

Supplementary material

Surface Modified Boron Nitride as A Filler to Achieve High Thermal Stability of Polymer Solid-State Lithium Metal Batteries

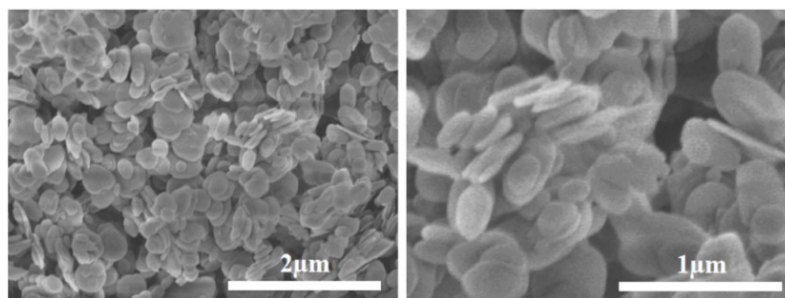


Fig. S1. The SEM image of BNNS.

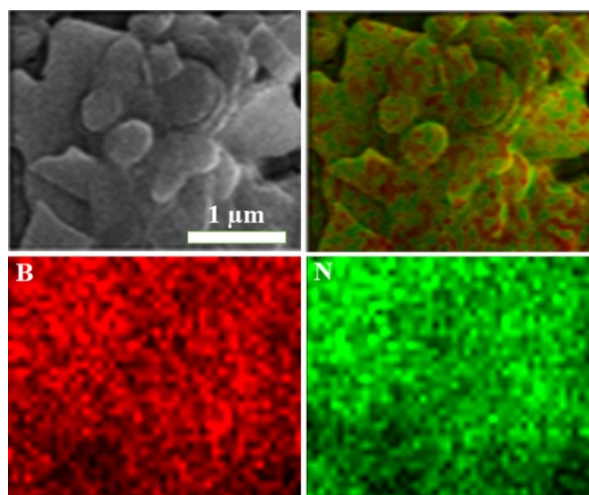


Fig. S2. The SEM and Elemental mapping images of BNNS.

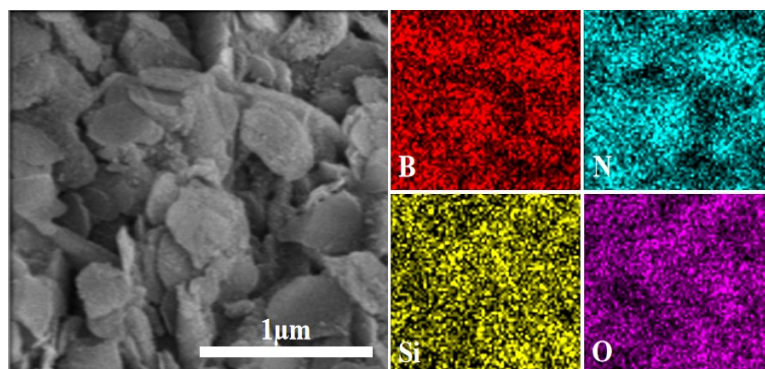


Fig. S3. The SEM and Elemental mapping images of $\text{SiO}_2@\text{BNNS}$.

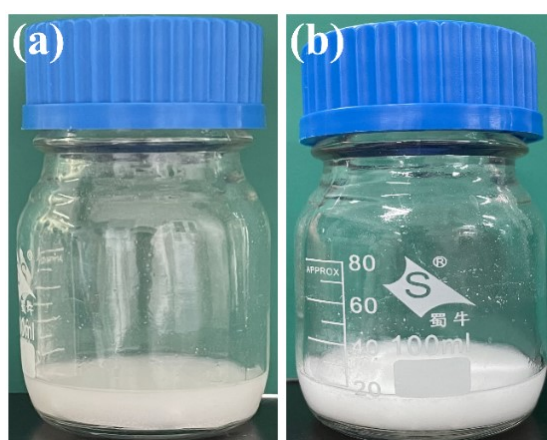


Fig. S4. (a) The Photograph of BNNS nanosheets dissolving in acetonitrile. (b) The Photograph of the homogeneous electrolyte solution of $\text{SiO}_2@\text{BNNS}$, PEO and LiTFSI in acetonitrile.

