Supporting information

Freestanding Films of Reduced Graphene Oxide Fully Decorated with Prussian Blue Nanoparticles for Hydrogen Peroxide Sensing

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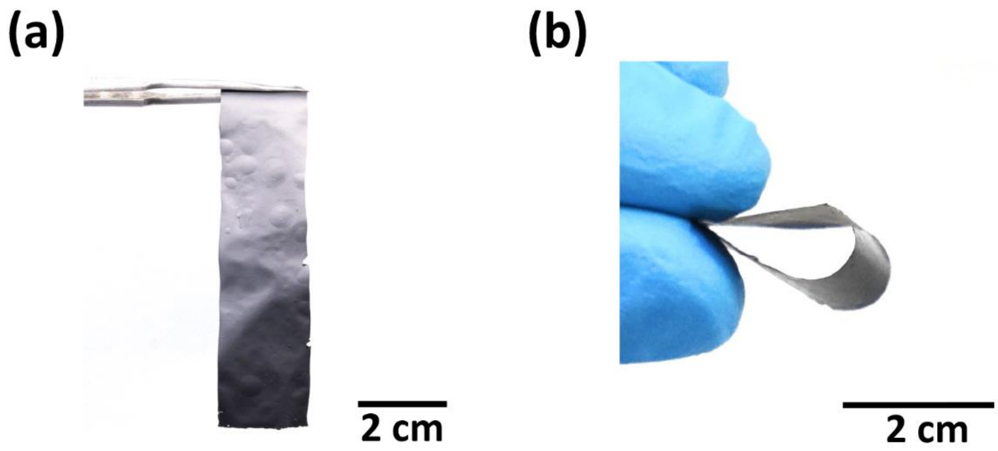

Figure S1. Photographic images of rGO/PAni/Fe_2O_3 freestanding films (a) as-synthesized, and (b) under mechanical deformation.

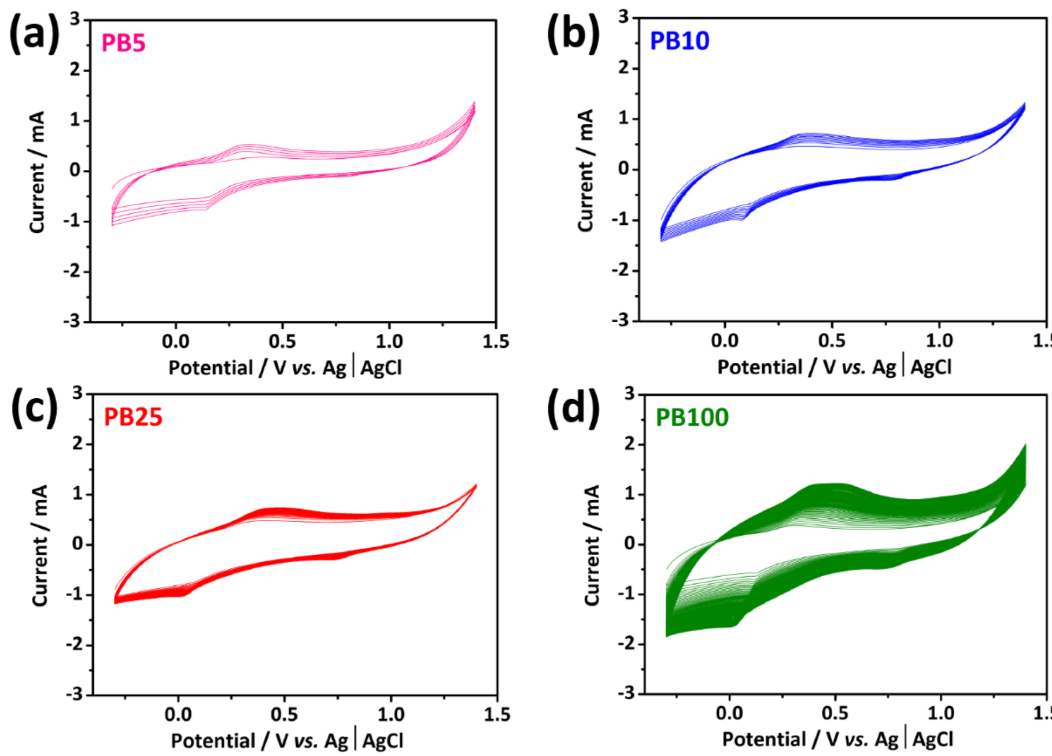

Figure S2. Electrochemical profile of PB growth over the graphene-based electrodes for samples PB5(a), PB10 (b), PB25 (c), and PB100 (d).

