

Supporting Information

Probing the Fast Lithium-Ion Transport in Small-Molecule Solid Polymer Electrolytes by solid-state NMR

Xiaobin Fu¹, Yiyang Liu^{1,3}, Wei Wang², Ling Han¹, Jing Yang¹, Min Ge¹, Yefeng

Yao^{2*}, Hongtao Liu^{1*}

¹Key Laboratory of Interfacial Physics and Technology & Department of Molten Salt Chemistry and Engineering, Shanghai Institute of Applied Physics, Chinese Academy of Science, Shanghai, 201800, China;

²Shanghai Key Laboratory of Magnetic Resonance & School of Physics and Electronic Science, East China Normal University, Shanghai, 200062, China.

³University of Chinese Academy of Sciences, Beijing 100049, China.

Email: liuhongtao@sinap.ac.cn; yfyao@phy.ecnu.edu.cn

Figure S1. WAXD patterns of β -CD, LITFSI and β -CD PEO_n/LITFSI electrolytes.

Figure S2. ^1H - ^{13}C CP/MAS NMR spectra of β -CD and β -CD PEO_n/LITFSI electrolytes.

Figure S3. SEM photos of β -CD PEO_n/Li⁺ electrolytes (n = 200, 1k, 3k, 10k).

Figure S4. ^7Li and ^{19}F static NMR spectra of β -CD PEO_{1k}/Li⁺ electrolyte acquired from 233 K to 313 K.

Figure S5. The ^7Li and ^{13}C single pulse NMR spectra of β -CD PEO_n/Li⁺ complexes with different recycle delays.

Figure S6. The quantitative ^7Li NMR spectra of β -CD PEO_n/Li⁺ electrolytes. The experimental temperature is room temperature.

Figure S7. The quantitative ^{13}C NMR spectra of β -CD PEO_n/Li⁺ electrolytes. The experimental temperature is room temperature.

Figure S8. The EIS curves of β -CD PEO_n/Li⁺ electrolytes acquired at room temperature.

Figure S9. DSC curves of β -CD PEO_n/Li with PEO molecular weight of 200 and 1k.

Figure S10. ^7Li signal deconvolution of β -CD PEO_n/LiTFSI at room temperature.

Figure S1. WAXD patterns of β -CD, LITFSI and β -CD PEO_n/LITFSI electrolytes.

