Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Graphene/carbon nanotube composite as an effective conducting scaffold to enhance photoelectrochemical water oxidation activity of hematite film

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Table S1. Spray coating conditions of the conducting scaffolds

G : CNT (mass ratio)	10 : 0	9 : 1	8 : 2	7 : 3	6 : 4	5 : 5	...
Volume of G aqueous dispersion (0.3 mg/mL)	1 mL	0.9 mL	0.8 mL	0.7 mL	0.6 mL	0.5 mL	...
Volume of CNT aqueous dispersion (0.3 mg/mL)	0 mL	0.1 mL	0.2 mL	0.3 mL	0.4 mL	0.5mL	...
Volume of 2-propanol	1 mL	1 mL	1 mL	1 mL	1 mL	1 mL	...
Total volume	2 mL	2 mL	2 mL	2 mL	2 mL	2 mL	...

G: Graphene.

The total volume of 2 mL was sprayed for 3 pieces of 1 cm^2 FTO-coated glass.

The unmodified Fe_2O_3 electrode was prepared using the same method without the prior deposition of any scaffold.

Table S2. Time constants for the final fitting result of the electrodes

Time constant (1/R/CPE)	Rs	For 1st R / CPE element	For 2nd R / CPE element	For 3rd R / CPE element
Bare Fe_2O_3	-	1440	68.8	3.25
Fe_2O_3 / Graphene	-	-	49.6	3.39
Fe_2O_3 / CNT	-	-	30.5	7.60
Fe_2O_3 / Composite	-	658	36.4	12.4

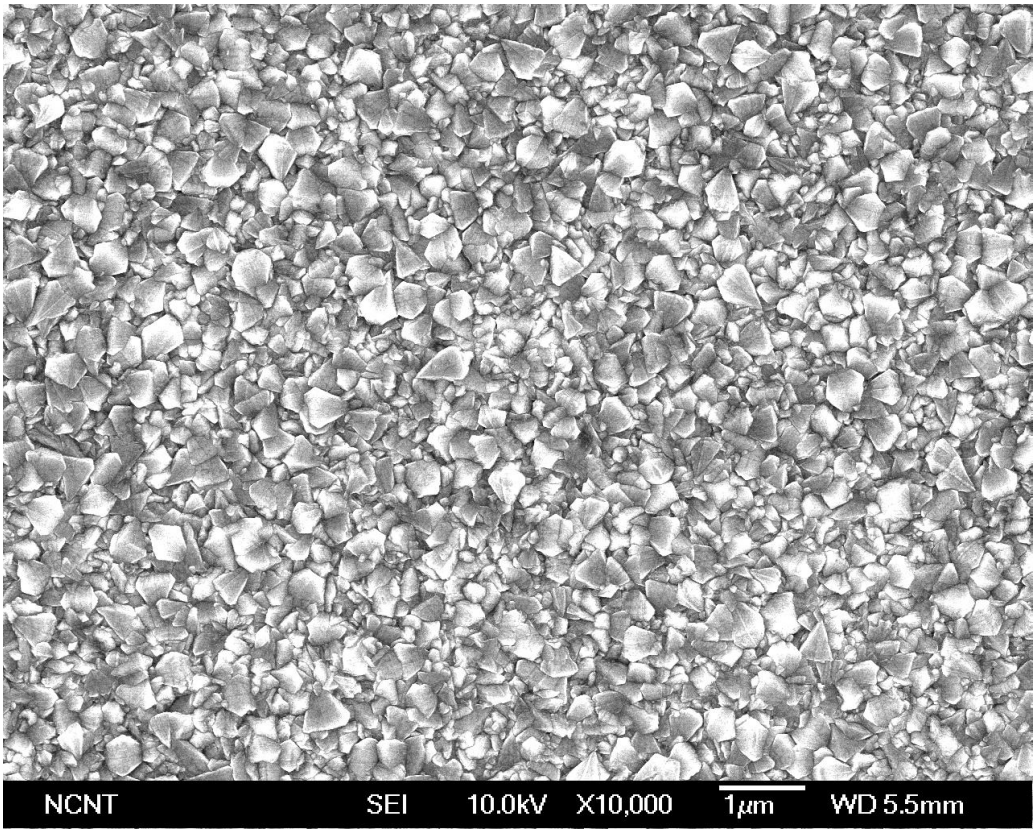

Figure S1. Surface SEM image of FTO glass.

