Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Electrochemical glucose biosensor based on graphene composites: Use of dopamine as reducing monomer and as site for covalent immobilization of enzyme†

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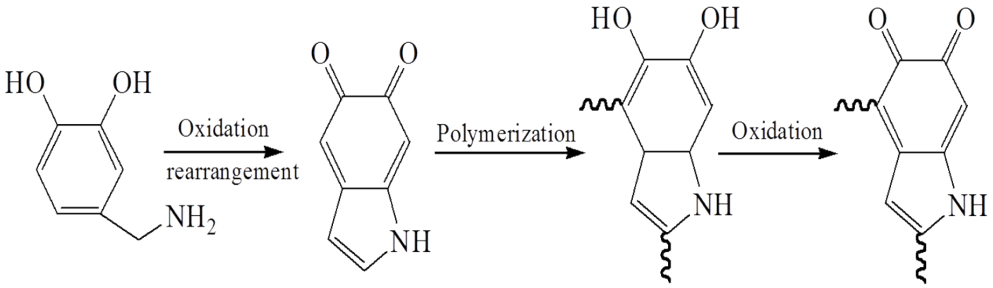

Fig.S1 Scheme of Self-Polymerization of Dopamine [1-4]

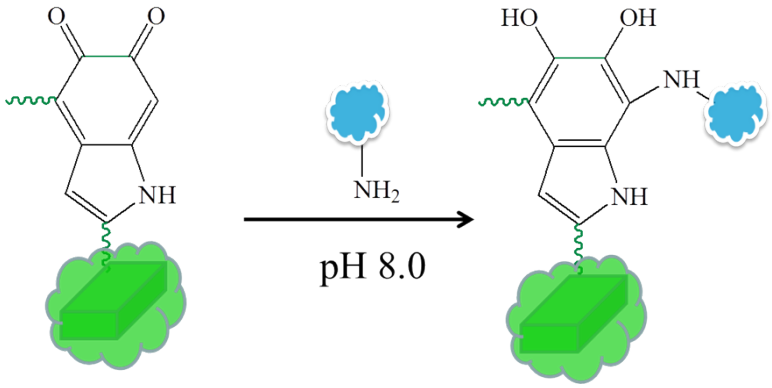

Fig.S2 The Michal addition reaction between PDA and GOD [2, 5-6]

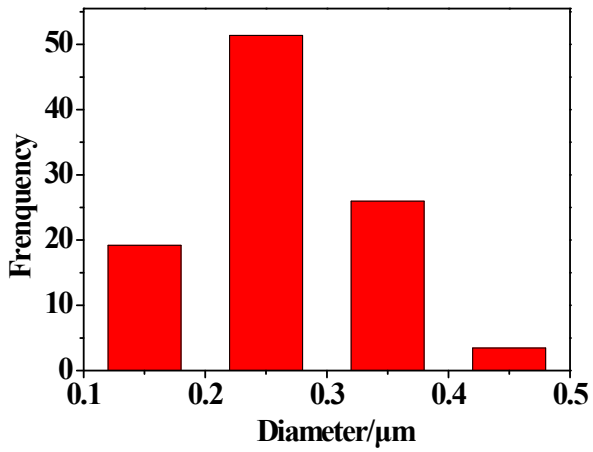

Fig. S3 The distribution of the particle number on the surface of GCE/PDA-RGO/GOD/Pt NPs

