

Electronic Supplementary Information (ESI)

Enhanced capacitive deionization of saline water using N-doped rod-like porous carbon derived from dual-ligand metal-organic frameworks

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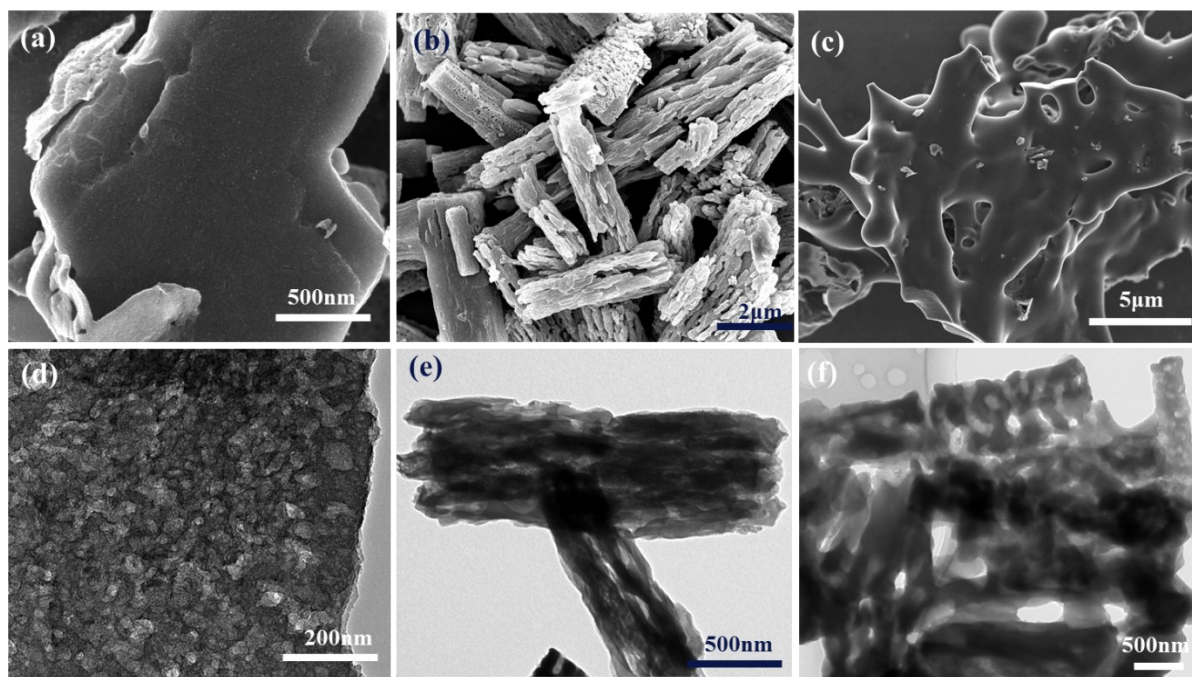


Fig. S1 SEM images of the prepared (a) PC, (b) SNPC, and (c) ENPC; and TEM images of (d) PC, (e) SNPC, and (f) ENPC.

