Supporting Information for

Boost Energy Efficiency and Power performance of Neutral Aqueous Organic Redox Flow Batteries

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Table S1. Energy efficiency (EE) and capacity utilization at 40, 80, and 100 mA/cm^2 for 0.5 M (13.4 Ah/L theoretical capacity) **FcNCl/MV** AORFBs using various anion ion exchange membranes and supporting electrolytes.

AORFBs	40 mA/cm^2		80 mA/cm^2		100 mA/cm^2	
	EE (%)	Capacity utilization (Ah/L)	EE (%)	Capacity utilization (Ah/L)	EE (%)	Capacity utilization (Ah/L)
DSV/NaCl	82.7	11.8	70.0	11.6	61.9	11.31
AMV/NaCl	72.1	11.6	51.1	11.5	42.2	11.13
ASV/NaCl	58.9	9.7	31.0	7.4	20.0	0.3
DSV/KCl	85.0	12.0	72.8	11.7	67.1	11.7
AMV/KCl	76.0	12.5	56.5	11.3	47.9	11.7
ASV/KCl	62.1	10.3	34.9	8.7	23.1	3.8

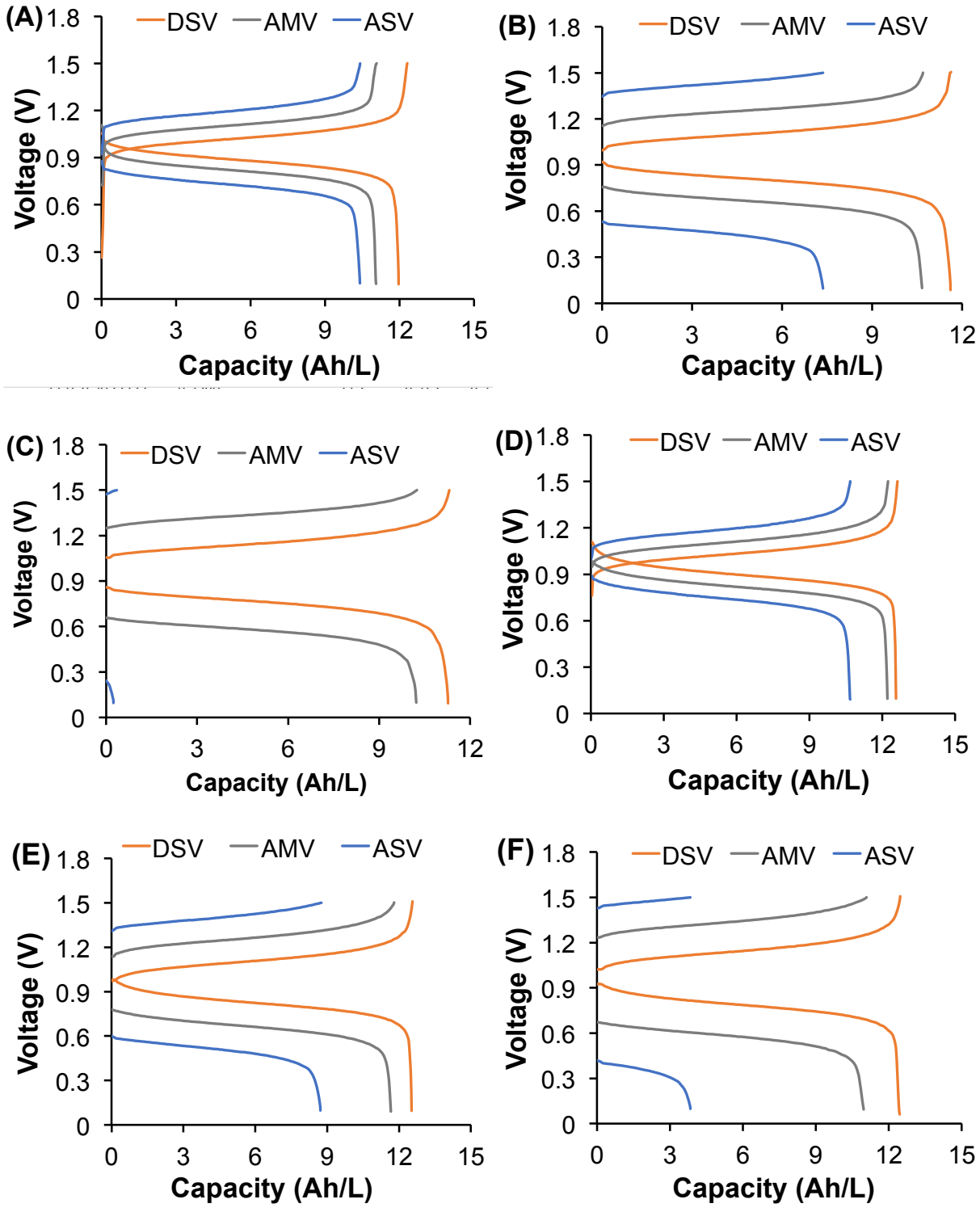

Figure S1. Representative voltage profile vs capacity of the **FcNCl/MV** AORFBs recorded at 40, 80, and 100 mA/cm^2 with various membranes using NaCl or KCl supporting electrolyte: (A) 40

mA/cm^2, NaCl; (B) 80 mA/cm^2, NaCl; (C) 100 mA/cm^2, NaCl; (D) 40 mA/cm^2, KCl; (E) 80 mA/cm^2, KCl; (F) 100 mA/cm^2, KCl.