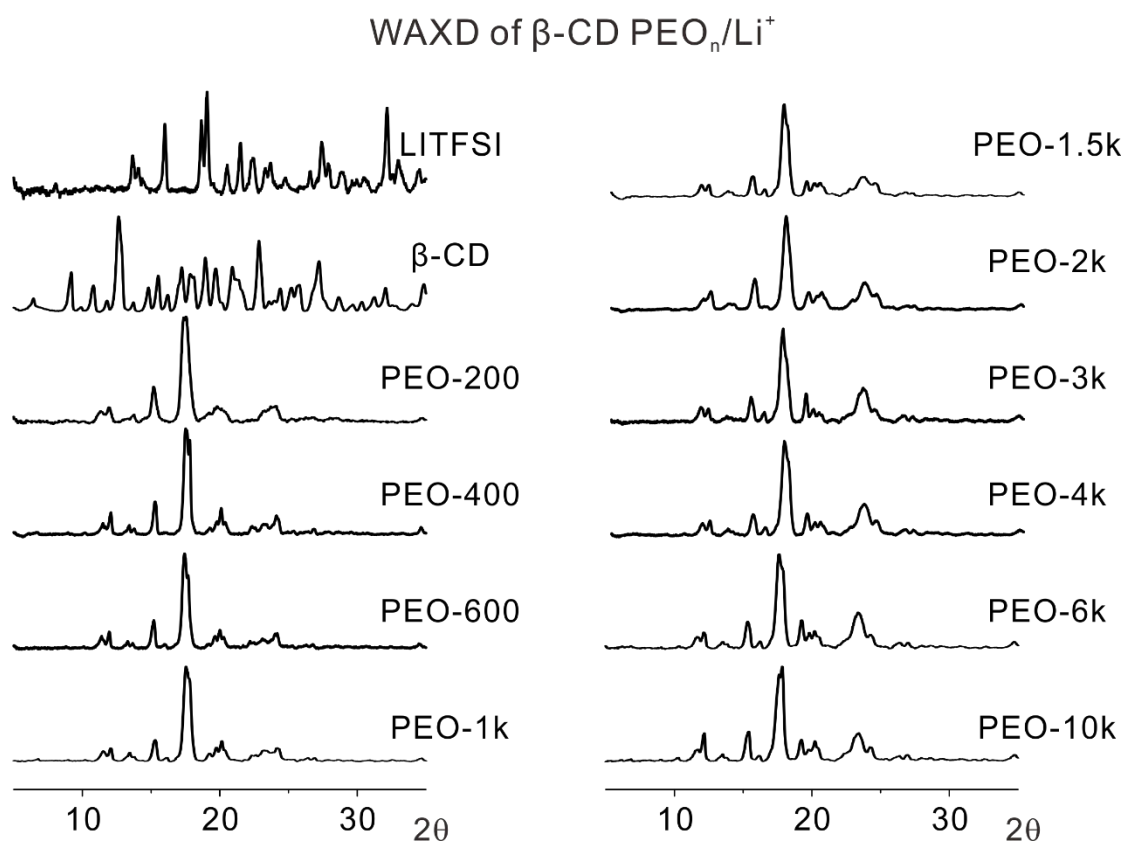


Figure S2. ^1H - ^{13}C CP/MAS NMR spectra of β -CD and β -CD PEO_n/LITFSI electrolytes.

