Hierarchical Porous Carbon Material from Network Loofah Sponge for High Performance Supercapacitors

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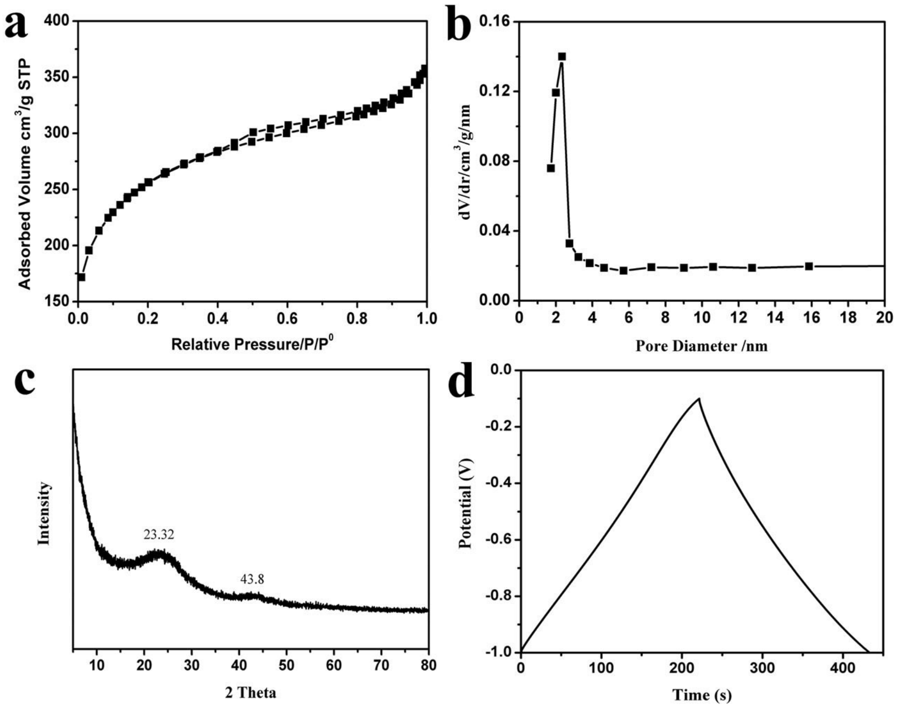

Figure S1. The LS sample activated by $ZnCl_2$ (a) N_2 sorption isotherms and porosity characteristics of LS activated by $ZnCl_2$, (b) pore size distribution of LS activated by $ZnCl_2$, (c) XRD pattern of the LS activated by $ZnCl_2$, and (d) charge-discharge curves of LS activated by $ZnCl_2$ at the current density of 1 A g^{-1} in the 6 M KOH electrolyte.

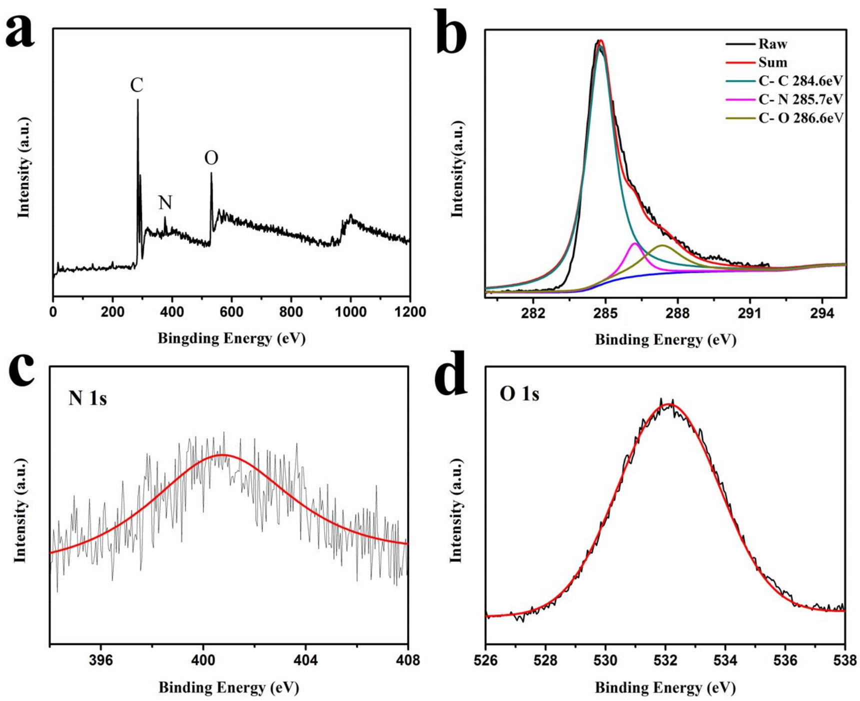

Figure S2. The total XPS spectra of LS (a), and C 1s (b), N 1s (c), O 1s (d) spectra of LS.

