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Supporting Information for

Sorghum core-derived carbon sheets as electrodes for lithium-ion capacitor

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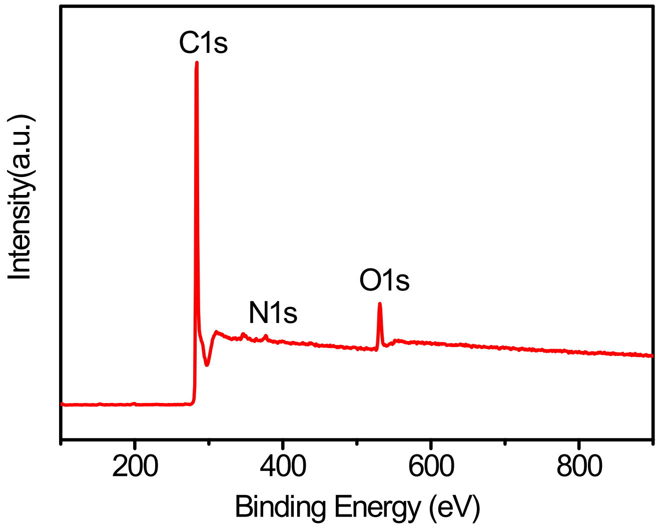

Fig. S1 XPS spectra of SCDCS.

Table S1 Physical parameters of SCDCS.

Sample	S_{BET} (m^2g^{-1})[a]	V_t (cm^3g^{-1})[b]	pore vol (%)[c]			d_{002} (nm)	L_a (nm)	L_c (nm)	I_G/I_D	XPS composition (at%)		
			$V_{<1\ nm}$	$V_{1\text{-}2\ nm}$	$V_{>2\ nm}$					C	N	O
SCDCS	1122	0.65	31.62	28.13	40.25	0.35	0.73	0.61	0.56	93.82	0.29	5.89

[a] Specific surface area was calculated by Brunauer-Emmett-Teller (BET) method.

[b] The total pore volume was determined by density functional theory (DFT) method.

[c] The volume proportions of pores smaller than 1 nm ($V_{<1nm}$), pores between 1 and 2 nm ($V_{1\text{-}2nm}$), and pores larger than 2 nm ($V_{>2nm}$) were also obtained by DFT analysis.

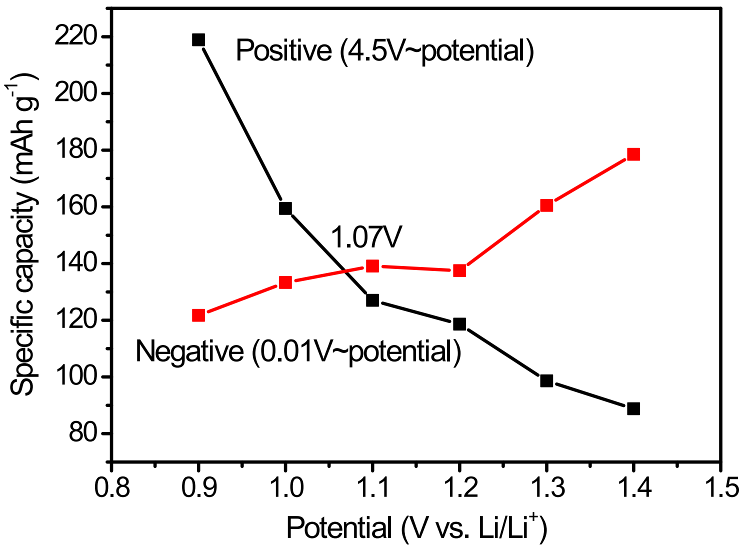

Fig. S2 The specific capacity in different voltage ranges. Positive: the discharge potential range from 4.5 V vs. Li/Li^+ to 1.4 V vs. Li/Li^+~0.9 V vs. Li/Li^+. Negative: the charge potential range from 0.01V vs. Li/Li^+ to 0.9 V vs. Li/Li^+~1.4 vs. Li/Li^+. At the desired voltage, which is 1.07 V vs. Li/Li^+, both of positive and negative electrodes have equal capacity.

