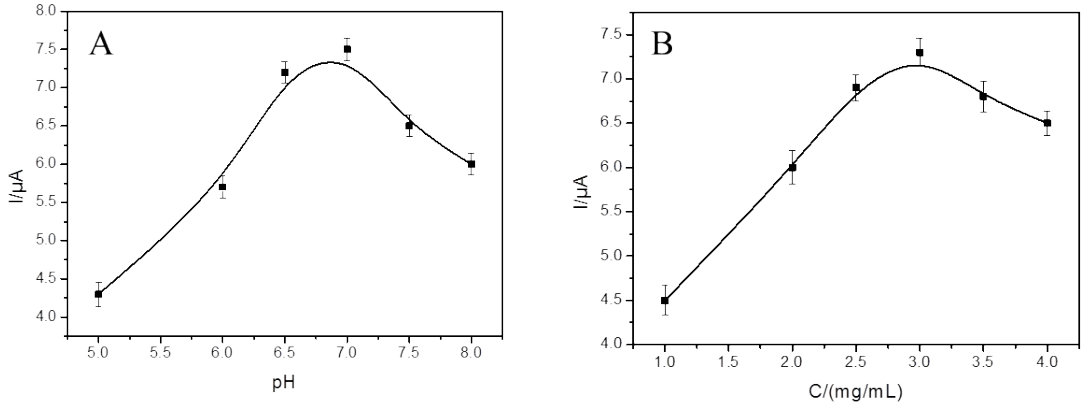

Fig. S1 (A) The peak current of 10 μM chloramphenicol in PBS at different pH; (B) The peak current of 10 μM chloramphenicol on the modified electrode with β-CD@G/Cu-BTC composites at different concentration.

Table S1. The determination result of CAP in milk samples (n = 3)

Sample number	Added (μ mol L^{-1})	Found (μ mol L^{-1})	Recovery (%)	RSD (%, n=3)
1	0.02	0.0193	96.5	3.22
2	0.05	0.0477	95.4	1.25
3	0.2	0.21	105.0	1.71
4	2.0	2.12	106.0	2.88
5	5.0	5.04	100.8	1.2
6	8.0	8.16	102.0	1.5

Table S2. Comparison of different electrochemical sensors for CAP determination

Electrode	Linear range (mol L^{-1})	Detection limit (mol L^{-1})	Method	Reference
MWCNT/NS/MIP /RTIL/CPE	1×10^{-6}-1×10^{-2}	1.0×10^{-6}	matched potential method	S1
Gold electrode	2.5×10^{-6}-7.4×10^{-6}	1.0×10^{-6}	CV and square wave voltammetry	S2
Au/N-G/GCE	2×10^{-6}-8×10^{-5}	5.9×10^{-7}	CV and linear sweep voltammetry	S3
SPAN-MoS_2/CPE	1×10^{-5}-1×10^{-3} 1×10^{-7}-1×10^{-5}	6.5×10^{-8}	DPV	S4
MoS_2/PANI/CPE	1×10^{-7}-1×10^{-4}	6.9×10^{-8}	DPV	S5
β-B-CD-G/Cu-TCPP/GCE	1×10^{-8}-1×10^{-5}	3.1×10^{-9}	DPV	This work

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