Supplementary information for

Different crystallographic sodium manganese oxides for capacitive deionization: performance comparison and the associated mechanism

Yubo Zhao,[a] Bolong Liang,[a] Mingzhu zong,[a] Meng Duan,[b] Kexun Li,*[a] Cuicui Lv*[a]

The College of Environmental Science and Engineering, MOE Key Laboratory of Pollution Processes and Environmental Criteria, Tianjin Key Laboratory of Environmental Remediation and Pollution Control, Nankai University, Tianjin 300071, China

[b] *North China Municipal Engineering Design & Research Institute Co., LTD, Tianjin 300071, China*

*** Corresponding author.**

E-mail addresses: likx@nankai.edu.cn (K. Li), lvcuicui870818@163.com (C. Lv).

Table S1 The surface areas, pore volume and pore diameter of the NMOs

Sample	BET surface areas (m^2/g)	Pore volume (m^3/g)	Pore diameter (nm)
T-NMO	1.86	0.0039	8.32
P-NMO	6.69	0.017	10.55
O-NMO	5.57	0.021	15.16

Table S2 Comparison of desalination capacity between the P-NMO and the recently reported pseudocapacitive materials

Material	Experimental conditions		Desalination capacity (mg/g)	Ref. no
	Applied voltage	Salt concentration		
MnO_2	1.0 V	5 mmol/L	9.93	35
MXene	1.2 V	5 mmol/L	13.0	36
$Mo_{1.33}C$/MXene	0.8	600 mmol/L	5.9	37
MoS_2	1.2 V	400 mmol/L	8.8	38
MoS_2/CNT	0.8 V	500 mmol/L	25.0	39
TiS_2/CNT	0.8 V	600 mmol/L	14.5	40
V_2O_5/CNT	0.8 V	600 mmol/L	35.7	41
GA/TiO_2	1.2 V	500 mg/L	25.0	42
$NaMnO_2$/CNT	1.2 V	500 mmol/L	32.7	24
Mg-buserite	1.2 V	15 mmol/L	37.2	43
$Na_2FeP_2O_7$	1.2 V	100 mmol/L	30.2	44
T-NMO	1.0 V	50 mmol/L	19.6	This study
P-NMO	1.0 V	50 mmol/L	49.9	This study
O-NMO	1.0 V	50 mmol/L	39.5	This study

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Table S3 Overall performance of the different crystallographic NMOs in this study and NMO-related pseudocapacitive materials in literature.

Material	Experimental conditions			Desalination capacity	Desalination efficiency	Energy consumption	Charge efficiency	Ref. no
	Voltage/current	Feed concentration	Operation mode					
T-NMO//AC	1.2 V	20 mmol/L	Constant voltage	31.2 mg/g	/	/	/	12
T-NMO//Ag	0.5 mA/cm^2	Sea water*	Constant current	/	25 %	0.29 Wh/L	/	11
T-NMO//m-TiO2 NTs	50 mA/g	3 mg/L (≈50 mmol/L)	Constant current	36 mg/g	/	/	/	16
T-NMO//T-NMO	1.0 V	50 mmol/L	Constant voltage	19.6 mg/g	/	12.83 μmol/J (0.136 Wh/L)	0.70	This study
P-NMO//P-NMO	1.0 V	50 mmol/L	Constant voltage	49.9 mg/g	/	15.25 μmol/J (0.244 Wh/L)	0.89	This study
O-NMO//O-NMO	1.0 V	50 mmol/L	Constant voltage	39.5 mg/g	/	14.06 μmol/J (0.236 Wh/L)	0.80	This study

* Na^+: 11250 mg/L, K^+: 450 mg/L, Mg^{2+}: 1400 mg/L, Ca^{2+}: 450 mg/L, Cl^-: 18500 mg/L, $SO4^{2-}$: 2750 mg/L

