

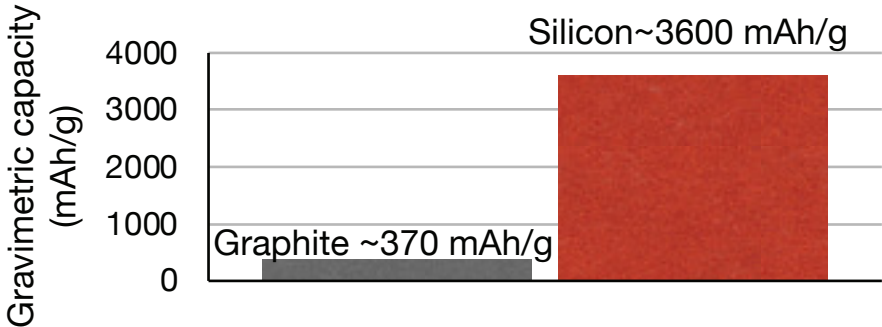
Design of multifunctional polymeric binder for Si - anodes in Li-ion batteries

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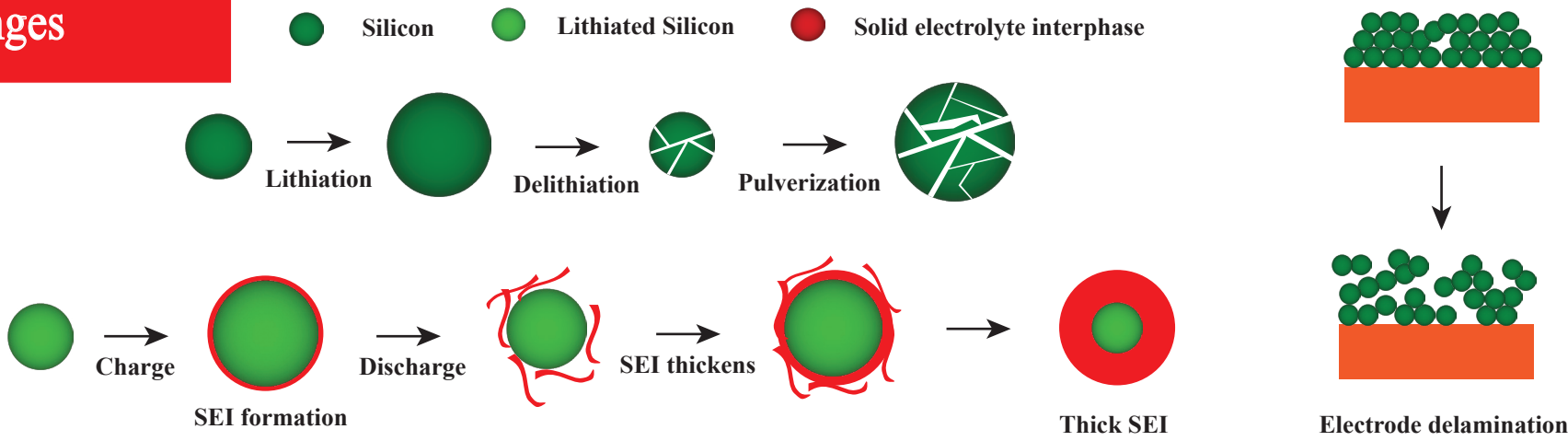
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Why study Si anodes ??

- 10x higher specific capacity over graphite
- Low cost and abundant
- **Next generation Li-ion battereies** - long lasting and energy dense