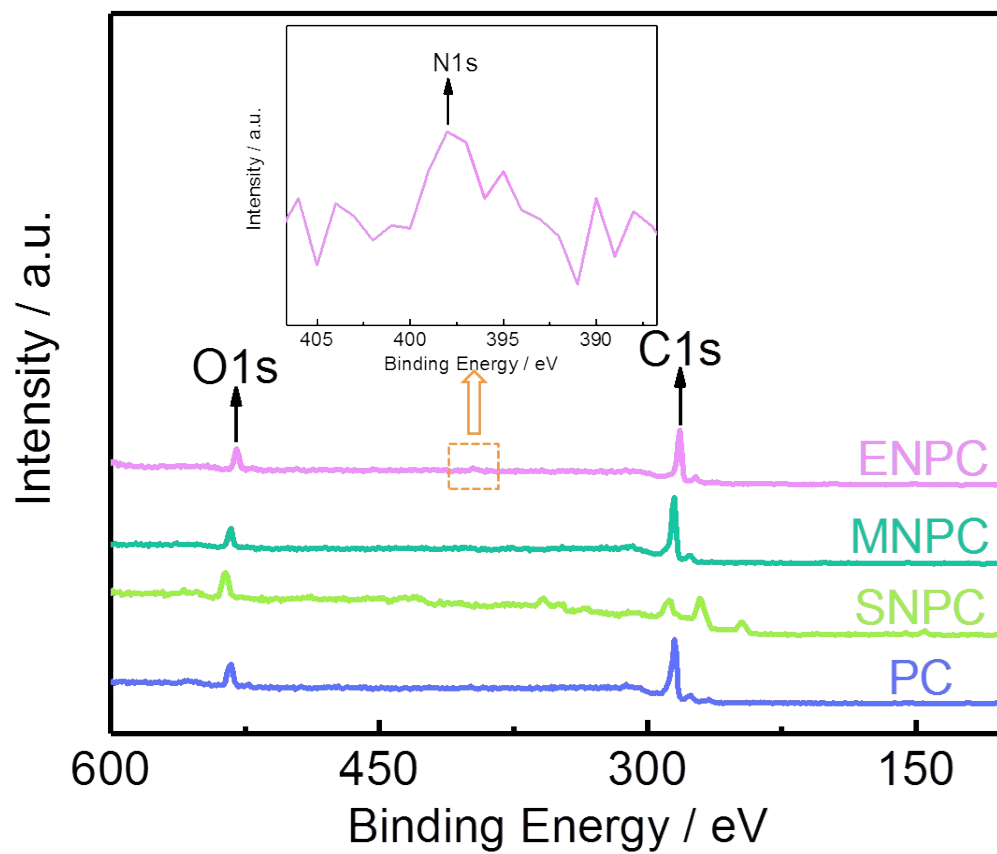


Fig. S2 Full XPS spectra of MNPC. The inset is the magnified area.

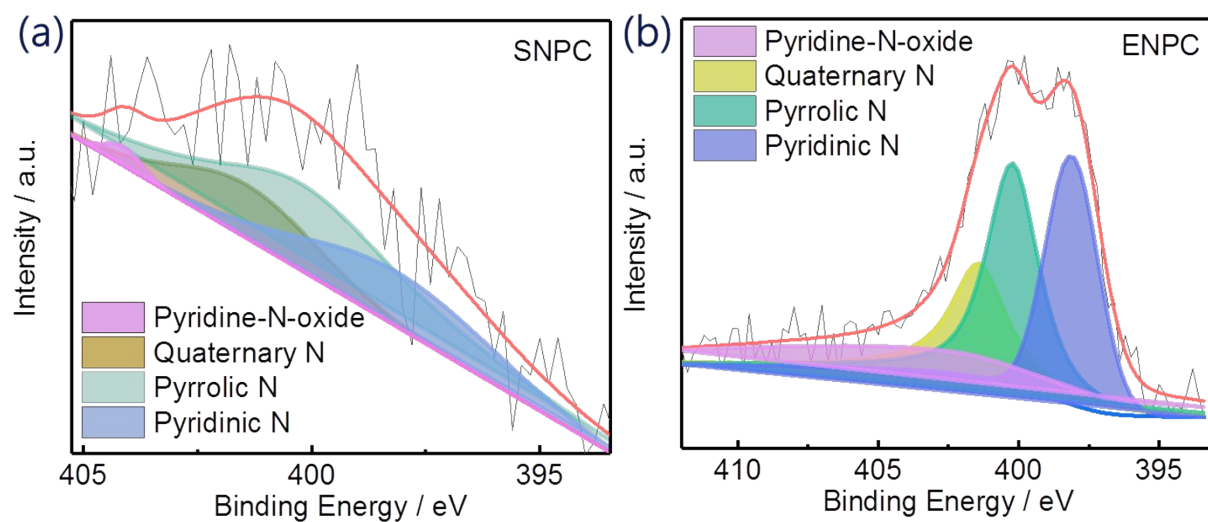


Fig. S3 High-resolution N1s spectrum of the SNPC and ENPC samples.

