

Designing Materials at the Macromolecular Level for High Performance Solid Polymer Electrolytes

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Solid polymer electrolytes (SPEs) could be a real “game-changer” as they represent the ultimate solution to the safety issues associated with the use of flammable and toxic liquid electrolytes in commercial Li-ion batteries. Most importantly, SPEs hold the key for the realization of high energy-density Li-metal batteries, as they are chemical stable towards Li metal while their mechanical resistance could reduce, or even suppress Li dendrite formation and eliminate the associated safety hazards and the catastrophic failure of the battery. Despite the considerable research effort in SPEs, the development and realization of their potential has been hampered by the inability to design materials with both high ionic conductivity and good mechanical properties. In this talk, we will present a new material platform based on macromolecular nanostructured materials that provides new opportunities for the synthesis of SPEs with properties to levels not accessible before by conventional linear polymer systems.

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