Supporting Information

Application of *β*-cyclodextrin -reduced graphene oxide nanosheets for enhanced electrochemically sensing nitenpyram residue in real samples

S1 Background CV in PBS

In order to clarify the improvement of the efficiency for the NIT detection, the background CV in an aqueous solution without NIT (just PBS) was represented in Fig. S1. Compared with Fig.2, it can be seen that there are no peaks from -0.2 V to -1.4 V in background CV, which means that there is no interference in NIT determination and the peak comes from the NIT reduction on β-CD/GCE.

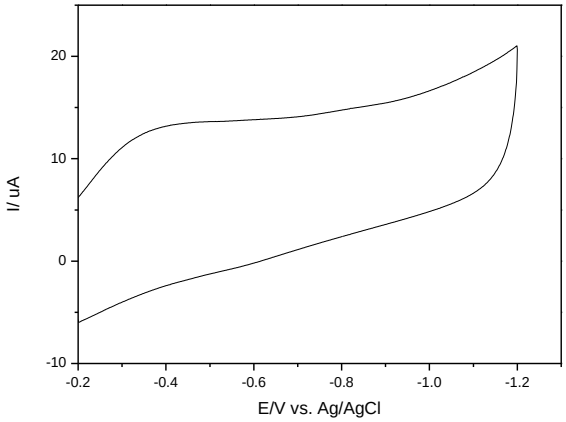

Fig. S1 Background CV recorded in PBS without NIT.

S2 Binding affinity experiments

In order to investigate the supramolecular inclusion between NIT and *β*-CD, the binding affinity experiments of NIT guest to the *β*-CD-rGO host was studied. The association constant (K) of NIT with *β*-CD on the electrode surfaces can be deduced using the following equation derived from Langmuir isotherm (Eq. (S1))[1].

$$\frac{[NIT]}{I_{pc}} = \frac{1}{KI_{\max}} + \frac{[NIT]}{I_{\max}} \qquad \text{(S1)}$$

Where I_{pc} is the reduction peak current for a given concentration of NIT, I_{max} is the maximum peak current and K is the binding constant. As shown in Fig. S2, the plots of $1/I_{pc}$ vs. 1/[NIT] present two cross straight lines, indicating the formation of two inclusion complex in different molar ratio between *β*-CD and NIT[2]. The K_1 and K_2 value were calculated to be 36.1 M^{-1} at high NIT concentration and 1.9×10^4 M^{-1} at low, respectively, attributing to the intercept and slope of the linear equation $1/I_{pc}=0.341\times1/[NIT]+12.3$ (R=0.994) and $1/I_{pc}=0.058\times1/[NIT]+112.1$ (R=0.991). The results are extremely higher than those of other guest molecules (such as 1558 M^{-1} for carbidopa, 2823 M^{-1} for 1,3-dinitrobenzene[4]) binding with the *β*-CD host, indicating *β*-CD immobilized on the *β*-CD-rGO/GCE surface has the excellent abilities of inclusion and recognition toward NIT molecular. From the above analysis, it can be speculated that the electrochemical response mainly comes from the surface-confined NIT molecules which are easily included in the cavity of *β*-CD attached to the rGO film.

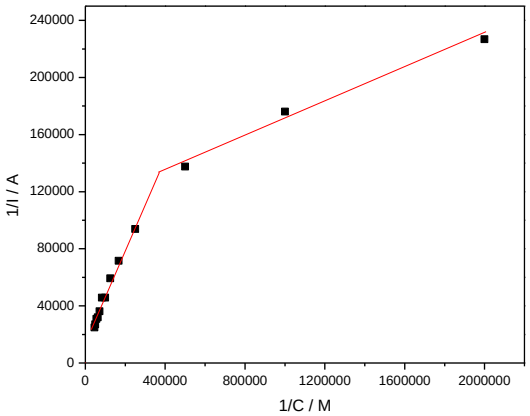

Fig. S2 Plots of reciprocal of peak current vs. reciprocal of concentration.

References:

1. T. Fukuda, Y. Maeda, H. Kitano, **Langmuir, 1999, 15**, 1887.

2. R. Wang, **Acta Phys-Chim Sin, 2007, 23**, 1353.

3. J. Li, H. Feng, Y Feng, J. Liu, Y. Liu, J. Jiang, D. Qian, **Microchimica Acta 2014, 181**, 1369.