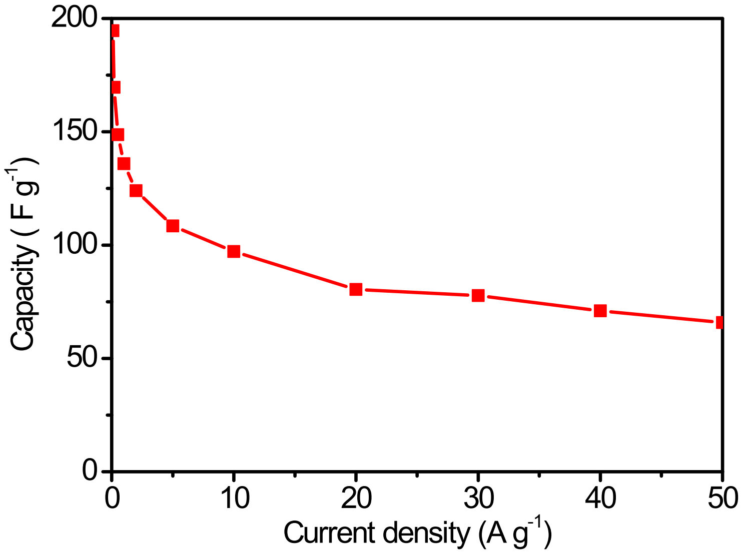

Fig. S3 Specific capacitance at current density ranging from 0.1 to 50 A g^{-1}.

Table S2 Some recent reports on the performance of lithium ion capacitors.

Sample	Energy density	Power density	Cycling stability	Voltage	Ref.
SCDCS//SCDCS	124.8 W h kg^{-1} at 107.4W kg^{-1}	10507.9 W kg^{-1} at 59.5 W h kg^{-1}	66%, 5000 cycles (10 A g^{-1})	0-4.3V	This work
SFAC//SFAC	83 W h kg^{-1} at 128W kg^{-1}	5718 W kg^{-1} at 41 W h kg^{-1}	88%, 5000 cycles (1 A g^{-1})	2-4V	1
MFC//3DaC	157 W h kg^{-1} at 200 W kg^{-1}	20000 W kg^{-1} at 58 W h kg^{-1}	86.5%,6000 cycles (2 A g^{-1})	0.01-4V	2
PHPNC//TiC	101.5 W h kg^{-1} at 450 W kg^{-1}	67500 W kg^{-1} at 23.4 W h kg^{-1}	≈82%,5000 cycles (2 A g^{-1})	0-4.5	3
CPIM//AC	28.5 W h kg^{-1} at 348 W kg^{-1}	6940 W kg^{-1} at 13.1 W h kg^{-1}	97.1%,5000cycles (0.5 A g^{-1})	2-4V	4
HC//AC (LIC-IH)	100.5 W h kg^{-1} at 6200 W kg^{-1}	7800 W kg^{-1} at 80.9 W h kg^{-1}	96.0%,5000cycles (2 C)	2-4V	5
TiO_2-rGO//AC	42 W h kg^{-1} at 800 W kg^{-1}	8000 W kg^{-1} at 8.9 W h kg^{-1}	80%, 100 cycles (0.4 A g^{-1})	1-3V	6
TiO_2-B //AC	23 W h kg^{-1}	2800 W kg^{-1}	73%,1200cycles (1.5 A g^{-1})	0-2.8V	7
Graphene-VN //carbon nanorods	162 W h kg^{-1} at 200 W kg^{-1}	10000 W kg^{-1} at 64 W h kg^{-1}	≈83%, 1000 cycles (2 A g^{-1})	0-4V	8
B-Si/SiO_2/C//AC	128 W h kg^{-1} at 1229 W kg^{-1}	9704 W kg^{-1} at 89 W h kg^{-1}	70%, 6000 cycles (1.6 A g^{-1})	2-4.5V	9
$H_2Ti_{12-x}Nb_xO_{25}$//AC	24.3 W h kg^{-1} at 1794.6 W kg^{-1}	5821.3 W kg^{-1} at 11.3 W h kg^{-1}	84%, 1000 cycles (3.0 A g^{-1})	0-2.8V	10
3D-MnO//CNS	184 W h kg^{-1} at 83 W kg^{-1}	15000 W kg^{-1} at 90 W h kg^{-1}	76%, 5000 cycles (5 A g^{-1})	1-4V	11

