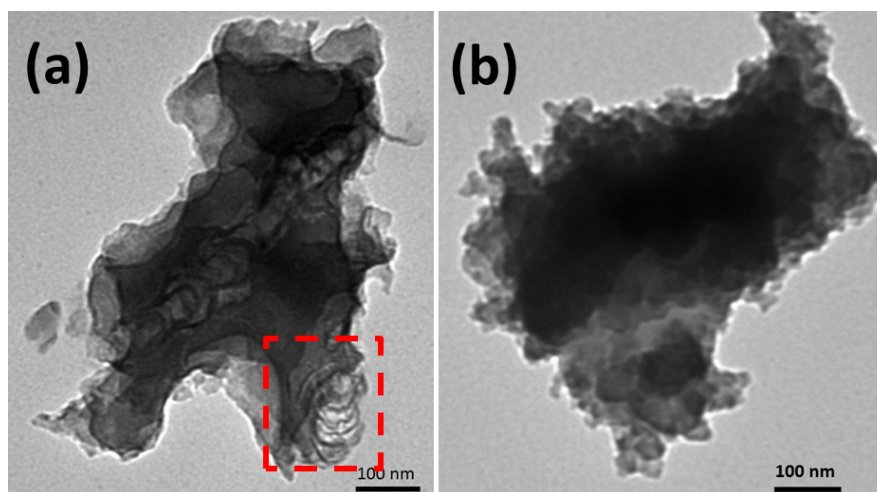


*Electronic Supplementary Information (ESI)*

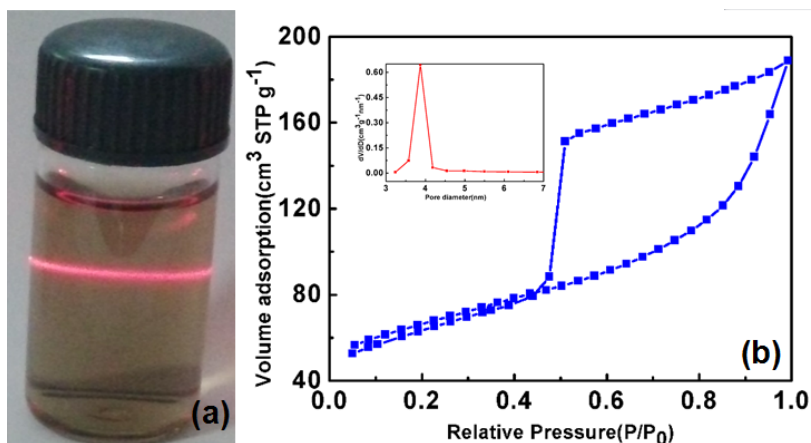
**Graphene-like carbon nanosheets prepared by a Fe-catalyzed glucose-blowing method for capacitive deionization**

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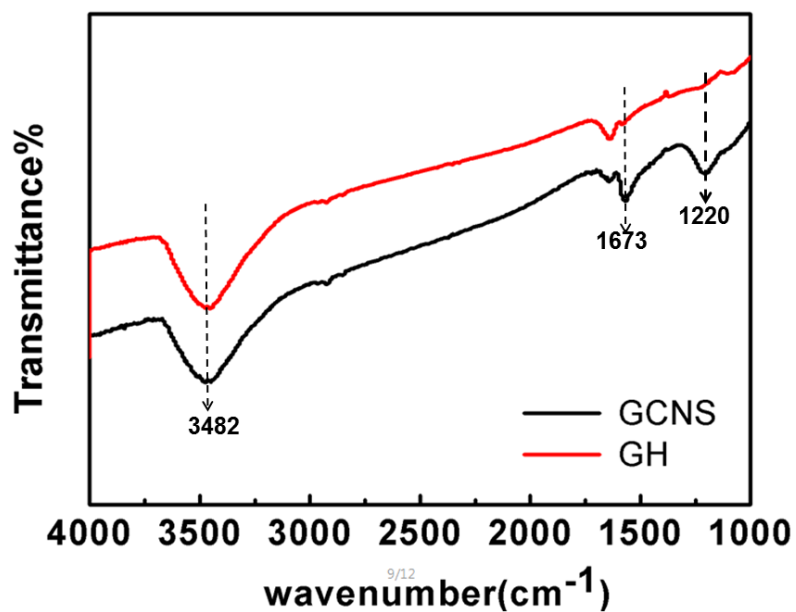


**Fig. S1.** TEM images of (a) C-1 and (b) C-2.



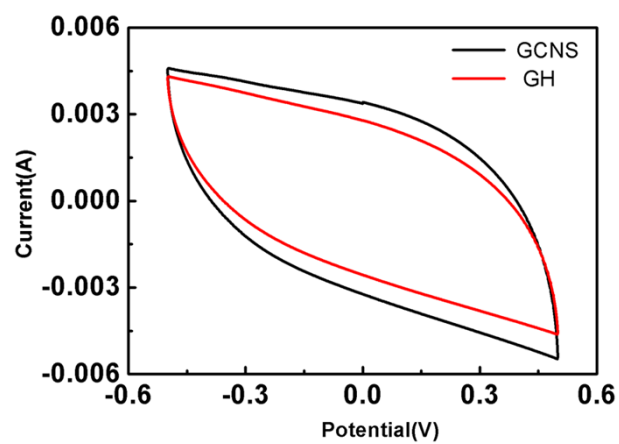
**Fig. S2.**(a) Tyndall effect of the GCNS solution, and (b) Nitrogen sorption isotherm and BJH pore size distribution for GCNS.

