Electronic Supplementary Information (ESI):

Grafting Sulfonic and Amine Functional Groups on 3D Graphene for Improved Capacitive Deionization

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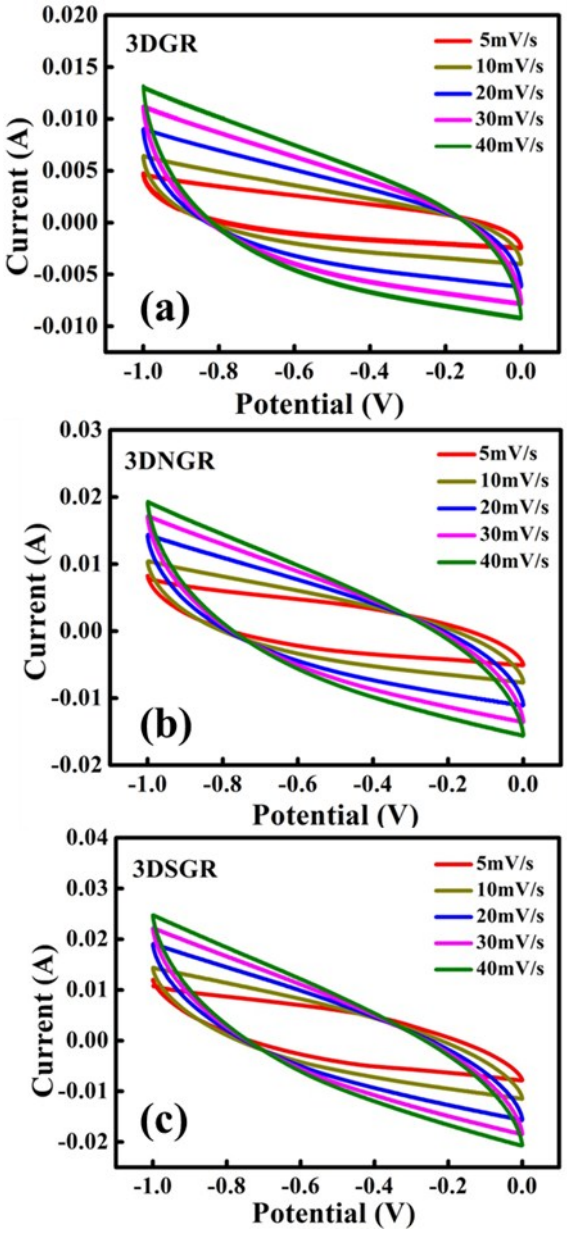

Fig. S1 CV curves of 3DGR, 3DNGR and 3DSGR at different scan rates.

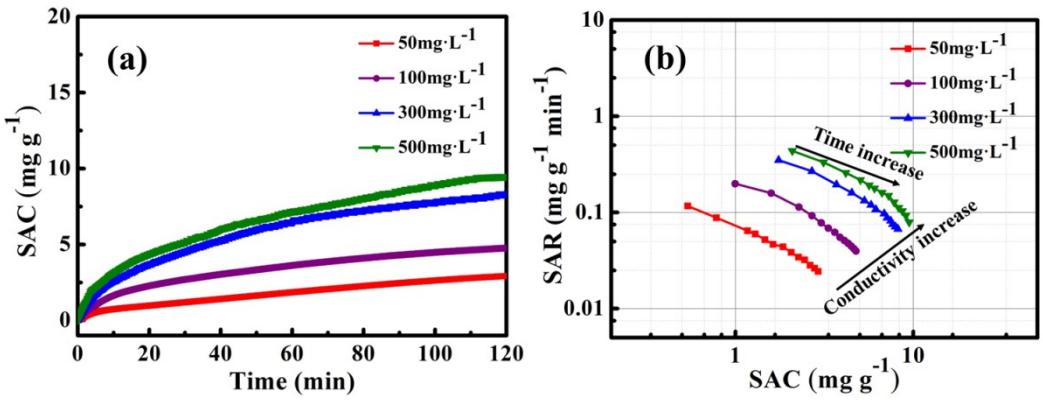

Fig. S2 (a) SAC and CDI Ragone plots for the capacitor 3DGR-3DGR in a NaCl solution with different initial concentrations at a flow rate of 40 mL min^{-1} at 1.4 V

