Supporting Information for

A Rocking Chair Desalination Battery based on Prussian Blue Electrodes

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Desalination performance of a rocking chair desalination system (Na ion removal efficiency: 25%)

The desalination process for a 25% Na ion removal efficiency was conducted at a constant current (±0.5 mA/cm^2) for 40 min. The source water (seawater) was put into the positive and negative compartments (0.3 mL at each compartment). After charging step, each solution in the positive and negative compartments was extracted and exchanged with virgin seawater (0.3 mL at each compartment). Figure S1 (a) and (b) show the voltage changes during the charging/discharging step and their corresponding voltage vs. charge capacity plot, respectively. Table 1 displays the cation and anion concentrations of source water and a treated water during the charging or discharging steps with ion removal efficiencies.

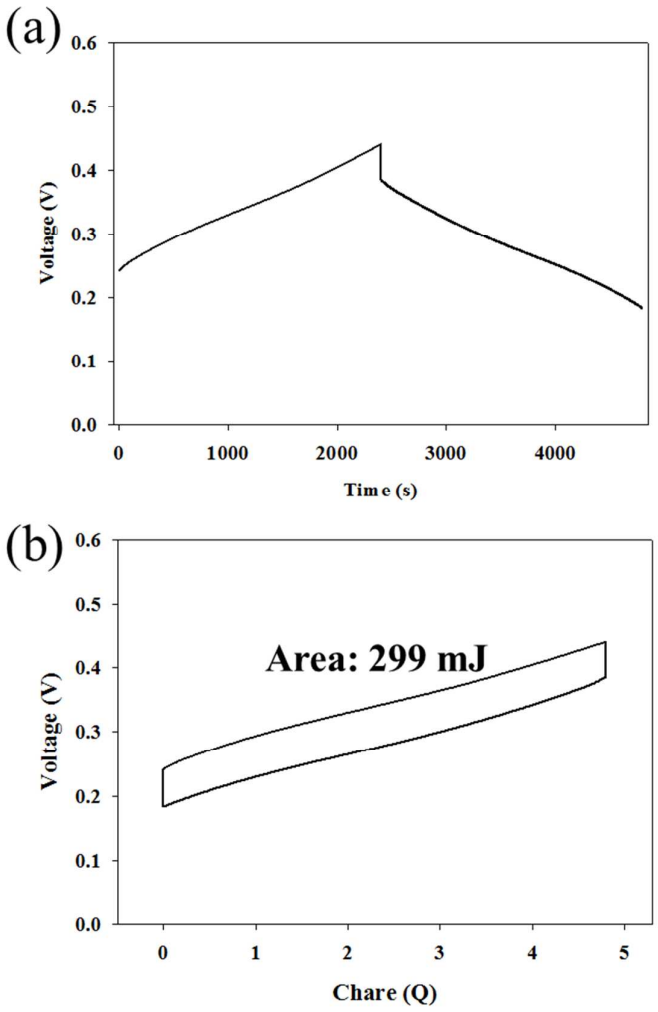

Figure S1. (a) The voltage profiles and (b) cell voltage *vs.* charge plot during the desalination cycle in seawater with a 25% removal of salt (current density: 0.5 mA/cm^2).

Table S1. The ion concentration of actual seawater and dilute solutions (25% removal efficiency of Na ion).

	Na^+	K^+	Mg^{2+}	Ca^{2+}	Cl^-	SO_4^{2-}
Seawater (mM)	477.5	10.8	58.9	11.1	512.1	31.5
Dilute solution (charging, mM)	358.7±18.4	1.7±0.6	56.7±1.5	10.6±0.1	391.0±27.1	28.1±0.5
Dilute solution (discharging, mM)	360.0±2.0	3.2±0.5	56.1±2.3	10.5±0.2	390.2±4.8	29.5±1.0
Ion removal (average, mM)	118.2	8.4	2.5	0.6	121.6	2.8
Ion removal (average, %)	24.8	77.3	4.3	5.4	23.8	8.7
Redox Potential of NaNiHCF (*vs*. SHE)[1,2]	0.59	0.69	0.60	0.59	-	-

Desalination capacity of a rocking chair desalination battery (0.5 M NaCl solution).

To investigate the maximum desalination capacity, the desalination test was conducted at a constant current operation (±0.5 mA/cm^2) with a voltage range of 0.05 to 0.85 V. 0.5 M NaCl solution was supplied for evaluating the maximum desalination capacity of a rocking chair desalination battery. Figure S2 shows the cell voltage *vs*. time plot during the operation and Table S2 represents the ion concentration of sodium and chloride ions of source water and treated water.