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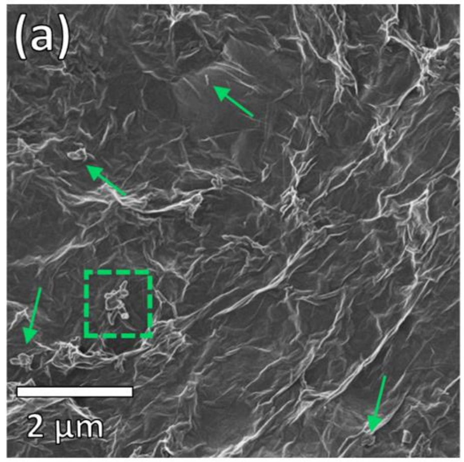

Figure S3. SEM image for rGO/PAni film.

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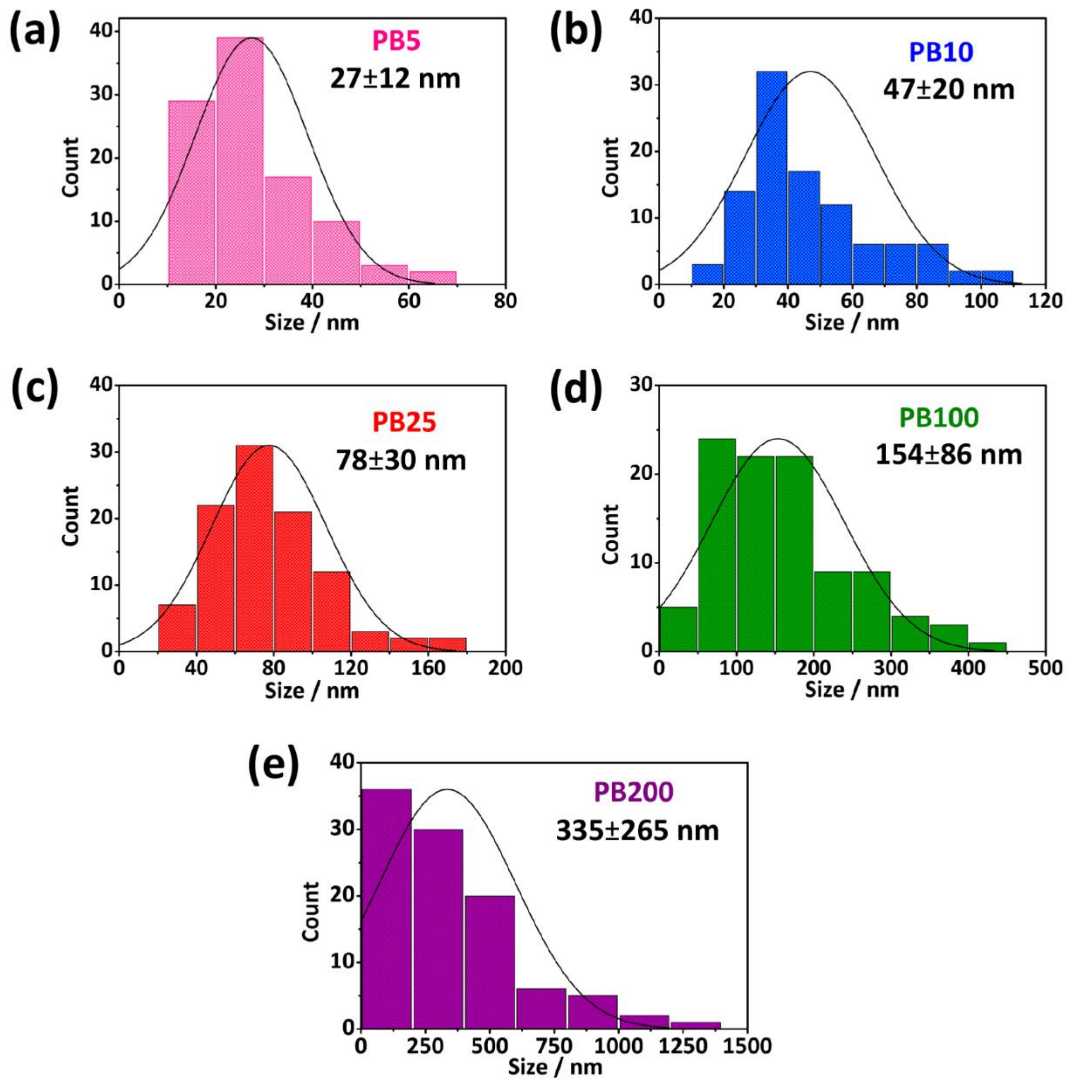

