Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supporting Information

Electrochemical detection of serotonin based on poly(bromocresol green) film and nanoparticles in chitosan matrix

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1. Effect of BCG electropolymerization cycles and concentration

In this work, cyclic voltammetry was used to form the polymer film with different cycles. Fig. S1a showed that the response current enhanced with increasing of electropolymerization cycles from 10 to 25 cycles, and almost did not increase from 25 to 30 cycles. When further increasing the electropolymerization cycles, the current showed a decreasing tendency. So the 25 cycles was selected as the optimum condition of electropolymerization. In Fig. S1b, the response peak current of 5-HT enhanced gradually with increasing concentration of BCG from 0.1 to 0.5 mM, and almost did not increase from 0.5 to 0.7 mM. When further increasing the concentration of BCG, the peak current showed a decreasing tendency. This might because that excessive thickness of the film would hinder the electron transfer. So the concentration of BCG was 0.5 mM.

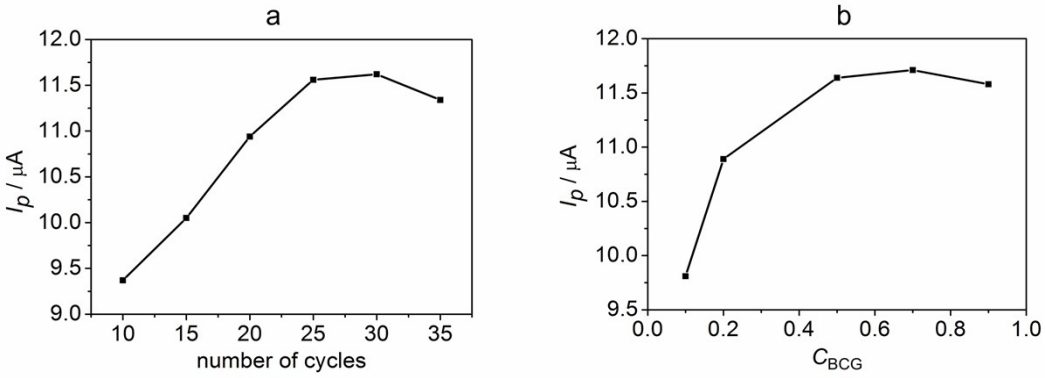

Fig. S1 The peak currents of the (a) different electropolymerization cycles of BCG (cycles:10, 15, 20, 25, 30, 35) and (b) different concentration of BCG (BCG concentration: 0.1, 0.2, 0.5, 0.7, 1.0 mM) in a 0.1 M phosphate buffer (pH 7.0) and 1.0×10^{-4} M 5-HT.

2. The SEM image of the poly(BCG)

The SEM image of the poly(BCG) is shown that the BCG are electropolymerized on suface of electrode.

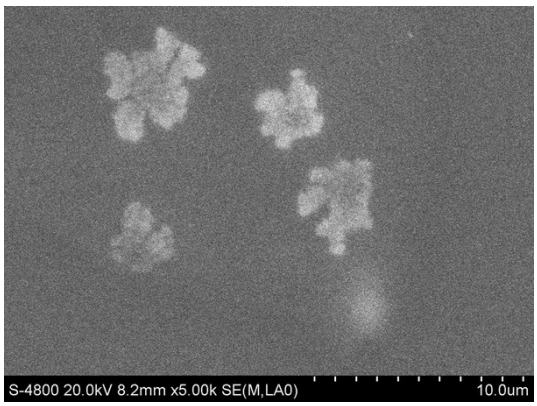

Fig. S2 SEM images of the poly(BCG)

3. The number of proton involved in the reaction

In this work, the number of proton value can be evaluated based on the slope of the E_{pa} versus pH (the slope is 0.0383). We hypothesis electrode reaction is:

$$Ox + ne + mH^+ \leftrightharpoons Red$$

$$0.0383 = \frac{0.059m}{an}$$

where α is electron transfer coefficient ($\alpha=0.5$); n is number of electron involved in the reaction (n=2). The value of m is estimated as 0.65, indicating that one proton was involved in the oxidation of 5-HT.

4. **The DPV graphs to show the interference of AA**

The interference of AA coexisting in 5-HT at the Fe_3O_4–MWCNTs–poly(BCG) / GCE was analyzed by DPV. The contents of AA increase from 0 to 4.0×10^{-3} M in solution. The results showed that 400-fold excess AA no obviously influence on the detection of 5-HT.

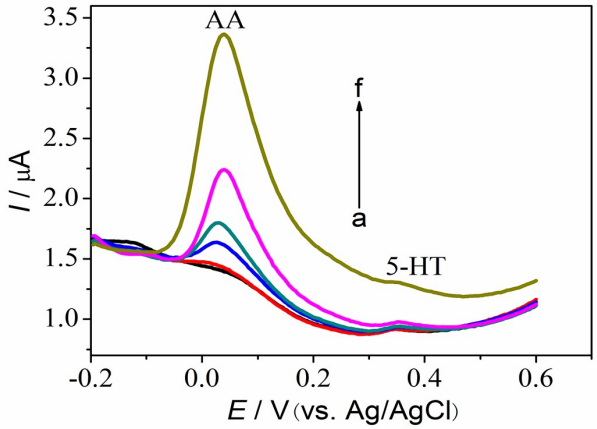

Fig. S3 DPV of various concentration of AA at Fe_3O_4–MWCNTs–poly(BCG) / GCE in 5.0×10^{-6} M 5-HT solution. AA concentration (curve a–f):0, 5.0×10^{-5}, 2.5×10^{-4}, 5.0×10^{-4}, 2.0×10^{-3} and 4.0×10^{-3} M.