Table S1. Chemical composition of LS materials determined by X-ray photoelectron spectroscopy.

XPS (atom%)	LS	LS-600	LS-700	LS-800	LS-900	LS-1000
C	72.95	74.62	76.23	79.38	81.47	83.67
N	2.56	2.06	1.88	1.64	1.39	1.09
O	24.49	23.32	21.89	18.98	17.14	15.24

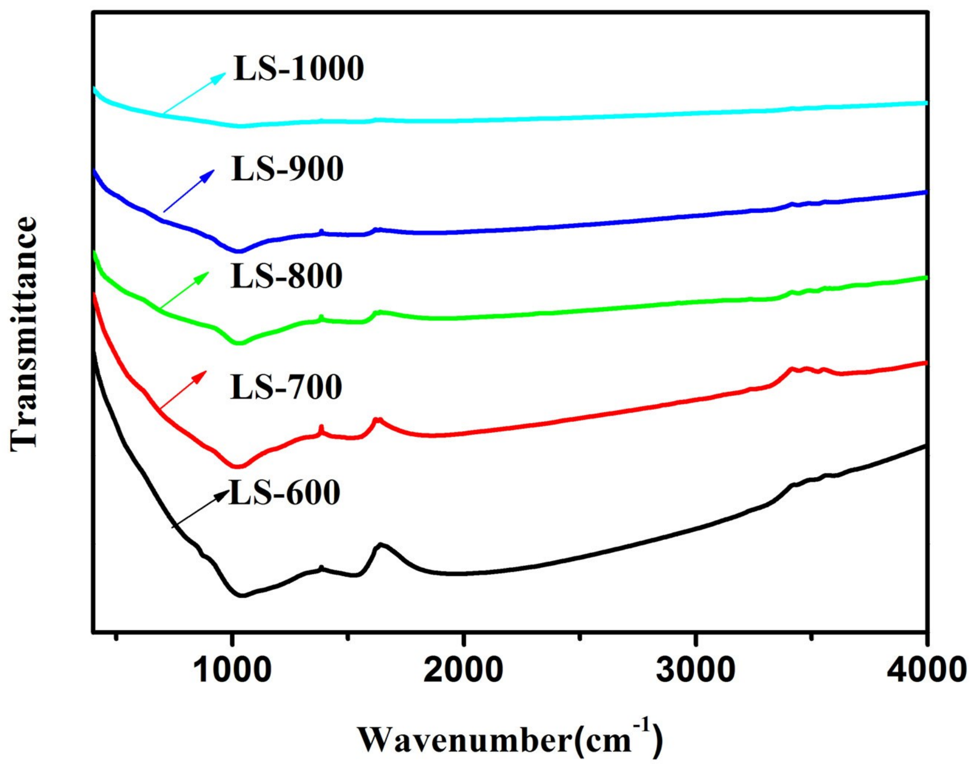

Figure S3. IR of the LS-600 to LS-1000.

