FLUXXII

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www.flux12.com

Madison, Wisconsin

COMPANY INTRODUCTION

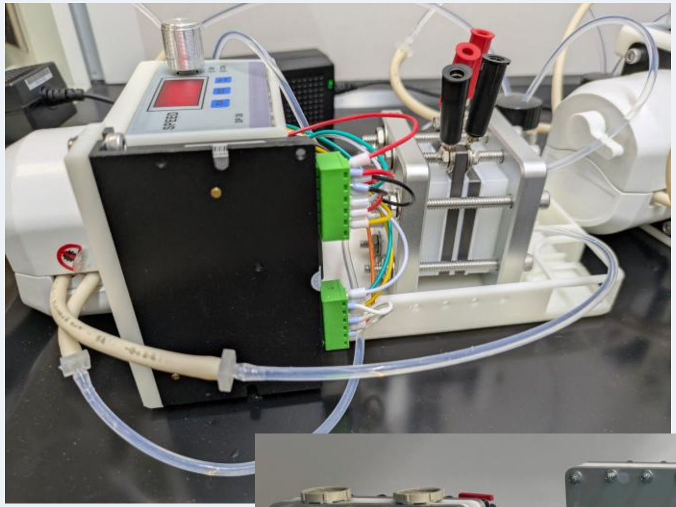
Membrane & Electrolyte Technology and Manufacturing

2023
FOUNDNG YEAR

USA, CHINA
GEOGRAPHY

10+
EMPLOYEES

$4.725m
FUNDING



OUR INVESTORS

Grantham Foundation for the Protection of the Environment

WARF Wisconsin Alumni Research Foundation

desai ventures

gener8tor

Activate

LIQUIDMETAL VENTURES

SAFAR PARTNERS

Collab Fund

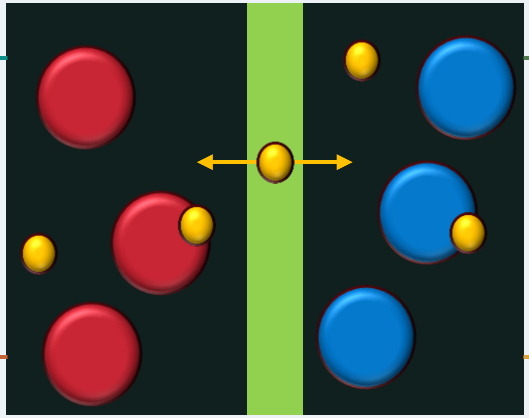
GIGASCALE CAPITAL

Membrane is a Key to Unlocking Next-Gen Flow Batteries

Ion-Exchange Membrane

Electrolyte Stability

Redox Crossover



Power Performance

Membrane Cost

Standard VRFB

Electrolyte	48.2%
Stack (exclude membrane)	19.0%
Membrane	6.3%
BOP	17.3%
Electronics & Controls	5.6%
Manufacturing, Shipping, Installation	3.6%
Total	100.0%

Low-Cost Electrolyte

Electrolyte	20.5%
Stack (exclude membrane)	29.1%
Membrane	9.7%
BOP	26.5%
Electronics & Controls	8.6%
Manufacturing, Shipping, Installation	5.5%
Total	100%