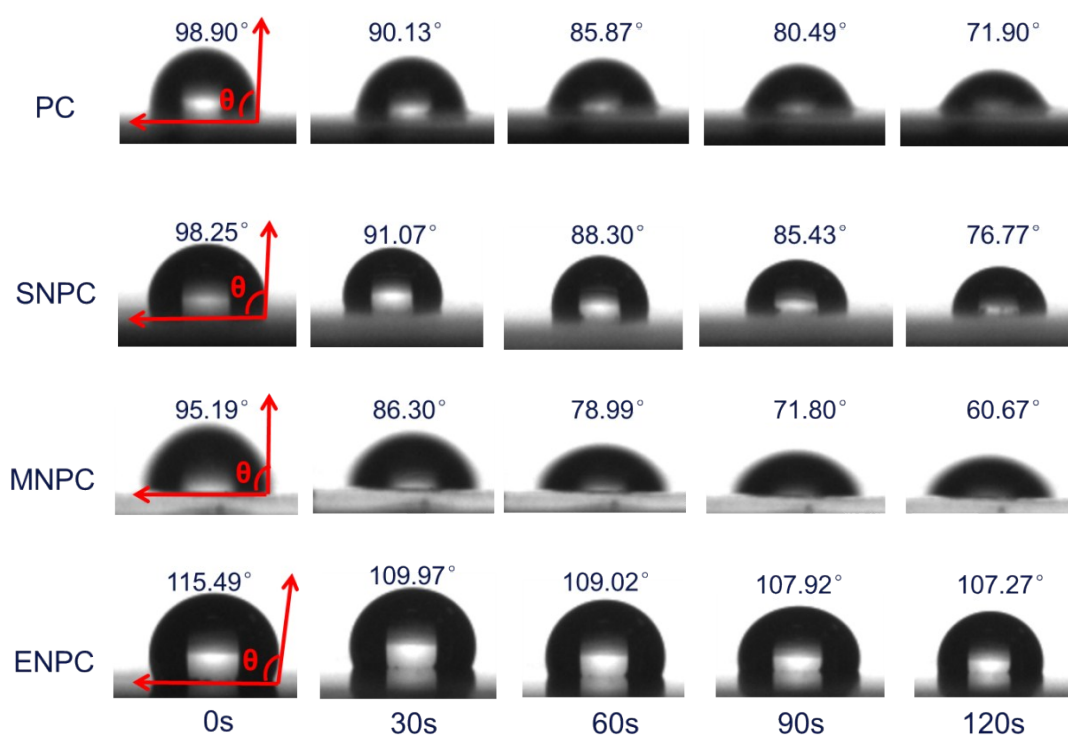


Fig. S4 Optical micrographs of the water contact angles on the surface of PC, SNPC, MNPC and ENPC electrodes as a function of contact time.

We tested the wettability of CDI electrodes. For PC, SNPC, MNPC and ENPC, we used the same electrode preparation method. The amount of binder added in the four electrodes was exactly the same, which is 10%. The final coating area of all the CDI electrodes was 60mm × 62mm. We made multiple measurements for every pair of electrodes, and finally get more reliable wettability data.

