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High power all-organic batteries

PhD student: Rebecka Löfgren, rebecka.lofgren@angstrom.uu.se

Supervisors: Martin Sjödín

Project funded by:





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Cycle of organic batteries

- Recycling and combustion



- Biomass

- Battery utilization



- Synthesis

- Battery fabrication



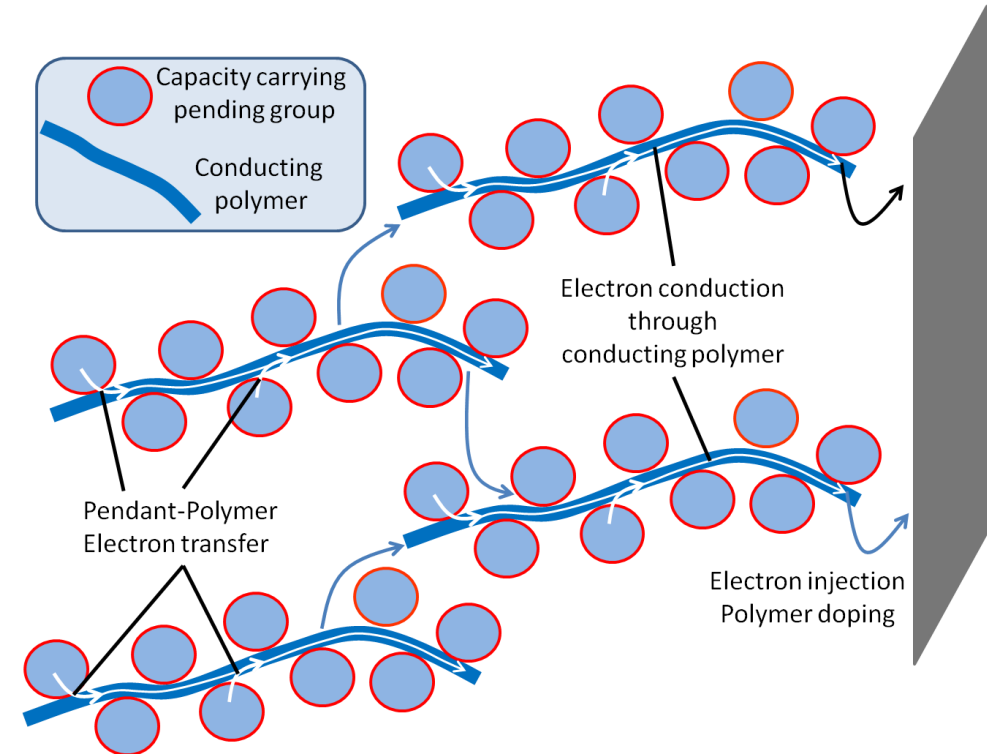


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Conducting redox polymers

- Conducting redox polymers (CRP) consist of a conducting polymer backbone and a redox active pendant group.
- Why use quinone based CRP?
 - High electronic conductivity
 - High charge capacity
 - Tunable properties
 - Ability to cycle both metal ions and protons



Schematic image of CRP.



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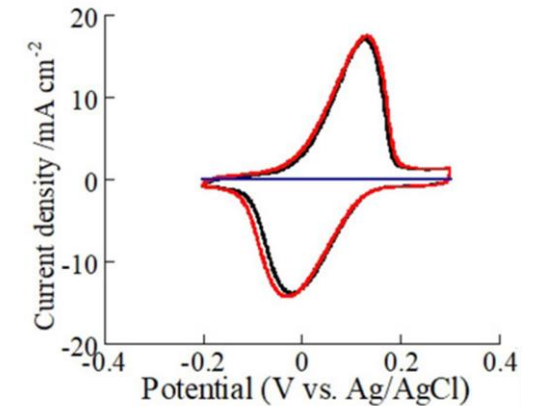
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Addition of CRP on porous carbon substrate

