Supporting Information

Catalytic-induced enhancing performance of electrochemical microcystin-LR aptasensor based on cobalt-based oxide on B, N codoped graphene hydrogel

Ruishuang Yuan^a, Zuorui Wen^a, Fuheng You^a, Ding Jiang^{b*}, Kun Wang^{a*}

^aKey Laboratory of Modern Agriculture Equipment and Technology, School of Chemistry and Chemical Engineering, Jiangsu University, Zhenjiang 212013, P.R. China

^bSchool of Petrochemical Engineering, Changzhou University, Changzhou, Jiangsu 213164, P.R. China

^{*} Corresponding author.

E-mail address: jiangding@cczu.edu.cn (D Jiang), wangkun@ujs.edu.cn (K Wang).

Reagents and instruments

GO was purchased from Nanjing XFNANO Material Technology Co., Ltd., China. NH₄B₃O₈ was purchased from Shanghai Aladdin. H₃BO₃ and Co(NO₃)₂ were purchased from Shanghai Lingfeng Chemical Reagent Co., Ltd. MC-LR was provided by J&K Braunwell Reagents. MC-LR aptamers were purchased from Shanghai Biotech Engineering Co., Ltd. The sequence is as follows: 5'-GGC GCC AAA CAG GAC CAC CAT GAC AAT TAC CCA TAC CAC CTC ATT ATG CCC CAT CTC CGC-3', which was dissolved in a phosphate buffer (PBS, pH 7.4) prepared with 0.1 mol/L Na₂HPO₄ and NaH₂PO₄ and kept at 4 °C in the dark. The water involved in the whole experiment was deionized (18.2 MΩ/cm). All reagents are of analytical grade and can be used directly.

Electrochemical impedance spectroscopy (EIS) and differential pulse voltammetry (DPV) were carried out at room temperature using the CHI 760E electrochemical workstation of Shanghai Chenhua Company. Using the three-electrode system including a glass-carbon electrode (GCE, \emptyset = 3 mm), a platinum wire electrode, and a Ag/AgCl electrode. The morphology and structure of the material was characterized by scanning electron microscope (SEM, Hitachi S4800, Japan). Characterized the crystal structure of the sample by X-ray diffraction (XRD, Bruker D8 Advance diffractometer, Germany) (λ = 1.54Å). The Raman Spectrometer (2000) with a 532 nm laser obtained the Raman spectroscopy. The ESCALAB 250 multifunctional surface analyzer used an Mg-Ka radiator record the X-ray photoelectron spectroscopy (XPS).



Fig. S1 (A) XRD pattern of 3D BNG/Co (curve a), and the standard card (curve b) for cobalt-based oxide. (B) Raman spectra of BNG/Co (curve a), NG/Co (curve b), BG/Co (curve c), and G/Co nanocomposite (curve d) and (C) XPS survey spectra of 3D BNG/Co.



Fig. S2 Effects of (A) aptamer concentrations and (B) incubation time of the asfaricated aptasensor.

Method	Linear range	Detection limit	References
impedimetric immunosensor	0.01-100 μg/L	0.004 µg/L	1
electrochemical impedance biosensor	0.05-100 μmol/L	0.018 µmol/L	2
nonenzymatic immunosensor	0.01-28 ng/mL	9.63 pg/mL	3
photoelectrochemical sensor	0.5-100 µg/L	0.1 µg/L	4
aptamer-based colorimetric sensor	0.5 -7500 nmol/L	0.37 nmol/L	5
electrochemical adaptor sensor	0.1 -1000 pmol/L	0.03 pmol/L	This work

 Table S1 Comparison of the MC-LR detection with different methods

References

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