In Fig. S2a, the clear Tyndall light scattering was discerned for the GCNS aqueous solution, and it was stably dispersed and did not aggregate for several weeks or more, which reasonably indicates that the GCNS is quite ultrathin<sup>1</sup>. The surface area measurement of GCNS via nitrogen sorption is shown in Fig.S2b. The GCNS displays a typical IUPAC type-IV adsorption isotherm patterns with a hysteresis loop appearing at a wide relative pressure range ( $P/P_0=0.5-1.0$ ), which indicates there are mainly mesopores exist in the GCNS. The exist of mesoporous are not only induced by the folded and wrinkled domains of GCNS, but also by the elimination of the Fe species from the nanosheets. The specific surface area of GCNS is calculated to be 220.82 m<sup>2</sup>/g, and the inside picture shows the nanosheets have the pore size distribution lied in 3.5-4.3 nm range.



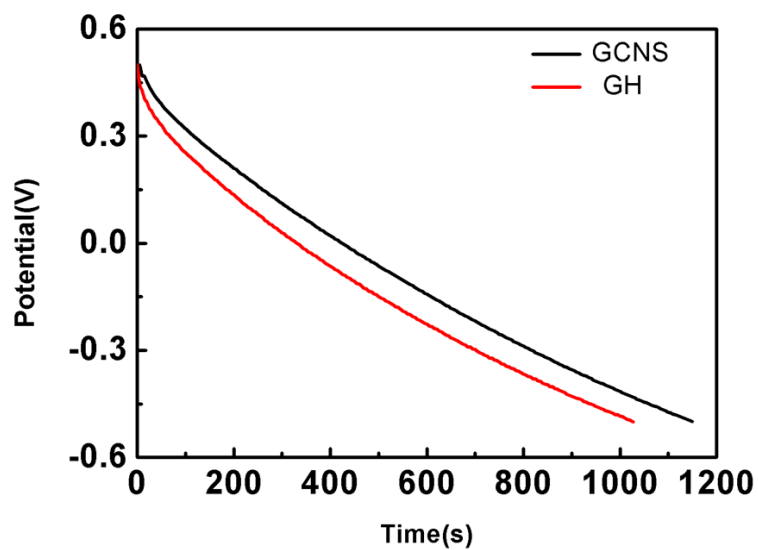
**Fig. S3.** The FT-IR spectra of GCNS and GH.

The GH was produced from hydrazine reduced graphene oxide. In the spectrum of GH (Fig.S3), a broad absorption band at  $3400\text{ cm}^{-1}$ , is owing to stretching vibration of  $-\text{OH}$ . The obvious peak appeared at  $1700\text{ cm}^{-1}$  is due to  $-\text{COOH}$ .



**Fig. S4.** CV curves of the GCNS, and GH electrodes at a scan rate of 5 mV/s.

For comparison, we investigated the electrochemical capacitive performance of this graphene-like GCNS with GH. Obviously, as shown in Fig. S4, the specific capacitance of the GH electrode is 43.94 F/g, and the value had increased by 24.44% compared to that of the GCNS one (54.68 F/g).



**Fig. S5.** Galvanostatic discharges of the GCNS, and GH electrodes at 100 mA/g.

We performed the galvanostatic discharge of the GH in the same condition with GCNS. As presented in Fig.S5, the discharge time of the GCNS electrode is evidently longer than that of the GH one, so a higher specific capacitance of the GCNS electrode is obtained.

**Table S1** The CDI capacity ( $Q_m$ ) of different electrode material

Sample	CDI operation conditions			$Q_m$	References
	Cell Voltage	Volume of NaCl solution	Initial concentration/conductivity of NaCl solution		
Hollow carbon nanofibers	1.2 V	-	89 $\mu$ S/cm	1.91 mg/g	Ref. 2
Carbon nanotube/reduced graphene oxide composites	1.6 V	-	50 mg/g	0.88 mg/g	Ref. 3
Graphene/carbon nanotube composites	2.0 V	35 ml	30 mg/g	1.41 mg/g	Ref. 4
Single-walled carbon nanotubes	2.0 V	-	390 $\mu$ mol/L	9.35 $\mu$ mol/g	Ref. 5
Reduced graphite oxidate-resol like material	2.0 V	200 ml	40 mg/g	2.14 mg/g	Ref. 6
Carbon nanofibers	1.3 V	-	73 $\mu$ S/cm	2.21 mg/g	Ref. 7
Ordered mesoporous carbon	1.2 V	100 ml	25 mg/g	11.6 $\mu$ mol/g	Ref. 8
Graphene	2.0 V	200 ml	65 mg/g	1.80 mg/g	Ref. 6
Graphene/mesoporous carbon composites	2.0 V	40 ml	30 mg/g	0.73 mg/g	Ref. 9
Graphene-coated carbon spheres	1.6 V	50 ml	30 mg/g	2.30 mg/g	Ref. 10
Graphene-like nanoflakes	2.0 V	-	55 $\mu$ S/cm	23.2 $\mu$ mol/g	Ref. 11
Graphene-like carbon nanosheets	1.6 V	35 ml	30 mg/g	2.26mg/g (38.6 $\mu$ mol/g)	This work

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