Assumptions: 100 MW / 6-hour, $110/m^2 membrane, Low-Cost Electrolyte is $50/kWh

Each Electrolyte System Has Specific Membrane Requirements

Vanadium

Challenge Oxidative stability

Affect Degradation and failure

Alkaline

Challenge Hydroxide stability

Affect Degradation and failure

pH Neutral

Challenge Ion conductivity

Affect Low power density

Asymmetric

Challenge Redox species crossover

Affect Capacity loss

Universal Considerations: mechanical strength, aerial cost, environmental policy

High-Throughput Screening of Membrane Design Space

1 Monomer Selection
Stability, Cost

2 Polymerization Parameters
Mechanical, Selectivity

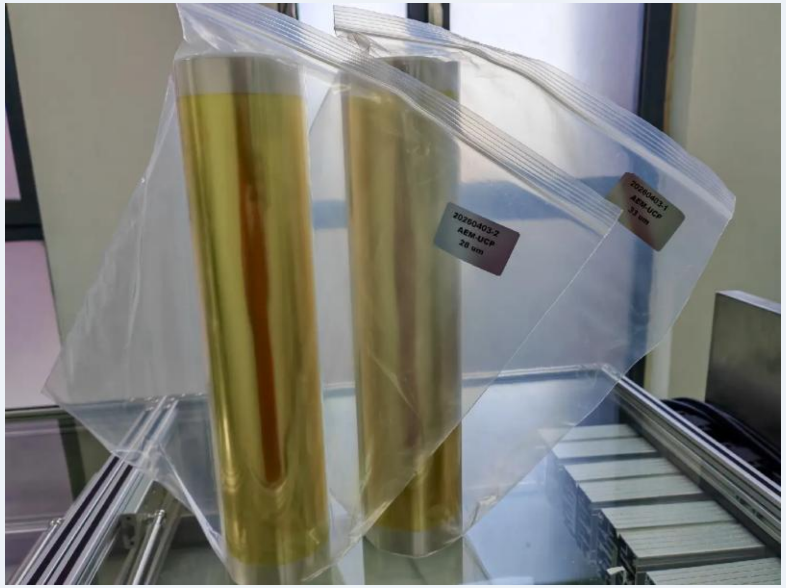
3 Ionic Functionalization
Resistance, Selectivity

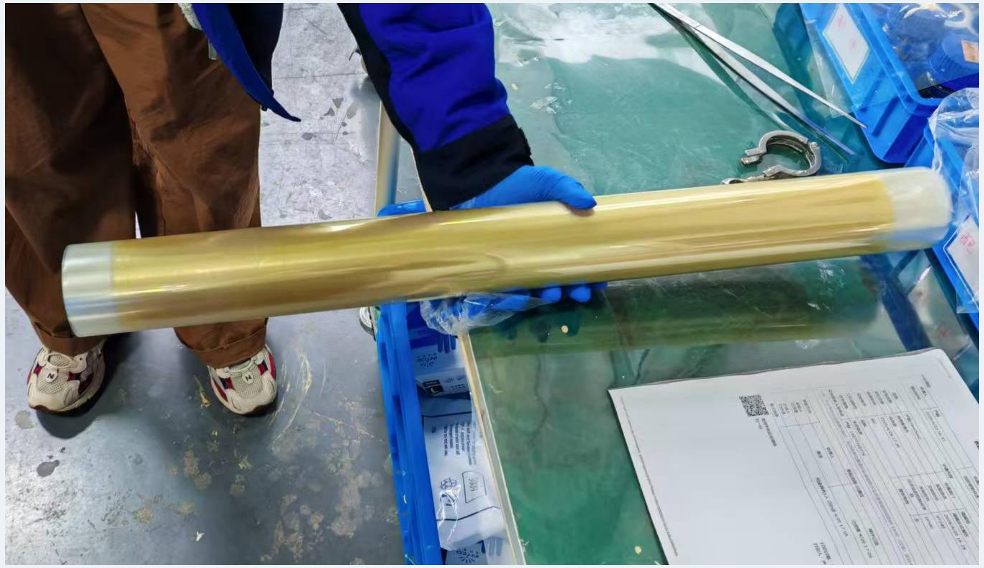
4 Resin Pre-Treatment
Mechanical, Selectivity