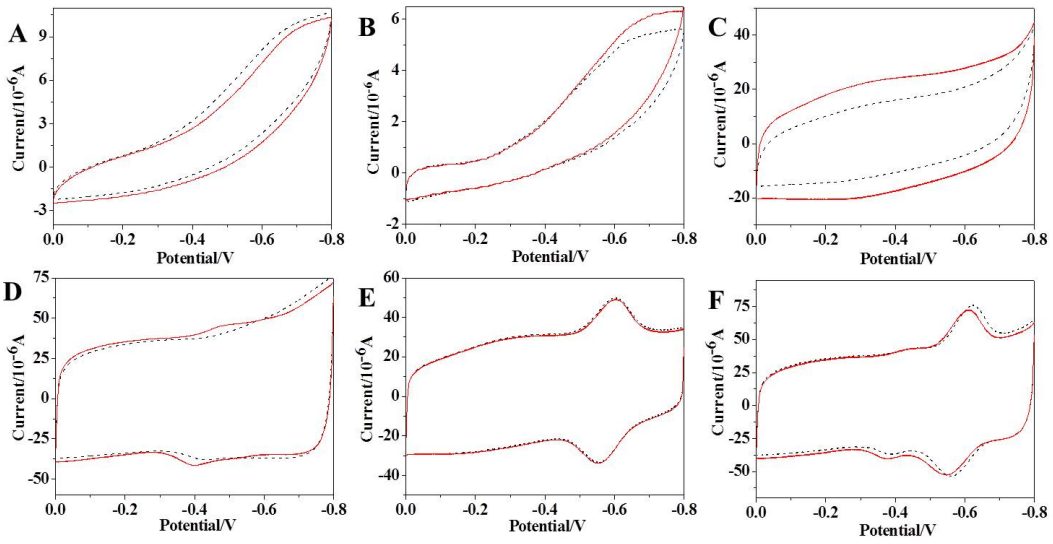

Fig. S4 Cyclic voltammograms at different modified electrodes in PBS solution in the absence and in the presence of 0.2mM glucose in pH 7.4 PBS at the rate of 0.1V/s. (A)GOD, (B)PDA, (C)RGO-PDA, (D)RGO-PDA/PtNPs, (E)RGO-PDA/GOD, (F)RGO-PDA/GOD/PtNPs.

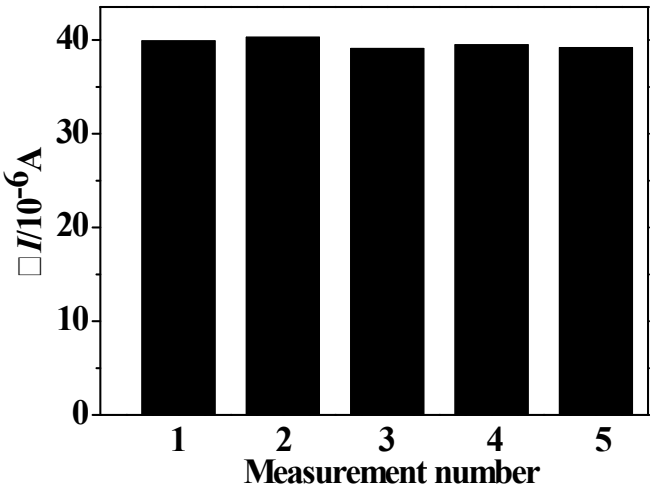

Fig.S5 The current responses of GCE/PDA-RGO/GOD/PtNPs to 0.2 mM glucose in five measurements.

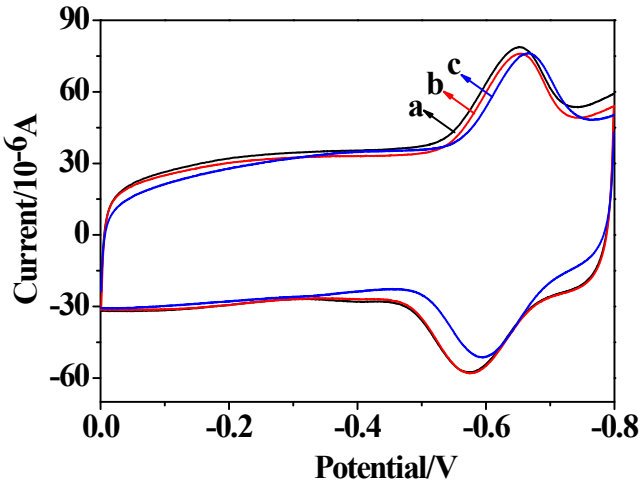

Fig.S6 Cyclic voltammograms of GCE/PDA-RGO/GOD/PtNPs in pH 7.4 PBS at the rate of 0.1V/s recorded at the 1st (a), and the 50th cycle (b). Curve c is CV of the modified electrode after has been stored in PBS at 4℃ for a week.