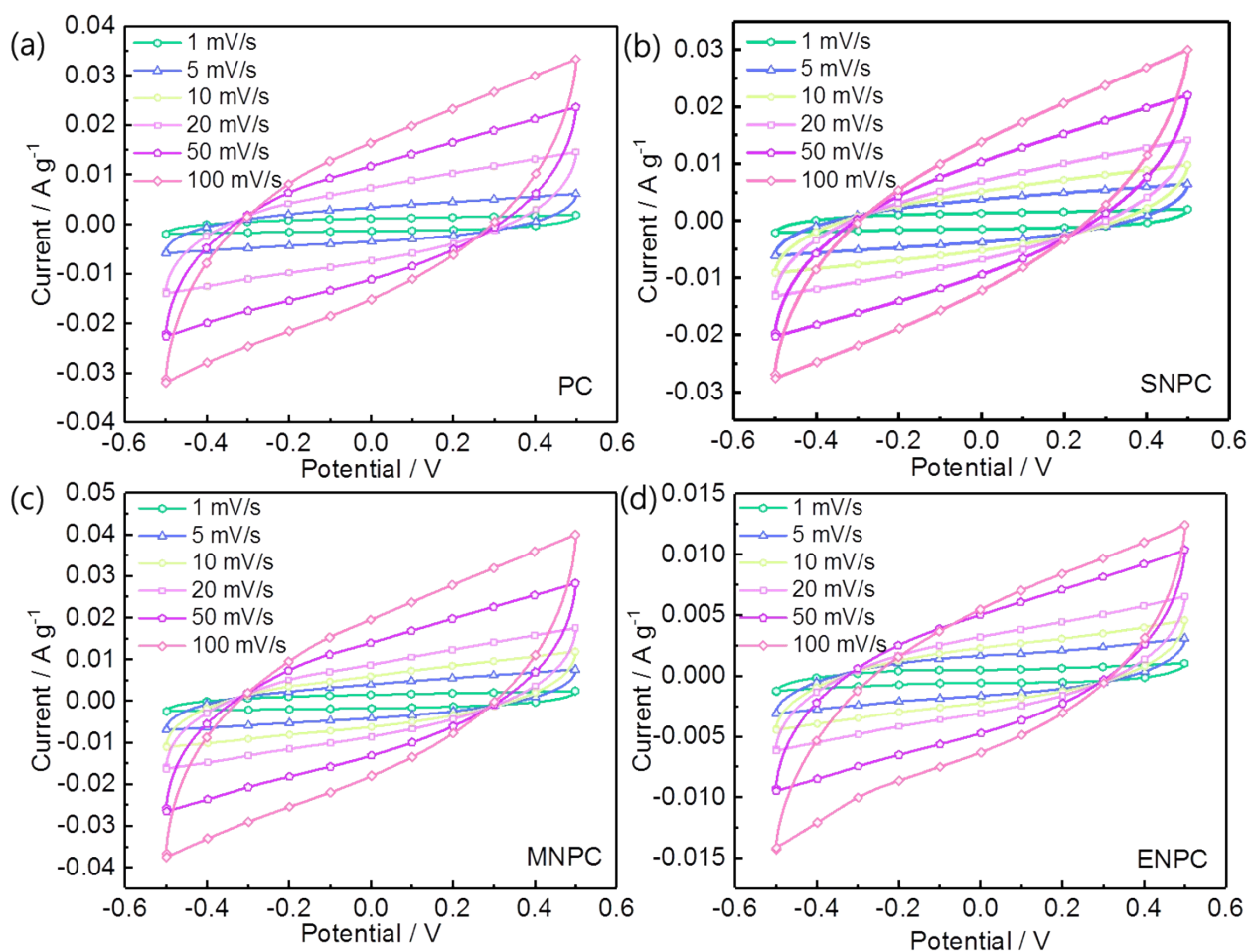


Fig. S5 Cyclic voltammograms of (a) PC, (b) SNPC, (c) MNPC and (d) ENPC electrodes at various scan rates. All the curves were obtained in a 0.5 M NaCl solution.