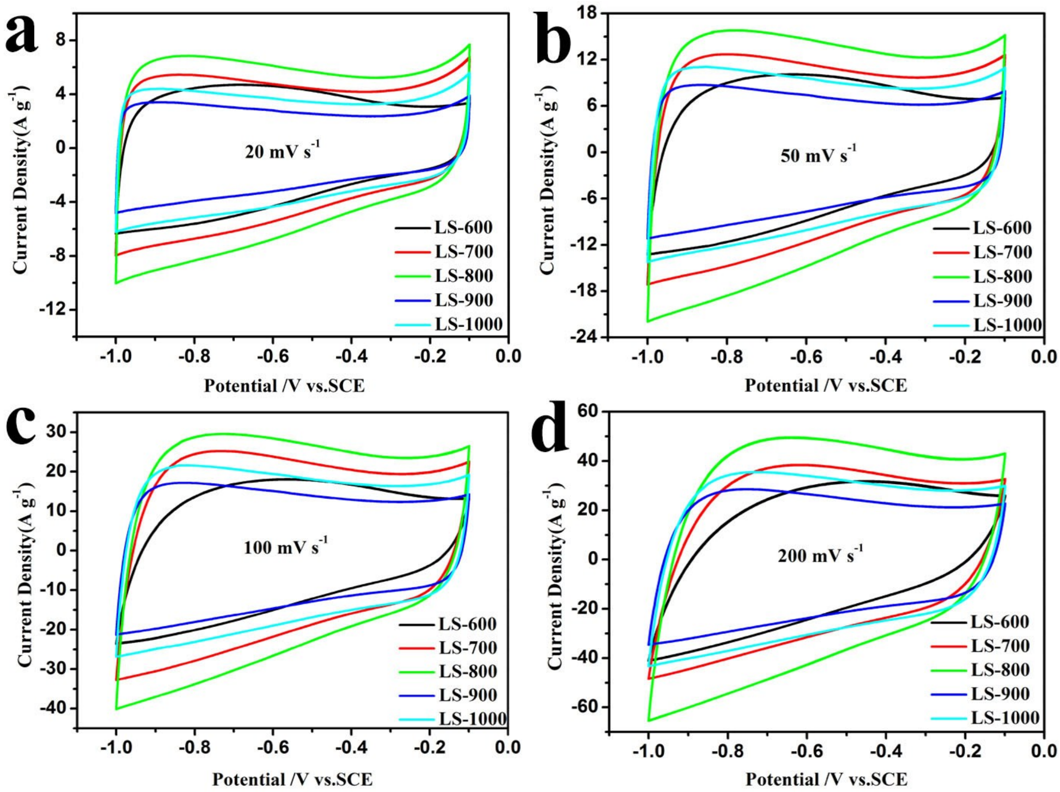

Figure S4. Cyclic voltammograms (CV) measurements of LS-600 to LS-1000 in 6 M KOH aqueous solution under a potential range from -1.0 to -0.1V at a scan rate of (a) 20 mV s^{-1}, (b) 50 mV s^{-1}, (c) 100 mV s^{-1} (d) 200 mV s^{-1}.

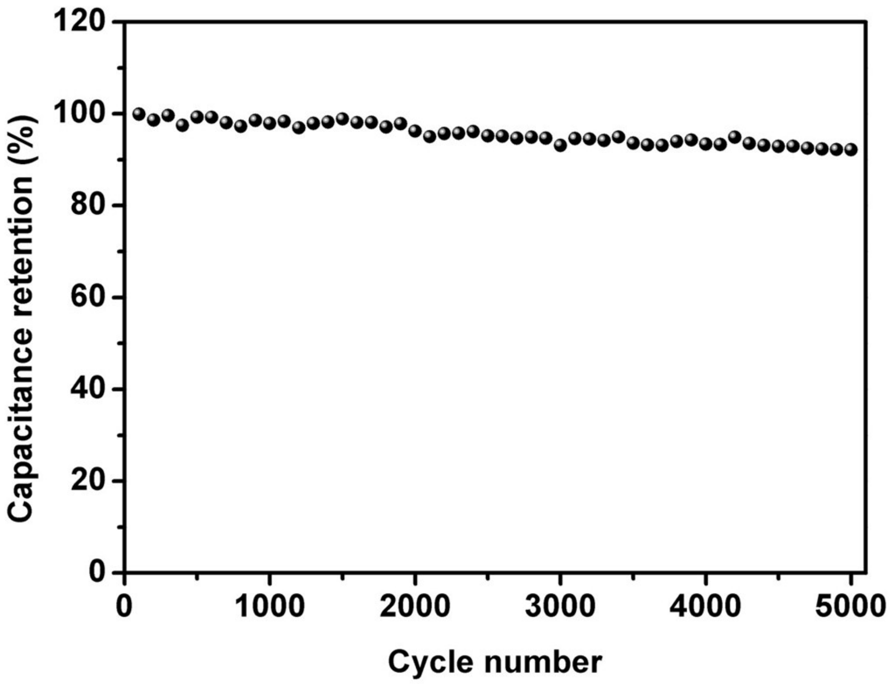

Figure S5. Electrochemical performance of LS-800 in a two-electrode system at a constant current density of 1 A/g for 5 000 cycles in 6 M KOH solution.

