Supporting Information

In Situ N, O-Dually Doped Nanoporous Biochar Derived from Waste Eutrophic *Spirulina* for High-Performance Supercapacitors

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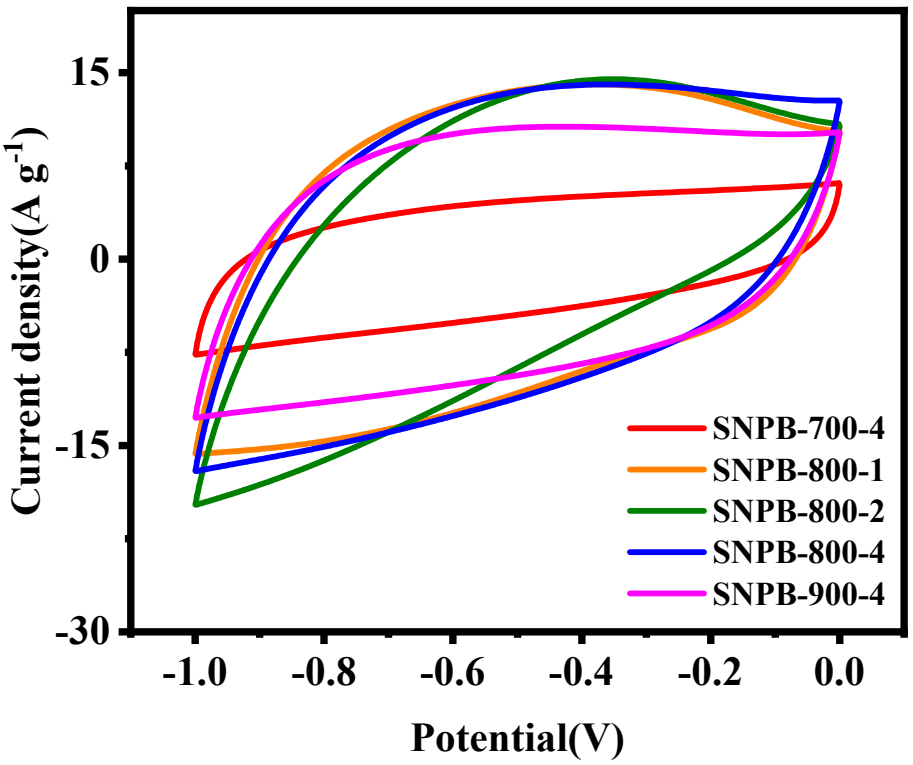

Figure S1. CV curves of SNPBs at 50 mV s^{-1} scanning rate.

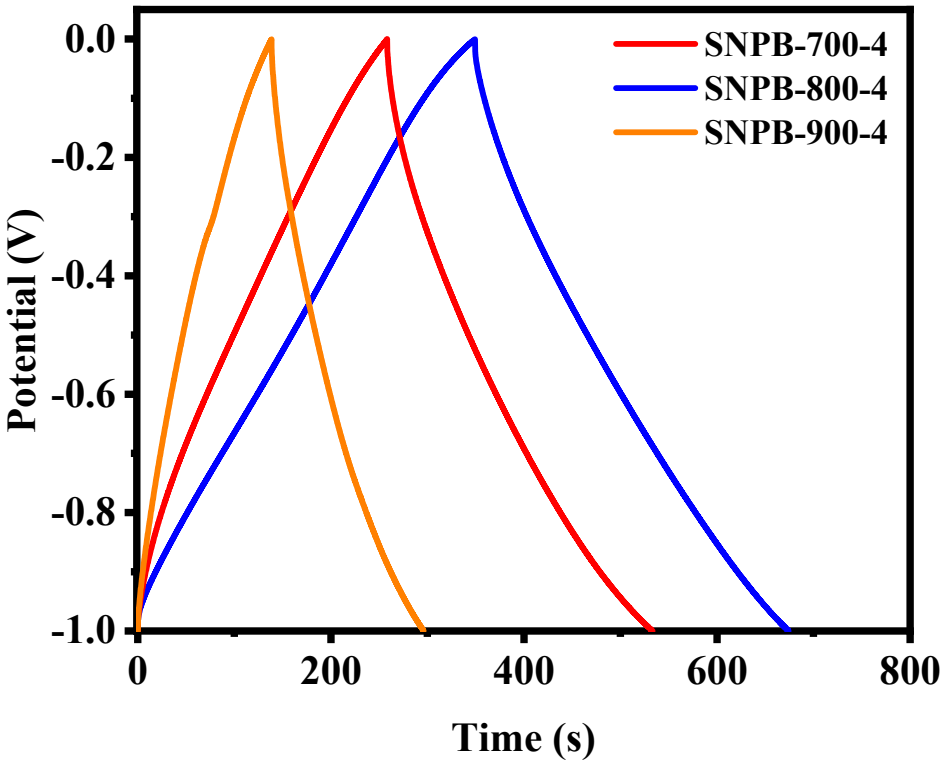

Figure S2. GCD curves of SNPB-X-4 at a current density of 1A g^{-1}.