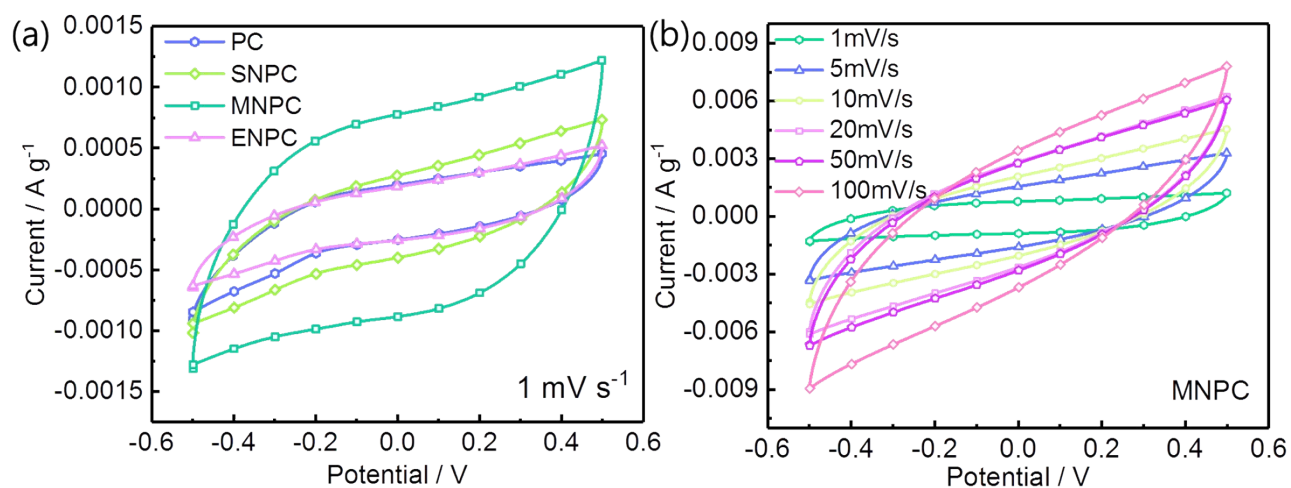


Fig. S6 Cyclic voltammograms of (a) various electrodes at a scan rates of 1 mV s⁻¹ and (b) MNPC electrodes at various scan rates in a 500 mg L⁻¹ NaCl solution.

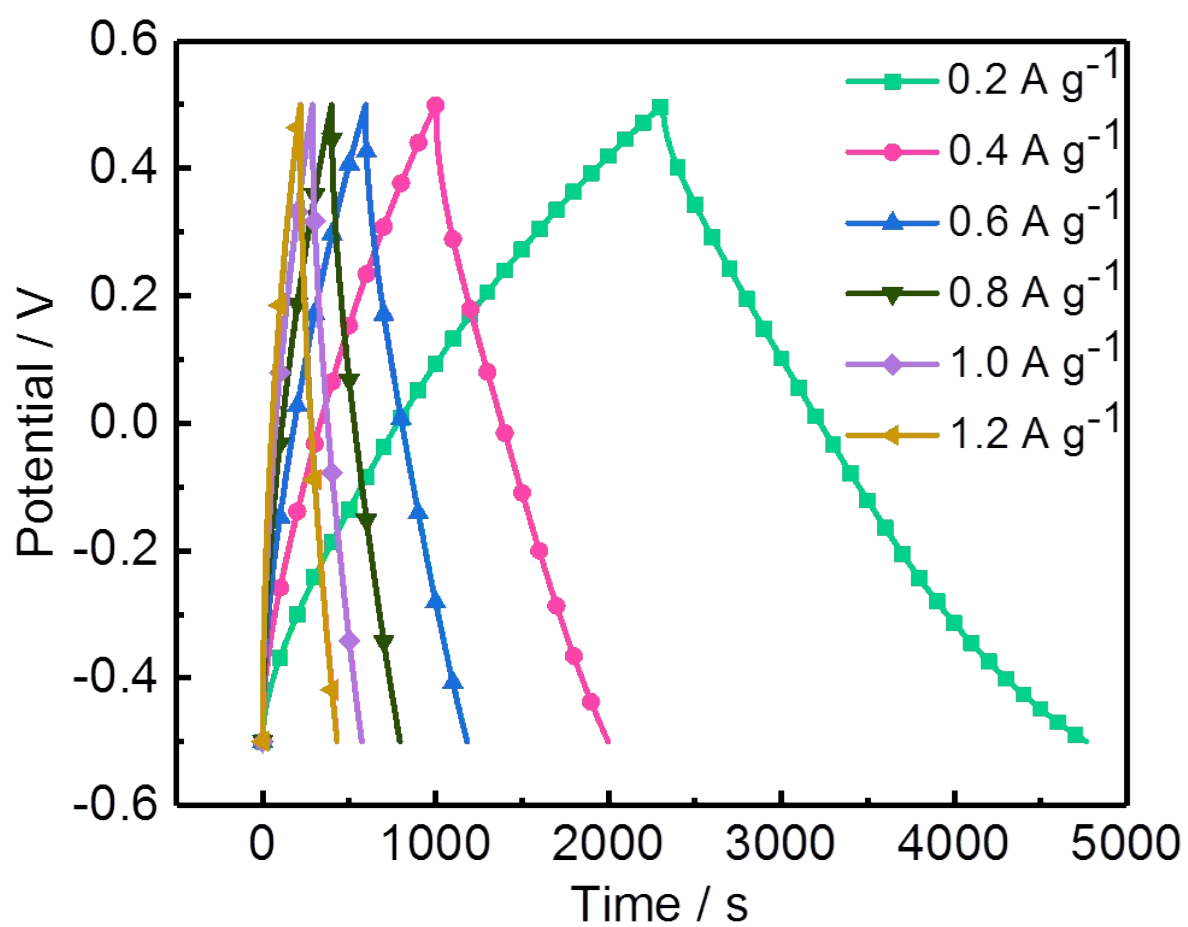


Fig. S7 GCD curves at various current densities of MNPC.

