

## Supporting Information

### Graphene oxide anchored ferric vanadate acid for the electrochemical detection of bisphenol A in tap water and urine

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### **Text S1. Synthesis of FeVO<sub>4</sub>**

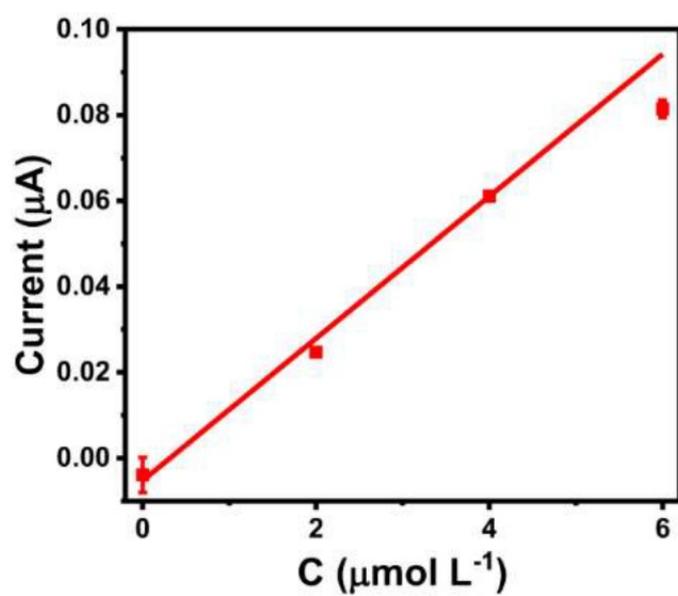
FeVO<sub>4</sub> was prepared through a simple hydrothermal method.<sup>1</sup> First, 10.0 mmol of FeCl<sub>3</sub>·6H<sub>2</sub>O was dissolved in 50 mL of deionized (DI) water to create a clear orange solution (Solution A). Next, 10.0 mmol of NH<sub>4</sub>VO<sub>3</sub> was fully dissolved in 50 mL of DI water by heating the mixture to 80 °C, resulting in Solution B. Solution B was then slowly added to Solution A under vigorous stirring, forming a yellow colloid. After an additional 30 minutes of stirring, the suspension was transferred into two 100 mL Teflon-lined stainless-steel autoclaves. The volume of the suspension was adjusted to 80% of the autoclave volume by adding more DI water. The autoclaves were then sealed and heated in an oven at 180 °C for 3 hours, followed by natural cooling to room temperature. The resulting precipitate was collected by centrifugation, washed several times with DI water and absolute ethanol, and finally dried at 60 °C for 6 hours.

### **Text S2. Characterization**

X-ray diffraction (XRD) measurements were carried out using a D2 PHASER X-ray diffractometer with CuK  $\alpha$  radiation at 30 kV and 30 mA, with a scanning rate of 8°/min, to confirm the phase structure of the synthesized FeVO<sub>4</sub>. The elemental composition and oxidation states of the elements were further analyzed using X-ray photoelectron spectroscopy (XPS) with a multifunctional photoelectron spectroscopy system (KAlpha+, Thermo). Additionally, the morphology and structure of the material were examined using transmission electron microscopy (TEM) on a JEOL JEM-2100F high-resolution instrument.

### **Text S3. Analytical measurements**

All electrochemical measurements were conducted through an electrochemical workstation (CHI 760E) with a three-electrode system. Pretreated sensor, saturated calomel electrode (SCE) and Pt electrode correspond to working, reference and counter electrode, respectively. The BPA was analyzed by differential pulse voltammetry (DPV). The corresponding parameters were set as follows: the amplitude of 50 mV, the pulse width of 50 ms, the potential range from 0.1 to 0.8 V, and the incremental potential of 0.004 V. The potential range of cyclic voltammetry (CV) for electrochemical characterization was set -0.2 to 0.5 V, and the scan rate was 100 mVs<sup>-1</sup>. The parameters of CV exploring scan rate were set as follows: the sample interval of 0.001 V, and the potential range from 0.2 to 0.8 V. EIS was conducted with a range of 1.0-1.0 x 10<sup>5</sup> Hz, applied potential of -0.4 V, and amplitude of 5 mV. The EIS was performed in 2.5 mM K<sub>3</sub>[Fe(CN)<sub>6</sub>]/K<sub>4</sub>[Fe(CN)<sub>6</sub>] solution with 0.1 M KCl. 0.1 M phosphate buffer was prepared by mixing Na<sub>2</sub>HPO<sub>4</sub> and NaH<sub>2</sub>PO<sub>4</sub> solution.



**Fig S1.** Linear relationship between peak current and different concentrations in 0.1 M phosphate buffer (pH = 7.0) containing 0, 2, 4 and 6 µM BPA.

**Table S1. Relevant parameters of LOD calculation.**

Sensors	LOD ( $\mu\text{M}$ )	linear equation	Linear range ( $\mu\text{M}$ )	<i>S.D.</i> (blank, n = 3)
GO/FeVO <sub>4</sub>	1.18	$I_{pa} (\mu\text{A}) = (0.0102 \pm 0.00000059) C (\mu\text{M}) + (0.0262 \pm 0.000058)$	0.01 - 40	0.004

**Table S2. Comparison of different sensors for the detection of BPA.**

Sensors	Linear range ( $\mu\text{M}$ )	LOD ( $\mu\text{M}$ )	References
NiFe <sub>2</sub> O <sub>4</sub> -rGO/SPE	0.05–25	10	2
MIP/PPy@LSG	0.05-20	8	3
GO-MWCNT- $\beta$ CD/SPE	0.05-5; 5–30	6	4
CB-modified graphite ink	0.1-0.9; 1-50	30	5
CTAB/Au/ZnO/rGO	0.01-1.34; 1.34-10	4.95	6
NiNP/NCN/CS/GCE	0.1-15	45	7
MWCNTs- $\beta$ CD/SPCE	0.125-2; 2–30	13.76	8
GO/FeVO <sub>4</sub>	0.01-40	1.18	This work

**Table S3. The reproducibility of the GO/FeVO<sub>4</sub> sensor towards 20 μM BPA.**

	$\Delta i_1/\mu\text{A}$	$\Delta i_2/\mu\text{A}$	$\Delta i_3/\mu\text{A}$	$\Delta i_4/\mu\text{A}$	$\Delta i_5/\mu\text{A}$	<i>S.D.</i> (%)
Different sensors	1.0696	1.0124	0.93405	0.9143	0.9821	6.2

**Table S4. Interference effects on the detection of 20 μM BPA in 0.1 M phosphate buffer (pH = 6.5).**

Interference	Concentration (μM)	<i>S.D.</i> (%)
KCl	200	3.0
KBr	200	3.2
NaCl	200	3.3
Glu	200	3.6
DA	200	7.6
TBBPA	2	8.6
APAP	2	2.9

## Supporting references

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