Supporting Information

Construted 3D Bi/$ZnSnO_3$ Hollow Microspheres for Label-free Highly Selective Photoelectrochemical Recognizing of Norepinephrine

Yuanyuan Dong[a,b], Chenxing Xu[a], Lei Zhang[a*]

a. College of Chemistry, Liaoning University, 66 Chongshan Middle Road, Shenyang, Liaoning, 110036, People's Republic of China

b. College of Materials and Chemical Engineering, Heilongjiang Institute of Technology, Harbin, 150050, People's Republic of China

[*] Corresponding author. Tel.: +86 24 62207809; Fax: +86 24 62202380.

E-mail address: zhanglei63@126.com (L. Zhang).

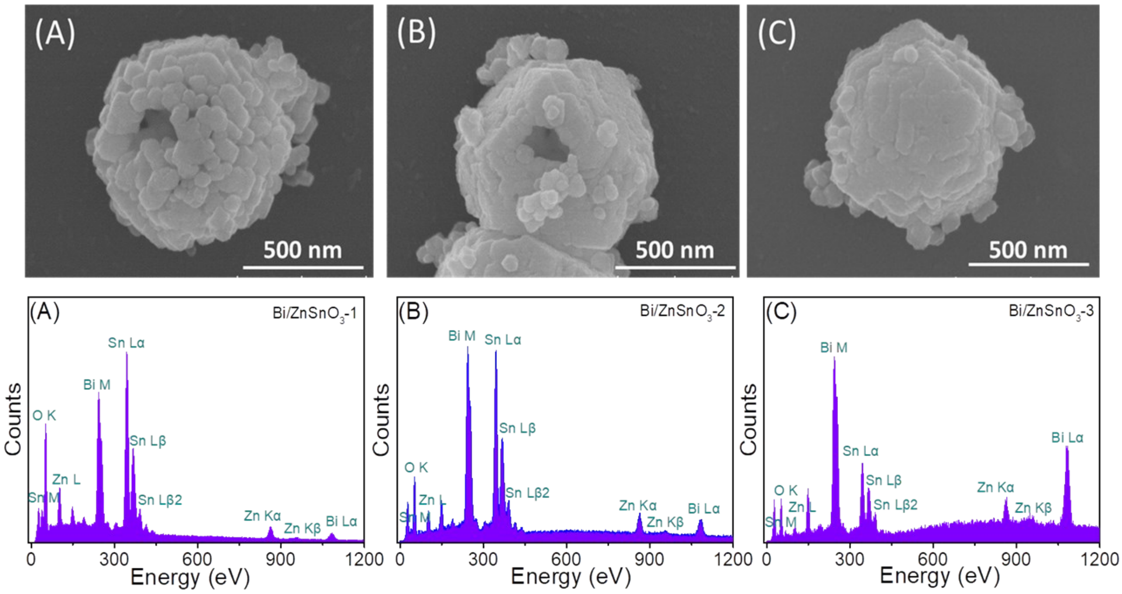


Fig. S1. SEM images of Bi/$ZnSnO_3$-1 (A), Bi/$ZnSnO_3$-2 (B) and Bi/$ZnSnO_3$-3 (C) composites; EDS of Bi/$ZnSnO_3$ composites (D-F).

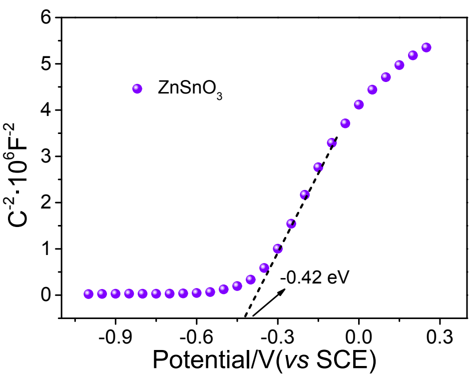


Fig. S2. *M-S* plot of $ZnSnO_3$.

