

Supplementary materials

Readily-accessible m-ferrocenyl-phenyl sulfonate as novel cathodic electrolyte for aqueous organic redox flow batteries

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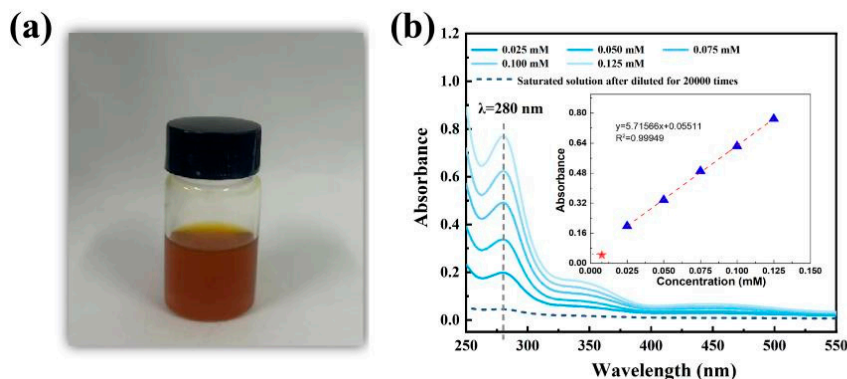


Figure S1. Photos of 10 mM BASFc in 0.5M Na₂SO₄ aqueous solution after 3 days(a) UV spectrum and concentration standard curve of BASFc in 0.5M Na₂SO₄(b)

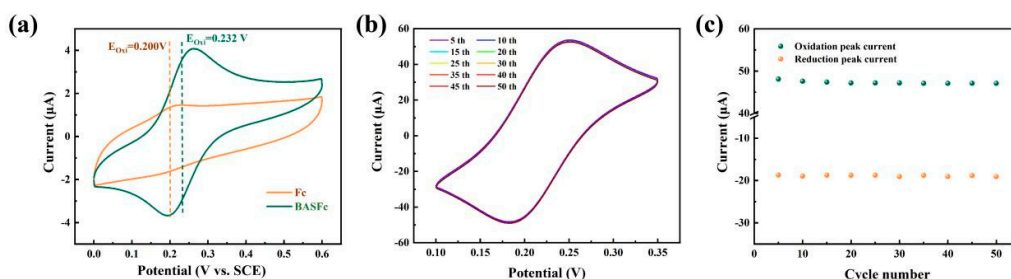


Figure S2. CV curves of saturated Fc and 0.5 mM BASFc in 0.5 M Na₂SO₄ (a) CV curves for 50 consecutive cycles (b) and peak current attenuation with the number of scans in 0.5M Na₂SO₄ (c)

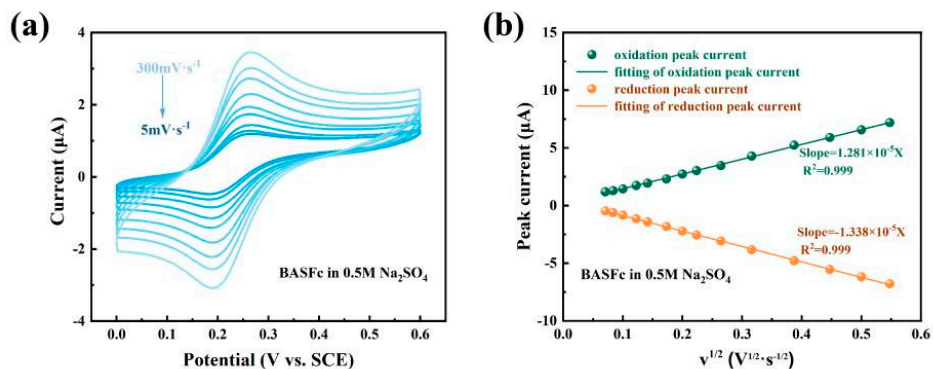


Figure S3. CV curves at different scan rates(a) of 0.5 mM BASFc and the linear relationship between the peak current and the square root of scan rate in 0.5M Na₂SO₄ (b)

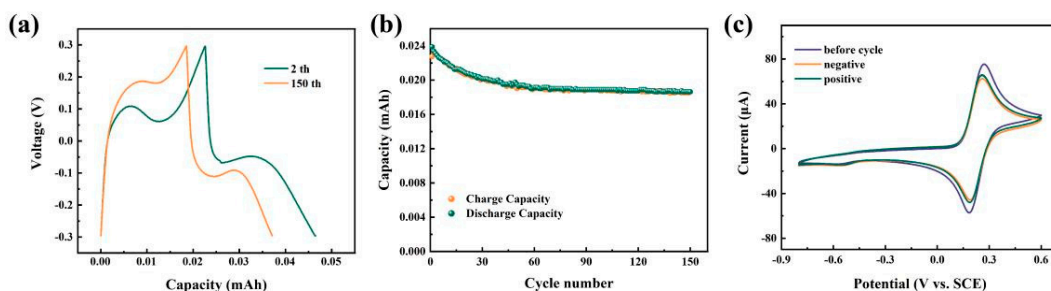


Figure S4. Charge-discharge curves for the flow battery with 10 mM BASFc + 0.5 M Na₂SO₄ (10 mL) as cathode and anode at 5 mA cm⁻² of 2nd and 150th cycles (a) Curve of charge-discharge capacitance attenuation of the cell at 1 mA cm⁻² during 150 continuous charge and discharge cycles(b) CV curves of the positive BASFc electrolyte before and after charging-discharging(c)

