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Supporting information

Seaweed-derived hierarchical porous carbon for high-rate performance supercapacitors

Zhiyuan Luo[a]‡, *Yide Qiao*[a]‡, *Rong Tang*[a], *Guopan Ren*[a], *Jiamin Jing*[a], *Wei Wang*[a], *Yang Yang*[b], *Yuanzhen Chen*[a,*]

[a] State Key Laboratory for Mechanical Behavior of Materials, Xi'an Jiaotong University, Xi'an 710049, China

[b] Shaanxi Coal and Chemical Industry Technology Research Institute Co., Ltd, Xi'an 710100, P. R. China.

*Corresponding author.

E-mail addresses: cyz1984@xjtu.edu.cn (Yuanzhen Chen).

‡ These authors contributed equally to this work.

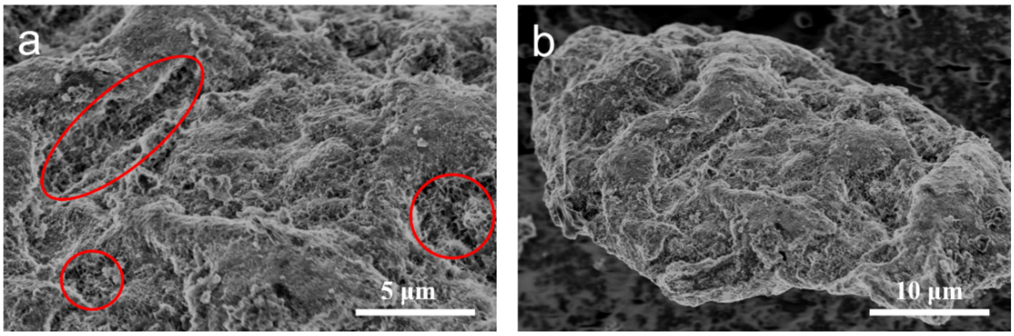

Figure S1. SEM images of SC-700.

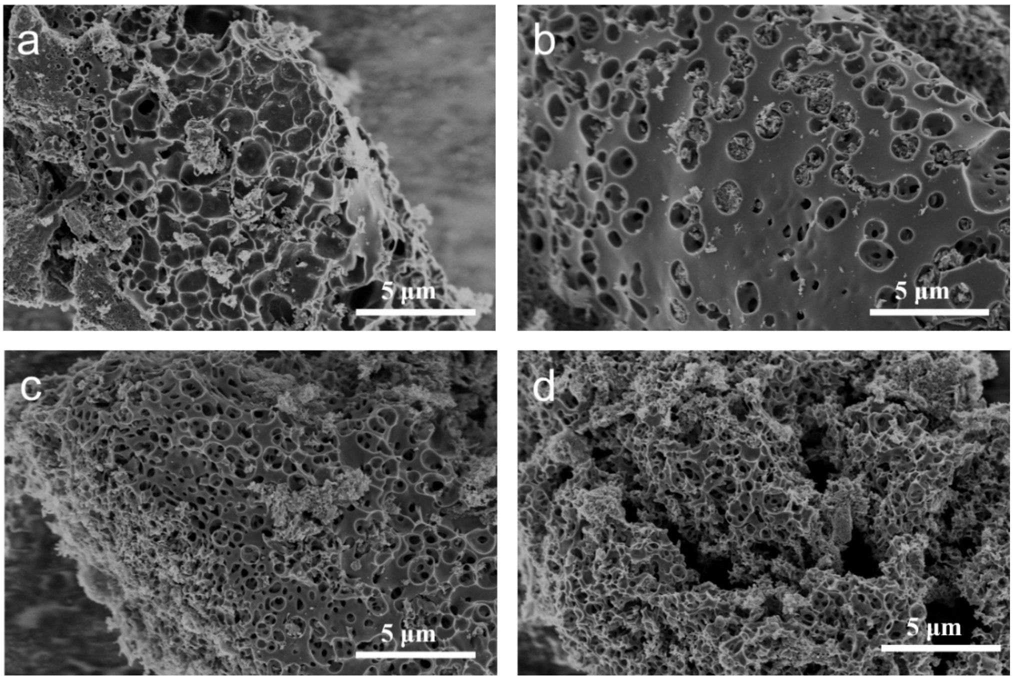

Figure S2. SEM images of (a) SPC-500, (b) SPC-600, (c) SPC-700, (d) SPC-800.

