Supporting Information

Ordered Mesoporous $NiCo_2O_4$ Nanospheres as a Novel Electrocatalyst Platform for 1-Naphthol and 2-Naphthol Individual Sensing Application

Jiangjiang Zhang,[†] Qianwen Mei,[‡] Yaping Ding,*[,‡] Kai Guo,[†] Xinxin Yang,*[,†] Jingtai Zhao *[,†,§]

[†] School of Materials Science and Engineering, Shanghai University, Shanghai 200444, People's Republic of China

[‡] Department of Chemistry, College of Sciences, Shanghai University, Shanghai 200444, People's Republic of China

[§] State Key Laboratory of Advanced Special Steel, Shanghai University, Shanghai 200444, People's Republic of China

Corresponding Author

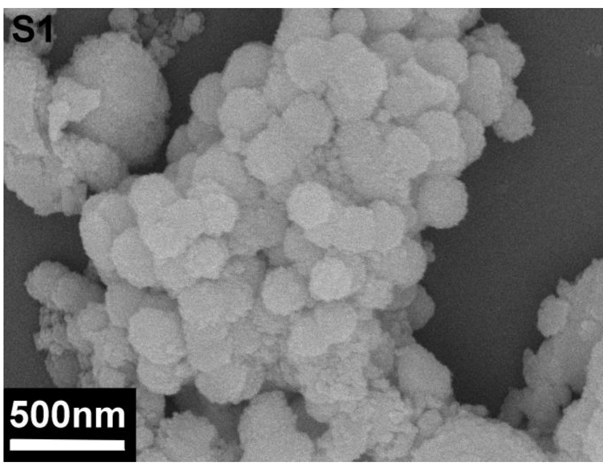
* E-mail: jtzhao@shu.edu.cn (J.T.Z)

* E-mail: wdingyp@sina.com (Y.P.D)

* E-mail: yangxinxin@shu.edu.cn (X.X.Y)

S.1 Syntheses and characterizations of KIT-6 hard template:

The KIT-6 is composed of the interconnected cylindrical pore channels with the cubic $Ia\bar{3}d$ space group to form ordered mesoporous nanosphere. From Fig.S3, the KIT-6 shows a very narrow pore size distribution centered at 7.4 nm. The specific surface area of KIT-6 is 738 m^2g^{-1}. After nanocasting strategy and a calcination process, meso-$NiCo_2O_4$ nanosphere retained a cubic $Ia\bar{3}d$ mesoporous architecture similar to that of the original silica template. Meso-$NiCo_2O_4$ nanosphere was inverted with respect to the silica template.



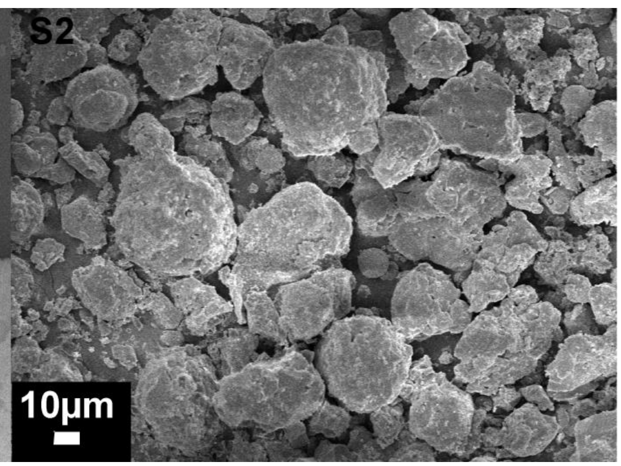


Fig. S1 SEM image of KIT-6 nanospheres.

Fig. S2 SEM image of bulk-$NiCo_2O_4$.

