Electronic Supplementary Material (ESI) for RSC Advances.


## Supporting Information

# An enzymatic biosensor for hydrogen peroxide based on one-pot preparation of $CeO_2$-reduced graphene oxide nanocomposite

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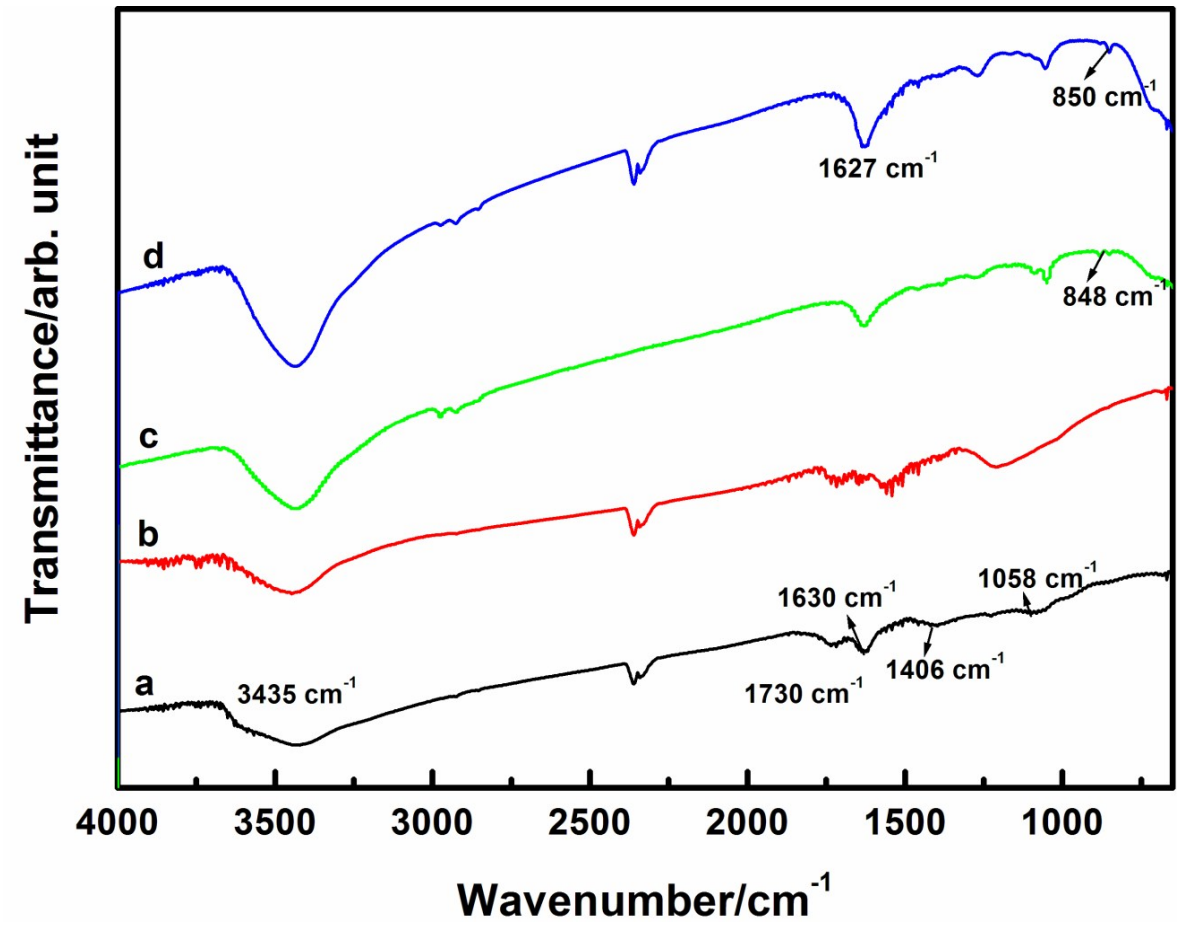