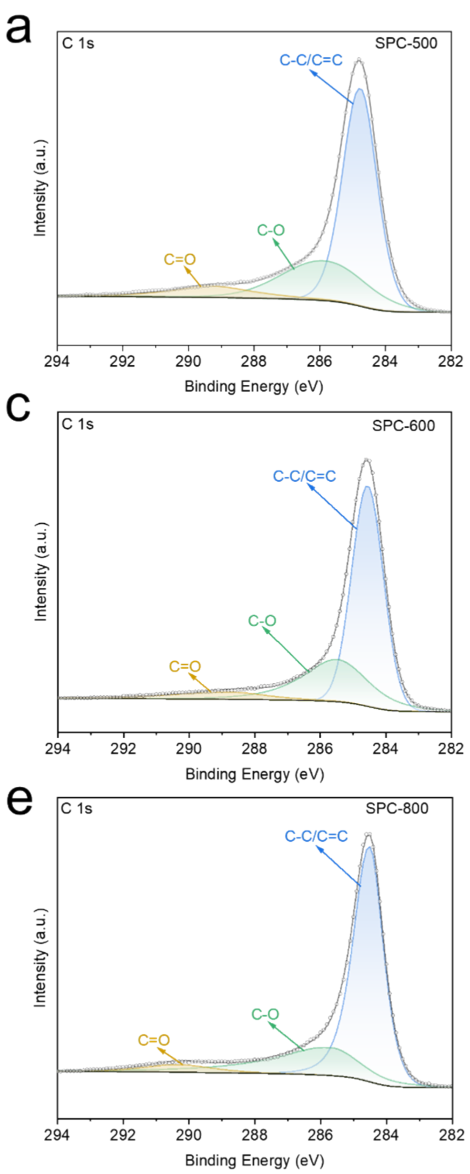

Figure S3. (a-f) The XPS survey of SPC-500, SPC-600, and SPC-700

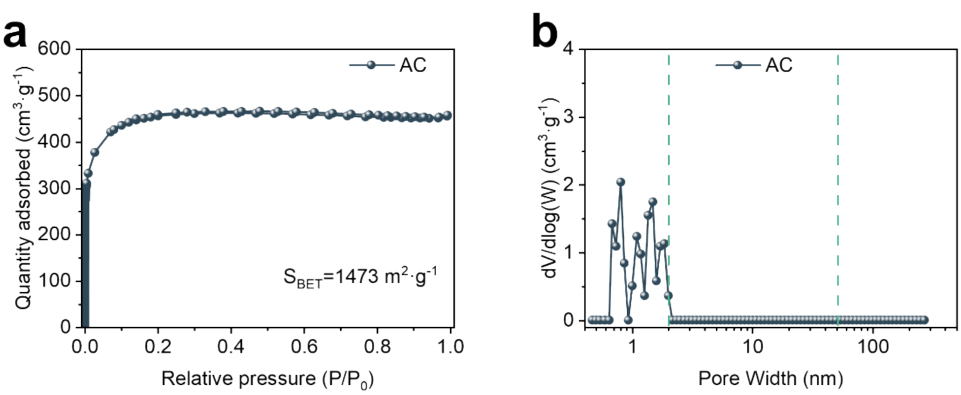

Figure S4.N_2 adsorption/desorption tests of AC. (a) Adsorption isotherm. (b) Pore size distributions.

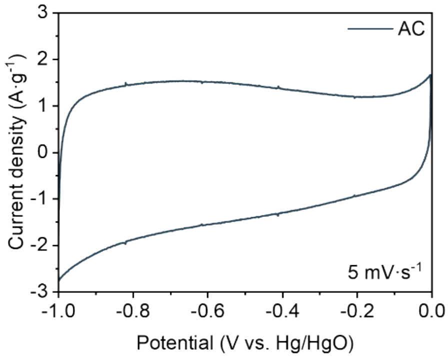

Figure S5. CV curve of AC at 5 mV s^{-1}.