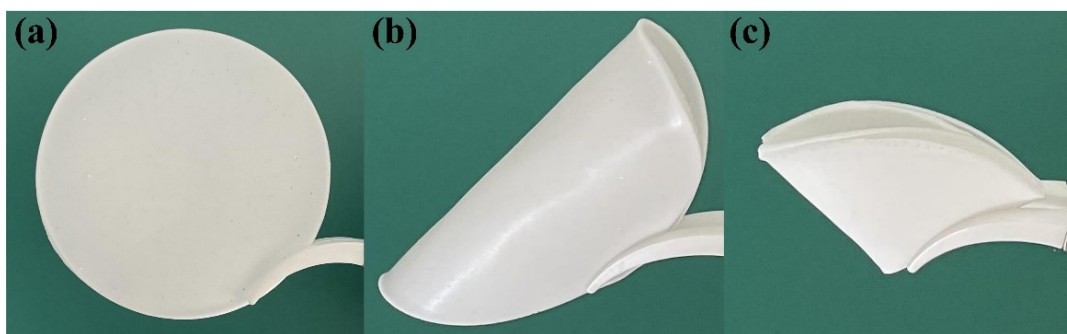


Fig. S5. Photograph of the 4%SiO₂@BNNS CPE membrane.



Fig. S6. Photograph of the thickness of PLSB CPE membrane.

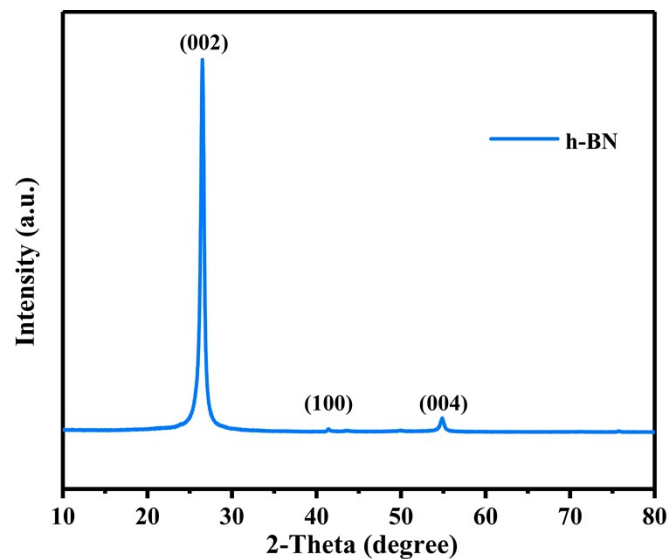


Fig. S7. The XRD spectra of BNNS.

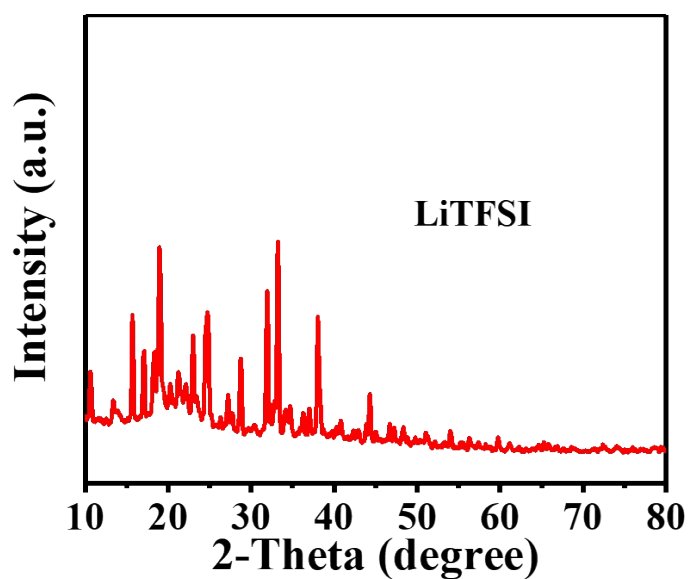


Fig. S8. The XRD of LiTFSI. The peaks at 11.04° , 16.03° , 19.09° , 20.55° , 21.54° , 23.32° , 25.07° , 27.4° , 29.03° , 32.20° , 33.48° , 38.30° and 44.54° perfectly match to (002), (011), (201), (111), (202), (013), (113), (212), (114), (015), (115), (116) and (125) crystal planes.