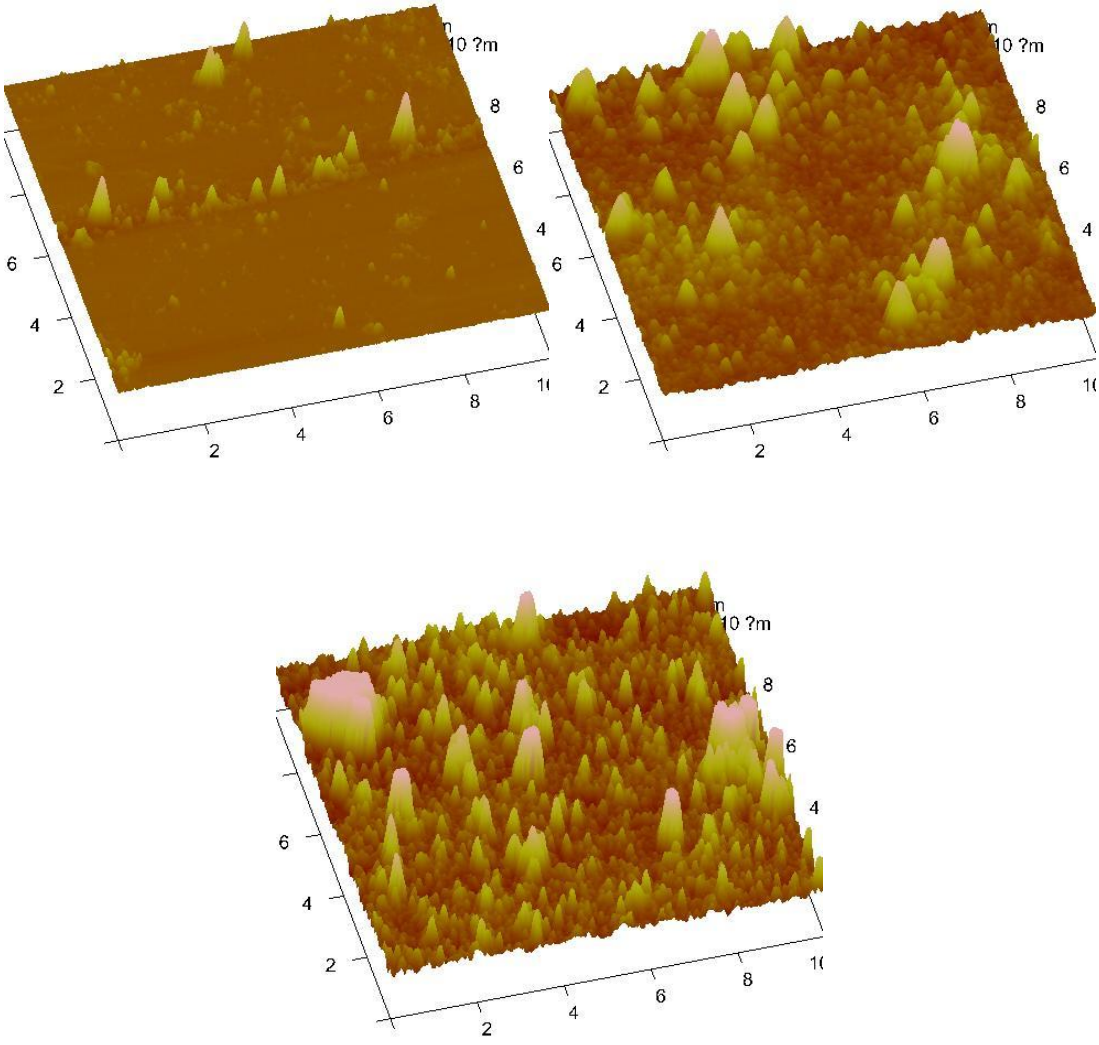

Figure S2. 3D surface AFM images of the pure graphene (left), CNT (right), and graphene and CNT composite scaffold (bottom) taken from the area of 10 × 10 μm^2.

