

Connecting Battery Components: Advanced Binder Designs for Emerging Rechargeable Batteries

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Although Lithium-ion batteries (LIBs) have been successful as power sources of various applications, they are evolving continuously for further improved performance in many aspects, particularly in the transportation sector. All-solid-state-batteries (ASSBs) are drawing discernable attention due to their superior safety. In response to this upcoming trend, new binder designs are demanded. In the first part of this talk, I will present advanced binder designs for LIB electrodes that undergo huge volume change. Such binder designs emphasize a principle relying on supramolecular chemistries, including hydrogen interaction, ion-dipole interaction, and ring-sliding motion in molecular machines. In the second part of this talk, I will introduce some binder designs targeting sulfide-based ASSBs. I will first introduce the difficulty of finding solvent-binder pairs compatible with sulfide electrolytes and will then cover our recent process on how to avoid the given problem. Along this direction, I will introduce binder designs based on click and deprotection chemistry.