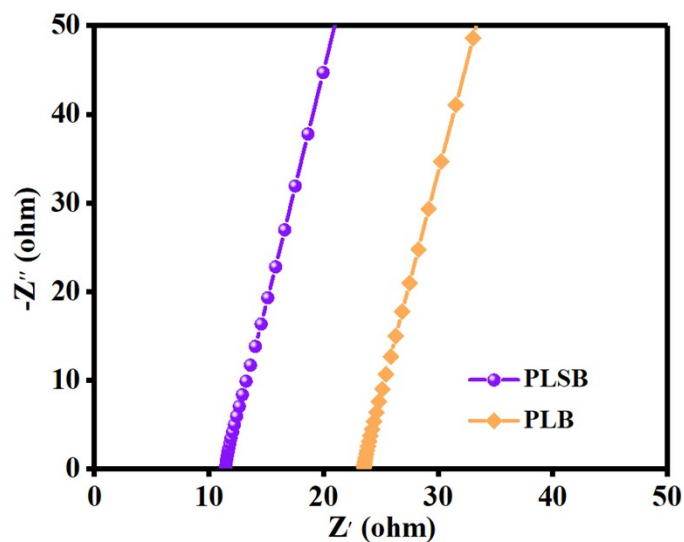


Fig. S9. The EIS plots of PEO/LiTFSI/SiO₂@BNNS and PEO/LiTFSI/BNNS at 60°C.

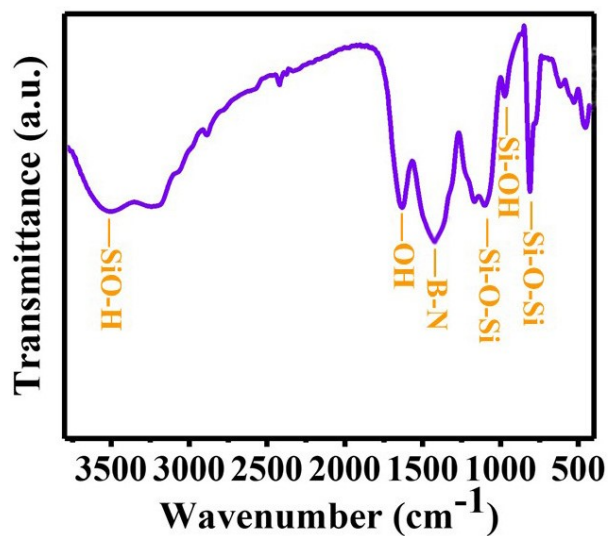


Fig. S10. FTIR spectra of SiO₂@BNNS between 4000 and 500 cm⁻¹.

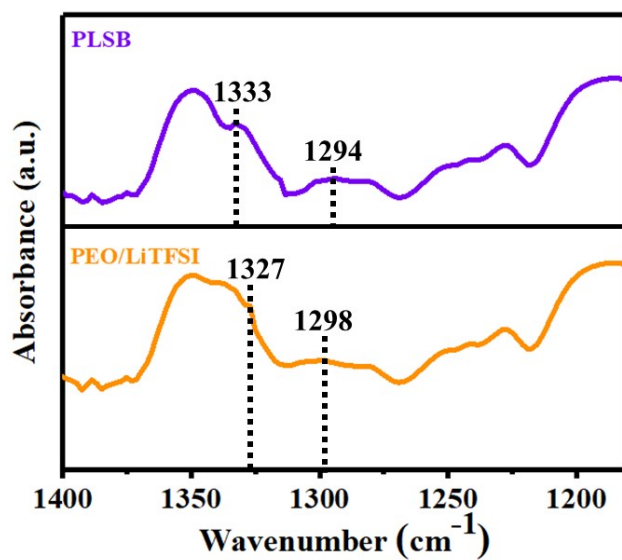


Fig. S11. FTIR spectra of PLSB and PEO/LiTFSI between 1400 and 1180 cm^{-1} .

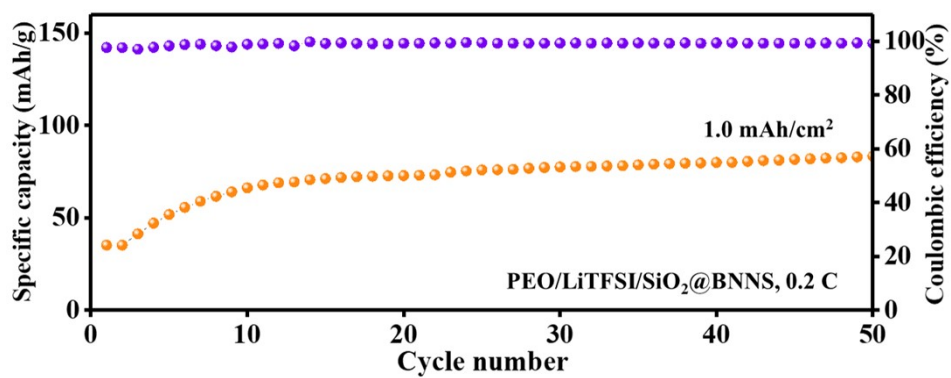


Fig. S12. Cycling performance of the solid-state $\text{LiFePO}_4/\text{Li}$ battery using PEO/LiTFSI/SiO₂@BNNS electrolyte at 60 °C and 0.2 C (1.0 mAh/cm²).

