Electronic Supplementary Information

Mass-Producible Polyhedral Macrotube Carbon Arrays with Multi-holes Cross Section Profiles: Superb 3D Tertiary Porous Electrodes' Materials for Supercapacitors and Capacitive Deionization Cells

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Table S1 ASAR comparation of LS500/A800 based CDI with that of CDI reported in literatures.

	Concentration of NaCl solution	Voltage (V)	Flow rate (mL min^{-1})	ASAR (mg g^{-1} min^{-1})	*Ref*
ZFCarbon	1 mM	1.2	50	<3	[1]
3DHGR	100 ppm	1.2	50	<0.6	[2]
NP-3DHCA	500 mg L^{-1}	1.2	40	<1	[3]
N-PHCS	500 mg L^{-1}	1.2	40	<2	[4]
600-NS-DCM	40 mg L^{-1}	1.4	25	< 0.7	[5]
AC granule	1000 mg L^{-1}	1.5	8	<0.3	[6]
N-HMCSs	100 mg L^{-1}	1.6	25	<2.5	[7]
LS500/A800	500 mg L^{-1}	1.0	4.5	3.6	This work
		1.2		3.8	
		1.4		3.9	

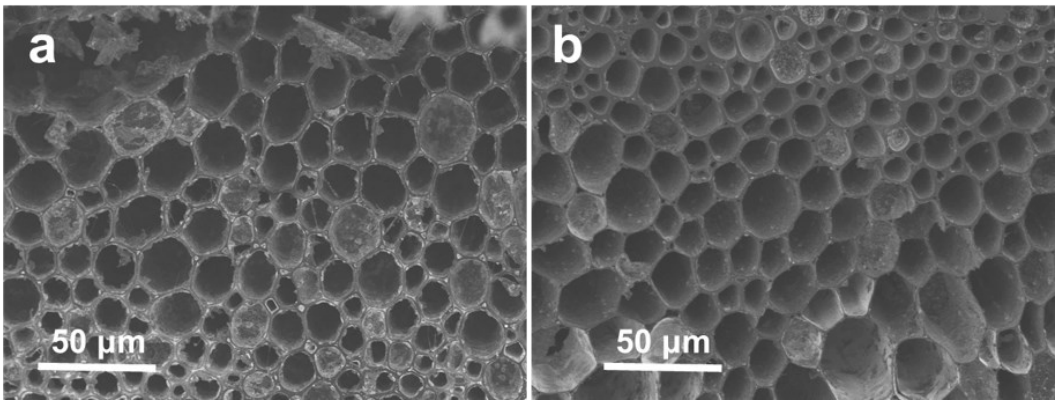

Figure S1 SEM images of a) LS400/A800, and b) LS600/A800 carbon materials.