**Fig. S1** FT-IR spectra of (a) GO, (b) rGO, (c) $CeO_2$-rGO and (d) $CeO_2$.

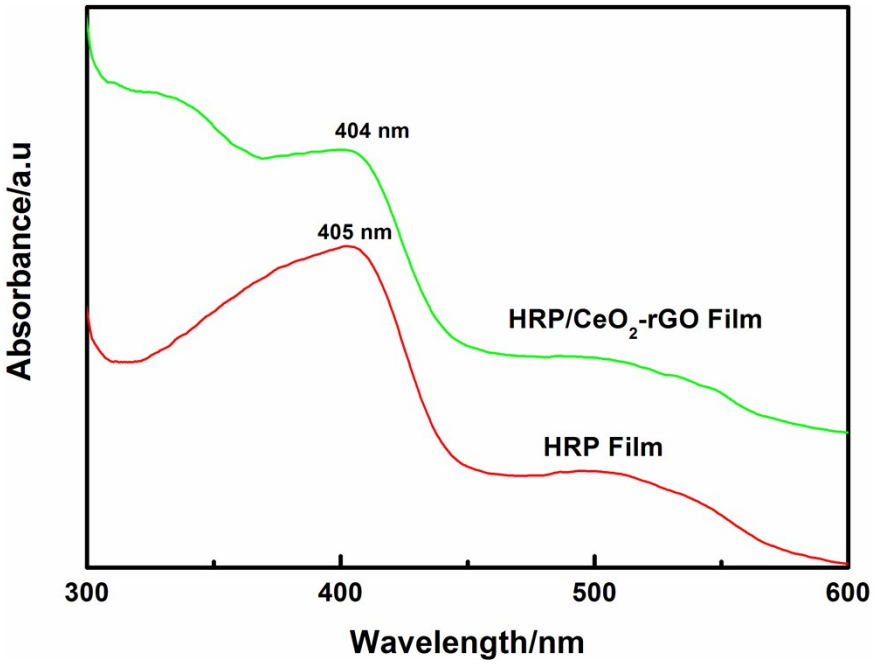


Fig. S2 UV-vis spectra of HRP and HRP/$CeO_2$-rGO film on quartz slides at room temperature.