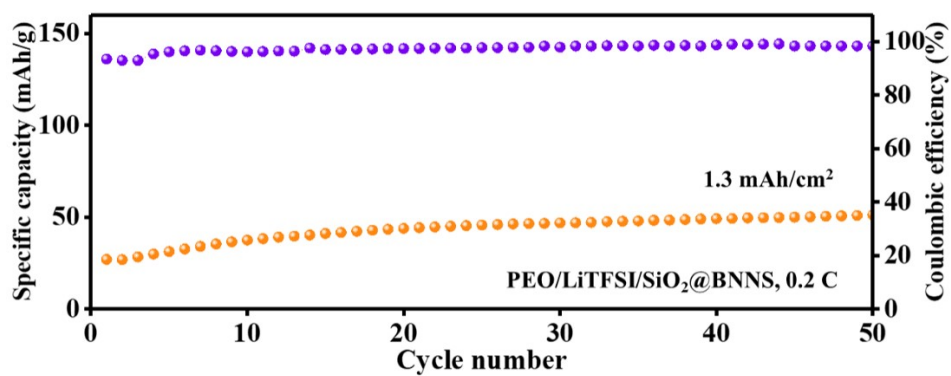


Fig. S13. Cycling performance of the solid-state LiFePO₄/Li battery using PEO/LiTFSI/SiO₂@BNNS electrolyte at 60 °C and 0.2 C (1.3 mAh/cm²).

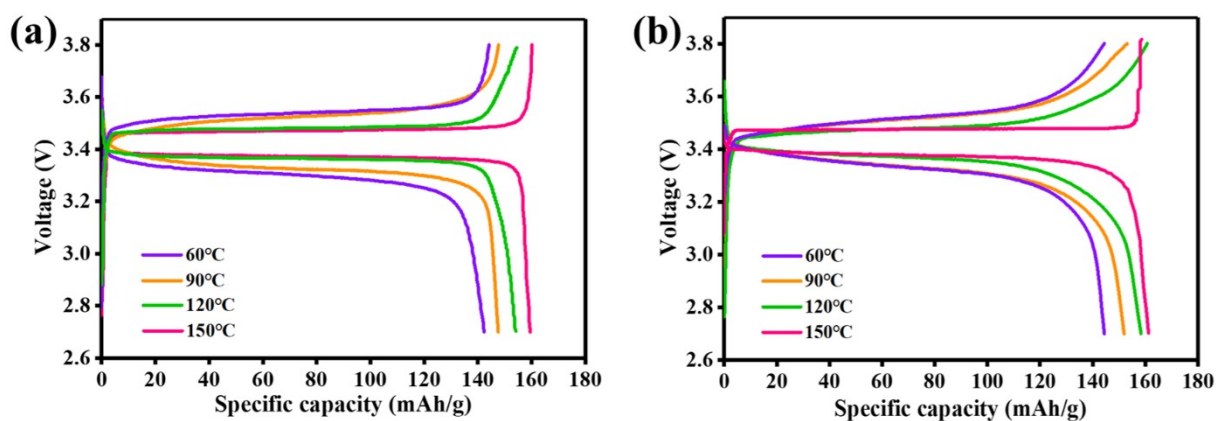


Fig. S14. coin(a) and pouch (b) cell typical charge–discharge curves of solid-state LiFePO₄/Li battery using PEO/LiTFSI/4 wt% SiO₂@BNNS electrolyte at 1 C.

