Electronic Supplementary Information

Microwave-Assisted Synthesis of Nitrogen and Boron Co-doped Graphene and Its Application for Enhanced Electrochemical Detection of Hydrogen Peroxide

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Graphene oxide (GO) was synthesized from natural graphite powder. Briefly, Graphite powder (1.0 g) was put into a mixture of concentrated H_2SO_4 (12 mL), $K_2S_2O_8$ (2.5 g) and P_2O_5 (2.5 g). The solution was heated to 80 °C and kept stirring for 4 h. The pre-oxided product could be obtained by filtering and washing with distilled water. Re-oxidation was carried out as follows: Pretreated graphite powder (1.0 g) was put into cold (0 °C) concentrated H_2SO_4 (36 mL) with successively stirring. Then, $KMnO_4$ (5.0 g) was added gradually under stirring and the temperature of the mixture was kept below 10 °C. The solution was reacted for 4 h at 35 °C, and then distilled water (360 mL) and 30% H_2O_2 solution (5.0 mL) was added, after which the color of the solution changed to bright yellow. The mixture was successively washed with 5% HCl solution and distilled water to remove the metal ions and residual acids.

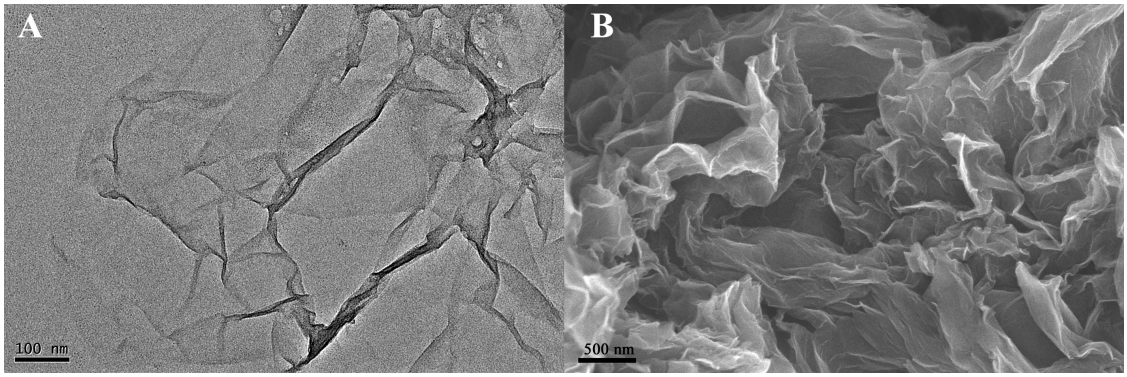

Figure S1. Additional TEM (A) and SEM (B) images of NB-G.

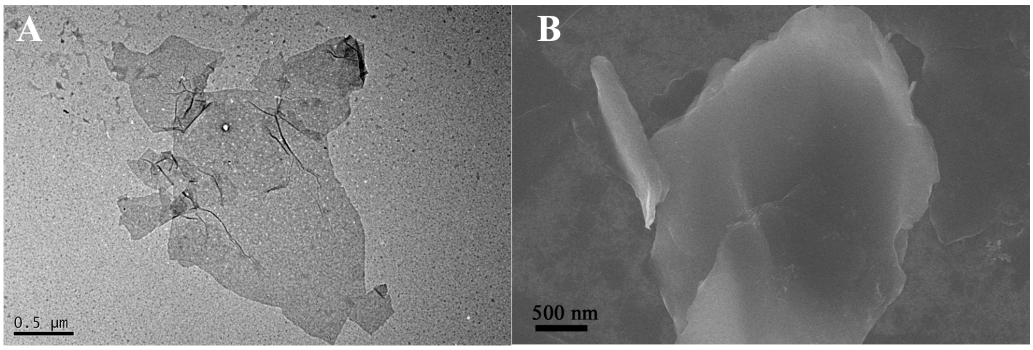

Figure S2. Typical TEM (A) and SEM (B) image of the sample prepared using conventional heating method followed by high-temperature annealing.