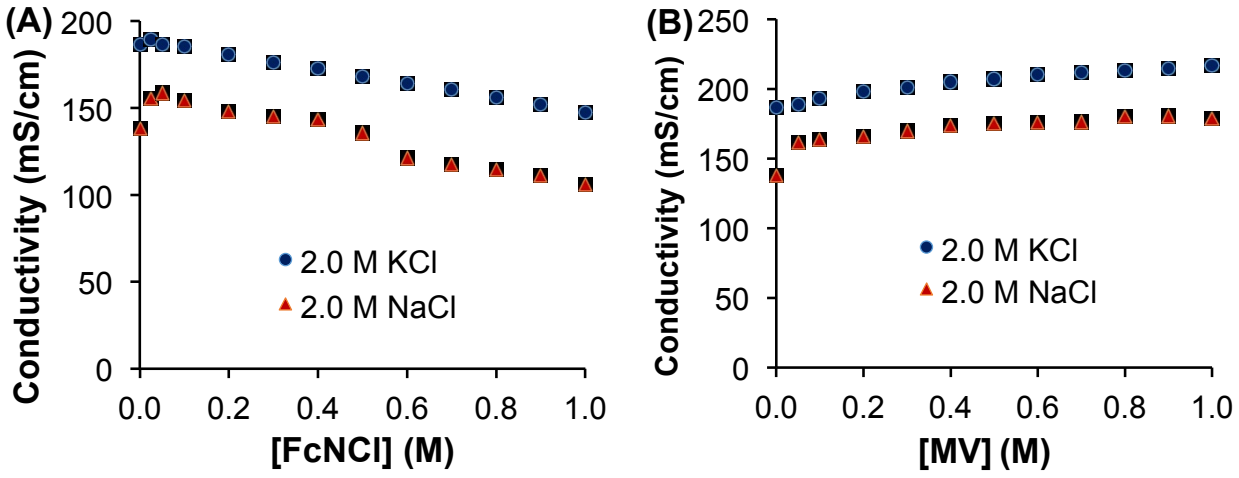

Figure S2. Conductivity measurement of **FcNCl** (A) and **MV** (B) from 0 to 1.0 M in 2.0 M KCl or 2.0 M NaCl solutions at room temperature.

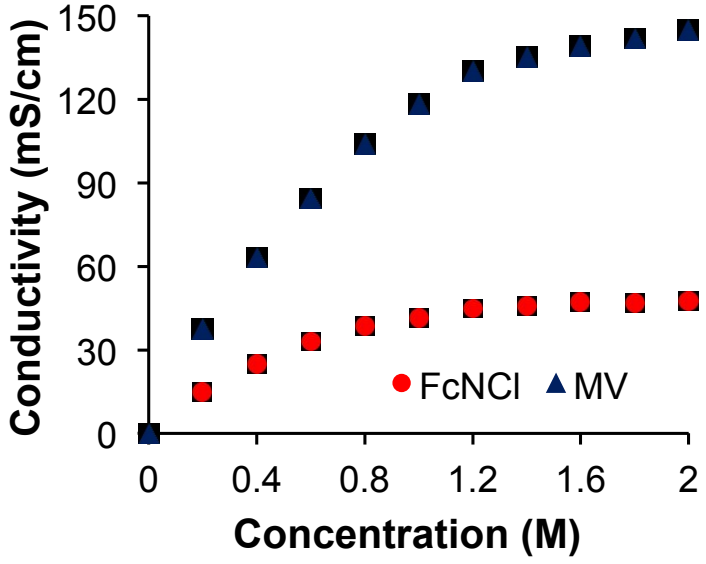

Figure S3. Conductivity dependence vs concentration of **FcNCl** and **MV** solutions without supporting electrolyte.