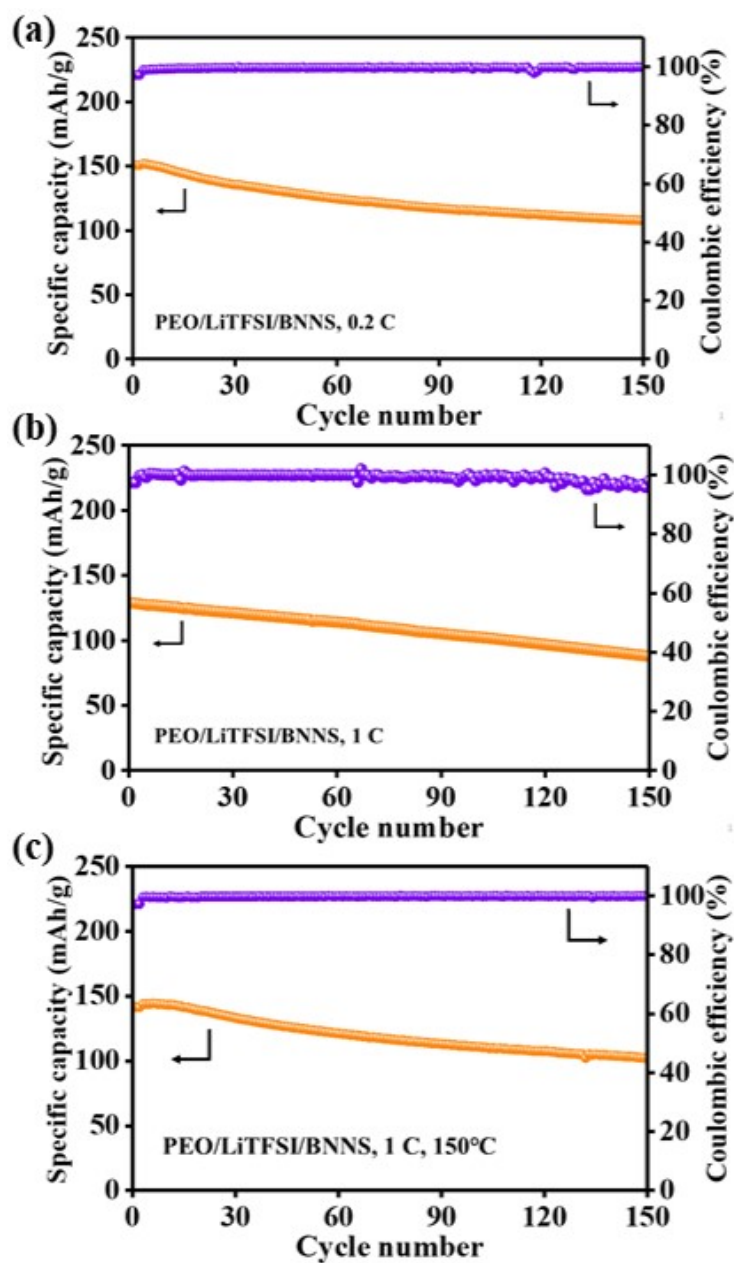


Fig. S15. (a) Cycling performance of the solid-state $\text{LiFePO}_4/\text{Li}$ battery using PEO/LiTFSI/BNNS electrolyte at 60 °C and 0.2 C. (b) Cycling performance of the solid-state $\text{LiFePO}_4/\text{Li}$ battery using PEO/LiTFSI/BNNS electrolyte at 60 °C and 1 C. (c) Cycling performance of the solid-state $\text{LiFePO}_4/\text{Li}$ battery using PEO/LiTFSI/BNNS electrolyte at 150 °C and 1 C.

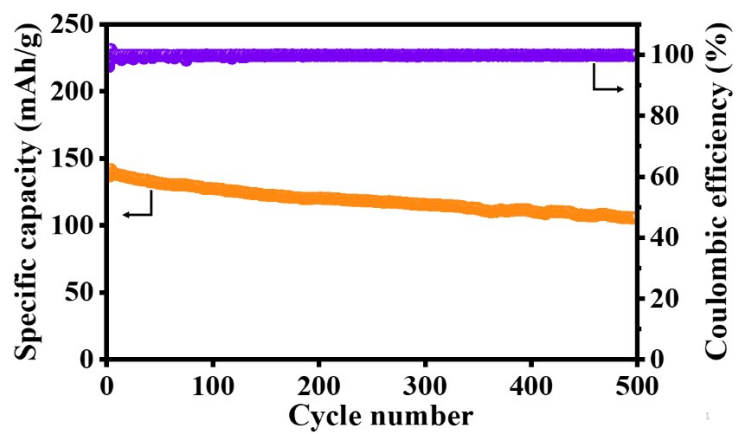


Fig. S16. Cycling performance of the solid-state $\text{LiFePO}_4/\text{Li}$ battery using $\text{PEO}/\text{LiTFSI}/\text{SiO}_2@\text{BNNS}$ electrolyte at 150°C and 3C .

