

1 **Supporting Information**

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3 **Moderately oxidized graphene-carbon nanotubes hybrid for**
4 **high performance capacitive deionization**

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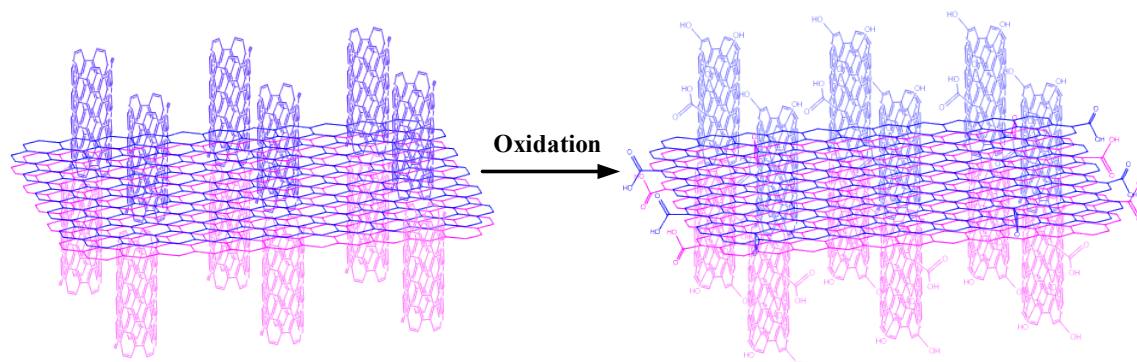
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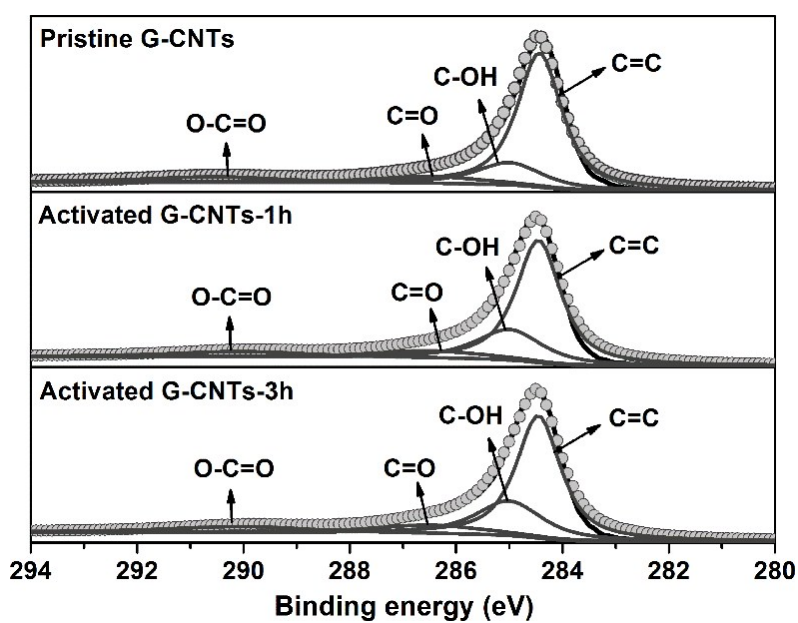


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Fig. S1 Schematic illustration of the moderate oxidation treatment for G-CNTs.

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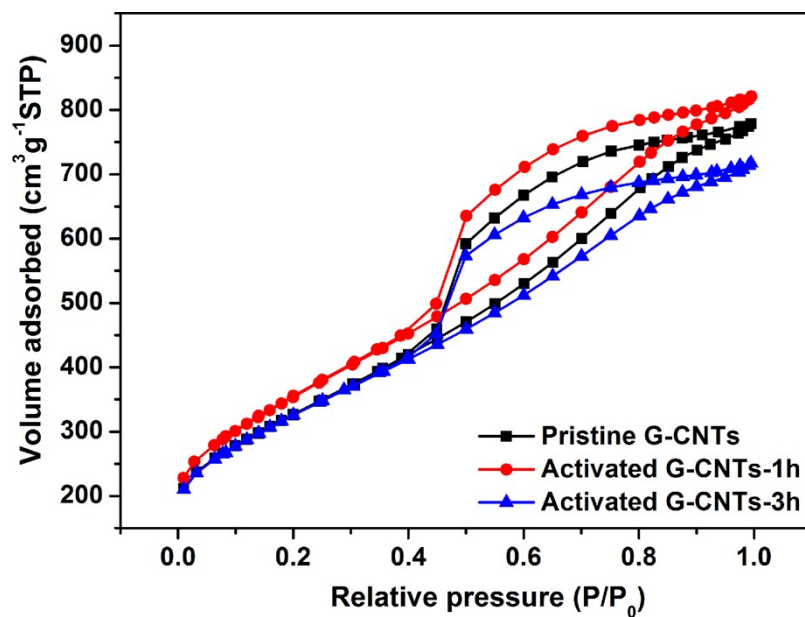
Fig. S2 High-resolution C1s XPS spectra of the pristine G-CNTs, the activated G-CNTs-1h and G-CNTs-3h.