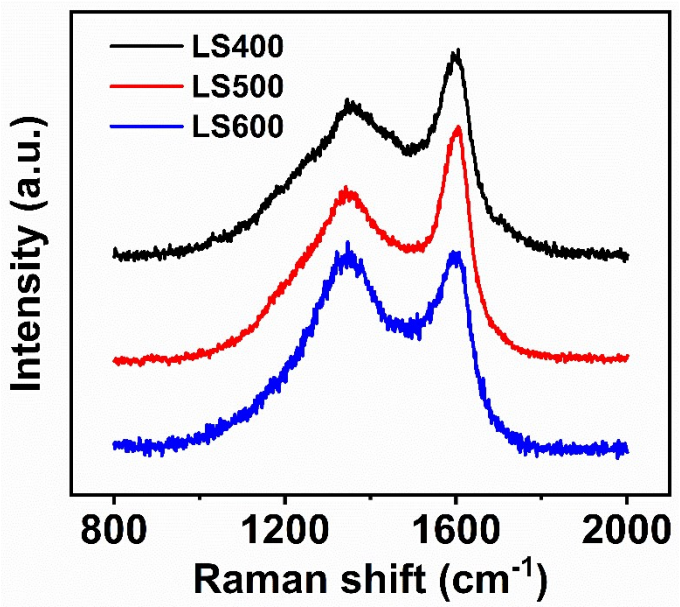

Figure S2 Raman spectra of LSx (x=400, 500, 600) carbon materials

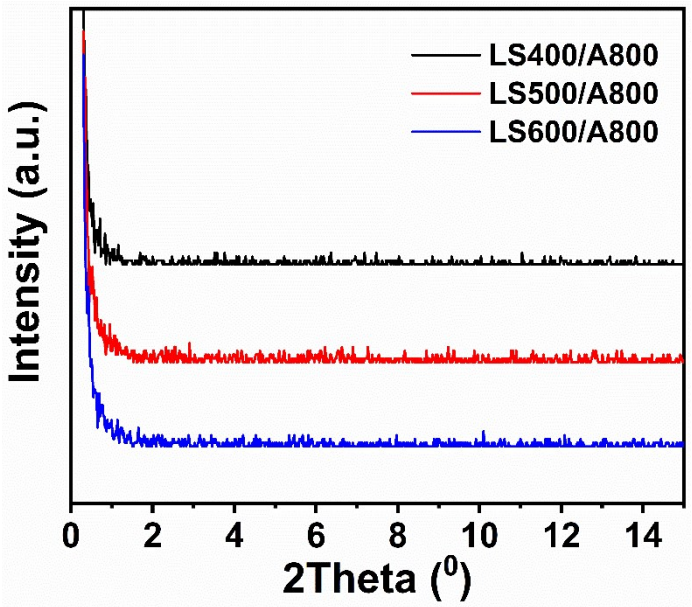

Figure S3 Small angle XRD patterns of LSx/A800 (x=400, 500, 600) carbon materials