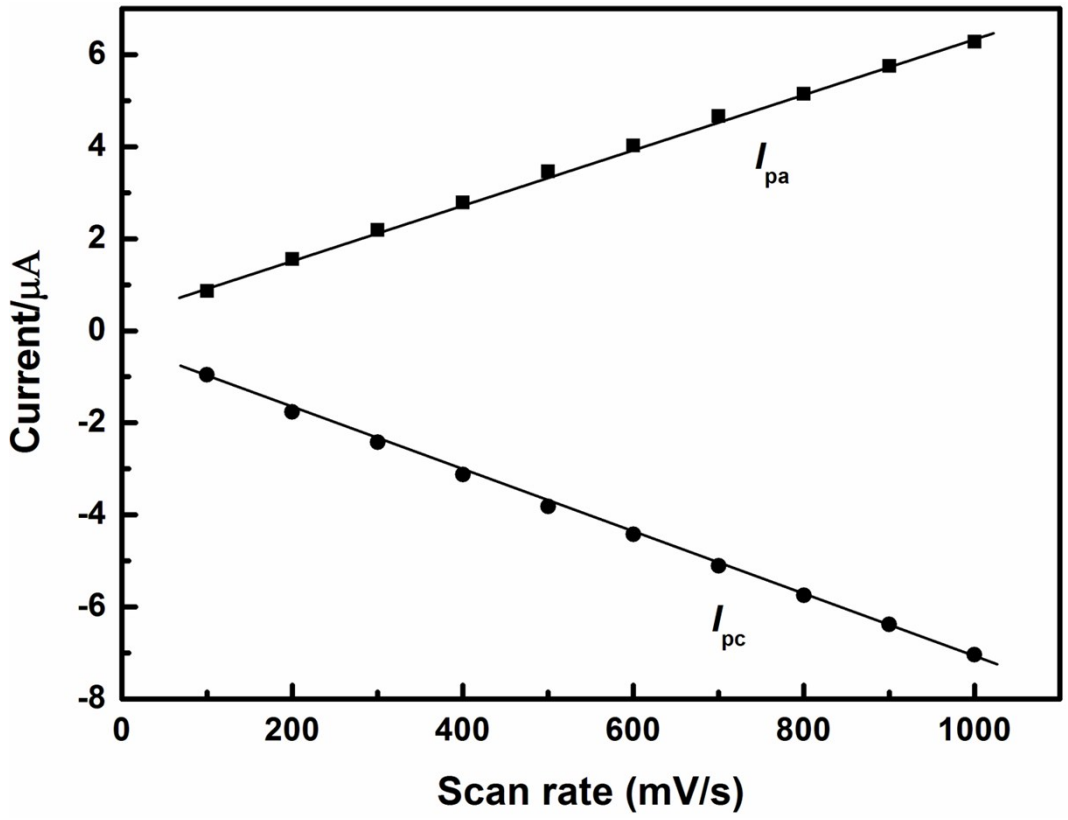


**Fig. S3** Plot of peak current as a function of scan rates for HRP/$CeO_2$-rGO modified GC electrode in PB solution (pH 7.0).

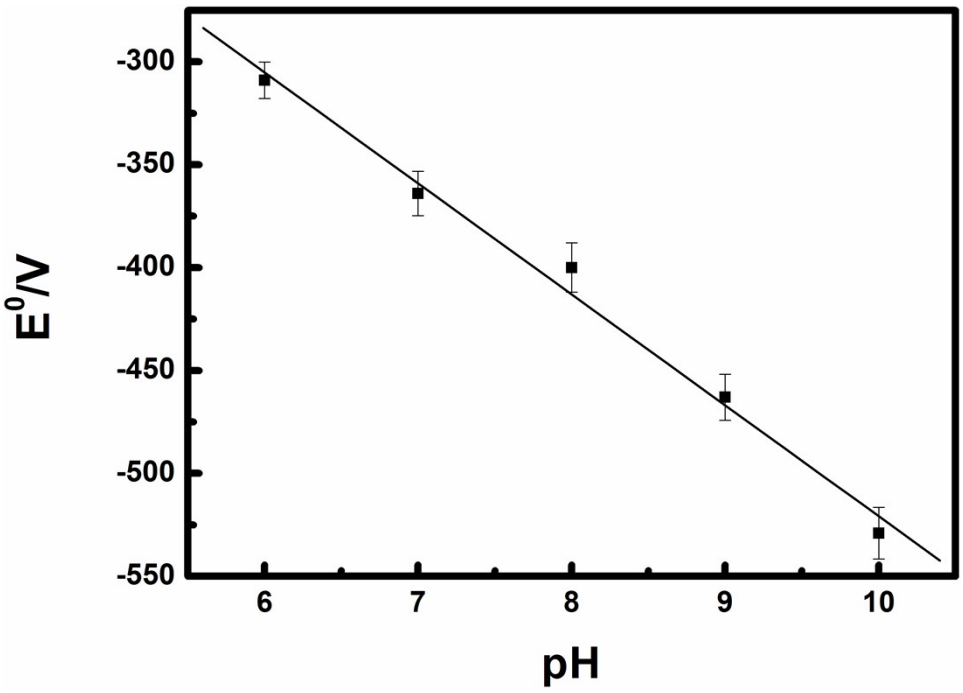


**Fig. S4** Plot of formal potential *vs*. pH for HRP/$CeO_2$-rGO modified GC electrodes in 0.1 M PB solution (pH 7.0) at scan rate 100 mV/s.