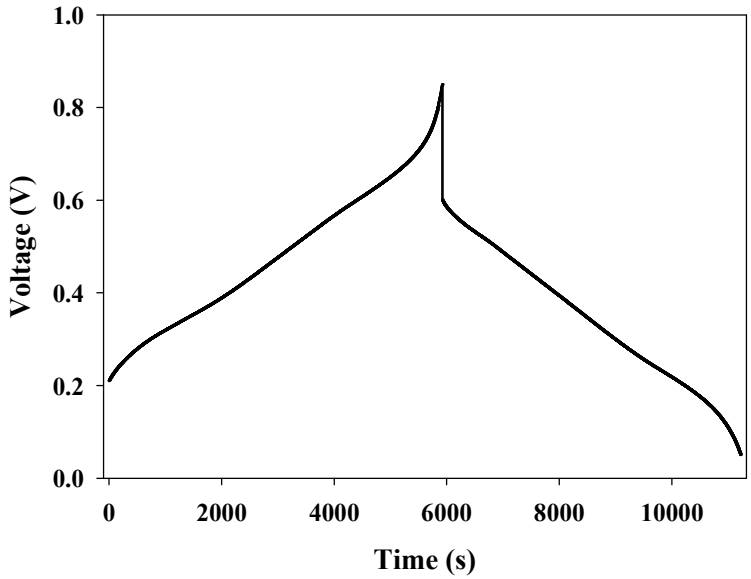

Figure S2. The voltage *vs.* time plot of the rocking chair desalination battery within a voltage range of 0.05 to 0.85 V in a 0.5 M NaCl aqueous solution.

Table S2. The ion concentration of source water and dilute solution (desalination capacity test in 0.5 M NaCl solution).

	Na^+	Cl^-
Source water (mM)	500.0	500.0
Dilute solution (charging, mM)	209.6±4.4	197.9±2.0
Dilute solution (discharging, mM)	198.3±3.3	198.2±4.7
Ion removal (average, mM)	296.1	302.0
Ion removal (average, %)	59.2	60.4

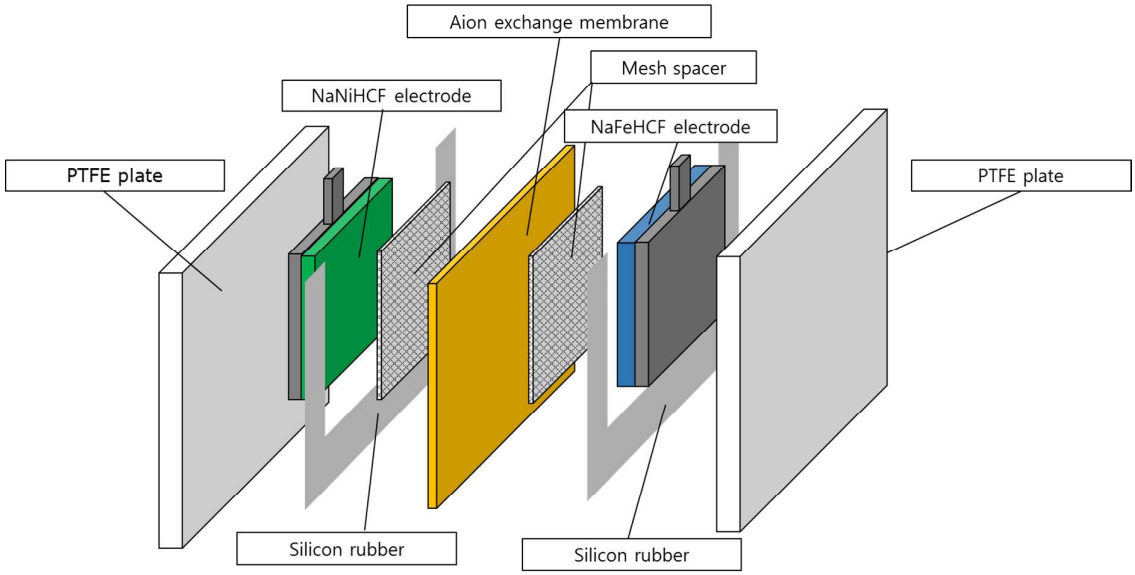

Figure S3. Illustration of a rocking chair desalination battery.

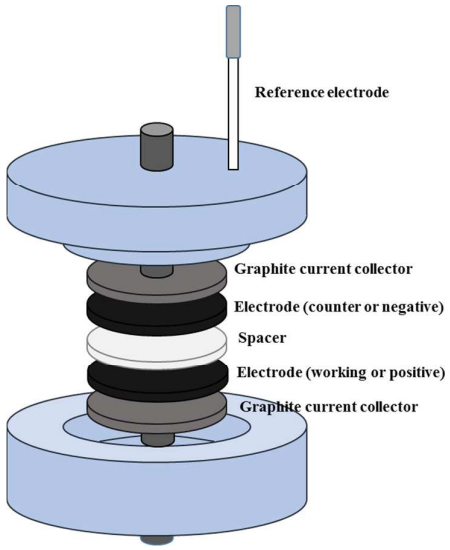

Figure S4. Illustration of an electrochemical cell.

Reference

1. Wessells, C. D.; Peddada, S. V.; Huggins, R. A.; Cui, Y. Nickel Hexacyanoferrate Nanoparticle Electrodes for Aqueous Sodium and Potassium Ion Batteries. *Nano lett.* **2011**, *11*, (12), 5421-5425.
2. Wang, R. Y.; Wessells, C. D.; Huggins, R. A.; Cui, Y. Highly Reversible Open Framework Nanoscale Electrodes for Divalent Ion Batteries. *Nano lett.* **2013**, *13*, (11), 5748-5752.