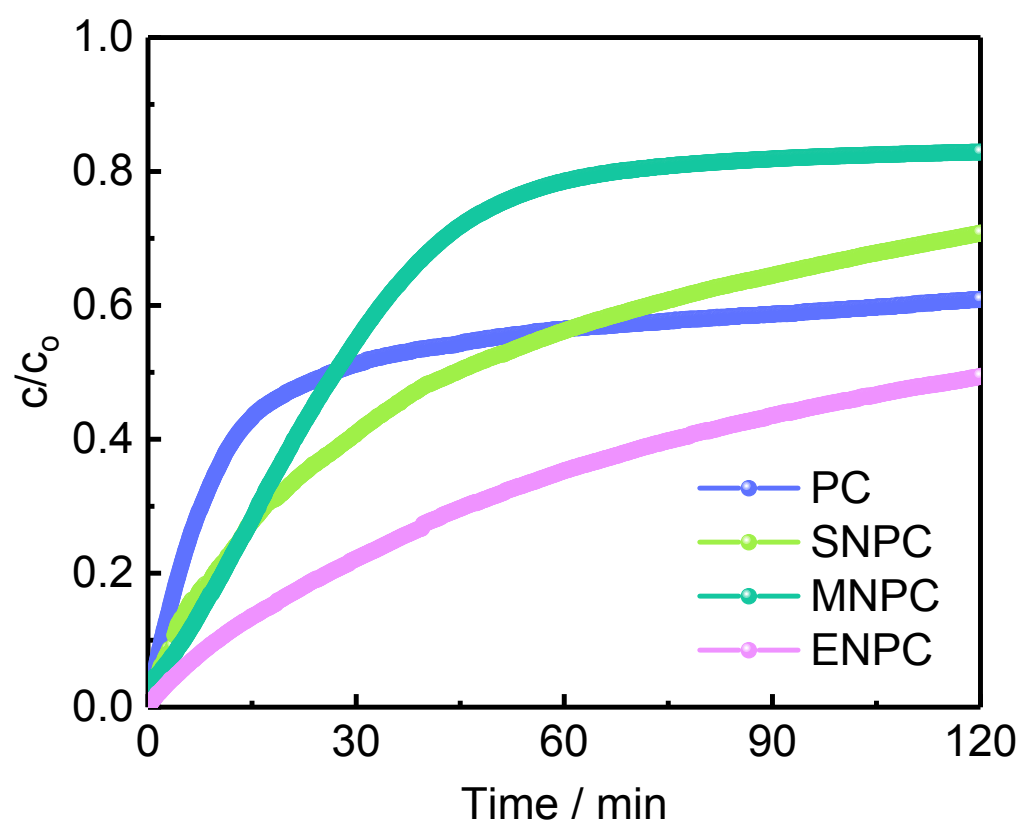


Fig. S8 Salt removal rates of PC, SNPC, MNPC and ENPC in a 50 mg L⁻¹ NaCl solution at 1.2 V.

