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Operando study on structure-activity relationship between electrolyte components and electrochemical performance for all-solid-state lithium-ion batteries

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All-solid-state lithium-ion batteries (ASSLIBs) have received extensive attention as one of the most promising power sources for flexible and wearable electronics. However, the practical application of ASSLBs has been hindered by poor interfacial stability and inferior ionic conductivity. Solid polymer electrolytes (SPEs) exhibit great potential in developing solid-state batteries, specifically for PEO and PEO-based derivatives, because of their superior interfacial compatibility, outstanding solubility against lithium salts, wide electrochemical windows, and high ionic conductivity. At the same time, solid fillers, as an important component in SPEs, play a crucial role in determining the overall electrochemical properties. Several strategies have been adopted to address the above issues, nevertheless, the SPEs degradation mechanism is still not clear and needs to be further studied. Therefore, we combined electrochemical characterization and morphological structure characterization to elucidate the structure-activity relationship between the component structure of the electrolyte and the electrochemical performance.

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