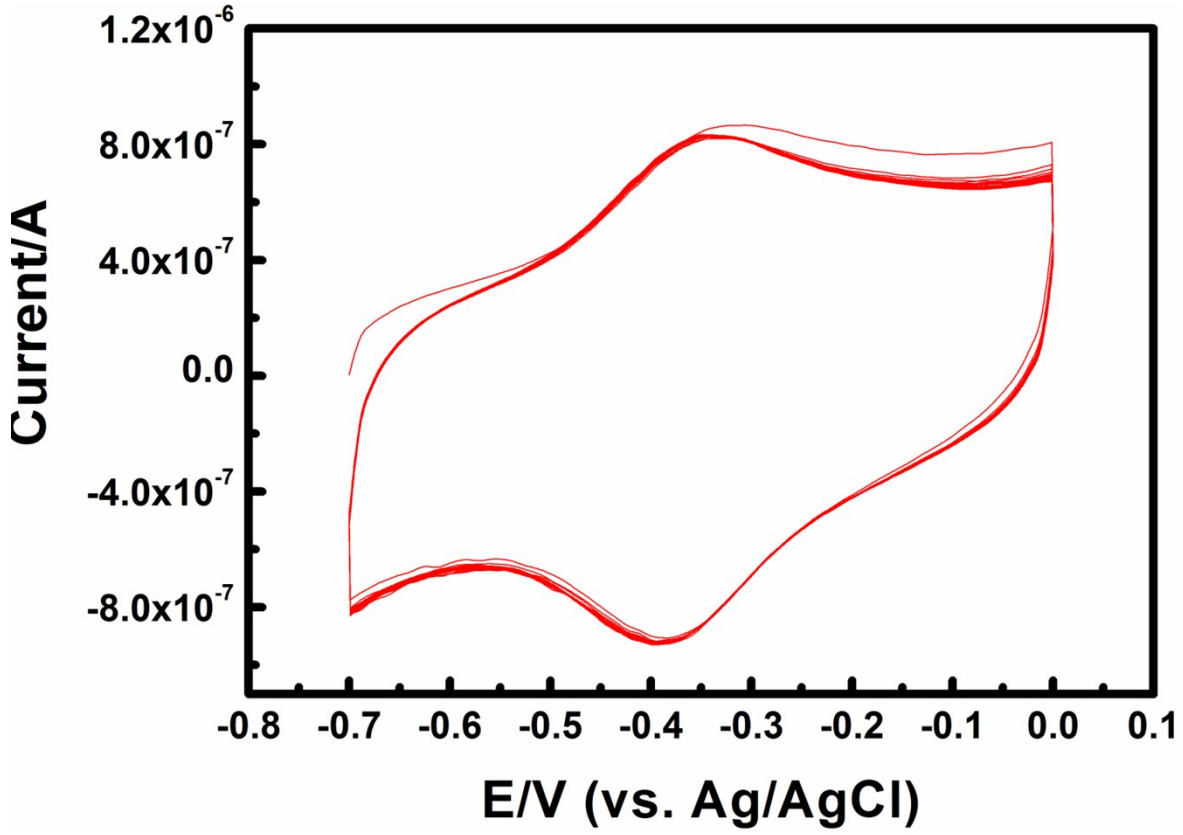


**Fig. S5** CVs stability of HRP/$CeO_2$-rGO modified GC electrode in PB solution (pH 7.0) at a scan rate of 100 mV/s for 20 continuous cycles in the potential window between -0.7 to 0 V.

**Table-S1 Comparison of the responses of other $H_2O_2$ sensors**

| Electrode materials | Detection limit (µM) | Linear range (µM) | $K^M_{app}$ (mM) | Ref. |
|---|---|---|---|---|
| Hb[a]-CNDs[b]-CS[c] | 0.27 | 1.0–118 | 0.067 | [1] |
| HGN[d]-HRP[e]-MB | 0.5 | 0.5–500 | - | [2] |
| CS/HRP-PTBA | 0.1 | 1–300 | 0.13 | [3] |
| HRP-Ag@C | 0.2 | 0.5–140 | 0.03 | [4] |
| HRP[a]/PTBA[f]-RTIL[g] | 0.5 | 5.0 – 175 | 1.22 | [5] |
| HRP/$TiO_2$ nanorod | 0.2 | 0.8 – 35 | 0.033 | [6] |
| Hb/Graphene/CS | 0.51 | 6.5 – 230 | 0.344 | [7] |
| HRP/$CeO_2$-rGO | 0.021 | 0.1–500 | 0.011 | This work |

[a]Hemoglobin

[b]Carbon nanodots

[c] chitosan

[d]hollow graphitic nanocapsule

[e] horseradish peroxidase

[f] poly (thiophene-3-boronic acid

[g]room temperature ionic liquids

**References**

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