Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Design of nitrogen-doped core-shell structured mesopore-dominant hierarchical porous carbon nanosphere for high-performance capacitive deionization

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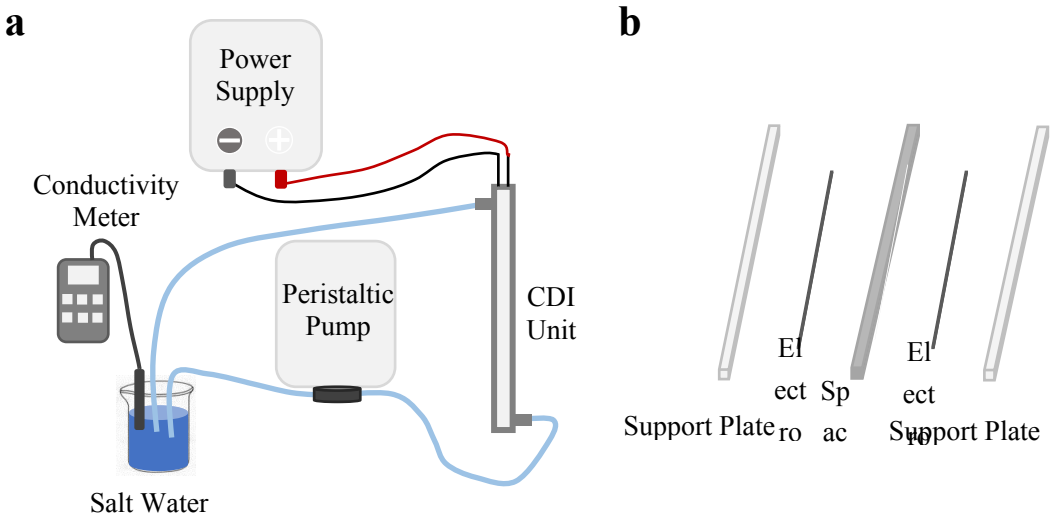

Fig. S1. Schematic diagram of deionization system (a) and CDI unit (b).

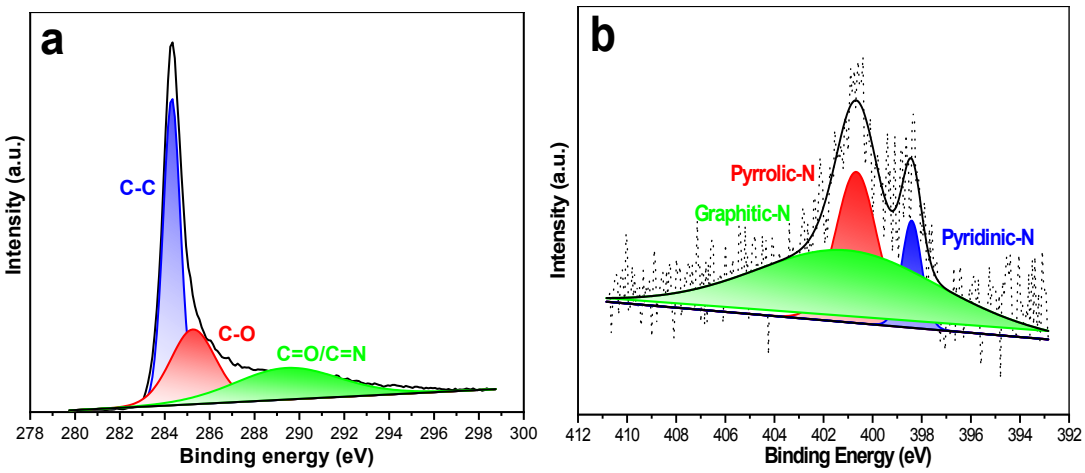

Fig. S2. High-resolution C1s (a) and N1s spectra (b) of YS-MD-HPCS.

Fig. S3. The water contact angle of YS-MD-HPCS.

