

## Supplementary Materials

### **g-C<sub>3</sub>N<sub>4</sub> nanosheets enhanced solid polymer electrolytes with excellent electrochemical performance, mechanical properties, and thermal stability**

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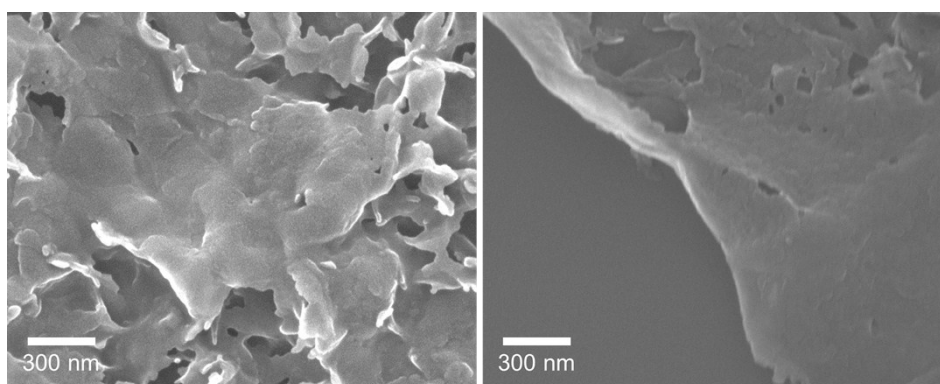


Figure S1. The SEM images of g-C<sub>3</sub>N<sub>4</sub> nanosheets

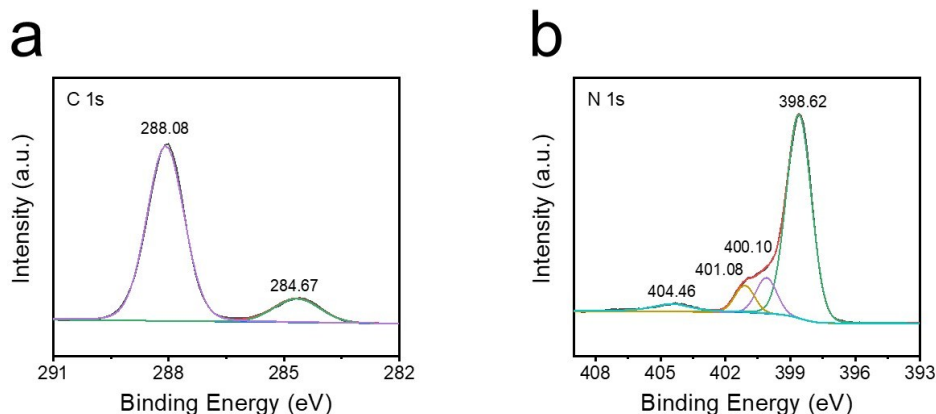


Figure S2. High-resolution (a) C 1s and (b) N 1s XPS spectrum of g-C<sub>3</sub>N<sub>4</sub> nanosheets.

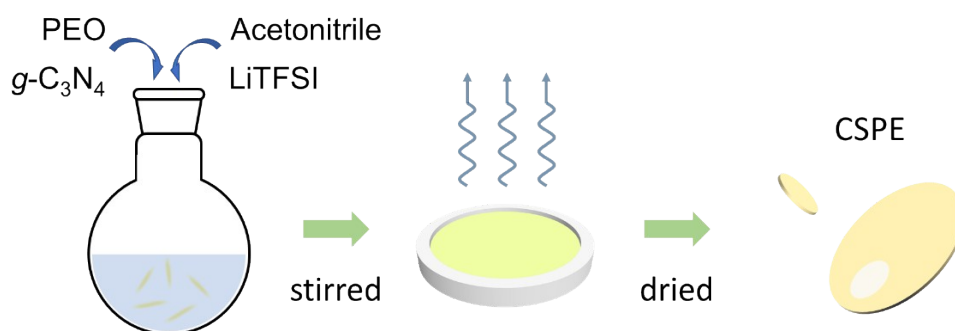


Figure S3. Schematic diagram of the synthetic route of g-C<sub>3</sub>N<sub>4</sub> CSPE

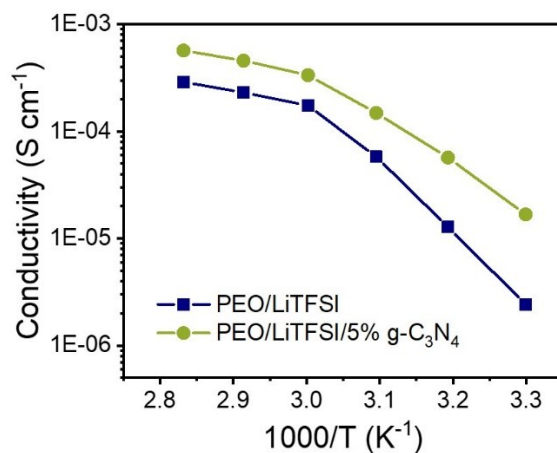


Figure S4. Ionic conductivities for g-C<sub>3</sub>N<sub>4</sub> CSPE and SPE with the ratio of EO: Li as 20:1.