5 Casting Parameter
Mechanical, Resistance

6 Membrane Post-Treatment
Mechanical, Selectivity

1st-Generation Universal FX-AEM Specifications



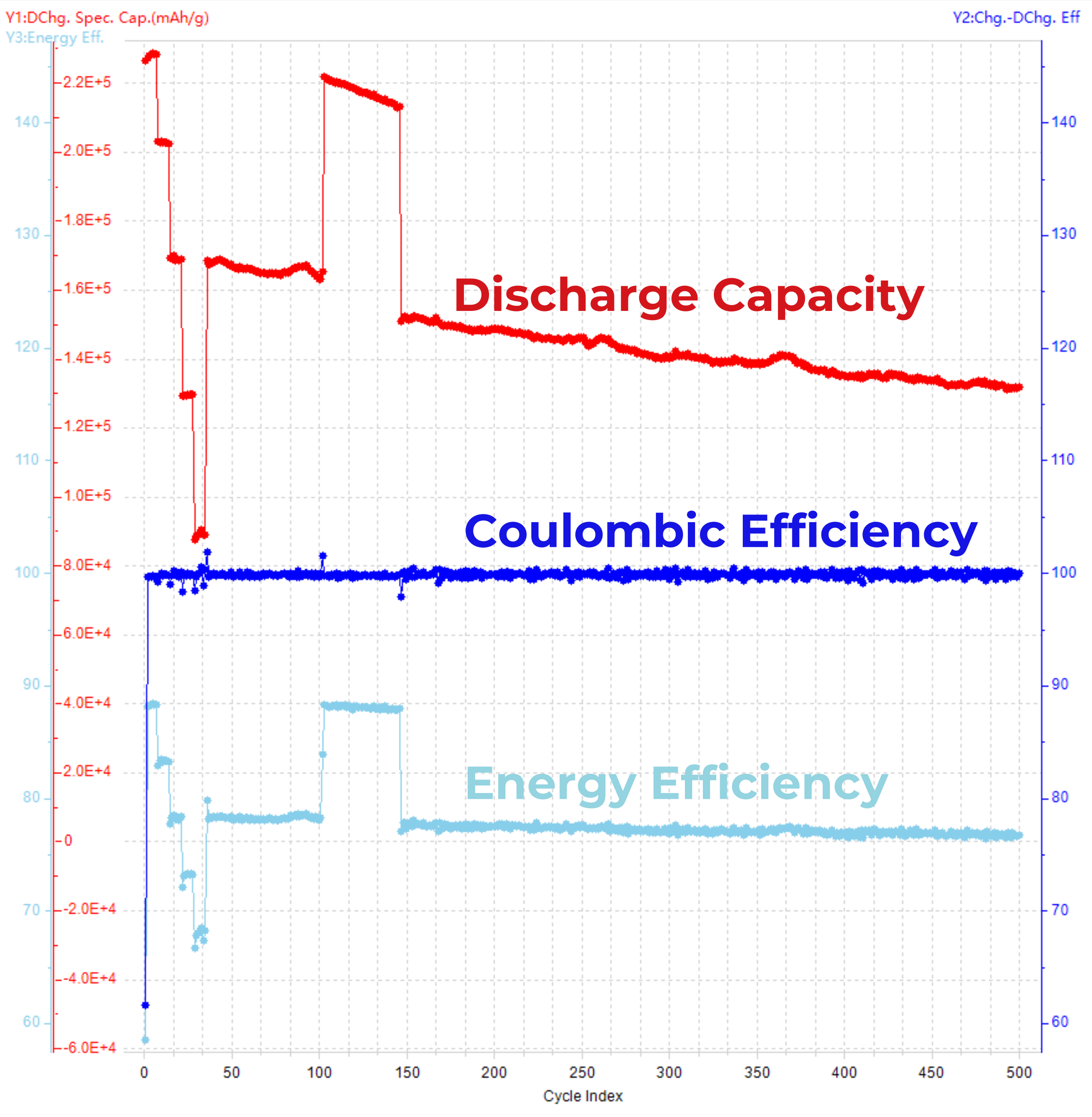


	Thickness (um)	Crossover (% per day)	Resistance (Ω/cm²)	Water Uptake (wt%)	Swelling Ratio	Tensile Strength (MPa)	Elongation at Break (%)
AEM - 1	40	~0.06 (FX-A-1)	0.99 (1M KCl)	22.9%	6.9%	45	43
AEM - 2	40	~0.14 (FX-A-1)	0.78 (1M KCl)	24.0%	9.6%	19.8	15.5

1^{st}-Generation FX-AEM-2 Vanadium Cell Performance

Coulombic Efficiency	Highest Selectivity, Limited Self-Discharge
Energy Efficiency	Comparable, Stable, Next-Gen Improvements
Stability	No Degradation or Failure, Lowest Rebalance Rate

			Current Density (mA/cm^2)				
			80	120	160	200	240
CEM	FS930	CE	95.16	96.37	96.88	97.17	97.34
		VE	92.08	88.27	84.62	81.03	77.67
		EE	87.62	85.07	81.97	78.73	75.6
AEM	FAP-450	CE	98.62	99.03	99.27	99.29	99.36
		VE	88.81	83.79	78.88	73.9	68.67
		EE	87.58	82.98	78.3	73.38	68.23
	FAPQ-330	CE	98.67	99.06	99.29	99.36	99.48
		VE	90.66	86.35	82.11	77.93	73.65
		EE	89.45	85.54	81.53	77.43	73.27
	FLUX AEM -2	CE	99.91	99.84	99.83	99.77	99.73
		VE	88.63	83.53	78.53	73.6	68.45
		EE	88.55	83.39	78.4	73.42	68.27



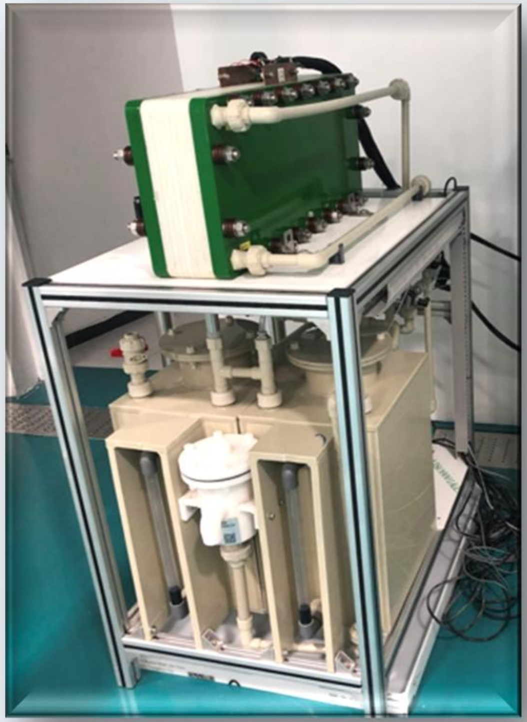
1st-Generation FX-AEM-2 FLUX Electrolyte Stack Performance