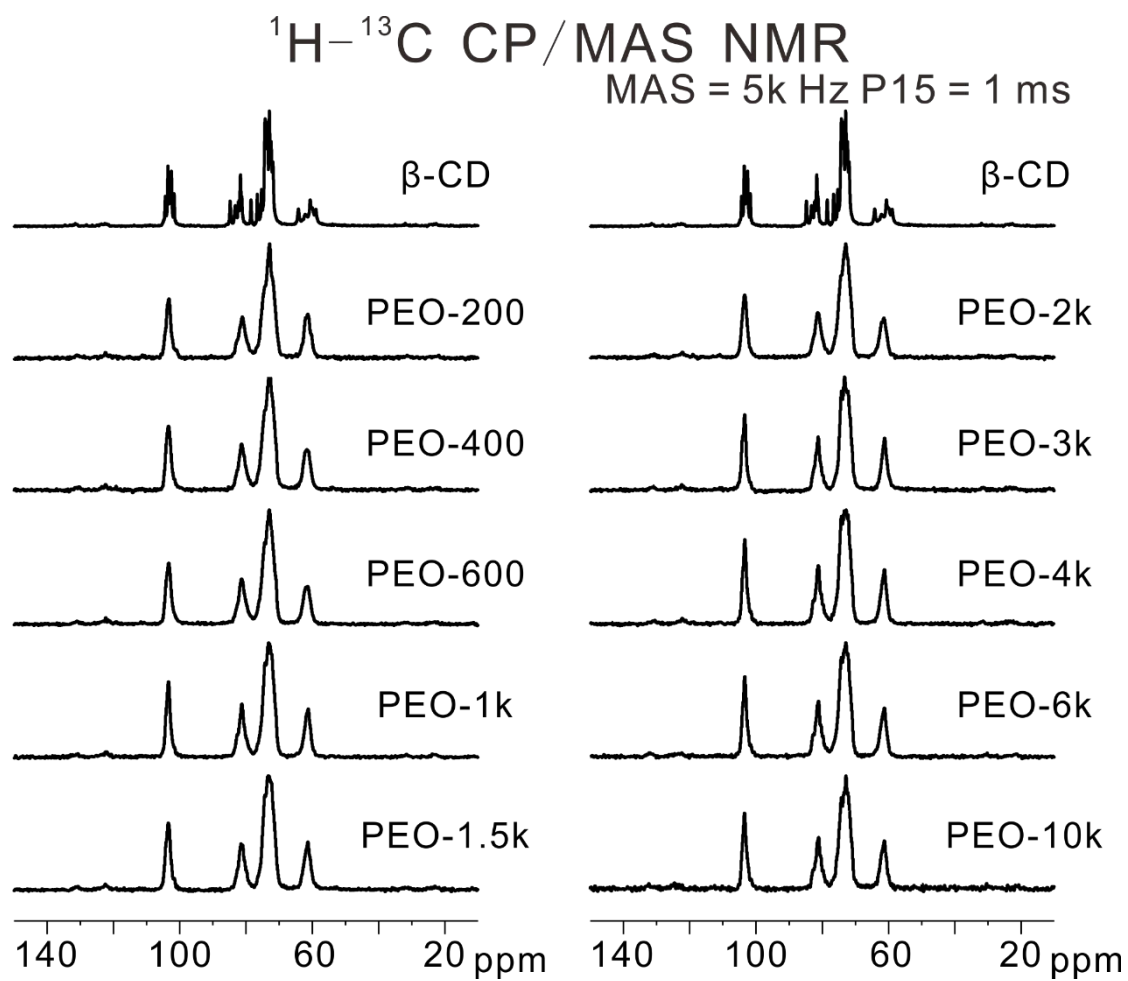


Figure S3. SEM photos of β -CD PEO_n/Li⁺ electrolytes (n = 200, 1k, 3k, 10k).

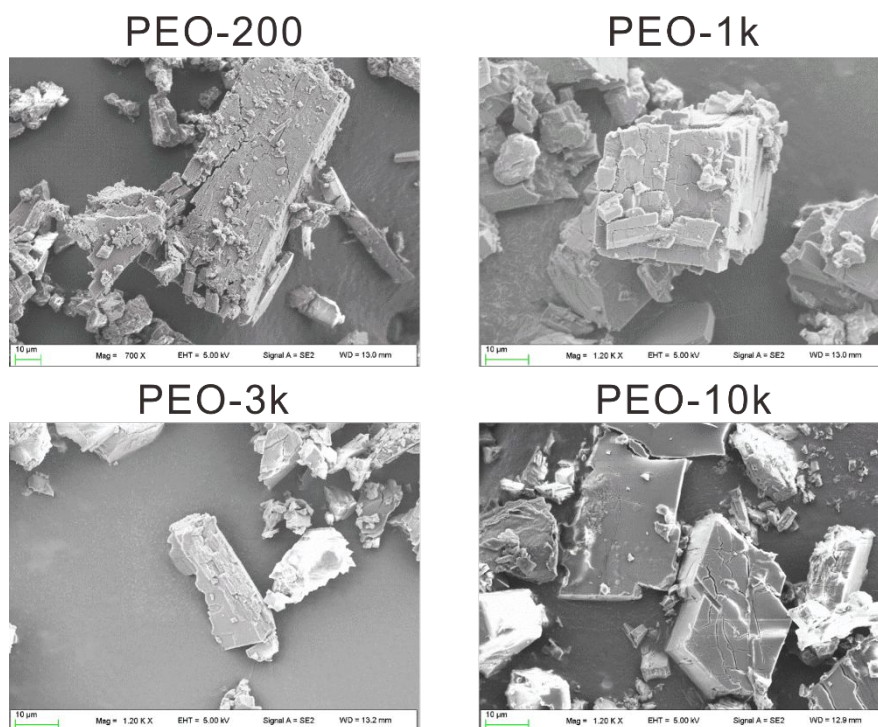


Figure S4. ^7Li and ^{19}F static NMR spectra of $\beta\text{-CD PEO}_{1k}/\text{Li}^+$ electrolyte acquired from 233 K to 313 K.