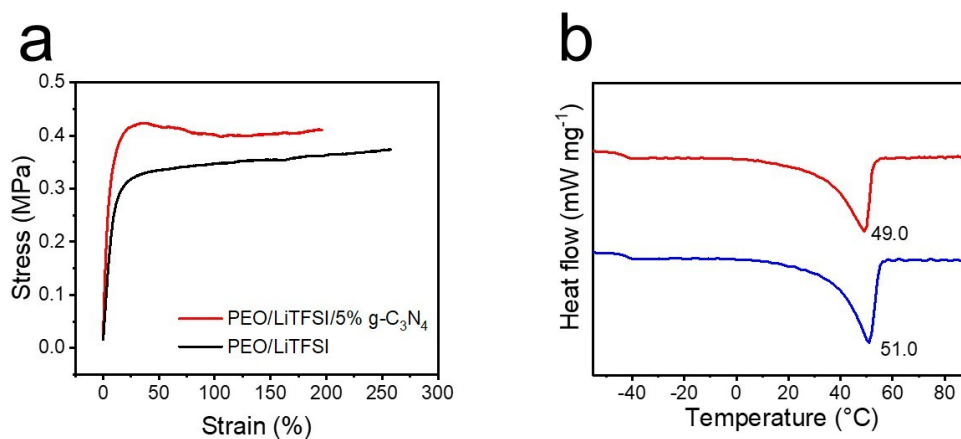


Figure S5. (a) The stress-strain and (b) DSC curves for g-C<sub>3</sub>N<sub>4</sub> CSPE and SPE with the ratio of EO: Li as 20:1.

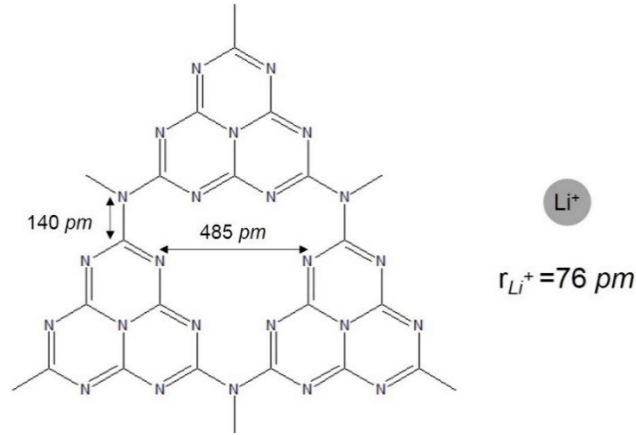


Figure S6. The holes produced by tris-triazine and lithium ion size comparison

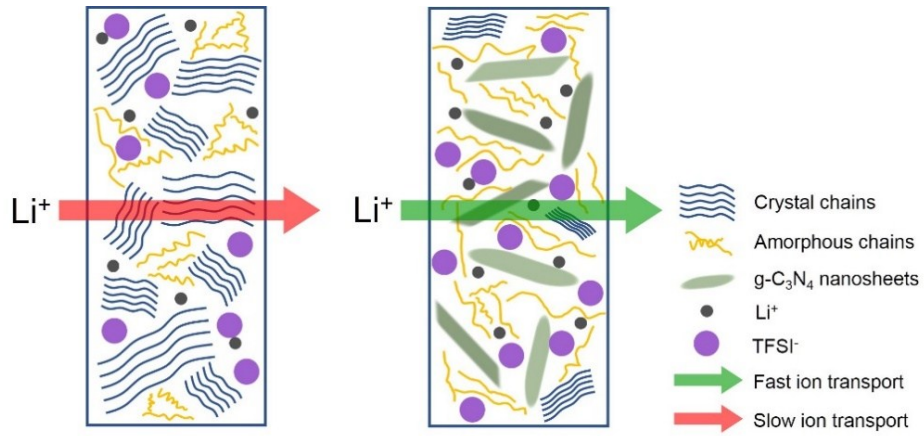


Figure S7. Schematic illustration showing ion transport mechanism in SPE and g-C<sub>3</sub>N<sub>4</sub> CSPE.