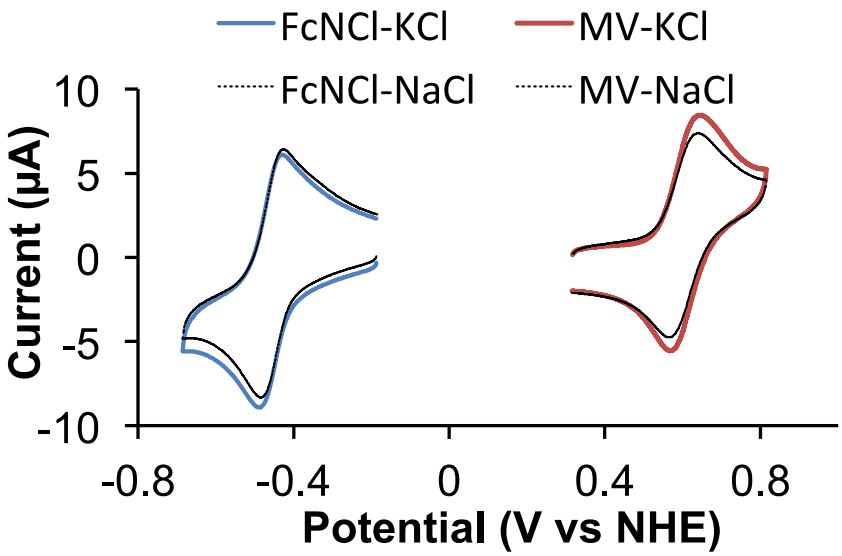

Figure S4. Cyclic voltammograms of FcNCl (0.6 V, blue trace) and MV (-0.45 V, red trace) in 0.5 M KCl. The dashed curves are the cyclic voltammograms of FcNCl and MV in 0.5 M NaCl,

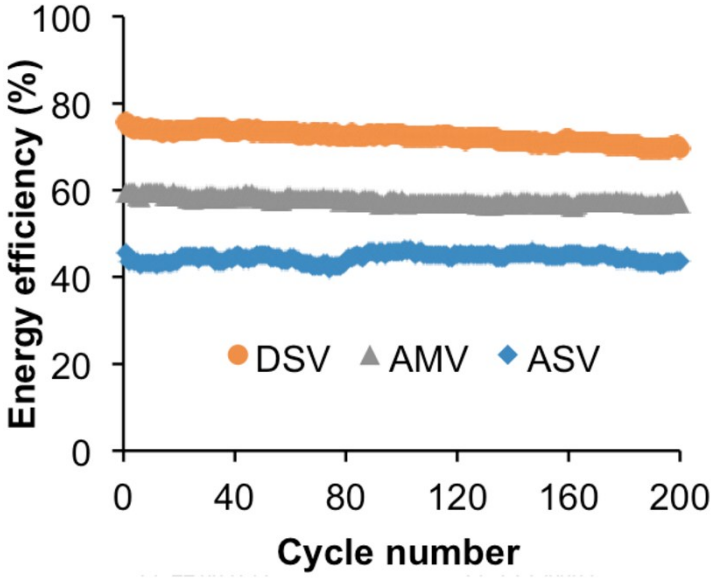

Figure S5. Plots of energy efficiency vs cycling numbers at 60 mA/cm^2 for the 0.5 M FcNCl/MV AORFBs using DSV, AMV, and ASV membranes using 2.0 M NaCl supporting electrolyte.

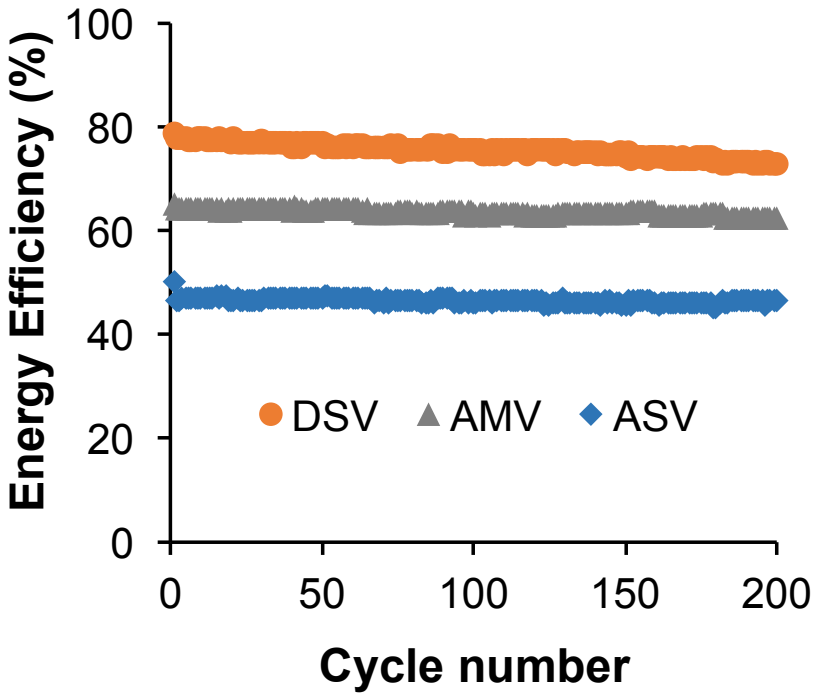

Figure S6. Plots of energy efficiency vs cycling numbers at 60 mA/cm^2 for the 0.5 M FcNCl/MV AORFBs using DSV, AMV, and ASV membranes using 2.0 M NaCl supporting electrolyte.