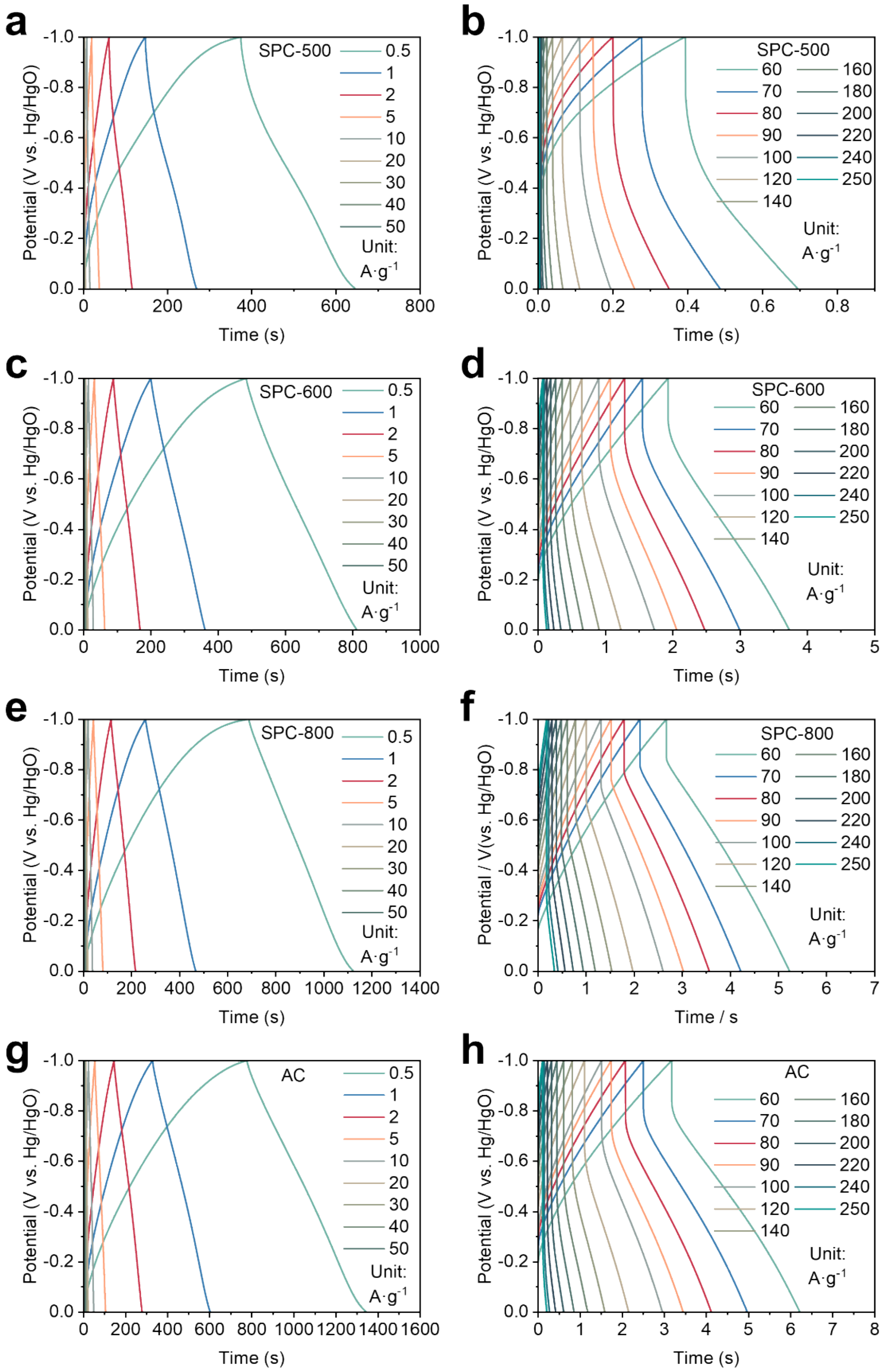

Figure S6. GCD curves of (a-b) SPC-500, (c-d) SPC-600, (e-f) SPC-800, and (g-h) AC at different current densities.

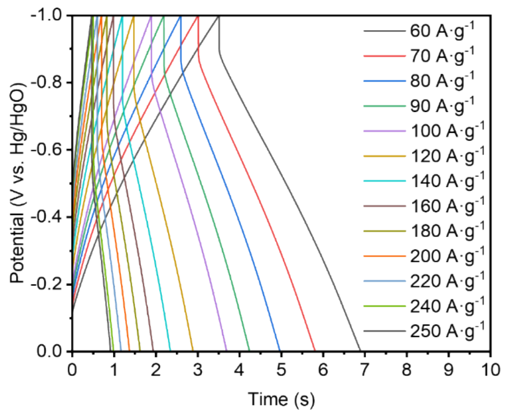

Figure S7. GCD curves at different current densities.