Figure S4. Size distribution of PB cubes in samples PB5 (a), PB10 (b), PB25 (c), PB100 (d), and PB200 (e).

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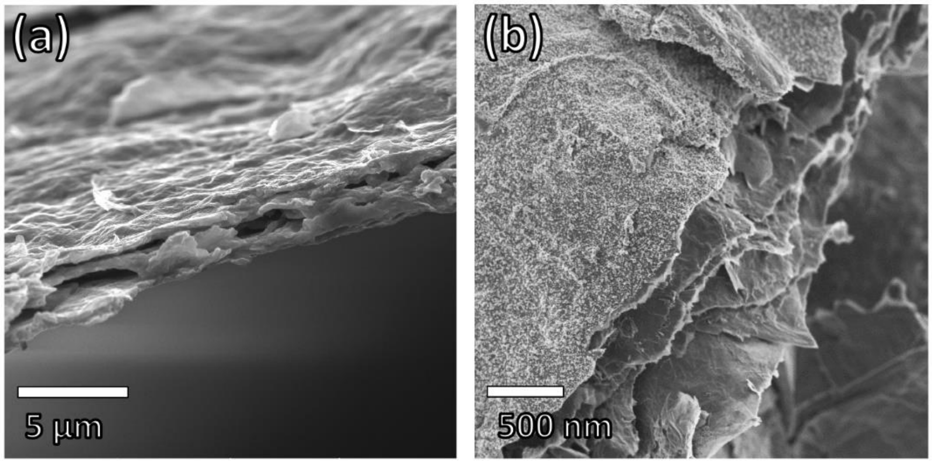

Figure S5. Cross-sectional images of the freestanding film before (a) and after (b) the electrodeposition of PB particles (PB100).

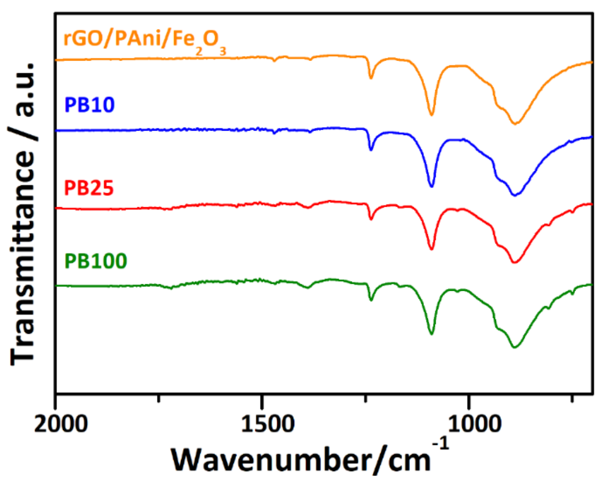

Figure S6. FTIR spectra of the bare electrode (rGO/PAni/Fe_2O_3) and samples PB10, PB25, and PB100.