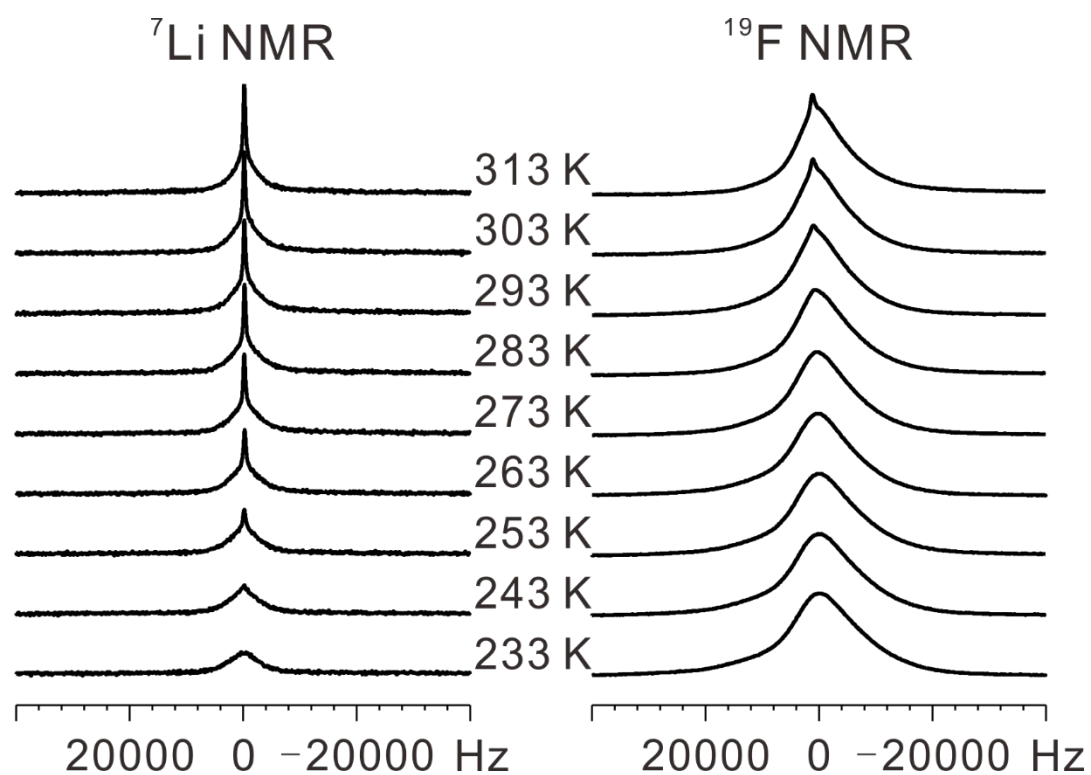


Figure S5. The ^7Li and ^{13}C single pulse NMR spectra of $\beta\text{-CD PEO}_n/\text{Li}^+$ electrolytes with different recycle delays.