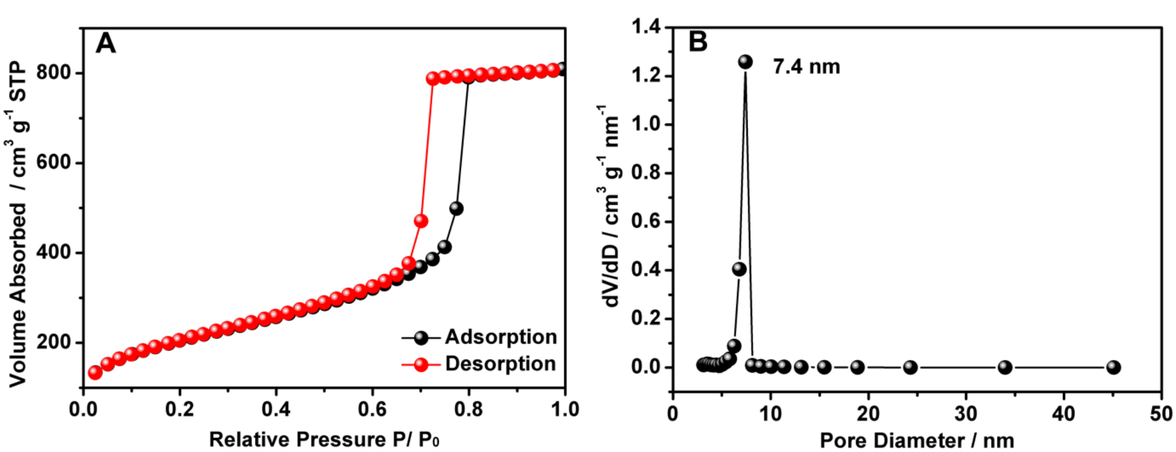


Fig. S3 (A) N_2 adsorption-desorption isotherm curve and (B) Pore-size distribution of KIT-6.

S.2 Optimization of the detection conditions

Effects of the applied potential and concentration of modifier

To improve the electrocatalytic performance of meso-$NiCo_2O_4$ / CPE towards 1-NAP and 2-NAP, effection factors were optimized, including the applied potential and the concentration of modifier. The applied potential is a key factor influencing the performance of the 1-NAP and 2-NAP sensors. Fig. S5 A and B illustrate the effection of the applied potential varying from +0.3 to +0.7 V on the response current of 4 μM 1-NAP and 2-NAP, respectively. The peak current response increased with the increment of applied potential from +0.3 to +0.4 V, and then decreased at potential +0.4 V. Therefore, potential of +0.4 V was chosen for further experiments of 1-NAP detection. Similarly, potential of +0.6 V was chosen for further experiments of 2-NAP detection.

Fig. S4 C and D show the effection of meso-$NiCo_2O_4$ concentration on the amperometric response of 4 μM 1-NAP and 2-NAP, respectively. The current response increased rapidly upon the increase of meso-$NiCo_2O_4$ from 1.0 to 2.0 mg/mL, and then decreased with concentration shifting from 2.0 to 3.0 mg/mL. Thus, 2.0 mg/mL meso-$NiCo_2O_4$ was selected for the amperometric detection of 1-NAP and 2-NAP.