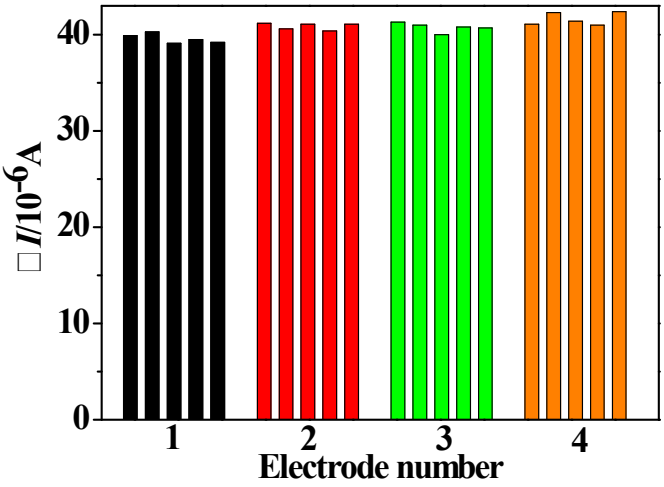

Fig.S7 Cyclic voltammograms of GCE/PDA-RGO/GOD/PtNPs in pH 7.4 PBS at the rate of 0.1V/s in the presence of 0.2mM glucose.

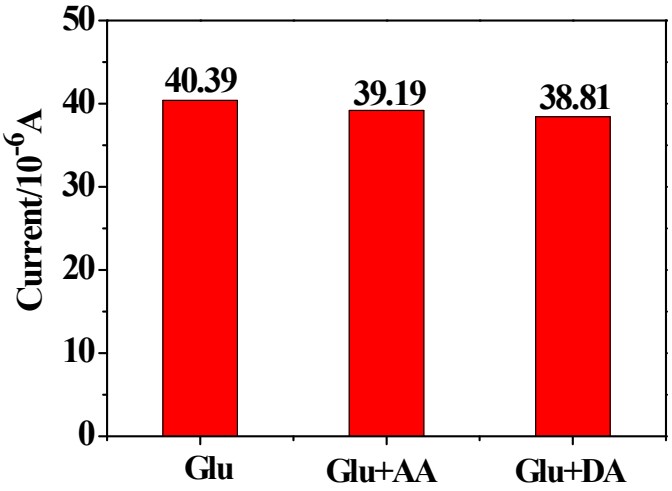

Fig.S8 The current response on the GCE/PDA-RGO/GOD/PtNPs with different substance, respectively

Sensing mechanism of GCE/PDA-RGO/GOD/PtNPs in different conditions [7-9]

In the pH 7.4 PBS (N_2-saturated) solution

$$GOD(FAD) + 2e^- + 2H^+ \rightleftharpoons GOD(FADH_2) \quad (1)$$

$$GOD(FADH_2) - 2e^- \rightleftharpoons GOD(FAD) + 2H^+ \quad (2)$$

In the pH 7.4 PBS (air-saturated) solution

$$GOD(FAD) + 2e^- + 2H^+ \rightleftharpoons GOD(FADH_2) \quad (3)$$

$$GOD(FADH_2) + O_2 \rightarrow GOD(FAD) + H_2O_2 \quad (4)$$

$$H_2O_2 - 2e^- \rightarrow 2H^+ + O_2 \quad (5)$$

In pH 7.4 PBS(Air-saturated) solution with the adding of glucose

$$GOD(FAD) + 2e^- + 2H^+ \rightleftharpoons GOD(FADH_2) \quad (6\text{-}1)$$

$$GOD(FAD) + glucose \rightarrow gluconolactone + GOD(FADH_2) \quad (6\text{-}2)$$

$$GOD(FADH_2) + O_2 \rightarrow GOD(FAD) + H_2O_2 \quad (7)$$

$$H_2O_2 - 2e^- \rightarrow 2H^+ + O_2 \quad (8)$$

References

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