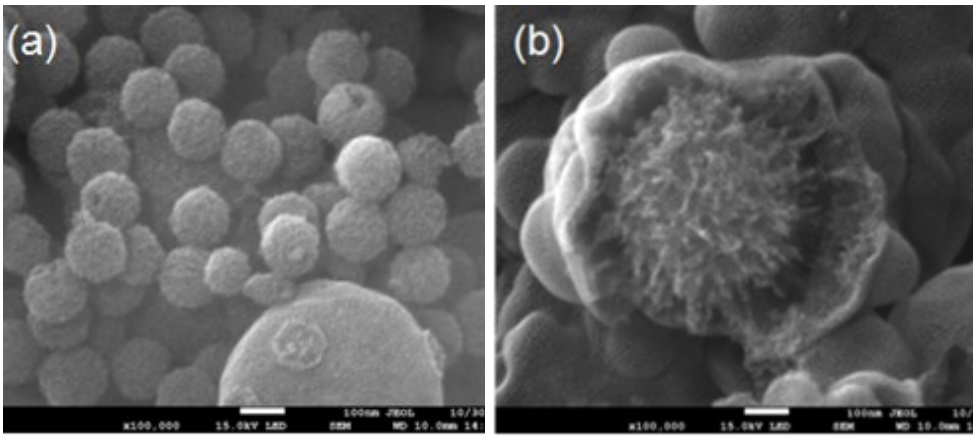

Fig. S4. SEM images of YS-MD-HPCS.

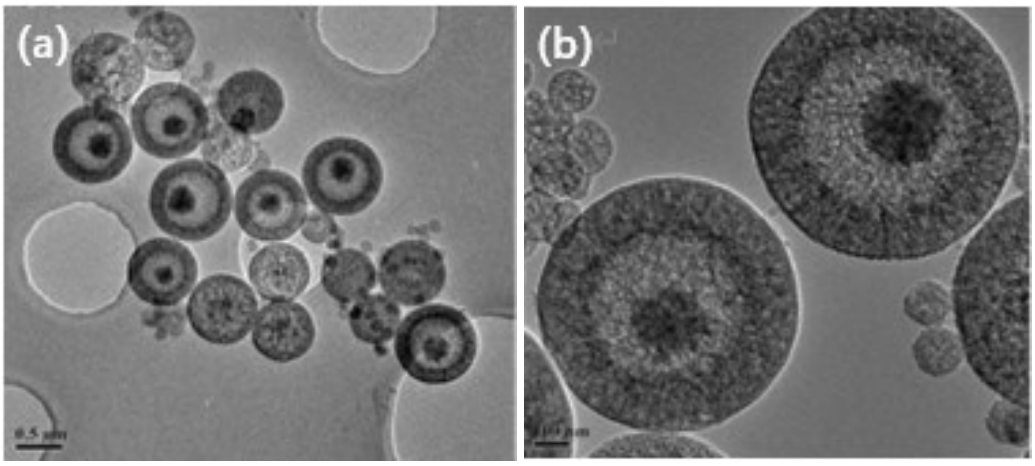

Fig. S5. TEM images of YS-MD-HPCS.