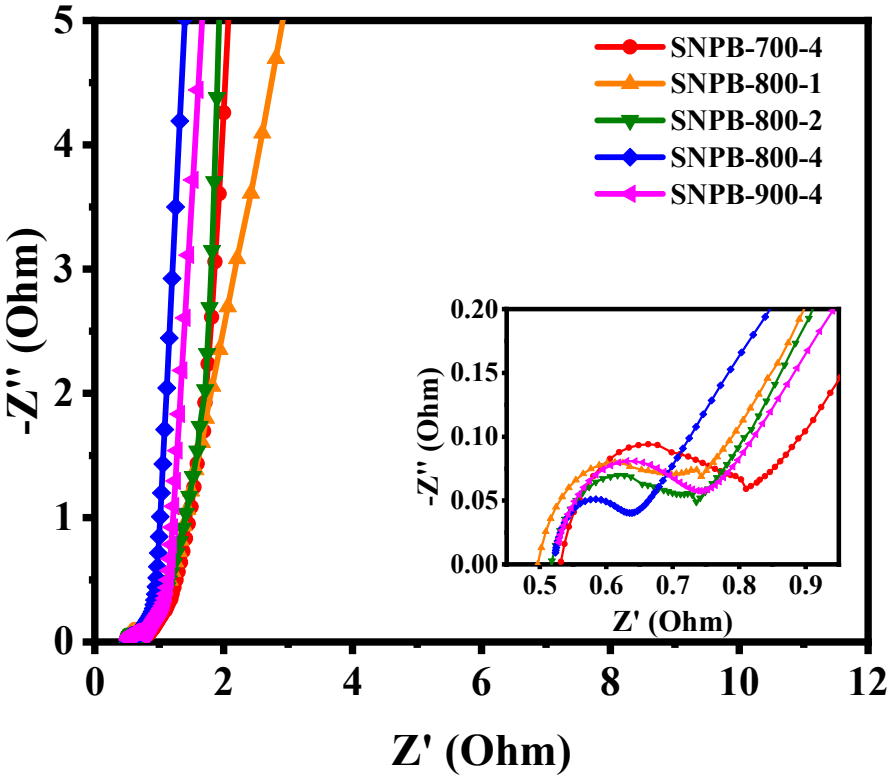

Figure S3. Nyquist plots of SNPBs.

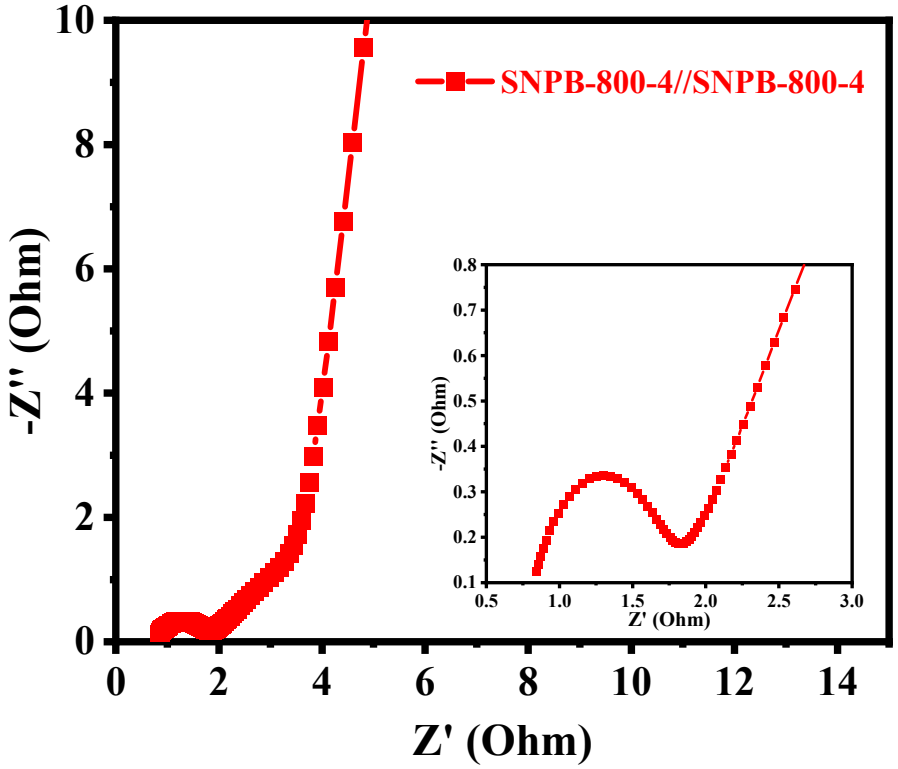

Figure S4. Nyquist plots of SNPB-800-4//SNPB-800-4.