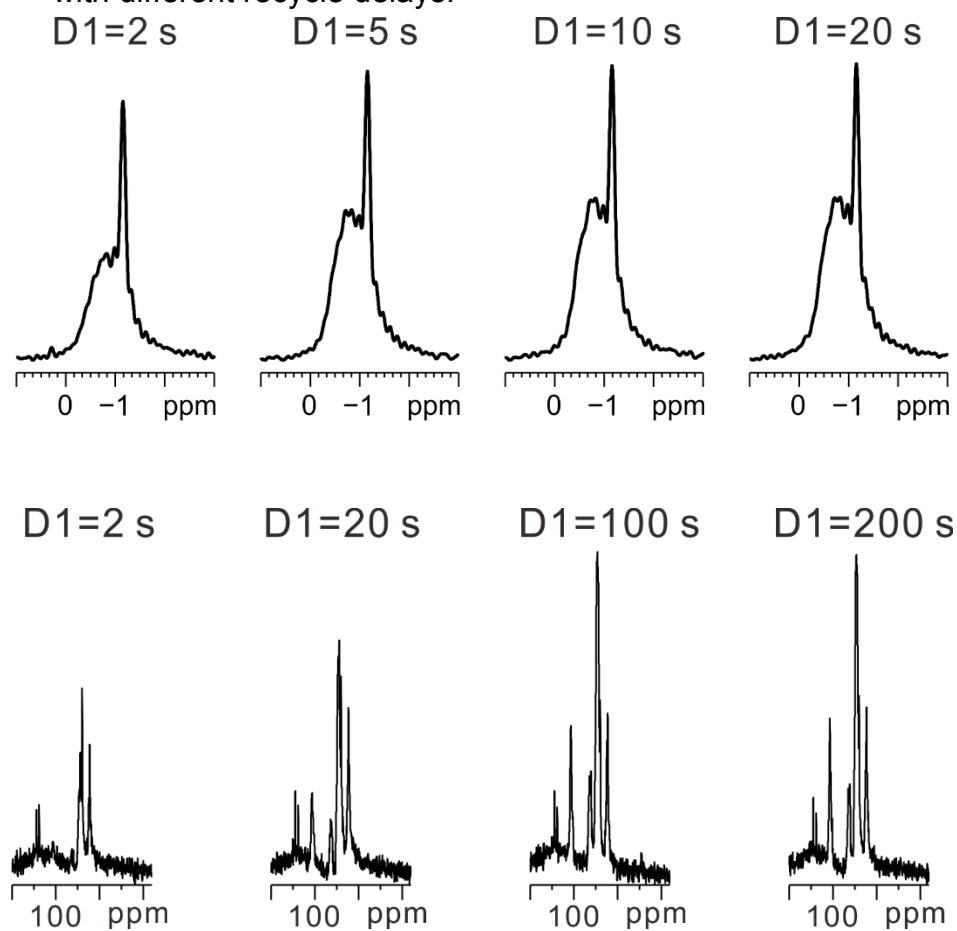


Figure S6. The quantitative ^7Li NMR spectra of $\beta\text{-CD PEO}_n/\text{Li}^+$ electrolytes. The experimental temperature is room temperature.

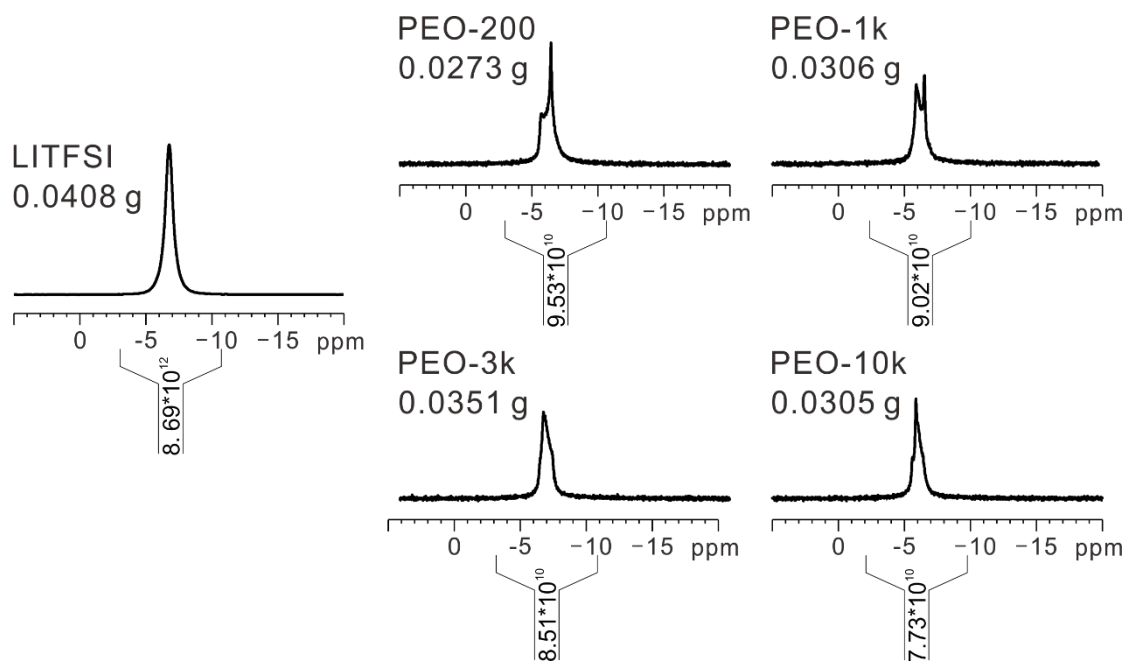


Figure S7. The quantitative ^{13}C NMR spectra of β -CD PEO_n/Li⁺ electrolytes. The experimental temperature is room temperature.

