Effect of 2D Graphene Oxide on the Performance of Solid Polymer Electrolytes

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Abstract
Solid-state polymer electrolytes are being widely investigated as safer alternatives to liquid electrolytes for next-generation lithium-ion batteries due to their improved thermal stability, mechanical integrity, and compatibility with high-energy electrodes, and the incorporation of two-dimensional nanofillers is a common strategy to enhance ionic conductivity by modifying polymer chain dynamics and ion transport pathways; however, their performance strongly depends on precise filler concentration. In this work, PVDF-HFP/LiTFSI-based solid polymer electrolytes were prepared with different graphene oxide (GO) loadings of 0.02, 0.05, 0.10, and 0.15 wt%, while maintaining uniform film thickness for all samples. Among these compositions, the electrolyte containing 0.15 wt% GO exhibited the highest room-temperature ionic conductivity of 6.83 × 10^{-5} S cm^{-1}, indicating the optimized filler content for enhanced lithium-ion transport and demonstrating the importance of compositional control for high-performance solid-state electrolyte systems.

References

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Figures

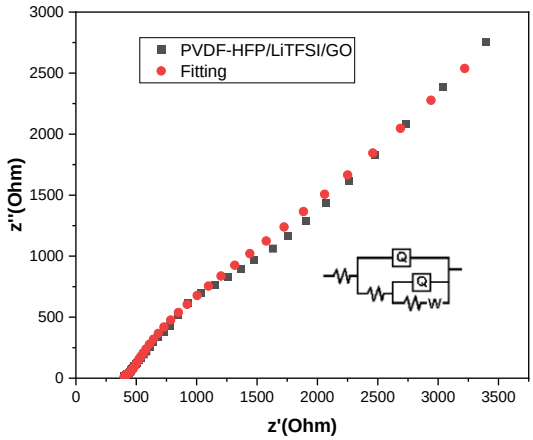

Figure 1: The fitting plot of PVDF-HFP/LiTFSI/GO(0.15%)