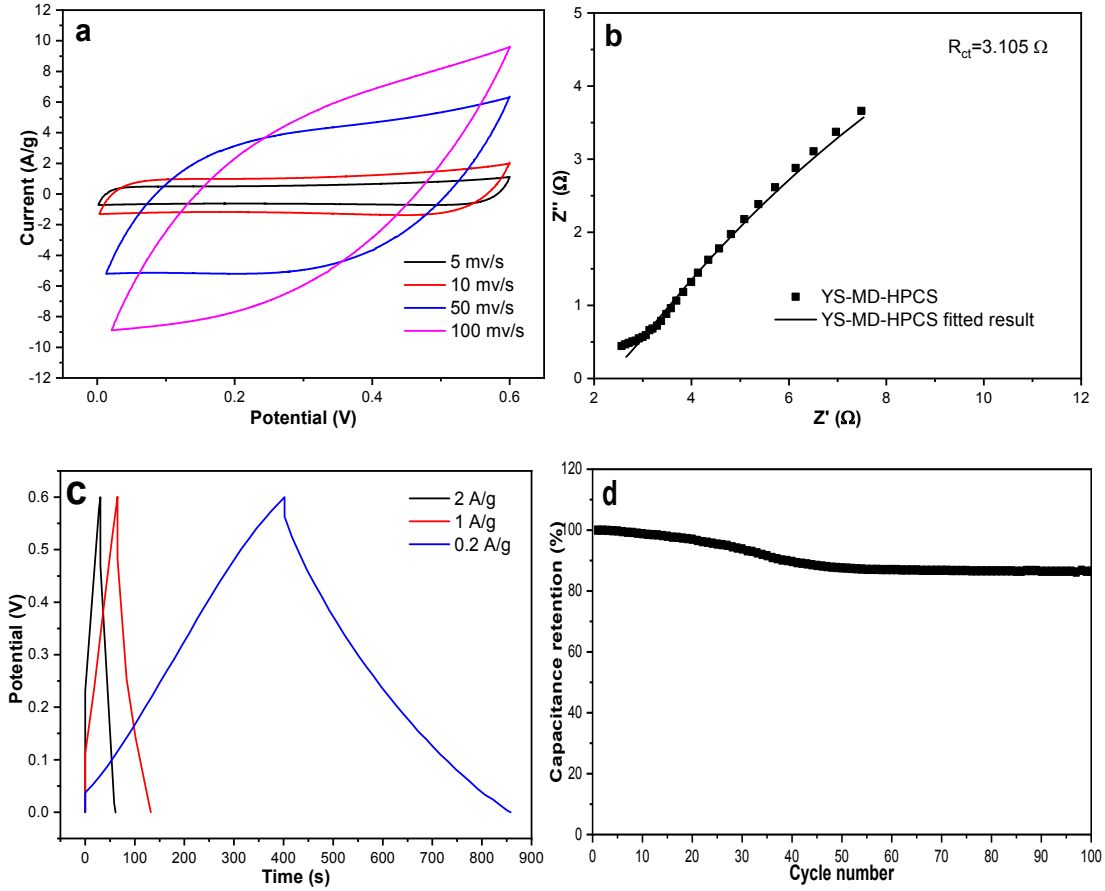

Fig. S6. Electrochemical performances of YS-MD-HPCS in 1 M NaCl solution. CV curves with different scan rates (a); EIS curve (b); GCD curves with different current densities (c); Galvanostatic cycling stability with a current density of 0.2 A/g (d).