Challenges



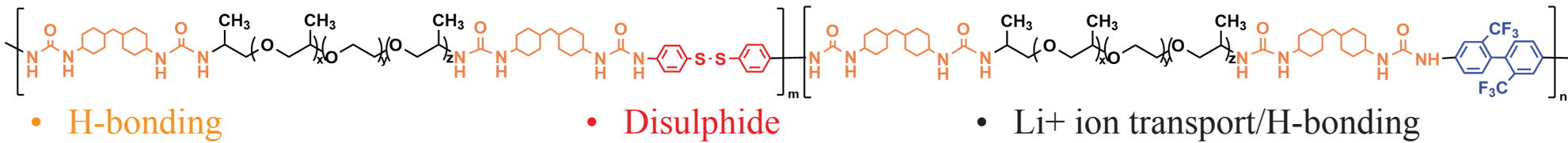
Poymeric binders

Polyvinylidene flouride

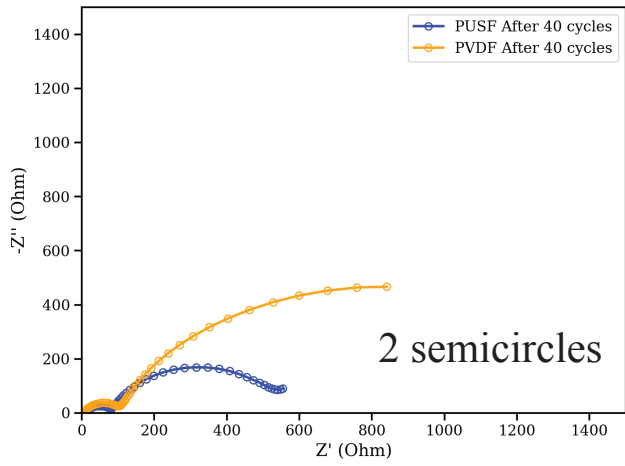
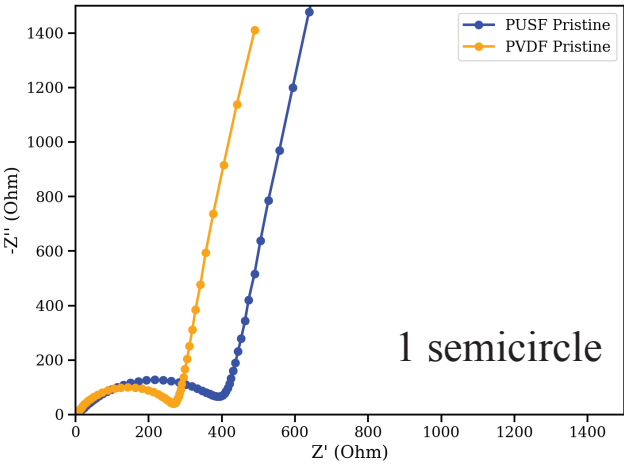
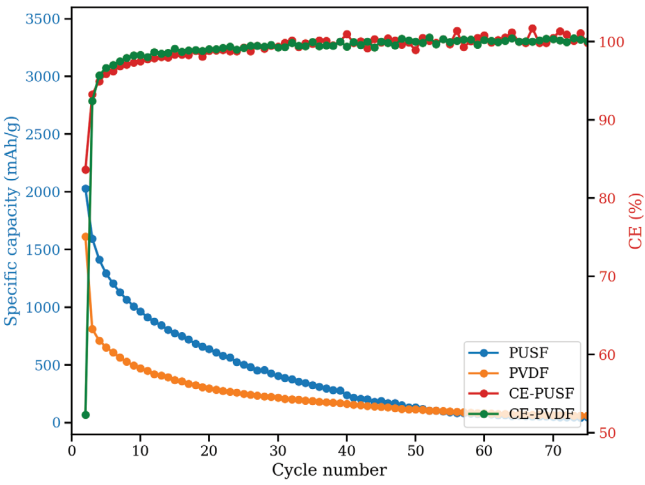


- Van der Waals interaction

PUSF - Supramolecular polymer



Results



- Li/Si half cell
- 6:2:2 electrode composition
- 1M LiPF₆ in EC/DMC = 50/50 v/v + 10% FEC

- Before cycling: One charge transfer interphase
- After cycling: SEI + charge transfer interphase

- Slightly improved cycling performance with PUSF
- Fast capacity decay with PVDF biner

“Two semicircles = Complex interfacial processes during cycling”

Outlook

- Ex-situ SEM, XPS, and (GI)-SAXS/WAXS
- Operando X-ray scattering measurements
- Adhesion tests and 180° peel off test

References:

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BatteryNL
DUTCH BATTERY MATERIALS



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