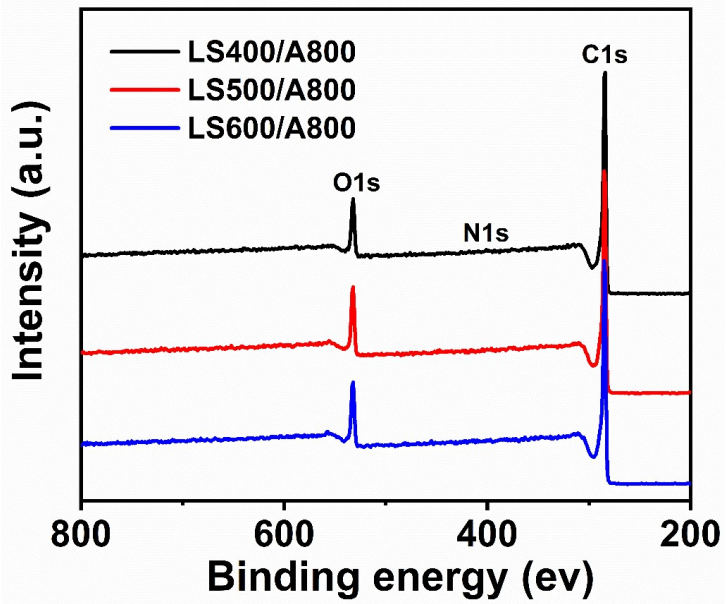

Figure S4 XPS spectra of LSx/A800 (x=400, 500, 600) carbon materials

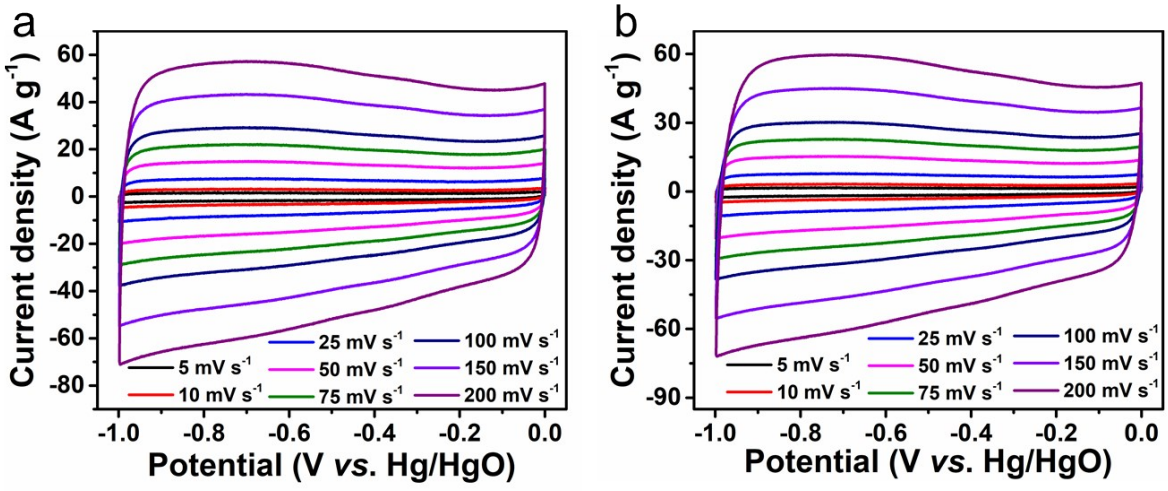

Figure S5 CV curves of a) LS400/A800, and b) LS600/A800 electrodes in 6 M KOH aqueous solutions at different scan rates as indicated.

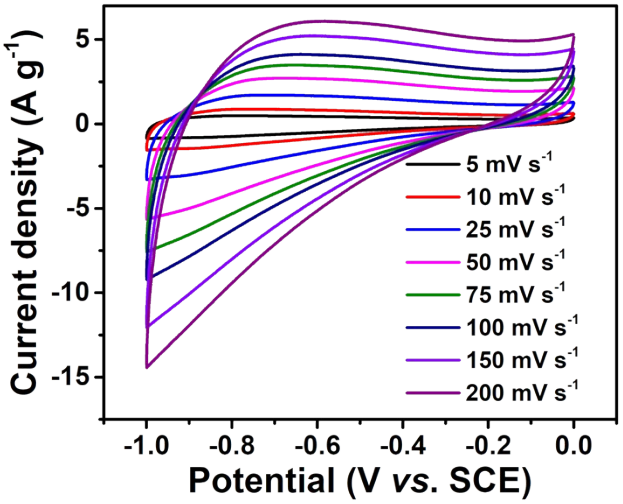

Figure S6 CV curves of LS500 electrodes in 6 M L^{-1} KOH solutions at different scan rates.

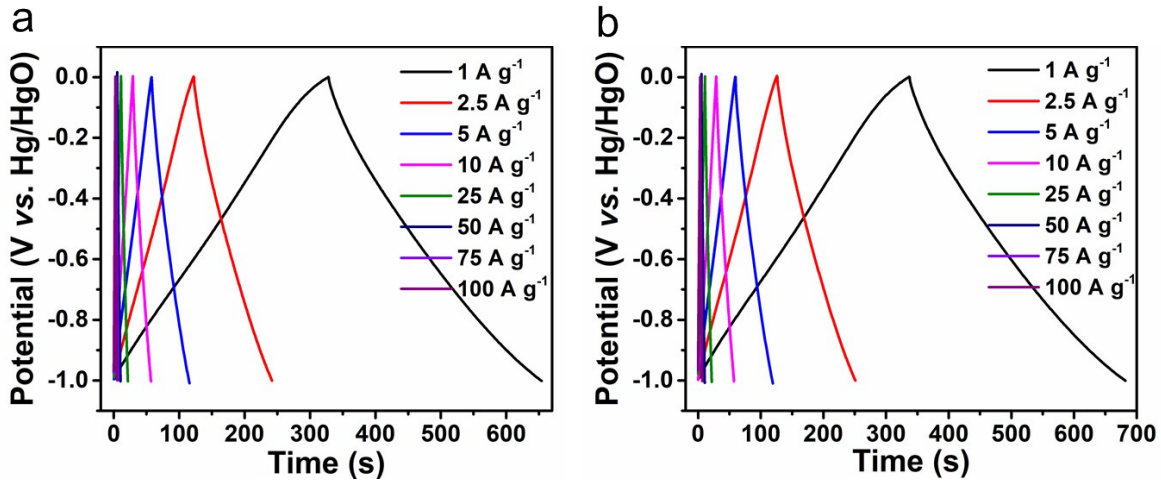

Figure S7 Voltage profiles obtained upon galvanostatic cycling at different constant currents (indicated) of a) LS400/A800, and b) LS600/A800 electrodes. Aqueous 6 M KOH solutions.