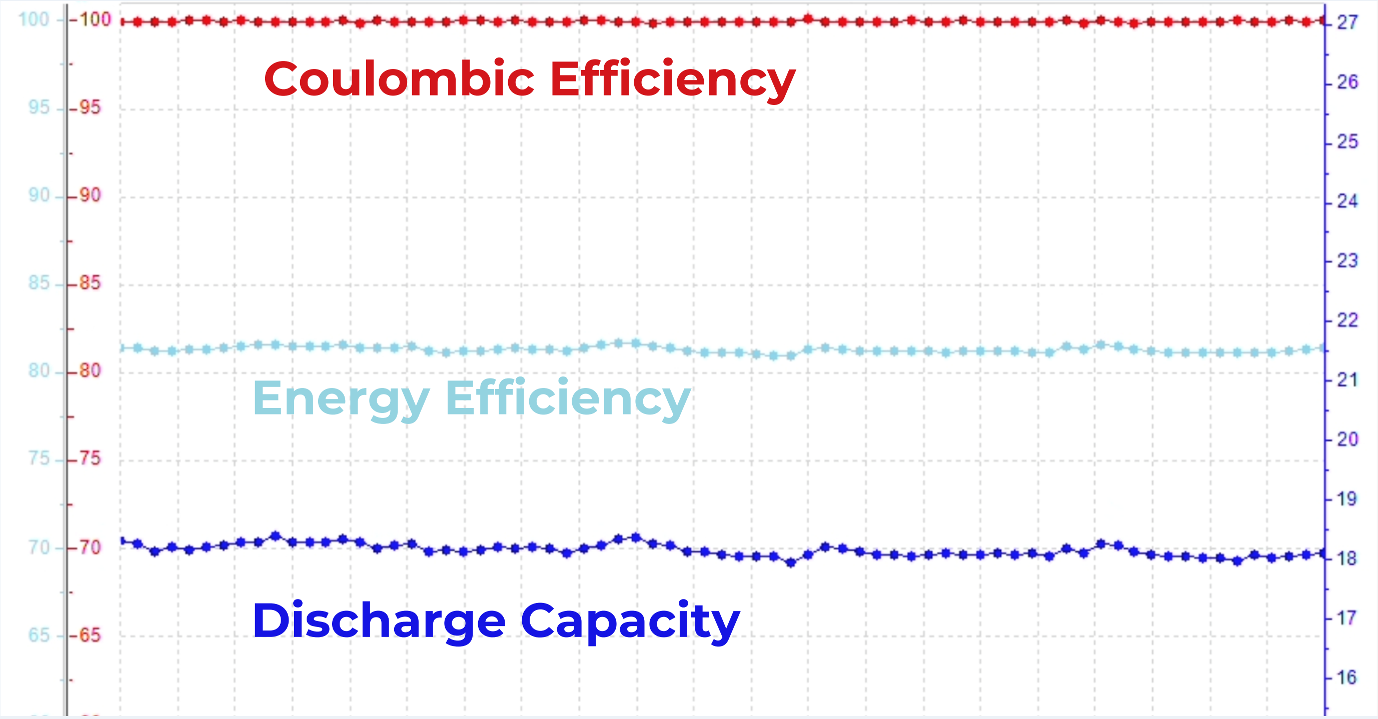
Electrolyte — All Aqueous Organic
pH Neural

Stability — Stable Efficiency / Resistance,
No Clogging or Degradation

Coulombic Efficiency — ~100.0% avg.,
~0.0% Crossover

Energy Efficiency — ~50% Current Density VRFB,
Next-Gen Improvements





0~100 Cycles

Next-Generation FX-IEMs Designed for Specific Electrolytes

Vanadium

Tuning	Higher Power AEM & CEM
Affect	Improved EE%

Alkaline

Tuning	Base-Stable AEM & CEM
Affect	Long-Lifetime Cycling

pH Neutral

Tuning	Higher Power AEM & CEM
Affect	>80% VE of VRFB

Asymmetric

Tuning	High Selectivity
Affect	Block Redox Crossover

Q3 2026 Release of Targeted FX-IEMs for Customer Testing