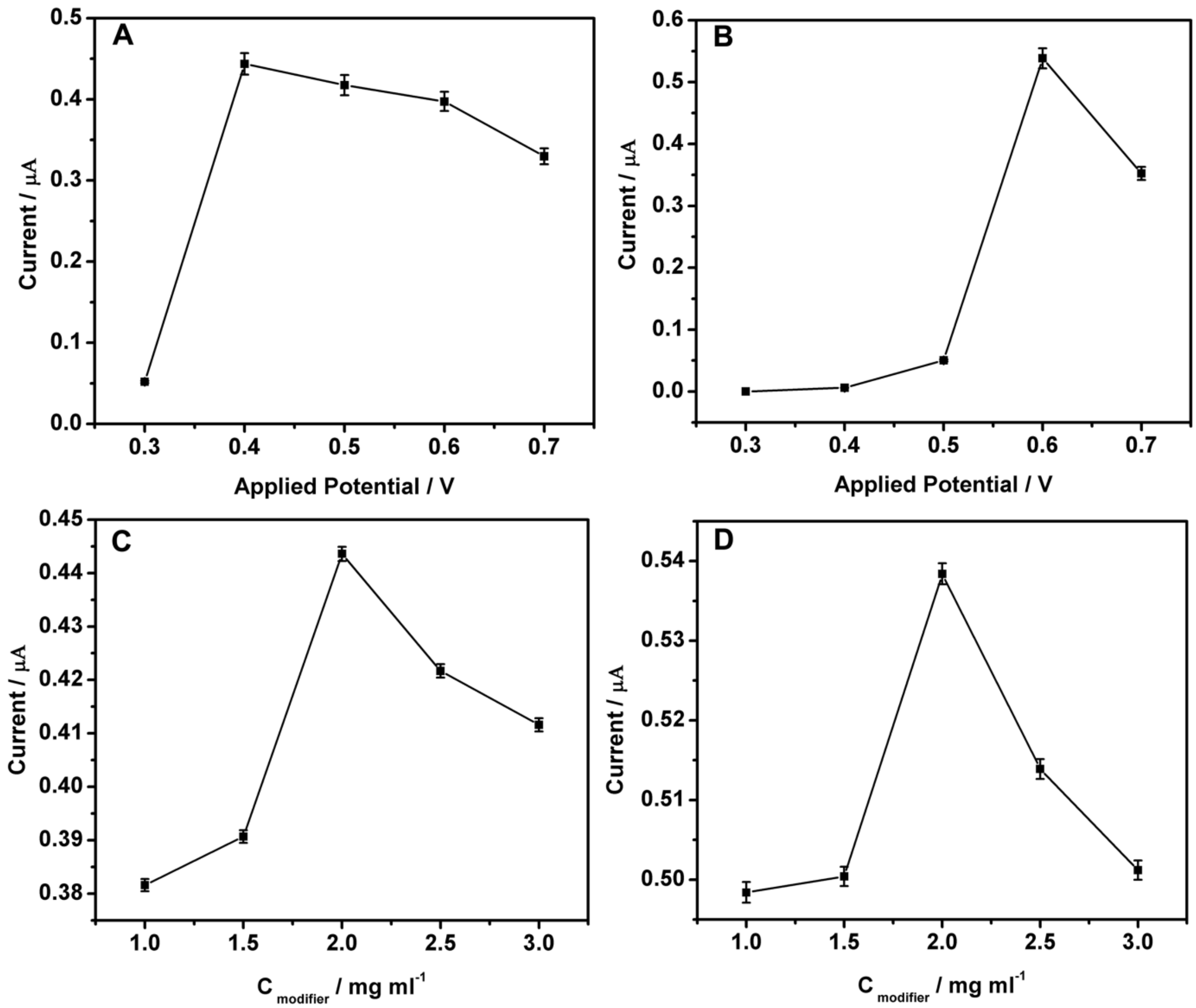


Fig. S4 Effects of optimization of the detection conditions on the amperometric response of 4 μM 1-NAP and 2-NAP, respectively: (A, B) applied potential; (C, D) concentration of meso-$NiCo_2O_4$.

The selectivity of meso-$NiCo_2O_4$ / CPE for NAP detection

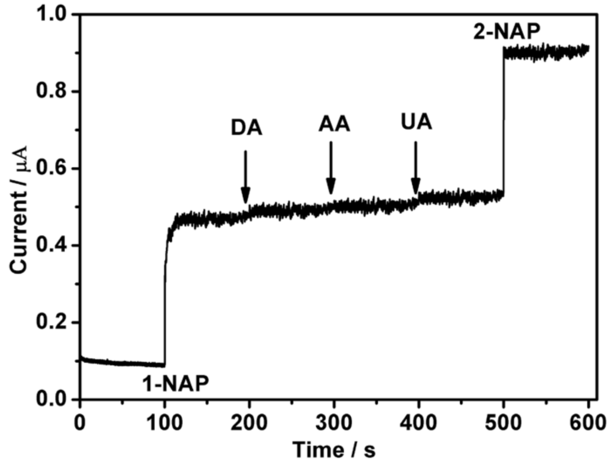


Fig. S5 Amperometric response curve of 4 μM 1-NAP and 2-NAP on meso-$NiCo_2O_4$ / CPE in the presence of 4 μM different interfering species in 0.1 M PBS electrolyte at the applied potential of 0.5 V.