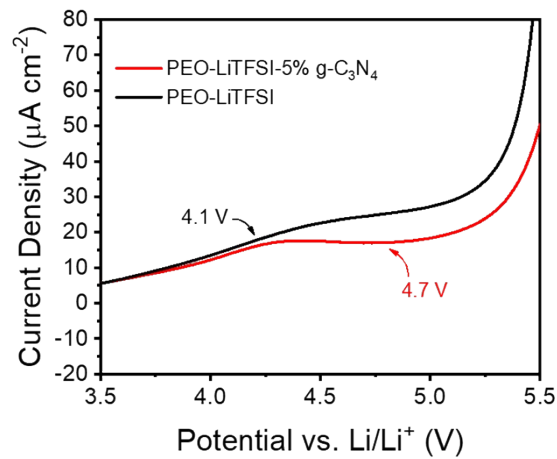


Figure S8. The enlarged view of the electrochemical window between SPE and g-C<sub>3</sub>N<sub>4</sub> CSPE.

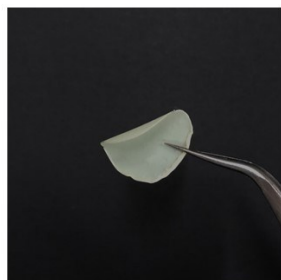


Figure S9. Photograph of the g-C<sub>3</sub>N<sub>4</sub> CSPE after heating at 150 °C for 30 min.



Figure S10. Photograph of the g-C<sub>3</sub>N<sub>4</sub> CSPE at stretch state.

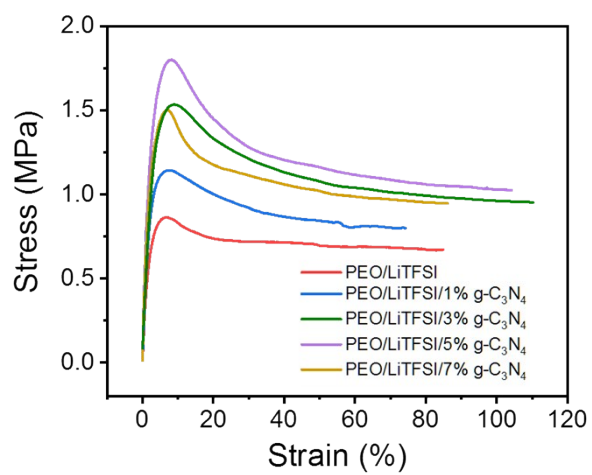


Figure S11. The stress-strain curves of composite solid polymer electrolytes with different g-C<sub>3</sub>N<sub>4</sub> contents.

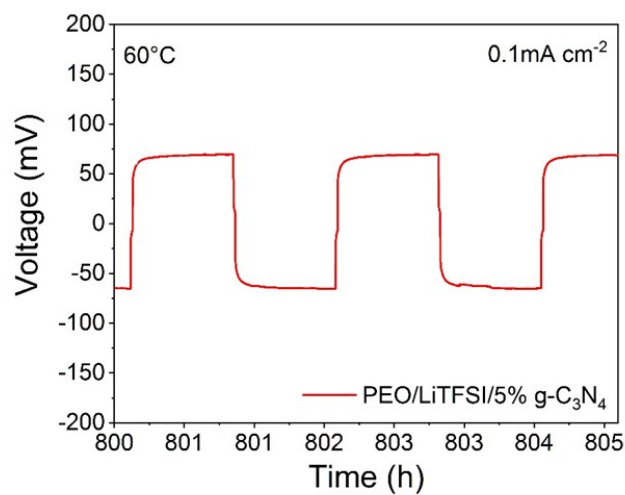


Figure S12. The enlarged time-voltage curve of the Li|g-C<sub>3</sub>N<sub>4</sub> CSPE|Li cell

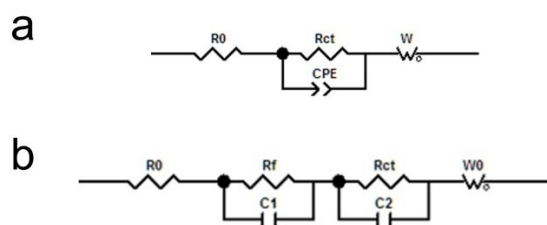


Figure S13. The equivalent circuit diagram of LFP/Li batteries (a) before and (b) after cycles.

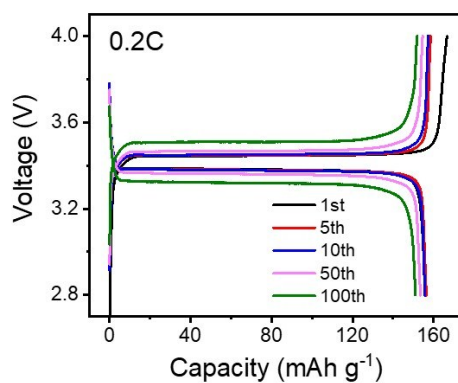


Figure S14. The charge and discharge curves of LFP/Li battery with g-C<sub>3</sub>N<sub>4</sub> CSPE under 0.2 C.