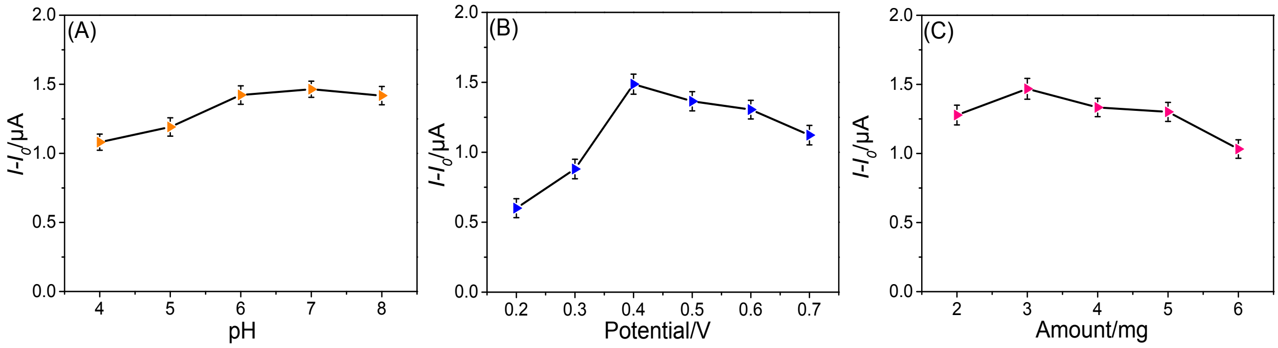


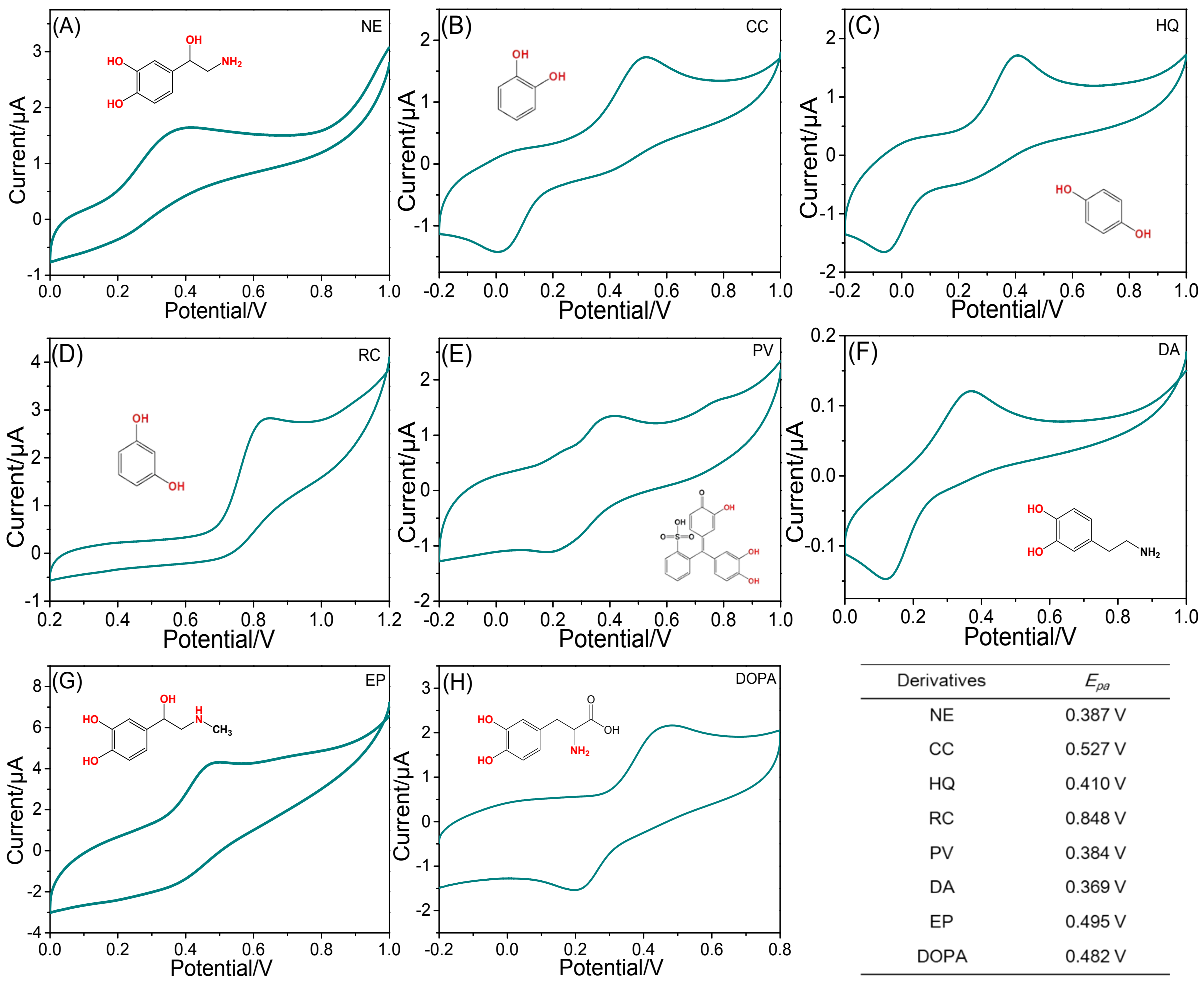
Fig. S3. Influences of (A) pH value, (B) applied bias potential and (C) Bi/$ZnSnO_3$-2 amount on the photocurrent response toward 1.0 μmol/L NE in 0.1 mol/L Na_2SO_4.

