Harvard Department of Chemistry & Chemical Biology
Sustainable Innovations
HARVARD School of Engineering and Applied Sciences

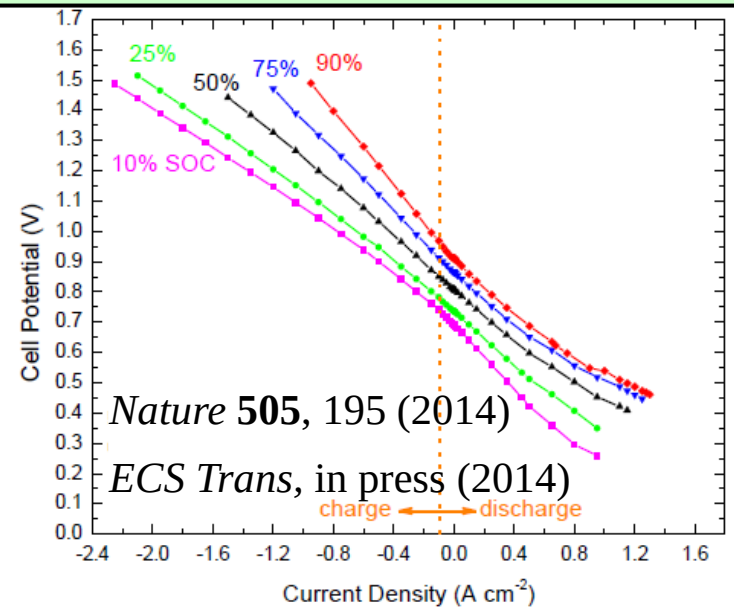
Roy G. Gordon, Alán Aspuru-Guzik Trent M. Molter Michael J. Aziz

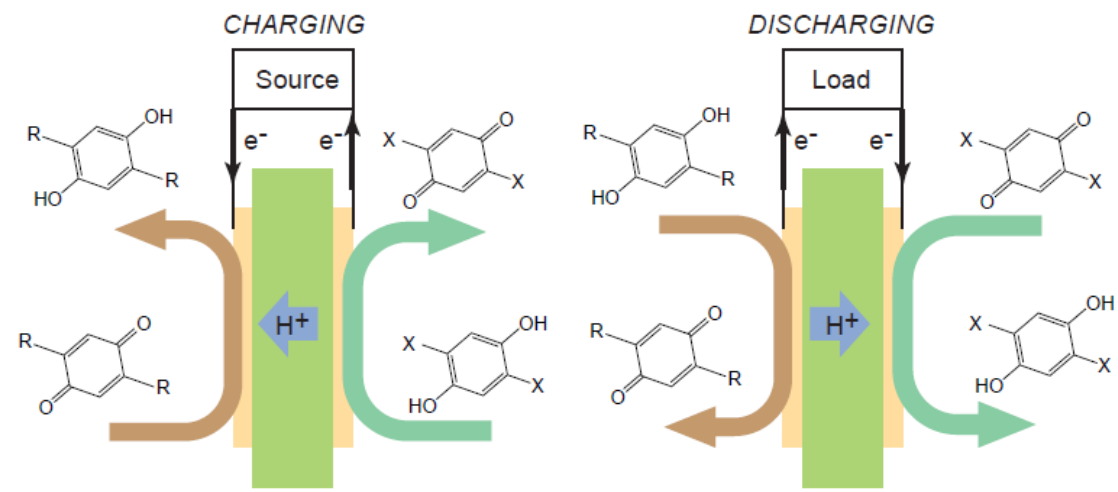
Small Organic Molecule Based Flow Battery

Technology Summary

Molecules that readily protonate / deprotonate in aqueous solution

Low chemicals cost:	**Enables low cost/kWh**
Rapid redox kinetics:	**Enable low cost/kW**
Small org. molecules:	**Enable inexpensive separator**
All-liquid storage:	**Enable inexpensive BOS & high cycle life**
Aqueous electrolyte:	**Enables fireproof operation**
Non-toxic:	**Opens residential & commercial markets**





Quinone-Bromide chemistry in hand:
- →cost of chemicals at scale: <$27/kWh
- →peak power density: > 600 mW/cm^2
- →carbon paper electrodes
- →no catalyst
- →1000x faster kinetics than VO_2^+/VO^{2+}
- →capacity retention >99.8% / cycle (700 cycles)
- →current efficiency: >98.3%
- →Open Circuit Voltage > 1 Volt (refined chemistry)

Quinone-Quinone chemistry under development:
- →Open Circuit Voltage > 1 Volt
- →Peak power density > 50 mW/cm^2

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