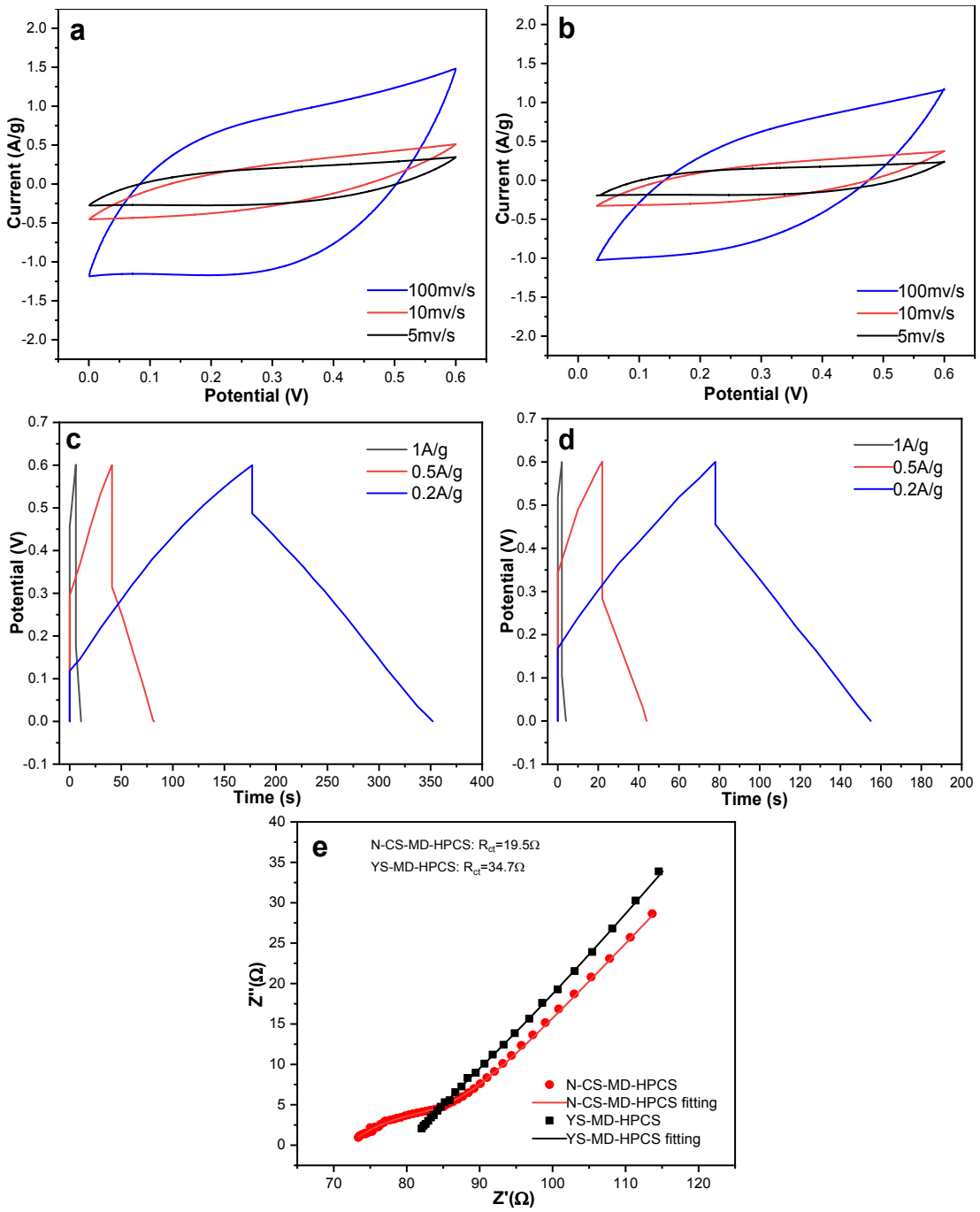

Fig. S7. Electrochemical performances in 1000 mg/L NaCl solution. CV curves of N-CS-MD-HPCS (a) and YS-MD-HPCS (b) with different scan rates; GCD curves of N-CS-MD-HPCS (c) and YS-MD-HPCS (d) with different current densities; EIS curve of N-CS-MD-HPCS and YS-MD-HPCS (e).