Table S2. Comparison of the properties of carbon materials synthesized use in supercapacitors.

Material	Activating agent	S_{BET} ($m^{-2}g^{-1}$)	Pore size (nm)	Electrolyte	Maximum capacitance ($F\ g^{-1}$)	Measurement condition	Reference
Loofah sponge	KOH	1733	1.97	6 M KOH	304	1 A g^{-1}	Our work
Cornstalk	HCl	540	2.3/9.2	6 M KOH	213	1 A g^{-1}	Ref. 43
Coconut shell	$ZnCl_2$	1874	3.0	6 M KOH	268	1 A g^{-1}	Ref. 44
Camellia oleifera shell	$ZnCl_2$	1935	2.1	1 M H_2SO_4	376	0.2 A g^{-1}	Ref. 50
Eggshell Membranes	KOH/HCl	221.2	1.2	1 M KOH	297	0.2 A g^{-1}	Ref. 51
Seed shells	KOH	2062	1.4	30 wt% KOH	355	0.125 A g^{-1}	Ref. 52
Banana fibers	$ZnCl_2$	1097	2.5	1 M Na_2SO_4	74	0.5 A g^{-1}	Ref. 53
Waste paper	KOH	416	5.9	6 M KOH	180	0.01 A cm^{-2}	Ref. 54
Sunflower seed shell	KOH	2509	2.1	30 wt% KOH	311	0.25 A g^{-1}	Ref. 55
Sugar-cane bagasse	$ZnCl_2$	1788	1.2	1 M H_2SO_4	300	0.25 A g^{-1}	Ref. 56

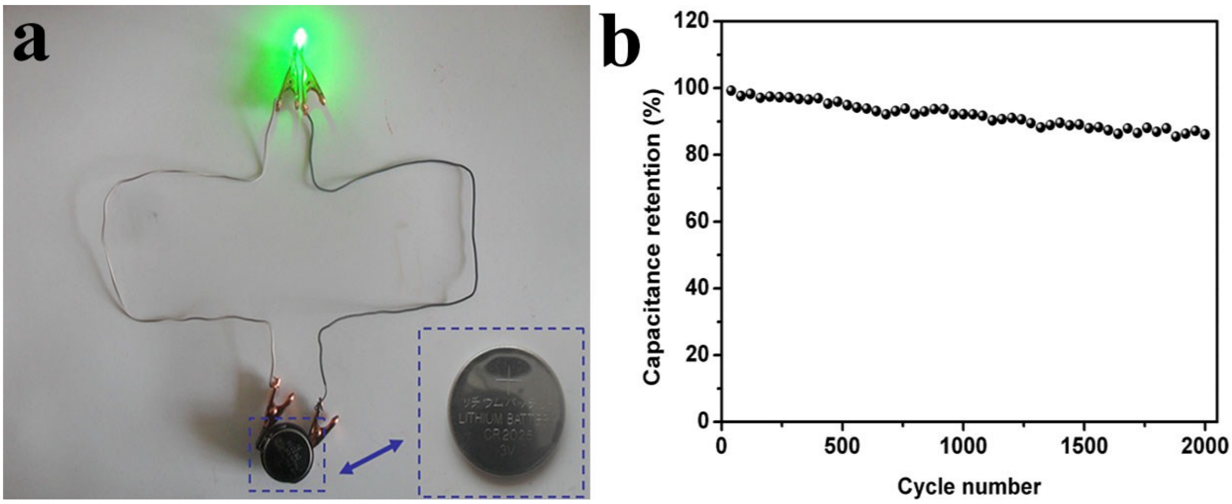

Figure S6. (a) Two fully assembled two-electrode series cells from LS-800 in organic 1M Et_4NBF_4-PC electrolyte to light a LED bulb. (b) Electrochemical performance of LS-800 in a two-electrode system at 1 A/g for 2000 cycles.