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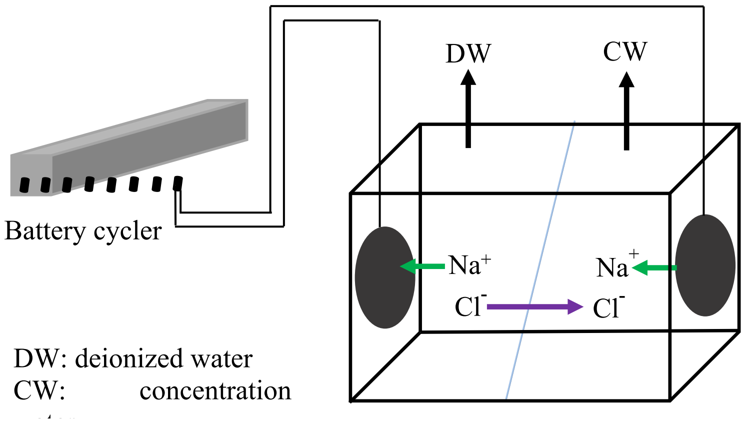

Fig. S1 Schematic diagram of the CDI cell.

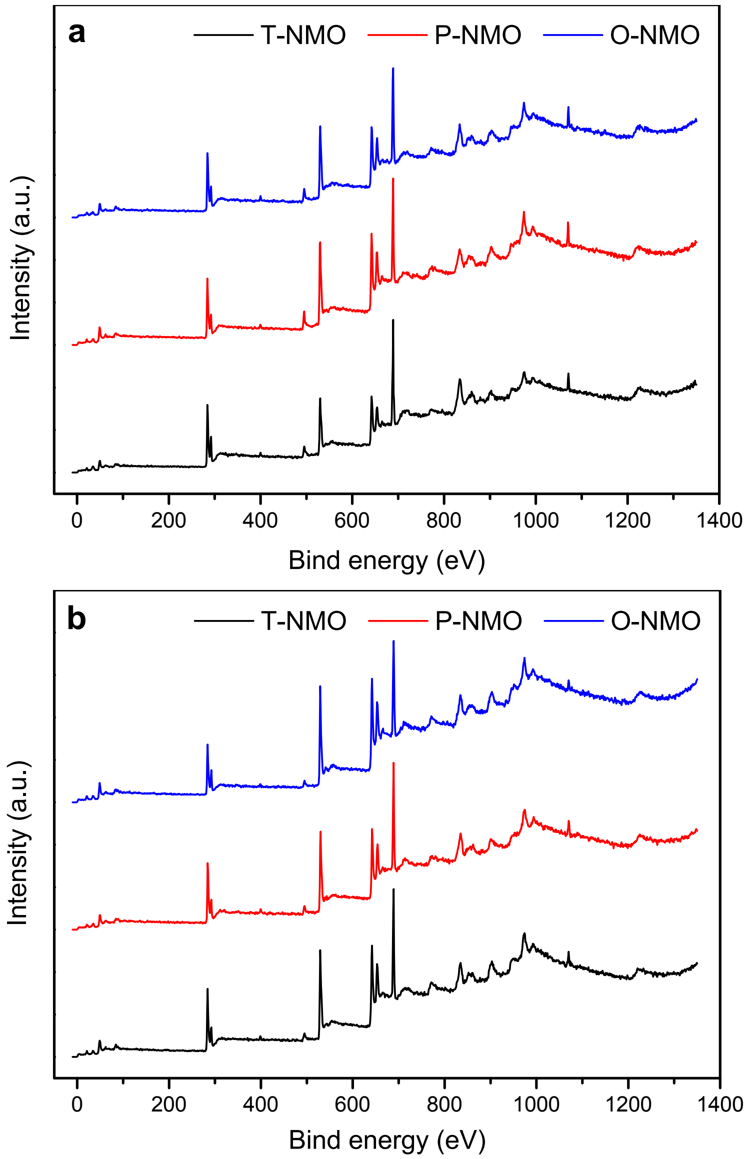

Fig. S2 Survey XPS spectra of the pre-desalination (a) and post-desalination (b) NMO samples during a typical cycle.