The FTIR spectra of the bare sample (rGO/PAni/Fe_2O_3) and PB10, PB25, and PB100 electrodes are depicted in Figure S5. The three main bands observed in all samples at 1236, 1090, and 888 cm^{-1} correspond to $\nu_{C–N}$ in benzenoid rings of PAni; $\nu_{–NH^{+\bullet}}$ of PAni, indicating the presence of the polymer in emeraldine salt protonated form, and $\gamma_{C–H}$ of both 1,4 and 1,2,4 rings. All bands confirm the presence of PAni in its conductive form.[1-5]

Supporting information

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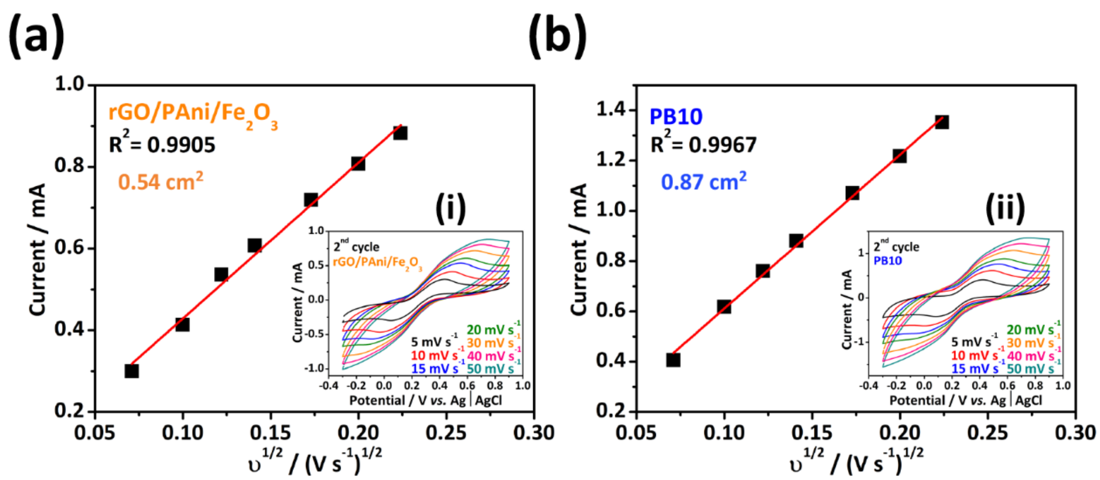

Figure S7 – Anodic peak current *vs.* square root of the scan rate of rGO/PAni/Fe_2O_3 (a) and PB10 (b) electrodes. Insets: Cyclic voltammograms at different scan rates of rGO/PAni/Fe_2O_3 (i) and PB10 (ii) electrodes.

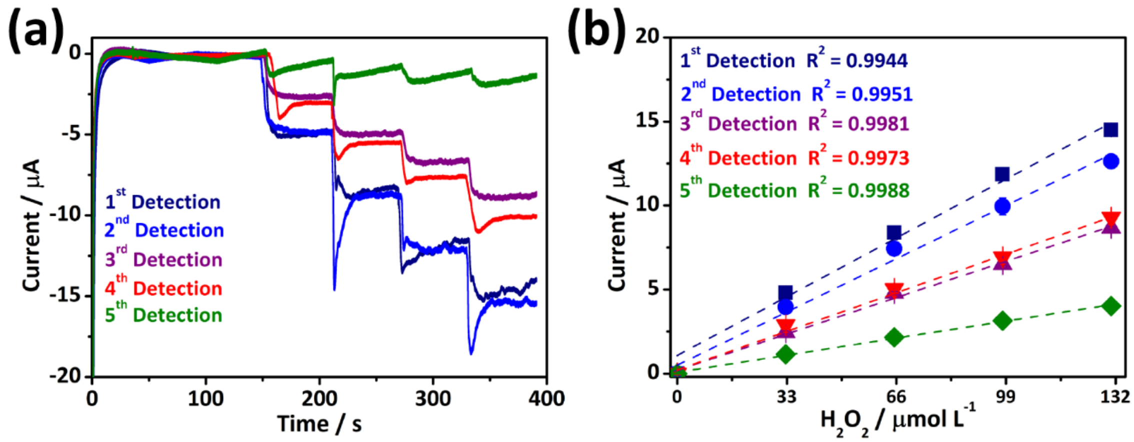

Figure S8. (a) Multiple chronoamperometric detections of H_2O_2 every 24 hours, and (b) the analytical curve calculated from (a).

Table S1. Electrochemical performance for H_2O_2 detection of the freestanding films synthesized in this work.

Sample	Limit of detection (µM)	Limits of quantification (µM)
rGO/PAni/Fe_2O_3	25.0	85.0
PB5	5.0	15.0
PB10	2.0	7.0
PB25	4.0	10.0
PB100	20.0	80.0