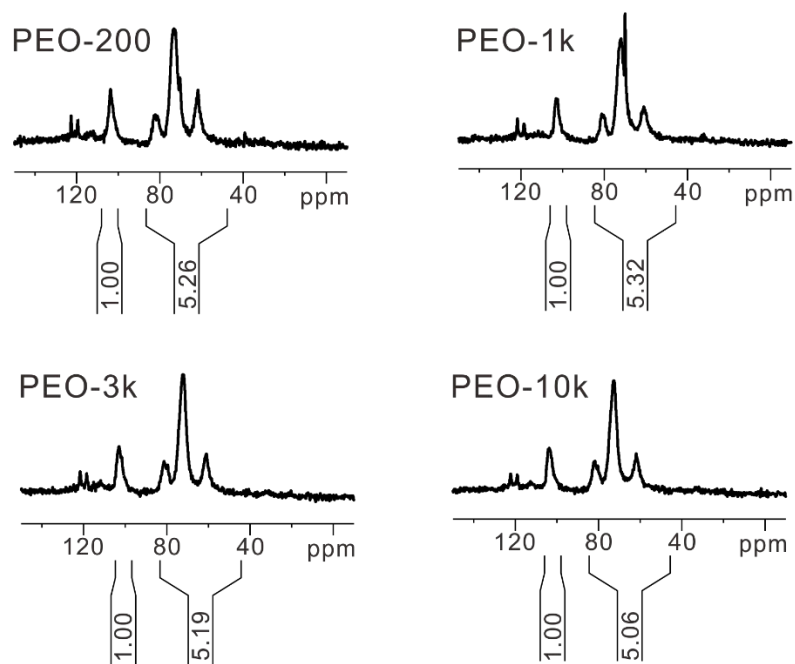


Figure S8. The EIS curves of β -CD PEO_n/Li⁺ electrolytes acquired at room temperature.

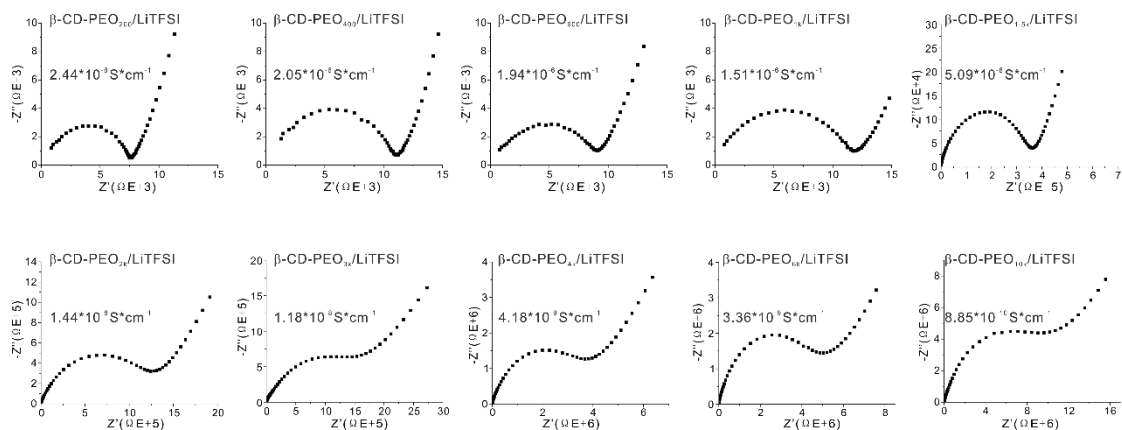


Figure S9. DSC curves of β -CD PEO_n/Li with PEO molecular weight of 200 and 1k.

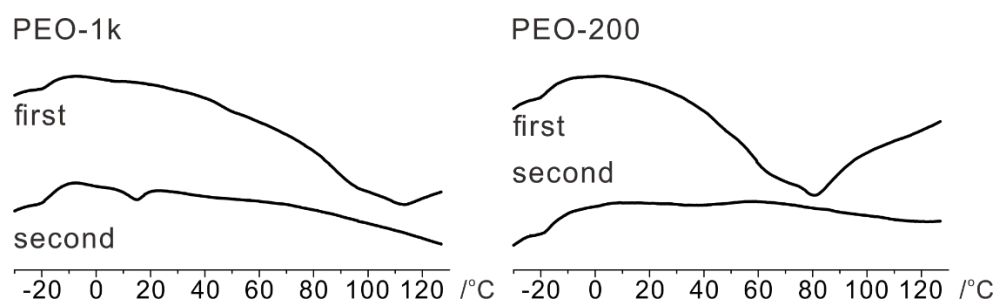


Figure S10. ^7Li signal deconvolution of $\beta\text{-CD PEO}_n/\text{LiTFSI}$ at room temperature.