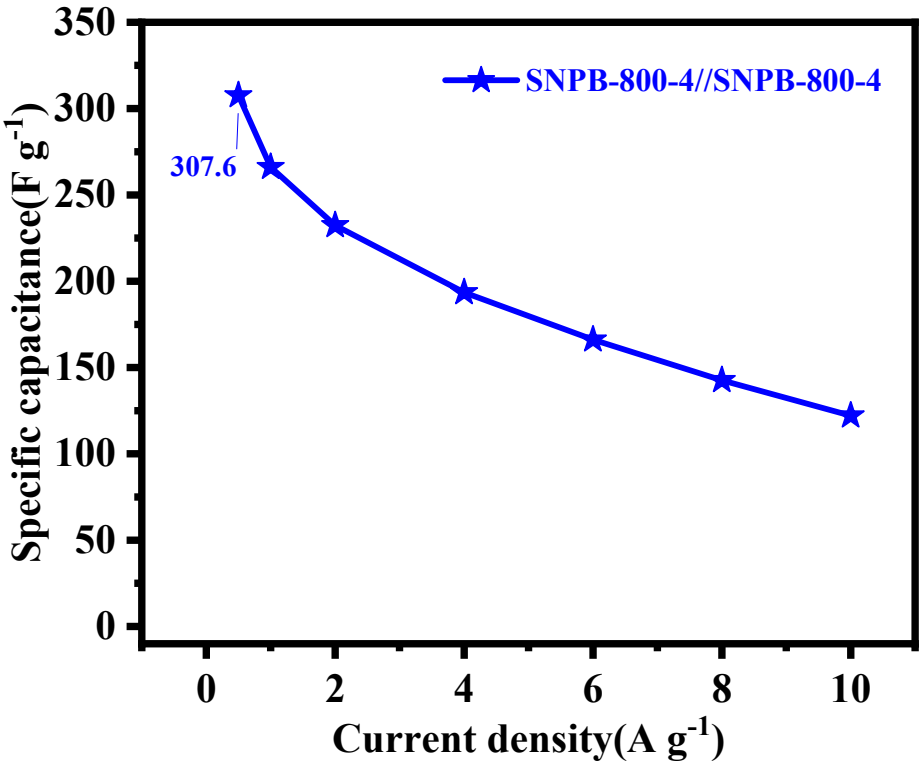

Figure S5. Specific capacitance of the SNPB-800-4//SNPB-800-4 electrode at different current densities.

Table S1. Element analysis of porous carbon prepared from *Spirulina* platensis.

Sample	C (%)	H (%)	N (%)	O (%)	C/N ratio	C/H ratio	C/O ratio	C/(O+N) ratio
Spirulina	45.43	7.76	10.22	36.59	4.45	5.85	1.24	0.97
PSB	59.28	3.84	10.35	26.53	5.73	15.44	2.23	1.61
SNPB-700-4	72.08	3.21	3.42	21.29	21.08	22.45	3.39	2.92
SNPB-800-1	68.73	1.09	1.27	28.91	54.12	63.06	2.38	2.28
SNPB-800-2	75.06	2.91	1.92	20.11	39.09	25.79	3.73	3.41
SNPB-800-4	80.58	3.09	2.55	13.78	31.6	26.08	5.85	4.93
SNPB-900-4	81.11	1.21	2.11	15.57	38.44	67.03	5.21	4.59

Table S2. Comparison of the performance between SNPB-800-4 and commercial carbon materials.

Electrode material	Specific surface area ($m^2 g^{-1}$)	Specific capacitance ($F g^{-1}$)	Current density ($A g^{-1}$)	Number of cycles	Cycle stability (%)	References
SNPB-800-4	2923.7	348.5	1	10,000	94.14	——
Carbon nanotubes	——	231.2	1	10,000	87.3	[1]
Carbon dots	1246	350	1	10,000	92	[2]
Carbon fiber@graphene	2035	552.8	0.1	200	90	[3]
Porous graphene	2160	210	1	5000	94.7	[4]

References:

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2. Pu, J.; Wang, L.; Huang, J.; Chen, Q.; Jin, Y.; Chen, J., High-performance supercapacitors based on porous activated carbon derived from carbon dots by directly pyrolyzing industrial glucose. Diamond and Related Materials 2023, 132, 109684.
3. Xie, Q.; Bao, R.; Xie, C.; Zheng, A.; Wu, S.; Zhang, Y.; Zhang, R.; Zhao, P., Core-shell N-doped active carbon fiber@graphene composites for aqueous symmetric supercapacitors with high-energy and high-power density. Journal of Power Sources 2016, 317, 133-142.
4. Zheng, C.; Zhou, X.; Cao, H.; Wang, G.; Liu, Z., Synthesis of porous graphene/activated carbon composite with high packing density and large specific surface area for supercapacitor electrode material. Journal of Power Sources 2014, 258, 290-296.