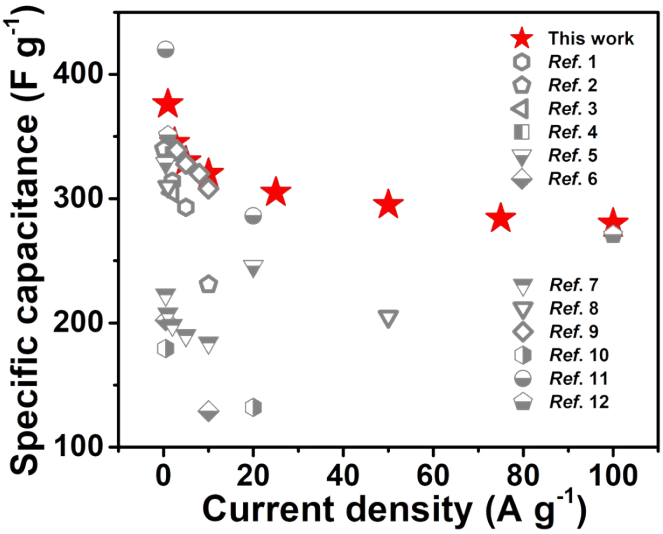

Figure S8 Specific capacitances of LS500/A800 electrodes in supercapacitors prototype cells at different constant current densities (indicated), aqueous 6 M KOH solutions. The chart includes specific capacitance values of various supercapacitors' electrodes reported in the literature [8-19] for comparison.

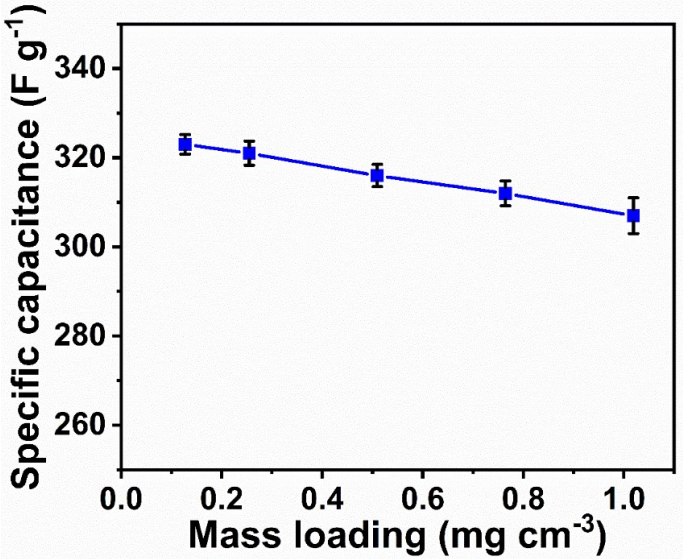

Figure S9 Specific capacitance of LS500/A800 electrode as a function of mass loading.