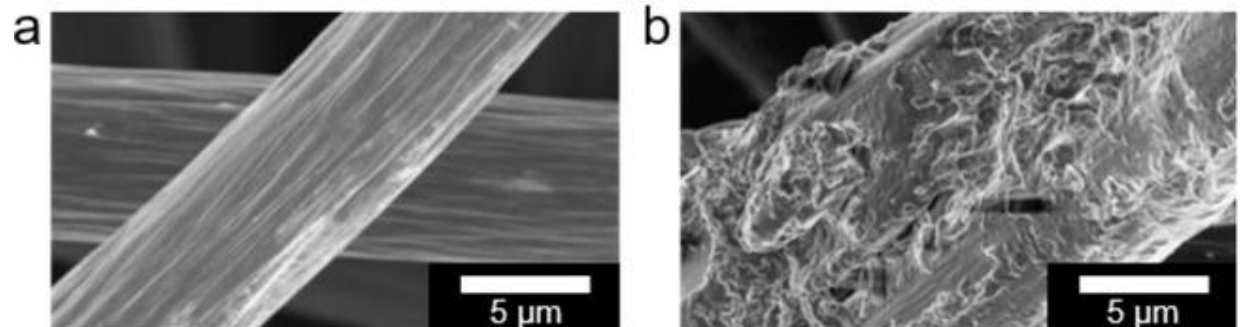
- **Challenge:** Mass loading causes cracking of the material.
- **Solution:** Load material on a porous carbon substrate.
- **Method:** Quinone based CRP trimer is added on conducting porous carbon felt and polymerized either under or after addition.



Commercial carbon felt.



Quinone-based CRP.



SEM image of carbon felt without (a) and with polymer (b).

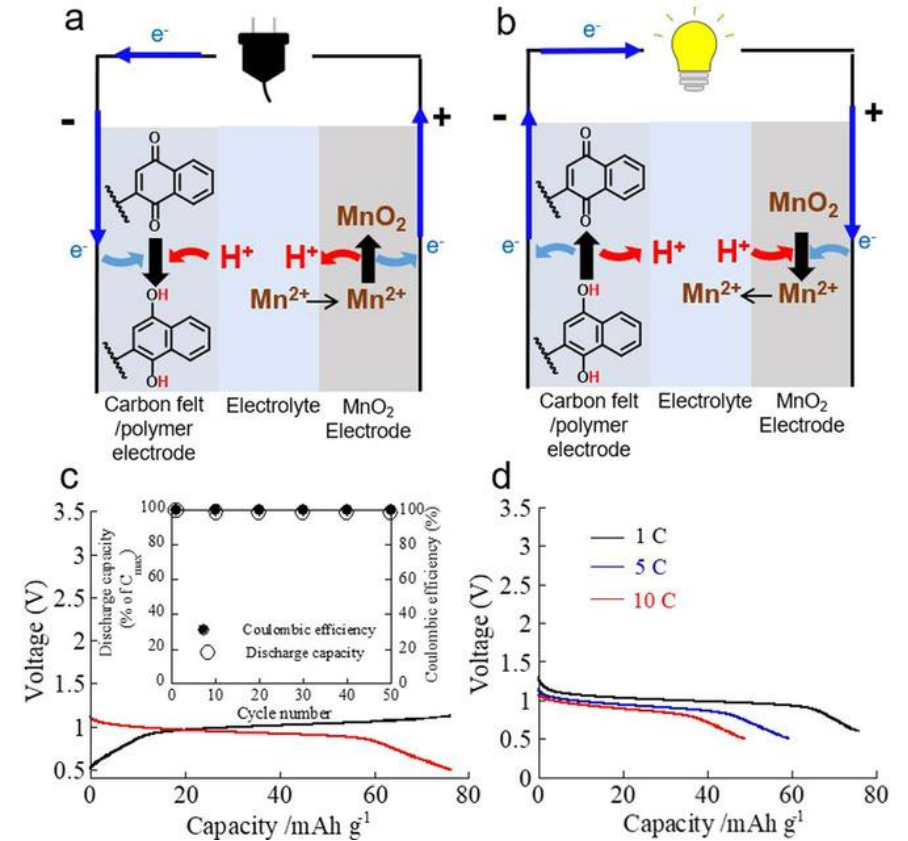


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Utilization of CRP-carbon electrode

- High mass loading.
- Output voltage of 1 V.
- Good cycling and rate performance.
- Future operation - electrolyte flow cell.



Electrochemical properties of polymer-manganese battery.



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Thank you for your attention.