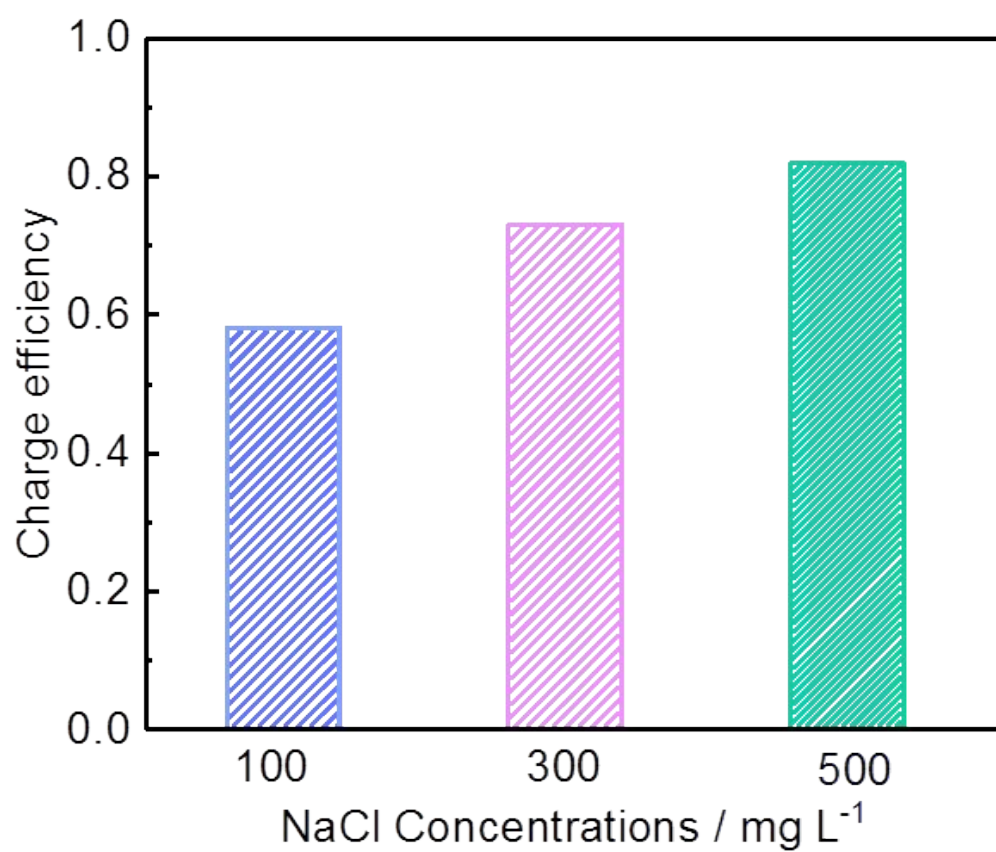


Fig. S9 Charge efficiency of MNPC electrodes in different concentration of NaCl solution at 1.2 V.

Table S1 Specific surface area and pore volume for the investigated samples.

Samples	S_{BET} ($\text{m}^2 \text{ g}^{-1}$)	S_{micro} ($\text{m}^2 \text{ g}^{-1}$)	$S_{\text{micro}}/S_{\text{BET}}$ (%)	V_{pore} ($\text{cm}^3 \text{ g}^{-1}$)	V_{micro} ($\text{cm}^3 \text{ g}^{-1}$)	$V_{\text{micro}}/V_{\text{pore}}$ (%)
PC	1185	582	49.1	0.930	0.258	27.7
SNPC	1198	723	60.3	0.905	0.309	34.1
MNPC	962	463	48.1	0.838	0.199	23.7
ENPC	356	38	10.8	0.302	0.015	5.0

Table S2 Comparison of Specific capacitance of reported carbon materials.

Electrode materials	scan rate [mV s ⁻¹]	NaCl concentration [mol L ⁻¹]	Specific capacitance [F g ⁻¹]	Ref.
Dodecahedron-like Carbon Frameworks	1	0.5	215.3	1
Nitrogen-Doped Hollow Mesoporous Carbon Spheres	1	1	179	2
nitrogen-doped cluster-like porous carbons	1	1	199.0	3
PVDF-derived porous carbon heterostructure with inserted carbon nanotube	1	1	198.9	4
Boron-nitride-carbon nanosheets	2	1	82.2	5
Nitrogen-rich microporous carbon	1	1	221.3	6
free-standing activated carbon electrodes	1	1	83	7
MNPC	1	0.5	277.7	This work

Table S3 Comparison of salt removal percentage of reported carbon materials.

Electrode materials	Applied voltage [V]	Initial NaCl concentration [g L ⁻¹]	salt removal percentage / %	Ref.
carbon-based cell	1.0	0.5	19.2	8
Flow-electrode	2.4	10	75.6	9
sulfonated carbon nanotubes	1.3	1	45.2	10
Flow-electrodes	1.2	0.2	61	11
RGO and AC composite	1.2	0.05	55	12
MNPC	1.2	0.05	83	This work

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