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Table S1. The carbon and oxygen contents (at. %) in the pristine G-CNTs, activated G-CNTs-1h and G-CNTs-3h.

Sample	C (at. %)	O (at. %)
Pristine G-CNTs	98.2	1.8
Activated G-CNTs-1h	95.7	4.3
Activated G-CNTs-3h	95.3	4.7

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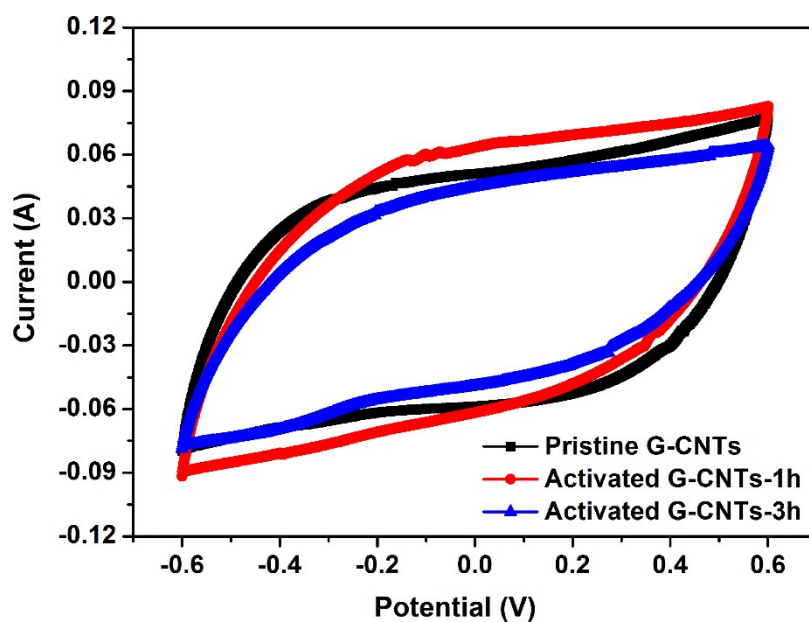
24 **Fig. S3** Nitrogen nitrogen adsorption–desorption isotherms of the pristine G-CNTs, the activated G-CNTs-1h and G-
 25 CNTs-3h.

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27 **Table S2.** BET surface area and pore volume of the pristine G-CNTs, the activated G-CNTs-1h and G-CNTs-3h.

Sample	BET surface area	Pore volume
	(m ² /g)	(cm ³ /g)
Pristine G-CNTs	1160	1.31
Activated G-CNTs-1h	1254	1.42
Activated G-CNTs-3h	1149	1.24

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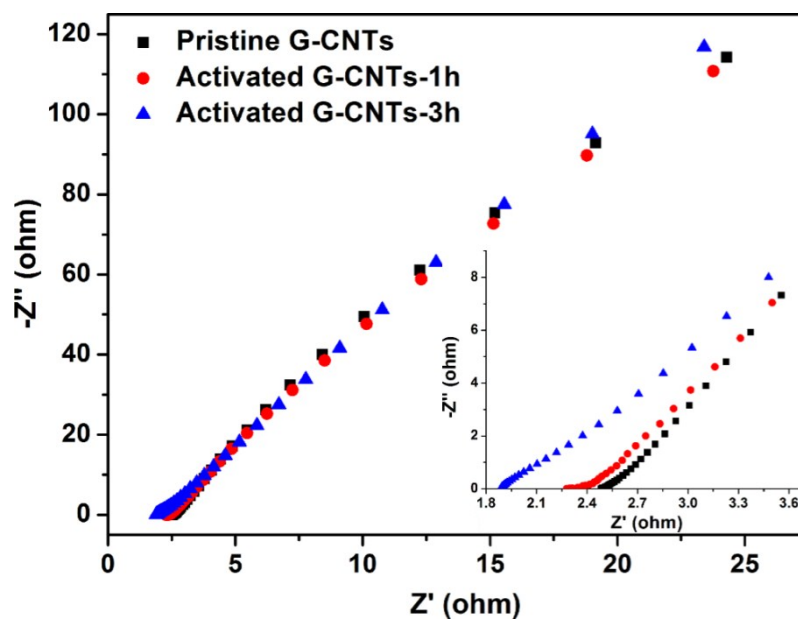
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 30 **Fig. S4** CV curves of the pristine G-CNTs, the activated G-CNTs-1h and G-CNTs-3h electrodes in 1M NaCl solution
 31 at a scan rate of 10 mV/s, respectively.