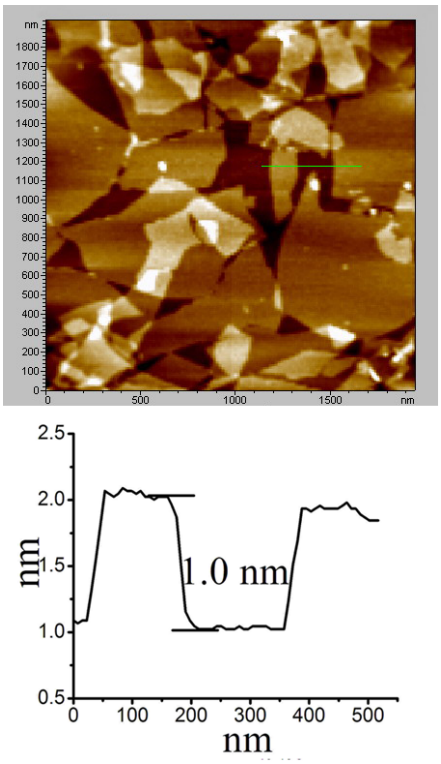

Figure S3. Typical AFM image of GO.

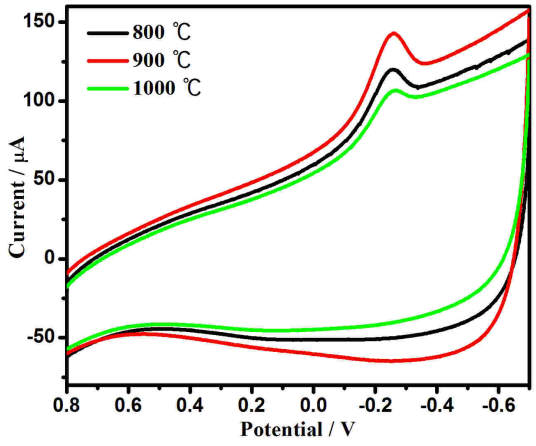

Figure S4. CV curves for the samples obtained under different annealing temperatures in N_2-saturated 0.1 M PBS (pH 7.4) in the presence of 2.5 mM H_2O_2.

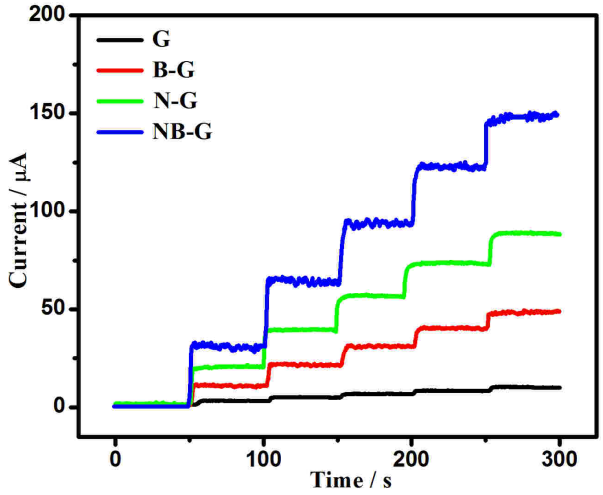

Figure S5. Typical current-time curves at the G, B-G, N-G and NB-G modified GCE in N_2-saturated PBS (0.1 M, pH 7.4) at -0.25 V with successive addition of 0.5 mM H_2O_2.

Table S1. Summary of the analytical performances of reported H_2O_2 detection systems.

nanocomposite[a]	detection limit (μM)	linear range (μM)	reference
NB-G	0.05	0.5-7500	this work
Au/POM/graphene	1.33	5.0-18000	S1
HRP/graphene/PANI	0.08	1-160	S2
HRP/graphene	0.1	1-2600	S3
Pt-MnO_2-graphene	1	2-13330	S4
HRP/MWNTs	10	16.7-740	S5
NCNTs	1.2	2-140	S6
Mb/titanate nanosheets	0.6	2-160	S7
HRP/3D porous silica	3	20-200	S8

[a] POM: Polyoxometalate; PANI: polyaniline; MWNTs: multiwall carbon nanotubes; NCNTs: nitrogen-doped carbon nanotubes;

Table S2. Effect of interfering species (100 μM) on the sensor response with 10 μM of H_2O_2 in N_2-saturated PBS (0.1 M, pH 7.4).

Interferent (I)	NO·	glucose	Ascorbic acid	NO_3^-	Ethanol
$\Delta I_{H2O2+I}/\Delta I_{H2O2}$	0.98	0.99	0.95	0.97	1.01

Reference

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