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Sandia National Laboratories

# Sandia Flow Battery Prototyping and Testing

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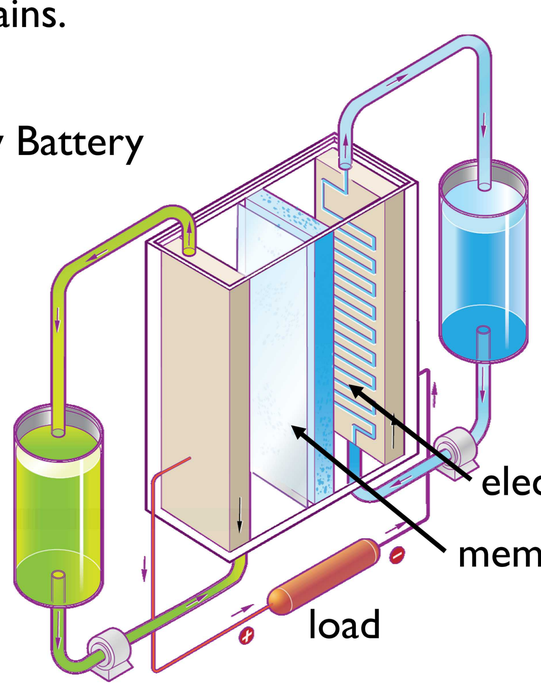
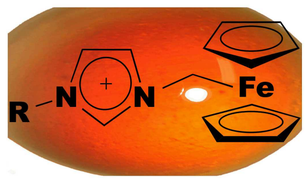
Redox flow batteries decouple energy density and power density, providing the design flexibility needed for secure, reliable grid-scale storage. The understanding gained from our fundamental materials research in electrolytes, membranes, and cell design has enabled significant performance gains.

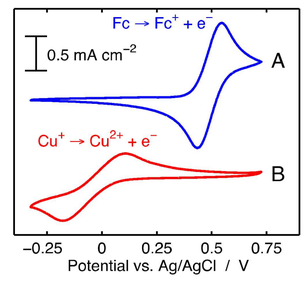
Typical Redox Flow Battery

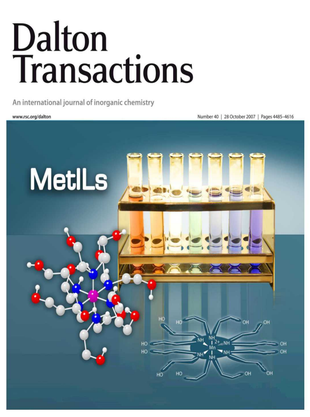


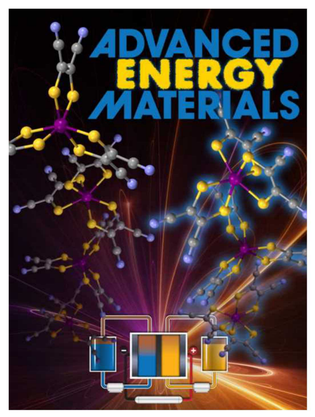

## Electrolytes

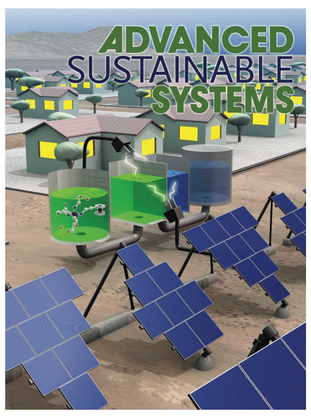
Electrolytes are the rechargeable "fuel" of a redox flow battery. We are actively researching novel, energy dense chemistries that transcend the 1.5 V limitation of water.