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33 **Table S3.** Specific capacitances (F/g) of the pristine G-CNTs, the activated G-CNTs-1h and G-CNTs-3h electrodes in
 34 1M NaCl solution at a scan rate of 10 mV/s, respectively.

Sample	Specific capacitances (F/g)
Pristine G-CNTs	43.7
Activated G-CNTs-1h	46.5
Activated G-CNTs-3h	38.1

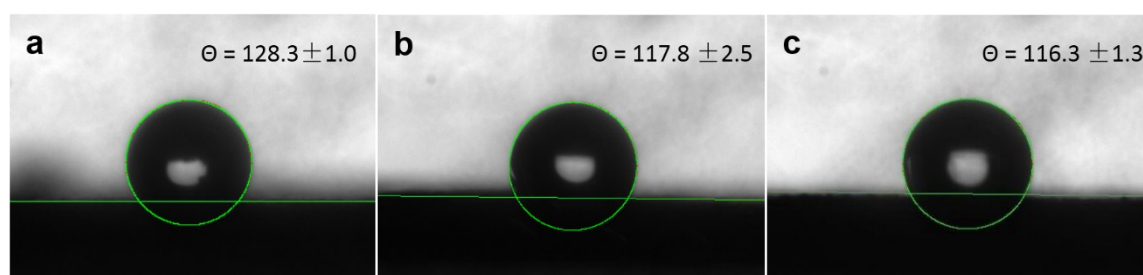
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37 **Fig. S5** Nyquist plots of the pristine G-CNTs, the activated G-CNTs-1h and G-CNTs-3h electrodes in 1 M NaCl
 38 aqueous solution. Inset shows the expanded high-frequency region of the plots.

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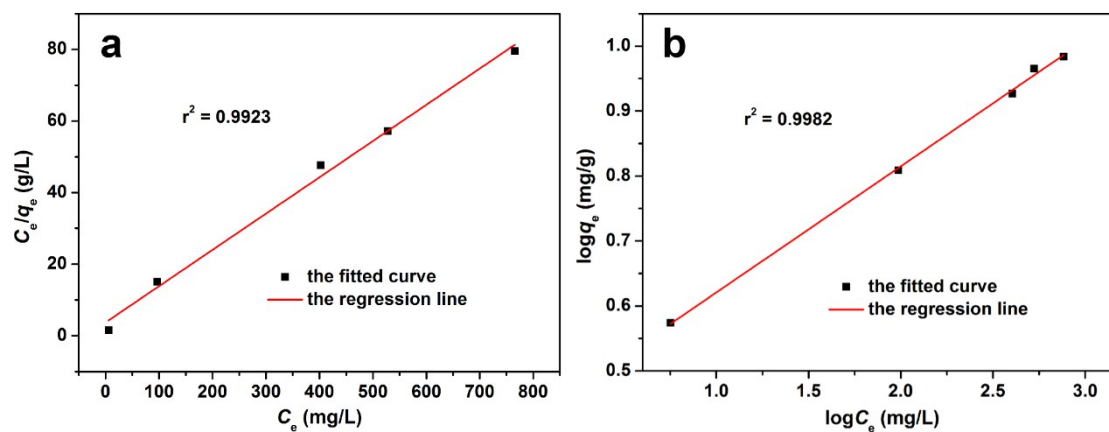
41 **Fig. S6** The changes in captive bubble contact angle of the pristine G-CNTs electrode (a), the activated G-CNTs-1h
 42 electrode (b), and the activated G-CNTs-3h electrode (c).

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44 **Table S4.** Comparison of the electrosorption capacity improvement ration of various pretreatments or modifications.

Electrode material	Pretreatment or modification	Improvement ration (times)
Graphene ³⁹	N-doping	1.40
Graphene ⁵⁰	KOH-activated treatment	1.34
Graphene ⁵¹	Ion-selective modification	1.45
Graphene ⁵²	Sulphonation modification	2.10
G-CNTs (this work)	Oxidation treatment	2.14

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47 **Fig. S7** Fitting regression line by (a) Langmuir and (b) Freundlich equation for the electrosorption of the activated G-
48 CNTs-1h electrode.

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50 **Table S5.** Parameters determined by fitting of Langmuir and Freundlich isotherms for the CDI performance of the
51 activated G-CNTs-1h electrode.

Isotherm	Parameters	Value
Langmuir	q_m	9.871
	K_L	0.0271
	r^2	0.9923
Freundlich	K_F	2.671
	n	5.153
	r^2	0.9982

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