Polymeric components impart inherent mechanical durability of electrochemical devices and decreased flammability to electrochemical devices, but must have higher performance metrics in order to gain widespread use. This is a particular challenge as long-range Li-ion transport is generally directly related to matrix dynamics and is ultimately limited by the sluggish dynamics of polymers. In this talk, I will discuss superionic conductivity in which the ion motion is decoupled from matrix dynamics and instead occurs through free volume elements in the structure. Semi-crystalline zwitterionic polymers appear both to demonstrate superionic conductivity and also very high salt solubilities due to their polarizability. As a result, they have both high Lithium ion conductivities (10-3 S/cm) and cation transport numbers (t+=0.67) despite their modest glass transition temperatures (0-25°C). I will also discuss new coacervate-based battery binders that demonstrate both high ion and electron conductivities and their use in composite electrodes compatible with polymer electrolytes.