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# Construction of a Novel Electrochemical Biosensor Based on Mesoporous Silica/Oriented Graphene Oxide Planar Electrode for Detecting Hydrogen Peroxide

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## Section 1 numerical model:

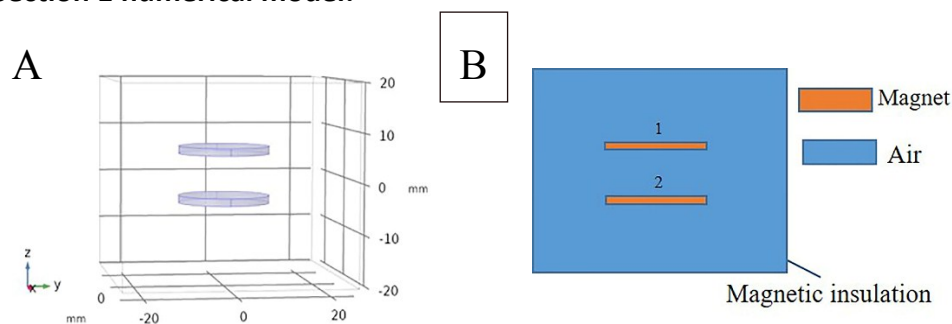
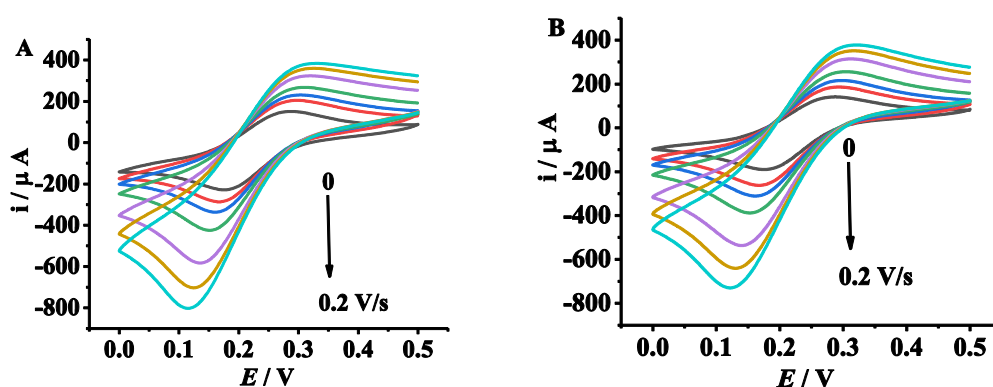


Figure S1 (A) Three-dimensional distribution map in the magnetic field model; (B) a schematic view of the section of the calculation domain (not to scale)

Figure S1A shows three-dimensional distribution map in the magnetic field model. Figure S1B indicates the y,z direction section at x coordinate 0 mm. Air zone width 50 mm, depth 50 mm, height 40 mm; magnet diameter 20 mm, high 1.5 mm. The magnet 1 center is located 5 mm, above the air domain center and the magnet 2 center is 5 mm below the air domain center. The model is AC/DC Module. The outer boundary of the air domain is magnetically insulated and the magnetic flux is conserved; the residual magnetic flux density of the magnet is 1.22 T.

## Section 2 Calculation of electrode activation area:



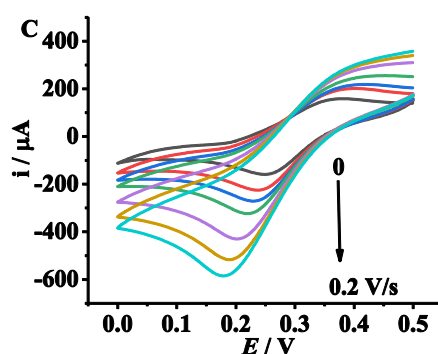


Figure S2 CV curves of (A)CMF/GO/HRP@MS electrode; (B)GO/HRP@MS electrode; and (C)HRP@MS electrode under potassium  $[\text{Fe}(\text{CN})_6]^{3-/4-}$  system with different scan rate(0.01, 0.02, 0.03, 0.05, 0.10, 0.15 and 0.20 V/s)

### Section 3 Electrode performance test:

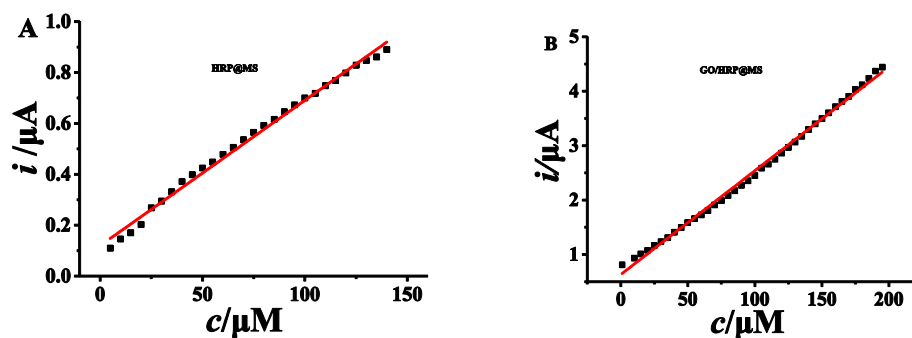


Figure S3 The reduction current curves of (A)HRP@MS electrode; (B) GO/HRP@MS electrode relative to  $\text{H}_2\text{O}_2$  concentration

### Section 4 Electrode detection repeatability and anti-interference ability:

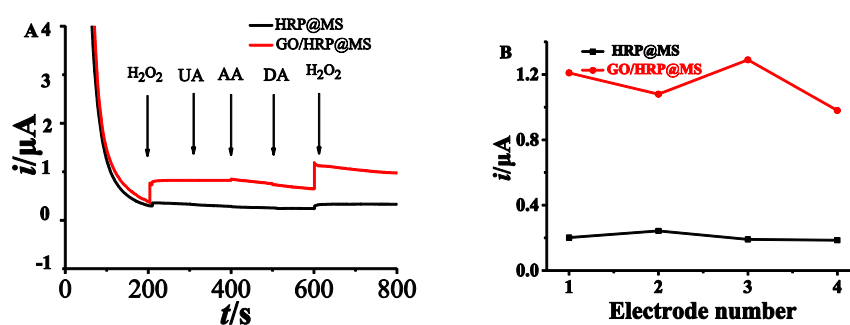


Figure S4 (A)The i-t curves of HRP@MS electrode (the black line) and GO/HRP@MS electrode (the red line) with continuous addition of 20  $\mu\text{M}$   $\text{H}_2\text{O}_2$ , UA, AA, DA; (B)the response of each electrode to the four in anaerobic PBS containing 20  $\mu\text{M}$   $\text{H}_2\text{O}_2$

### Section 5 Real sample detection:

Table S1. Determination of H<sub>2</sub>O<sub>2</sub> in real samples (HRP@MS)

Sample	Addition / $\mu\text{M}$	Detection amount / $\mu\text{M}$	RSD / %	Detection rate / %
Serum 1	5	3.88	8.55%	77.6%
Serum 2	20	16.34	2.93%	81.7%
Serum 3	100	82.04	6.30%	82.04%

Table S2. Determination of H<sub>2</sub>O<sub>2</sub> in real samples (GO/HRP@MS)

Sample	Addition / $\mu\text{M}$	Detection amount / $\mu\text{M}$	RSD / %	Detection rate / %
Serum 1	5	4.17	4.92%	80.03%
Serum 2	20	18.52	5.27%	92.60%
Serum 3	100	86.88	5.75%	86.88%