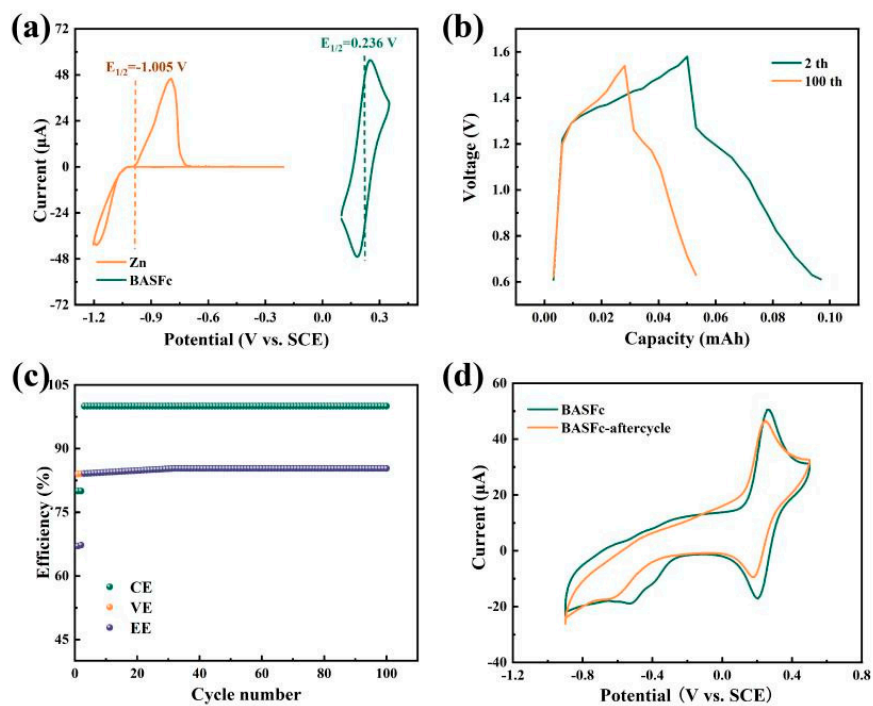


Figure S5. CV curves of 3 mM BASFc and zinc in 0.5M Na_2SO_4 (18 mL) (a) Charge-discharge curves for the flow battery with 3 mM BASFc + 0.5 M Na_2SO_4 (18mL) as cathode and Zn plate in 1M ZnSO_4 (18 mL) as anode at 5 mA cm^{-2} of 2nd and 100th cycles (b) CE,VE and EE (c) of the cell at 10 mA cm^{-2} during 100 continuous charge and discharge cycles; CV curves of the positive BASFc electrolyte before and after charging-discharging

Table S1. Electrochemical kinetics data of BASFc and other ferrocene derivatives in aqueous solutions.

Compound	electrolyte	k_0 (cm s ⁻¹)	D (cm ² s ⁻¹)
QP-Fc[Error! Reference source not found.2]	1M NaCl	0.011	4.45×10^{-6}
QB-Fc[Error! Reference source not found.2]	1M NaCl	0.0179	3.89×10^{-6}
QH-Fc[Error! Reference source not found.2]	1M NaCl	0.0179	3.88×10^{-6}
BQP-Fc[Error! Reference source not found.2]	1M NaCl	0.0054	3.73×10^{-6}
BQB-Fc[Error! Reference source not found.2]	1M NaCl	0.0037	3.16×10^{-6}
BQH-Fc[Error! Reference source not found.2]	1M NaCl	0.0017	2.40×10^{-6}
BTMAP-Fc[Error! Reference source not found.7]	1M NaCl	0.014	3.1×10^{-6}
Fc-SO ₃ Na[29]	0.5 M Na ₂ SO ₄	0.0106	3.17×10^{-6}
Fc-SO ₃ NH ₄ [30]	1M NaCl		3.79×10^{-8}
	1 M NH ₄ Cl		3.20×10^{-8}
C1-FcNCl[33]	1 M NH ₄ Cl	0.126	6.80×10^{-6}
C2-FcNCl[33]	1 M NH ₄ Cl	0.288	6.10×10^{-6}
C3-FcNCl[33]	1 M NH ₄ Cl	0.193	5.78×10^{-6}
HEFc-HP-β-CD[38]	1M NaCl	0.00831	1.87×10^{-6}
HEFc-HP-β-CD[38]	1M NaCl	0.0122	2.12×10^{-6}
HMFc-HP-β-CD[38]	1M NaCl	0.037	2.22×10^{-6}
Zn[Fc(SPr) ₂] [39]	0.5 M NH ₄ Cl	0.116	3.84×10^{-6}
imidazolium ferrocene bis(sulfonate) salts [40]	1 M H ₂ SO ₄	0.0105	1.102×10^{-6}
This work	0.5 M Na ₂ SO ₄	0.00595	7.28×10^{-8}
	1 M H ₂ SO ₄	0.0105	2.27×10^{-7}

References

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