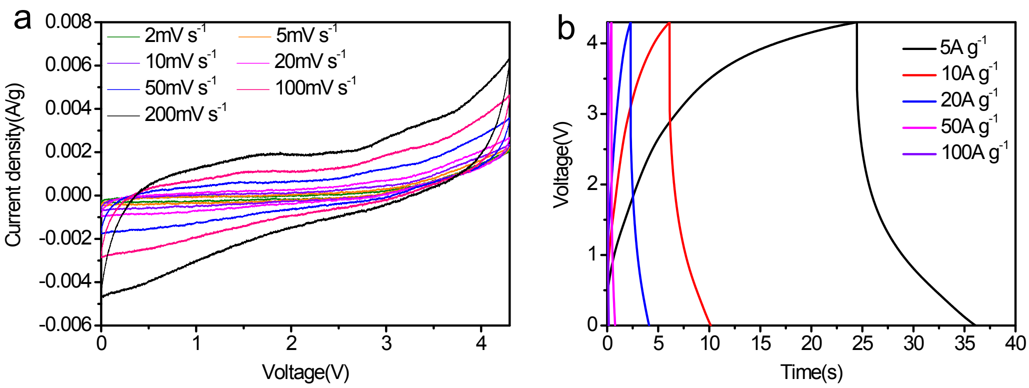

Fig. S4 (a) CV curves of SCDCS//SCDCS lithium ion capacitor without tuning the potentials at different scan rates. (b) Galvanostatic charge/discharge profiles of SCDCS//SCDCS lithium ion capacitor without tuning the potentials at different current densities.

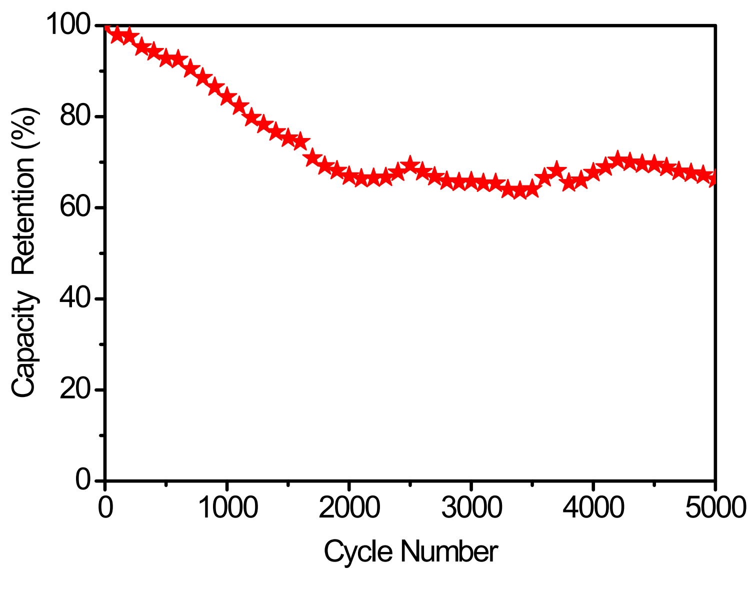

Fig. S5 Cycling stability of SCDCS//SCDCS lithium ion capacitor measured at 10 A g^{-1}.

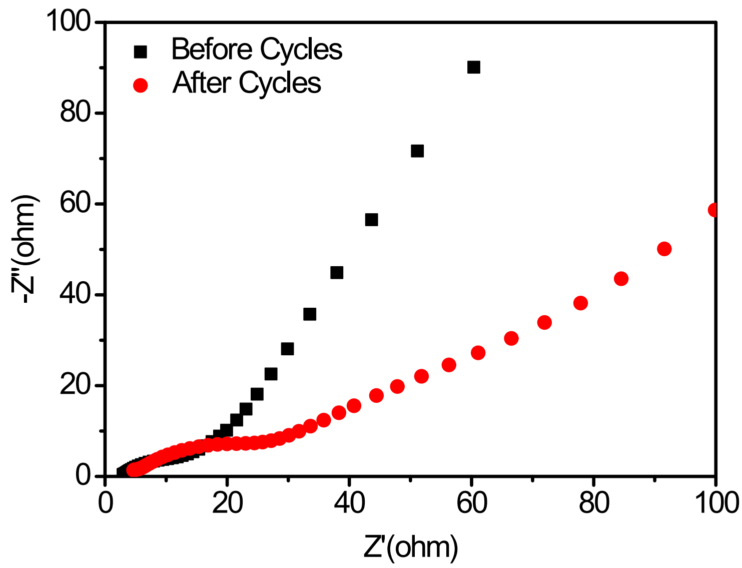

Fig. S6 Nyquist plots of SCDCS//SCDCS lithium ion capacitors before and after 5000 cycles.

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