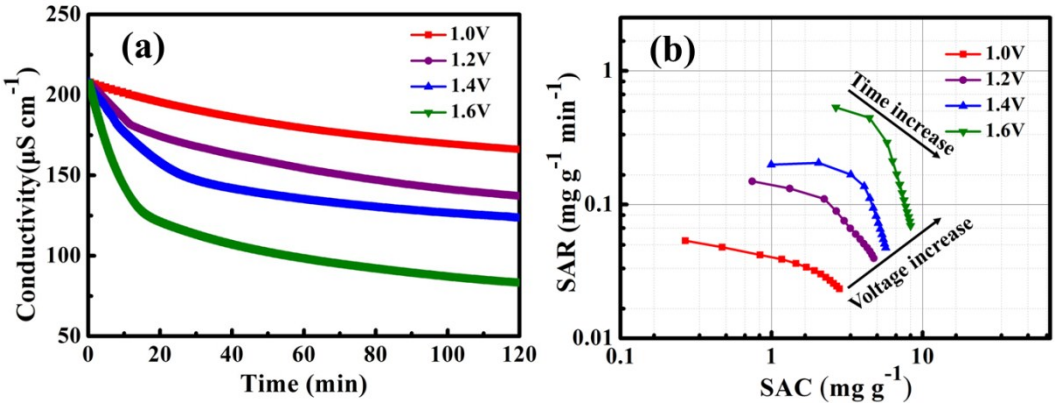

Fig. S3 (a) Plots of NaCl solution conductivity *vs.* time and (b) the CDI Ragone plots for the capacitor 3DGR-3DGR with different voltage at a flow rate of 40 mL min^{-1} in a 100 mg L^{-1} NaCl solution.

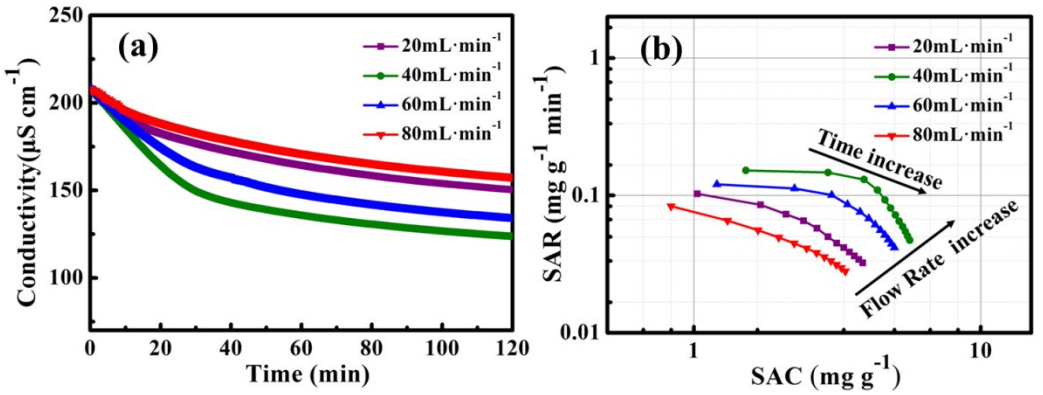

Fig. S4 (a) Plots of NaCl solution conductivity *vs.* time and (b) the CDI Ragone plots for the capacitor 3DGR-3DGR with different flow rate in a 100 mg L^{-1} NaCl solution at 1.4 V.

Table S1 Comparison of the salt adsorption capacity among various carbon electrode materials from the literatures

Electrode material	**Applied voltage (V)**	**Initial NaCl concentration (mg L^{-1})**	**Salt adsorption capacity (mg g^{-1})**	**Ref.**
Graphene	1.2	50	1.85	[1]
Graphene/mesoporous carbon	2	40	0.73	[2]
Graphene nanosheets	2.0	250	8.6	[3]
GAC[a]	1.2	500	2.92	[4]
Carbon nanofibers	1.2	500	2.21	[5]
Hollow carbon Nanofibers	1.2	40	1.91	[6]
RGO-RF[b]	2.0	65	3.229	[7]
CNTs-RGO[c]	1.2	500	1.4	[8]
Graphene/carbon Nanotube	2	30	1.41	[9]
3DMGA[d]	1.6	50	3.9	[10]
3DNGR-3DSGR	1.2	100	6.4	This work
3DNGR-3DSGR	1.4	100	9.72	This work
3DNGR-3DSGR	1.4	500	13.72	This work

a: reduced graphene oxide (RGO) and activated carbon (AC) composites; b: reduced graphite oxidate-resol like material; c: carbon nanotubes (CNTs) and reduced graphene oxide (RGO); d: three-dimensional macroporous graphene architectures.

Table S2 Comparison of the charge efficiency among various carbon electrode materials from the literatures

Electrode material	Applied voltage (V)	Initial NaCl concentration (mg L^{-1})	Charge efficiency	Ref.
Activated carbon	1.2	500	0.19	4
GAC[a]	1.2	500	0.24	
CNTs	1.6	500	0.32	8
CNTs–RGO[b]	1.6	500	0.40	
CFC[c]	1.4	250	0.41	11
CFC–SRGO[d]	1.4	250	0.46	
Carbon nanorods	1.2	500	0.56	12
Carbon nanofibers	1.2	500	0.72	13
3DNGR-3DSGR	1.4	500	0.85	This work

a: reduced graphene oxide (RGO) and activated carbon (AC) composites; b: carbon nanotubes (CNTs) and reduced graphene oxide (RGO); c: carbon fibre cloth (CFC); d: carbon fibre cloth (CFC) and sulphonated reduced graphene oxide (SRGO) composites.

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