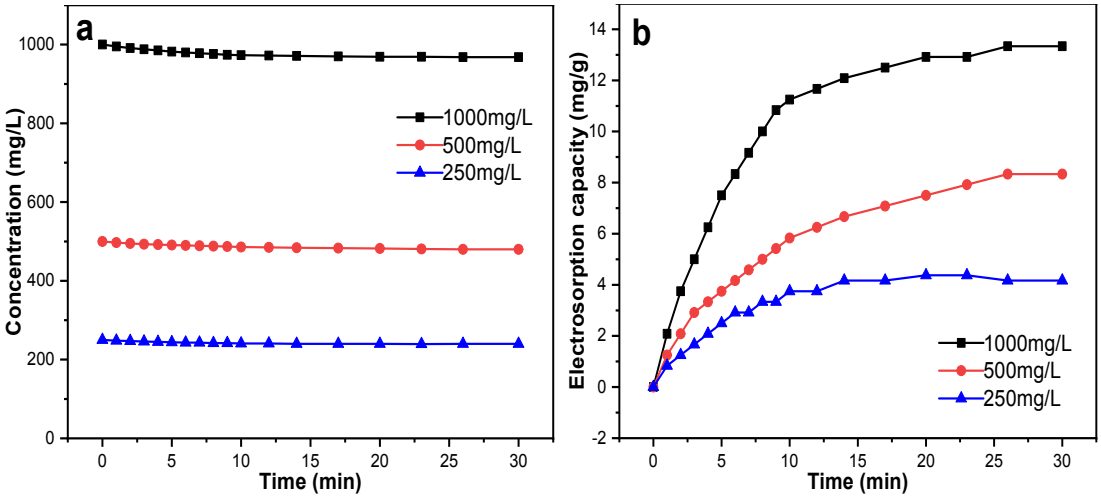

Fig. S8. Change of concentration of circulating solution (a) and the corresponding electrosorption capacity results (b) of commercial activated carbon with different initial concentrations.

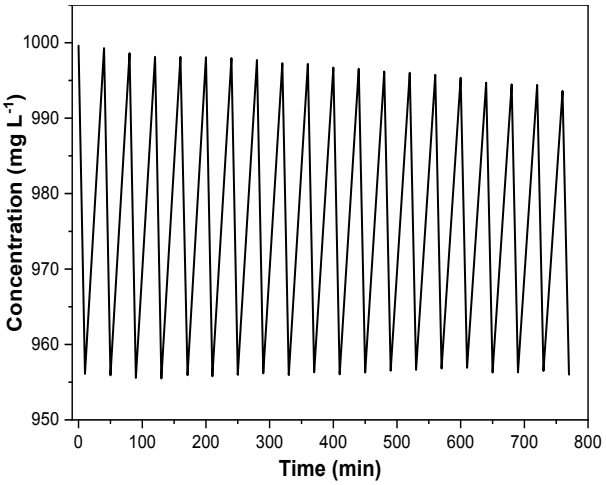

Fig. S9. Repeatability result of YS-MD-HPCS in 1000 mg/L NaCl solution.

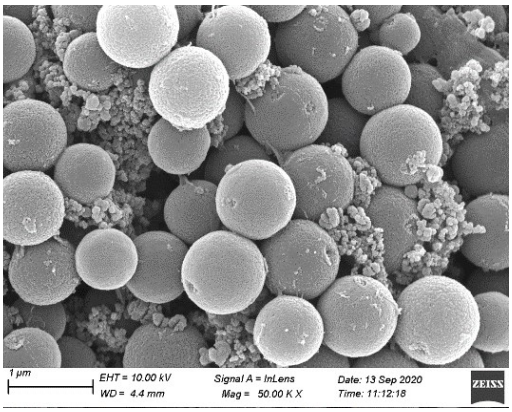

Fig. S10. SEM image of the N-CS-MD-HPCS electrode sample after 20 cycles.

Table S1. The intensity of D band and G band of YS-MD-HPCS and N-CS-MD-HPCS.

Sample	Intensity		I_D/I_G
	D band	G band	
YS-MD-HPCS	11625	11835	0.982
N-CS-MD-HPCS	11655	11662	0.999

Table S2. Comparison of specific capacitance of N-CS-MD-HPCS with reported porous carbons.

No.	Sample	Current density (mA/g)	Specific capacitance (F/g)	Ref.
1	3D graphene-based hierarchically porous carbon	0.2	81	32
2	Covalent triazine-based frameworks	0.2	92	33
3	Biomass-derived N-doped porous carbon	0.25	128	34
4	Porous graphene	0.2	76	35
5	Mesoporous carbon derived from ZIF-8	0.2	135	36
6	Rice-husk-derived carbons	0.2	74	10
7	Sub-micrometer carbon beads	0.2	121	37
8	N, S-codoped open hollow tubular porous carbon	0.2	84	38
9	YS-MD-HPCS	0.2	167	This work
10	N-CS-MD-HPCS	0.2	209	This work

Table S3. Coulombic efficiency results of YS-MD-HPCS and N-CS-MD-HPCS.

Sample	Coulombic efficiency		
	0.2A/g	1A/g	2A/g
YS-MD-HPCS	95.6%	93.5%	90.9%
N-CS-MD-HPCS	95.4%	92.7%	91.3%