

Optimizing Ion Mobility and Mechanical Rigidity in Sol-Gel Derived Electrolytes

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□ Solid Electrolyte Requirements

- ❖ High Li⁺ mobility/transference number
- ❖ Chemical compatibility with electrodes
- ❖ Mechanical stiffness to suppress dendrite growth

□ Approach

- ❖ Simulation-based predictive design of optimal structures and to assess theoretical limits
- ❖ Sol-gel synthesis to control pore structure and create monoliths
- ❖ Organic-inorganic hybrids to control mechanical properties, ion channel constitution, and counter ion tethering

□ Progress & Findings

- ❖ Successful shape control of xerogel and aerogel monoliths
- ❖ Strong correlation between ion mobility and elastic moduli, including samples with anisotropic properties