Optimization of Experimental Conditions

To obtain high sensitivity for the sensing of NE, the influence of the pH was investigated. In the experiment (Fig. S3A), the PEC response of NE on the Bi/$ZnSnO_3$-2/FTO was slightly larger at pH 7. Thus, the pH of the Na_2SO_4 solution was not adjusted for the subsequent experiment.

As a significant factor in the PEC sensing system, the influence of the applied potential was investigated. As revealed in Fig. S3B, upon addition of 1.0 μmol/L NE, the photocurrent intensity increased with increasing the bias potential from 0.3 to 0.4 V and tended to reach at a maximum of 0.4 V. Subsequently, the photocurrent displayed a slight reduction as the applied potential was more positive. Thus, 0.4 V was chosen as the optimum potential in this study.

Additionally, the effect of the modification amount of Bi/$ZnSnO_3$ coating was examined. As expected in Fig. S3C, Bi/$ZnSnO_3$-2/FTO showed the largest PEC signal at the modification amount of 3.0 mg while lower or higher amount both resulted in decreased photocurrent. This may be attributed to the excessive thickness of the Bi/$ZnSnO_3$ film immobilized on the electrode surface, which blocked the electron and proton transport to the electrode. In consequence, 3.0 mg was selected as the optimal modification amount for following measurements.



Derivatives	E_{pa}
NE	0.387 V
CC	0.527 V
HQ	0.410 V
RC	0.848 V
PV	0.384 V
DA	0.369 V
EP	0.495 V
DOPA	0.482 V

Fig. S4. The CVs of different catechol derivatives on the glassy carbon electrode in 0.1 mol/L Na_2SO_4.

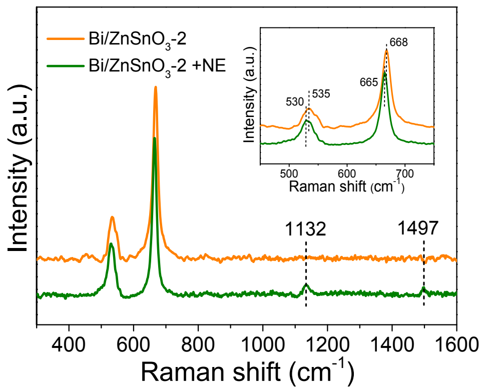


Fig. S5. Raman spectra of Bi/$ZnSnO_3$-2 samples before/after adsorption of NE.

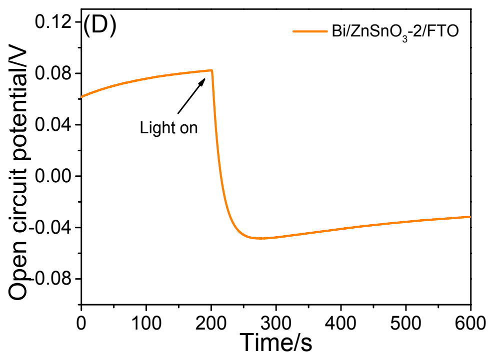


Fig. S6. Open circuit potential (OCP) response of the Bi/$ZnSnO_3$-2/FTO under dark and illuminated conditions.

Table S1. Comparison of different analytical methods for NE determination.

Modified electrode	Technique	Linear range (μmol/L)	LOD (nmol/L)	Refs.
MIP-coated PdNPs/GCE	DPV	0.5-80.0	100.0	10
ADPC/Fe_2O_3@CeO_2/CPE	DPV	0.2-300.0	40.0	11
CTAB-SnO_2/GCE	DPV	0.1-300.0	6.0	12
MoO_3/GCE	i-t	0.1-2000.0	110.0	13
$FeMoO_4$/GCE	i-t	0.05-200.0	3.7	14
Bi/$ZnSnO_3$/FTO	PEC	0.002-350.0	0.68	This work