From these 3D surface AFM images (10 × 10 μm^2) of scaffold on FTO, the root mean square roughness ($R_{q)}$ was calculated as follows: pure graphene scaffold, R_q = 4.6 nm; the pure CNT scaffold, R_q = 22.5 nm; graphene/CNT composite scaffold, R_q = 28.6 nm. The resolution was 256 × 256 for the 10 × 10 μm^2 images while 512 × 512 for the 2 × 2 μm^2 images (in the main manuscript of the present paper).

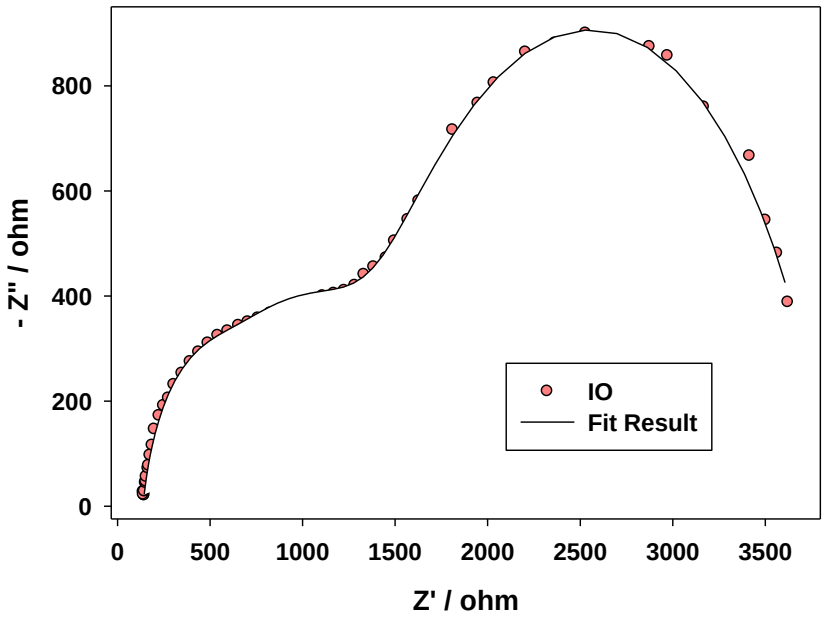

Figure S3A. Nyquist plot and best fitting result of the bare Fe_2O_3 electrode

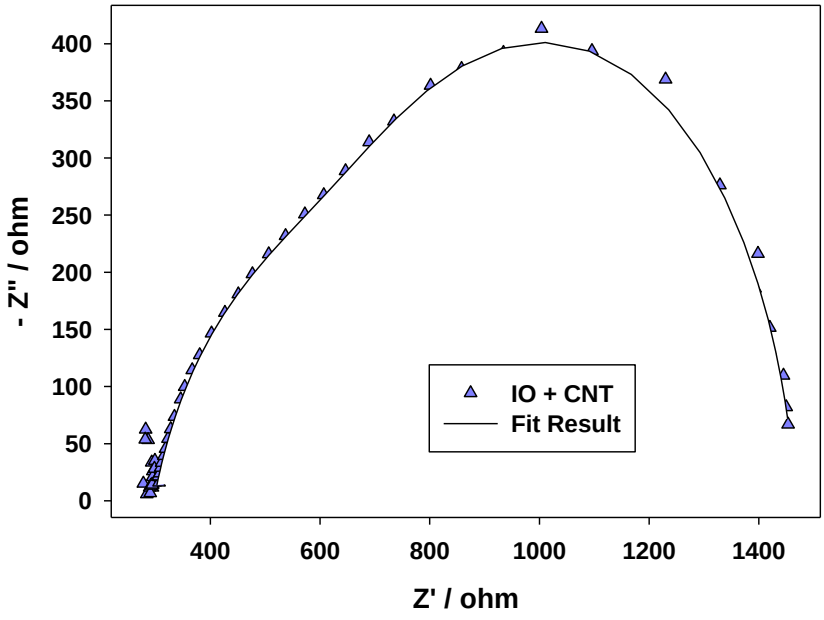

Figure S3B. Nyquist plot and best fitting result of the Fe_2O_3/graphene electrode