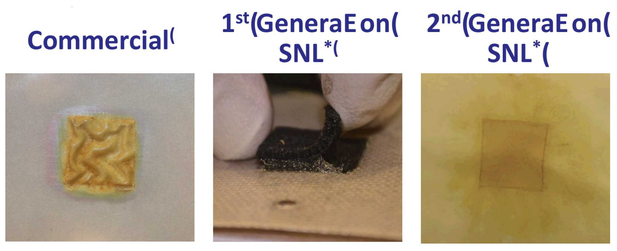



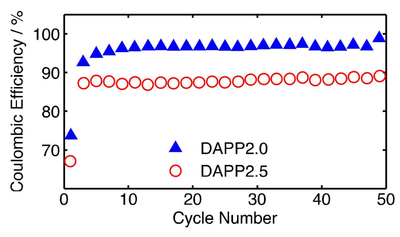




## Membranes

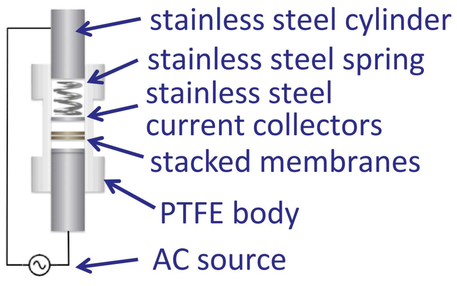
Membranes prevent mixing of anolyte and catholyte. We have developed chemically robust membranes with increased ionic conductivity that minimize mixing of anolyte and catholyte.