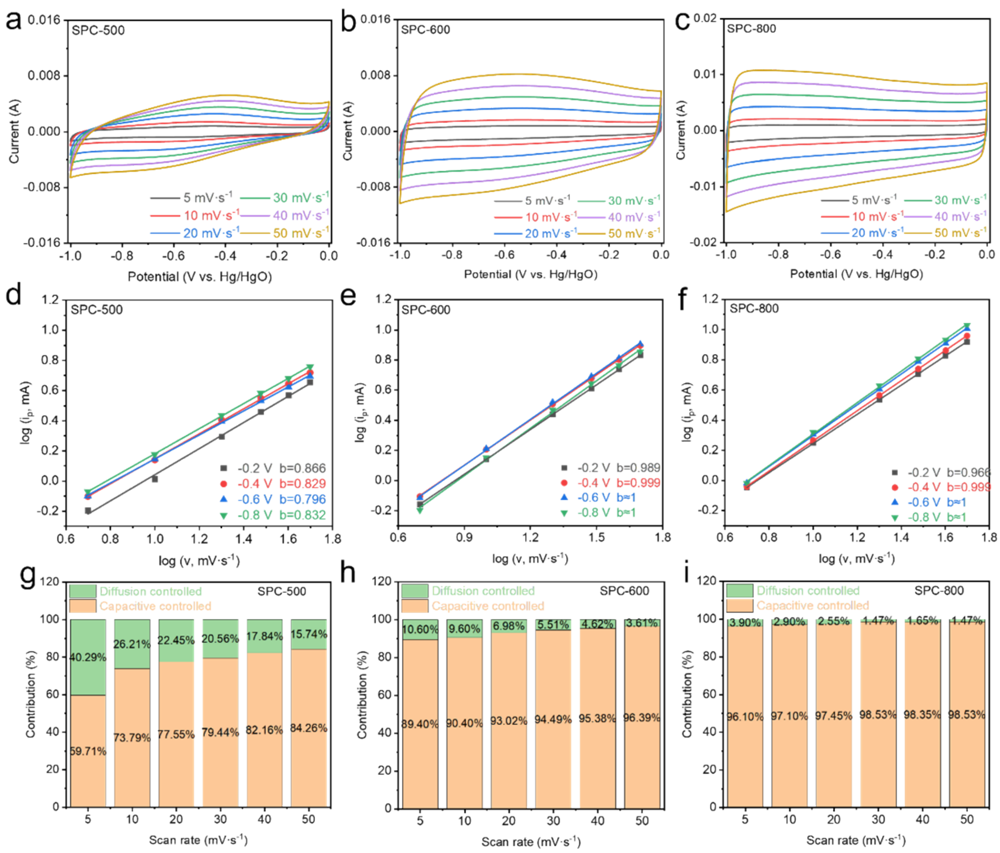

Figure S8. (a-i) The b value determination of SPC-500, SPC-600, and SPC-700.