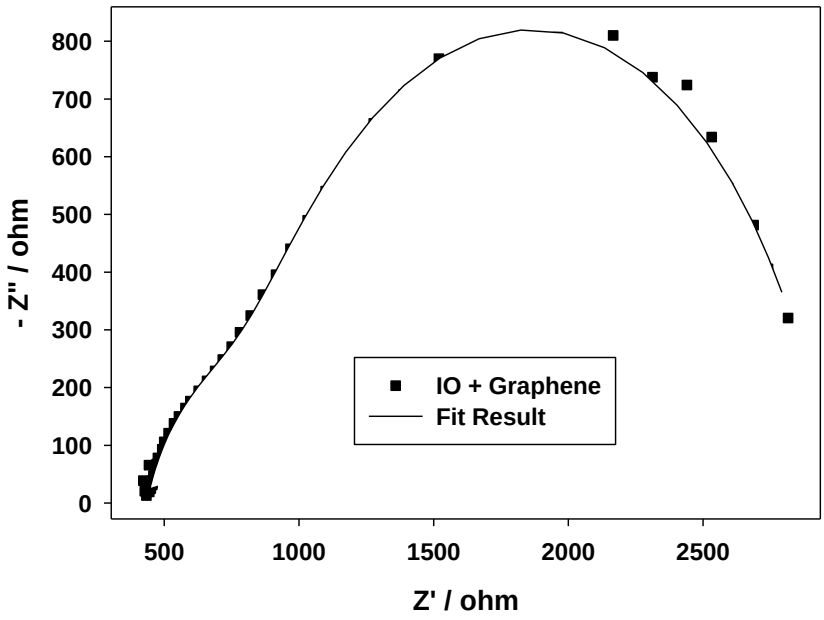

Figure S3C. Nyquist plot and best fitting result of the Fe_2O_3/CNTelectrode

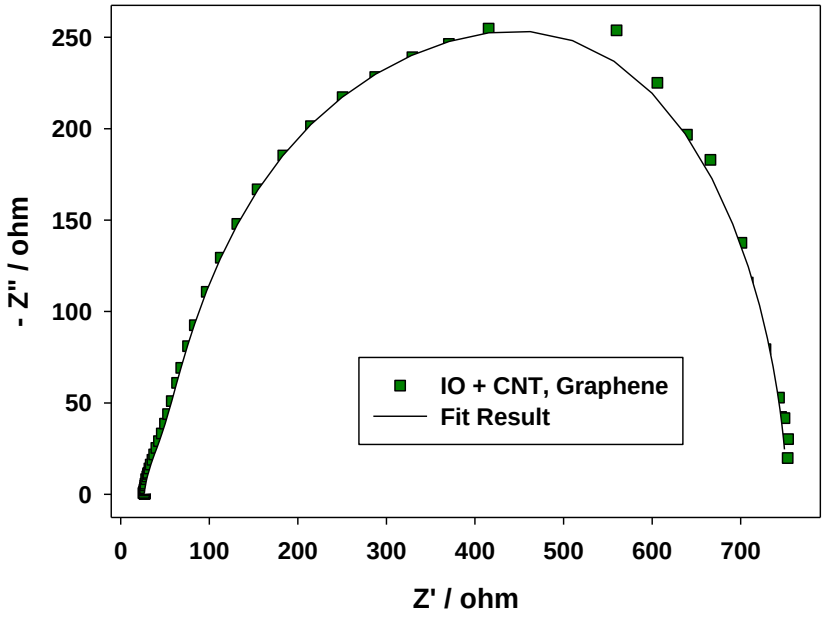

Figure S3D. Nyquist plot and best fitting result of the Fe_2O_3/composite electrode