Supplementary Information

Pt/graphene-CNTs nanocomposite based electrochemical sensors for the determination of endocrine disruption bisphenol A in thermal printing papers

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3.1 The FT-IR spectra analysis and Surface morphology of Gr-CNTs

Fig.S1 showed the SEM images of Gr-CNTs. The morphology of the as-prepared Gr shows a thin sheet shape.[36,37] It was also confirmed that the CNTs were well dispersed onto Gr without any appreciable aggregations in each Gr/CNTs composite.

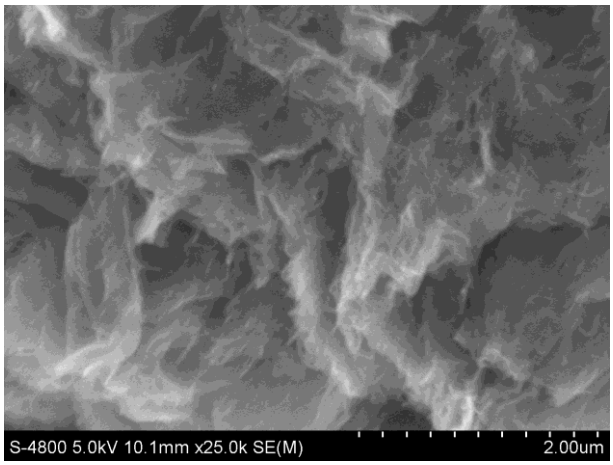

Fig. S1 SEM images of Gr-CNTs nanocomposite.

Fig.S2 shows the FTIR spectra of CNTs, Gr sheets, and Gr-CNTs

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nanocomposites mainly exhibit the characteristic peaks of hydrophilic oxygen groups. It is well known that carboxylic acid groups of Gr are unlikely to be reduced by EG under the given reaction conditions.[38] These groups should therefore remain in the reduced product as confirmed by FTIR analysis. In the FTIR spectra of the Gr and CNTs powders, the broad absorption band at about 3425 cm^{-1} is related to O–H stretching vibrations, and the absorption peak at about 1560 and 1637 cm^{-1} from the carbonyl and carboxyl groups are present. The presences of these oxygen-containing functional groups are abundant on the edge of Gr sheets and CNTs, which allows Gr and Gr-CNTs composite to readily disperse in water.[39] And the CNTs were inlaid among the Gr nanosheets by the π-conjugated multiple aromatic regions.[31,40] According to the results obtained from FT-IR, TEM and SEM, it can be concluded that Gr-CNTs was successfully synthesized.

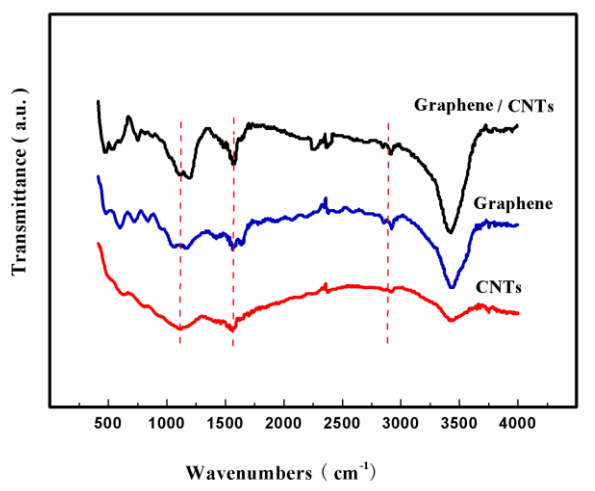

Fig. S2 FTIR spectra analysis of Gr nanosheets, CNTs and Gr-CNTs composite.

The chronoamperometric technique is an effective method to evaluate the electrocatalytic activity and stability of catalysts. Stable steady-state responses of the different modified electrode are shown in Fig. S3. The potential of the electrode was held at 0.65 V and the current flowing through the electrode was monitored for a period of 600 s. The high current observed in the initial stage originates from the double layer charging. The stable current on the Pt/Gr-CNTs/GCE (blue line) is about 10 times higher than that Pt/Gr electrode (black line), and about 10 times higher than Pt/CNTs electrode (red line) and about 12times higher than GCE (dark cyan line) electrode. It shows that the Pt/Gr-CNTs were excellent catalysis. The highly electrocatalytic activity and stability of Pt/Gr-CNTs due to the sandwich lamination structure of Pt/Gr-CNTs nanocomposite have high specific surface area and the synergistic reaction of Gr-CNTs with noble metal is the principal factor to increase the catalysis ability of Pt/Gr-CNTs nanocomposite.

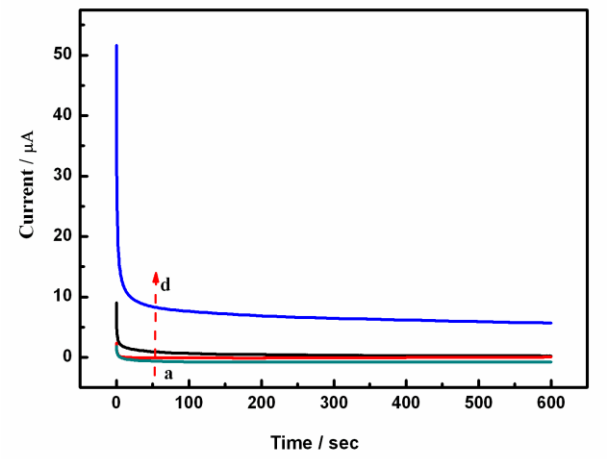

Fig. S3 I-t curves of BPA electro-oxidation on various electrodes: GCE (a), Pt/Gr (b), Pt/CNTs (c) and Pt/Gr-CNTs (d) in 1.0 mM BPA + 0.1 M sodium sulfate buffer, the

electrode potential was kept at 0.65 V.

Reference

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