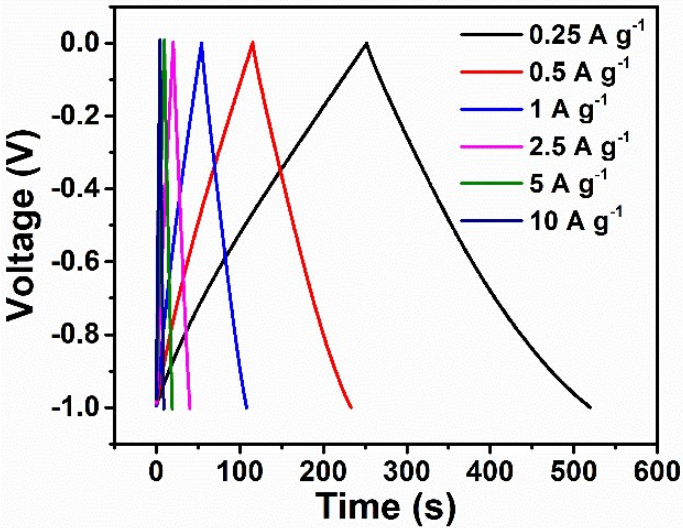

Figure S10 GCD curves of LS500/A800 based symmetrical supercapacitor.

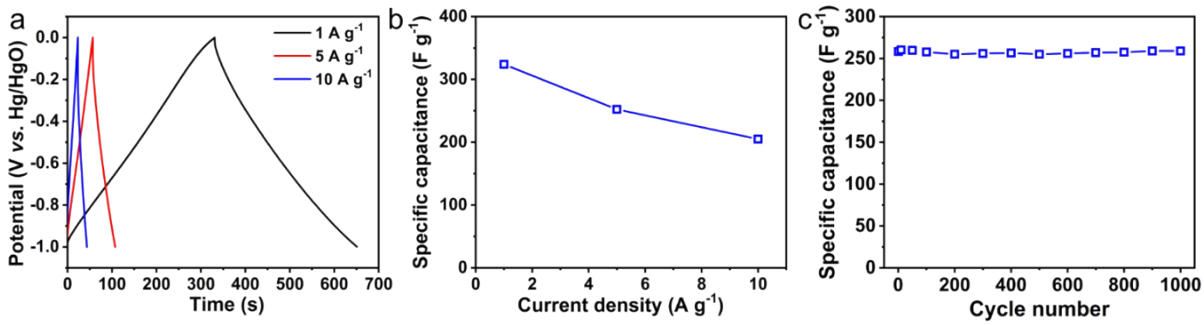

Figure S11 a) Voltage profiles obtained upon galvanostatic cycling at different constant currents of LS500/A800 electrodes with high loading; b) Specific capacitance of these electrodes as a function of current density; c) The cycling stability of LS500/A800 electrodes with high loading (at current density of 5 A g^{-1}). The electrolyte solution used was aqueous 6 mol L^{-1} KOH. The maximal fluctuations in the specific capacitance data measured in parallel experiments, presented in charts b, are estimated as +/- 3% around the average values presented by the graphs.