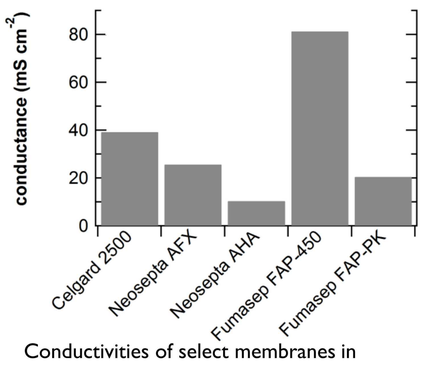



Tuning membrane composition to maximize efficiency




### Membrane Conductivity Cell

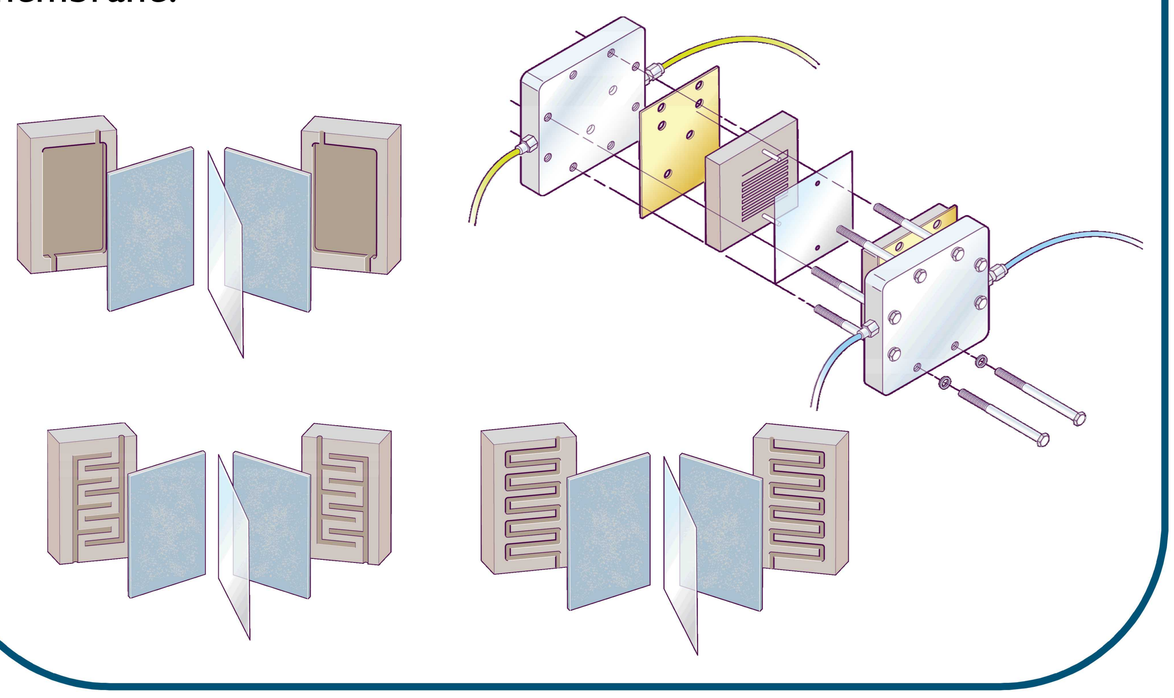


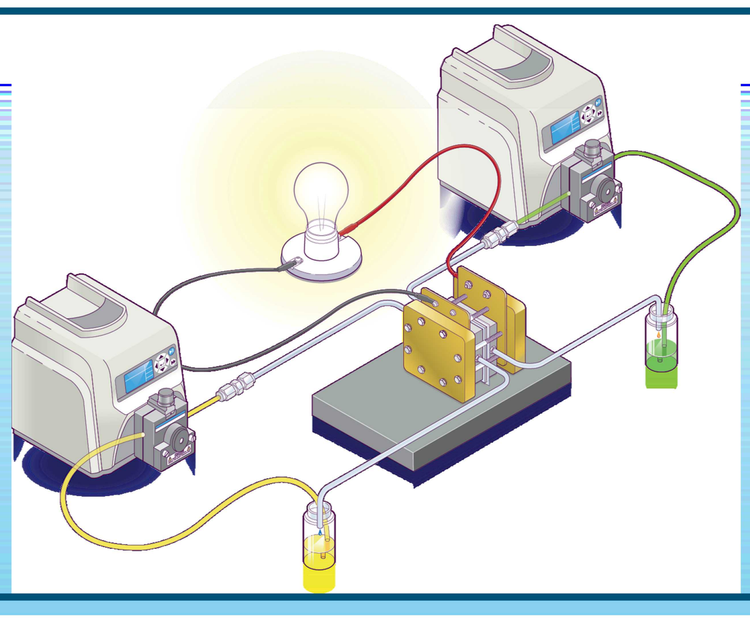

Conductivities of select membranes in propylene carbonate

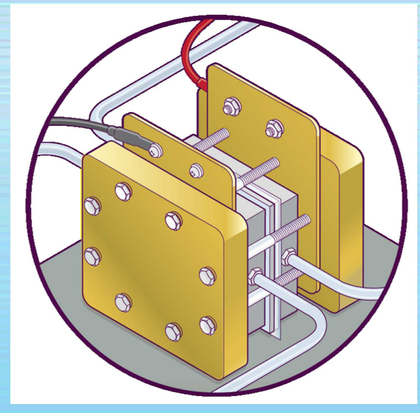
## Cell Design

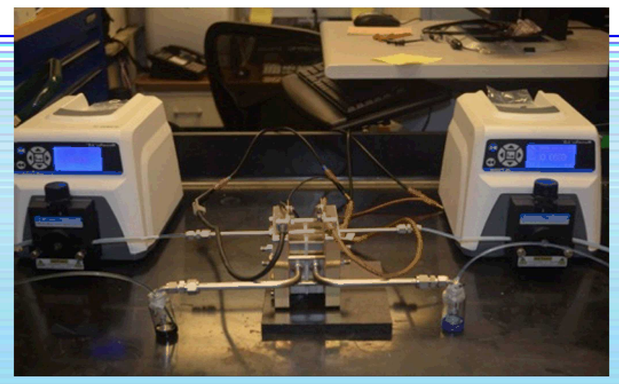
Flow fields in the electrochemical cell can alter battery performance. We are optimizing these flow fields for improved electrochemical performance and minimal stresses on the membrane.



## Prototyping







Lab Scale Prototype

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National Nuclear Security Administration

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