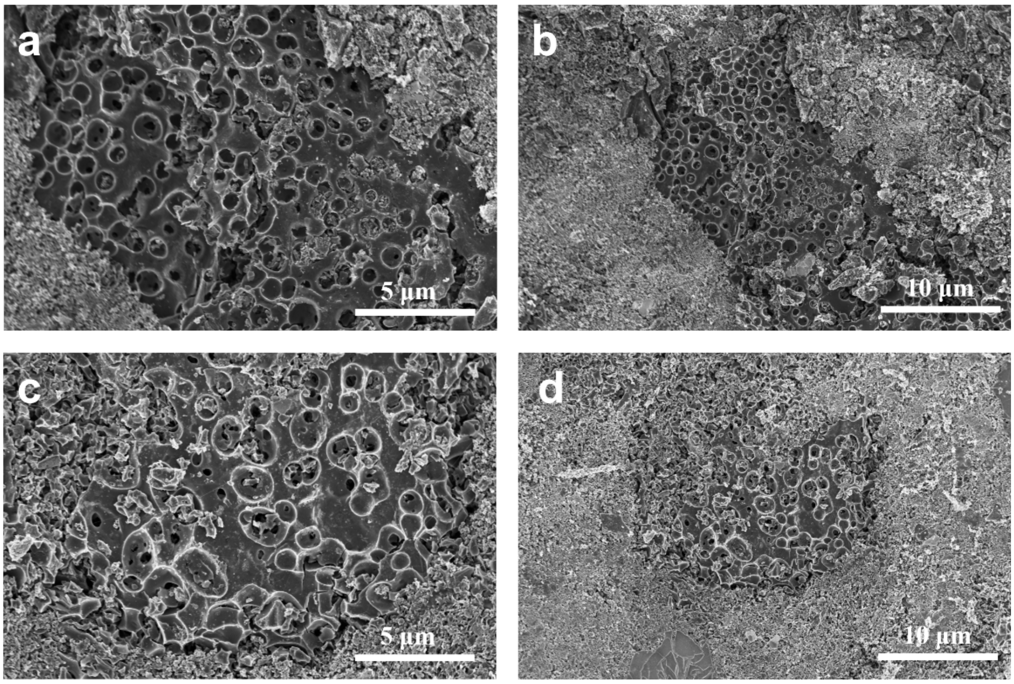

Figure S9. Morphology observation of SPC-700 electrodes, (a-b) the original electrode and (c-d) the electrode after 10,000 cycling tests.

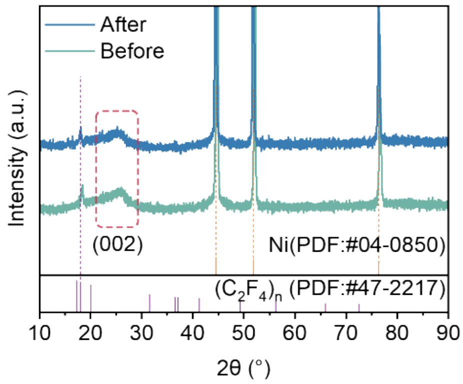

Figure S10. XRD patterns of SPC-700 electrodes before and after 10,000 cycling tests.

Table S1: Relative content of surface functional groups in samples at different activation temperatures

Sample	C-C/C=C	C-O	C=O
SPC-500	63.0%	28.4%	8.6%
SPC-600	64.6%	28.3%	7.1%
SPC-700	70.7%	25.5%	3.8%
SPC-800	71.0%	24.0%	5.0%

Table S2: The BET specific surface area and pore volume of all samples.

Sample	S_{BET} (m^2/g)	S_{mic} (m^2/g)	S_{mes} (m^2/g)	V_{mic} (cm^3/g)	V_{mes} (cm^3/g)	V_{mac} (cm^3/g)
SC-700	281	171	110	0.09	0.14	0.01
SPC-500	350	248	102	0.13	0.23	0.17
SPC-600	882	594	288	0.32	0.45	0.19
SPC-700	1489	979	510	0.51	0.78	0.23
SPC-800	1074	487	587	0.34	0.56	0.34
AC	1473	1051	422	0.58	0	0

Table S3: EIS fitting data for samples at different activation temperatures

Sample	R_s (Ω)	R_{ct} (Ω)
SPC-500	1.04	1.61
SPC-600	0.93	0.38
SPC-700	0.55	0.24
SPC-800	0.82	0.32
AC	0.89	0.42

Table S4: Comparison with the electrochemical properties of other reported biomass-derived porous carbons.

Sample	Electrolyte	Energy density (Wh kg^{-1})	Power density (W kg^{-1})	Stability/ Cycles	Ref.
MKC-550	6 M KOH	4.7	503	100%/4000	1
GEK-800	6 M KOH	5.2	246.9	98.3%/20000	2
PC-600	6 M KOH	6.5	250	91%/10000	3
RHC-12	6 M KOH	5.1	49.9	85.4%/6000	4
JPC	1 M Et_4NBF_4/AN	23.7	629	94%/10000	5
NPC-850	1 M $TEABF_4$/AN	21.2	1300	-	6
NOPC-800	$EMIMBF_4$	22.1	875	98%/10000	7
PAC-K-1:4	1 M $TEABF_4$/AN	16.52	500	-	8
SPC-700	6 M KOH	7.1	248.5	100%/10000	This work
	1 M TEATFB/PC	27.1	622.5	86.2%/10000	

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