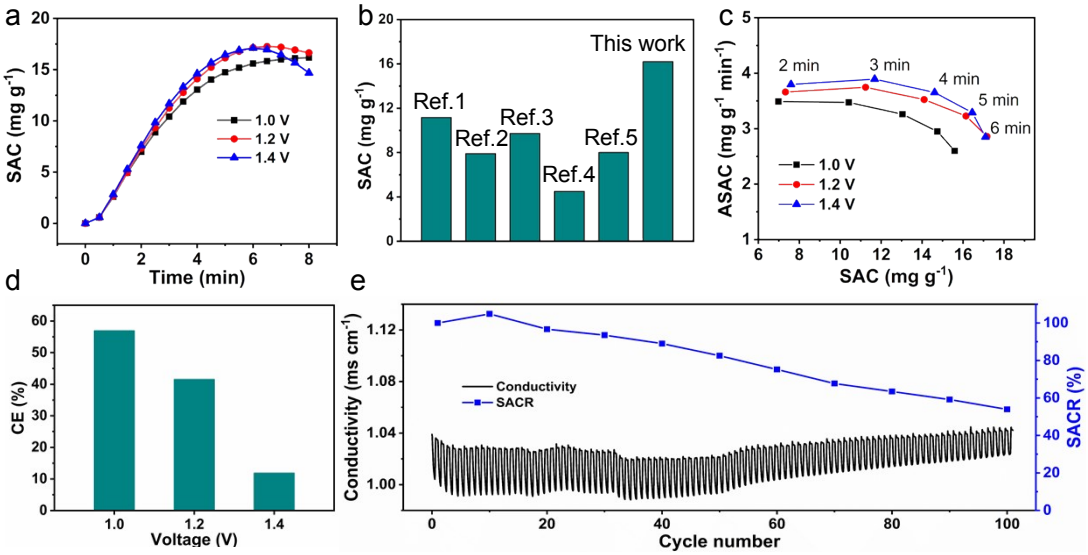

Figure S12 a) Salt adsorption capacity of LS500/A800 based CDI in 500 mg L^{-1} NaCl solution; b) The comparison of reported SAC values with that of LS500/A800 [20-24]. The specific references' numbers appear above the histograms in charts S12b; c) Ragone Kim–Yoon plots of the LS500/A800 electrodes in CDI cells under different working voltages; d) CE of LS500/A800 based CDI; e) Cyclic stability of LS500/A800 based CDI under 1.0 V.

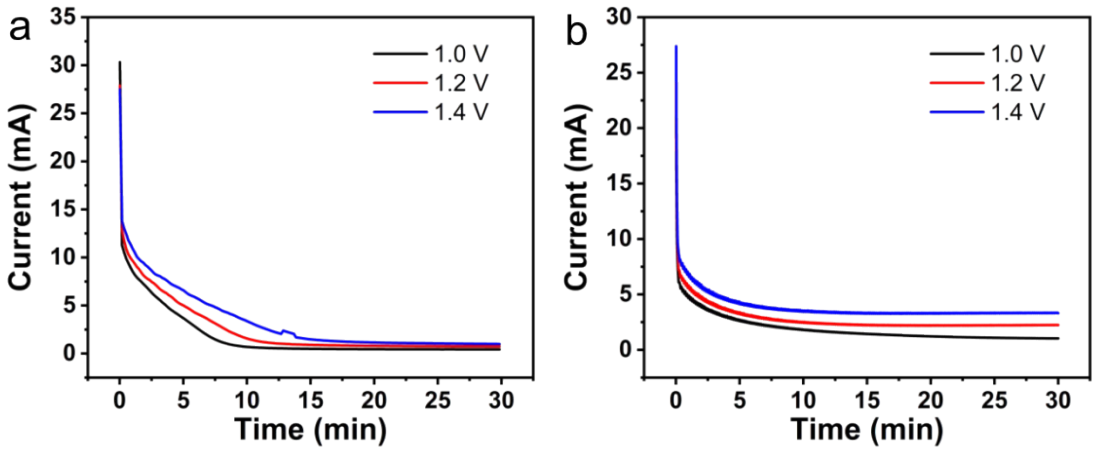

Figure S13 Current of MCDI cells with electrodes comprising a) LS500/A800 carbon and b) AC carbon at different working voltages.

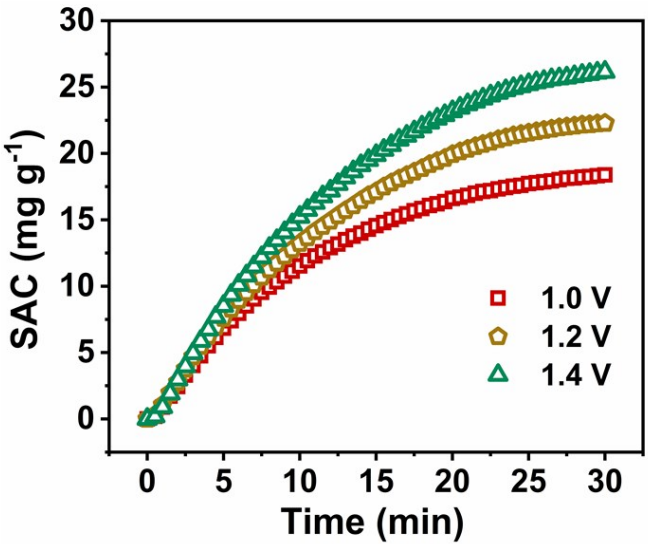

Figure S14 SAC of AC based MCDI at different working voltages.

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