Supporting Information

Polymeric ionic liquid-ionic plastic crystal all-solid-state electrolytes for wide operating temperature range lithium metal batteries

Xiaowei Li,[a] Zhengxi Zhang,*[a,b] Sijian Li,[a] Kaihua Yang,[a] Li Yang*[a,b]

a. School of Chemistry and Chemical Engineering, Shanghai Jiao Tong University, Shanghai 200240, PR China

b. Shanghai Electrochemical Energy Devices Research Center, Shanghai 200240, PR China

*Corresponding Author:

Email: zhengxizhang@sjtu.edu.cn(Z. X. Zhang); liyangce@sjtu.edu.cn(L. Yang).

Tel.: +86 21 54748917. Fax: +86 21 54741297.

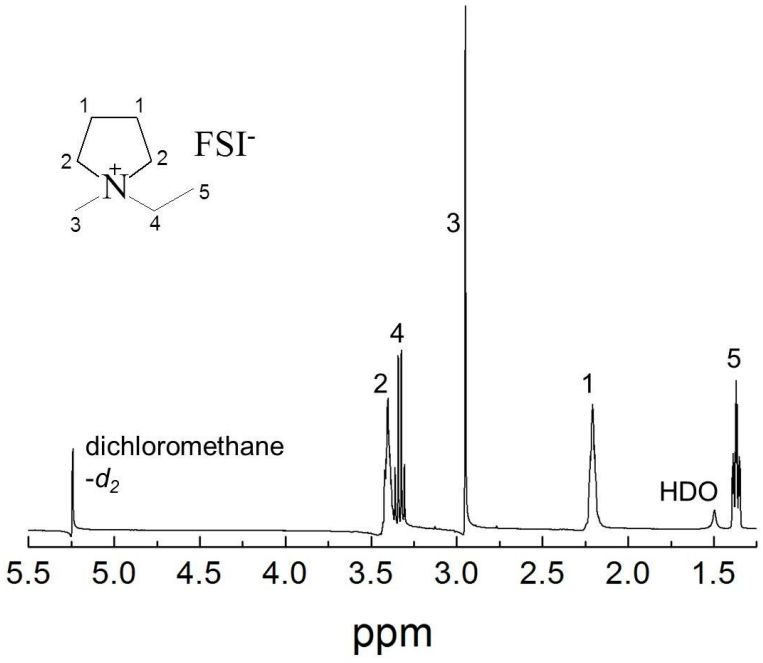

Fig. S1. ^{1}H NMR spectrum of P_{12}FSI.

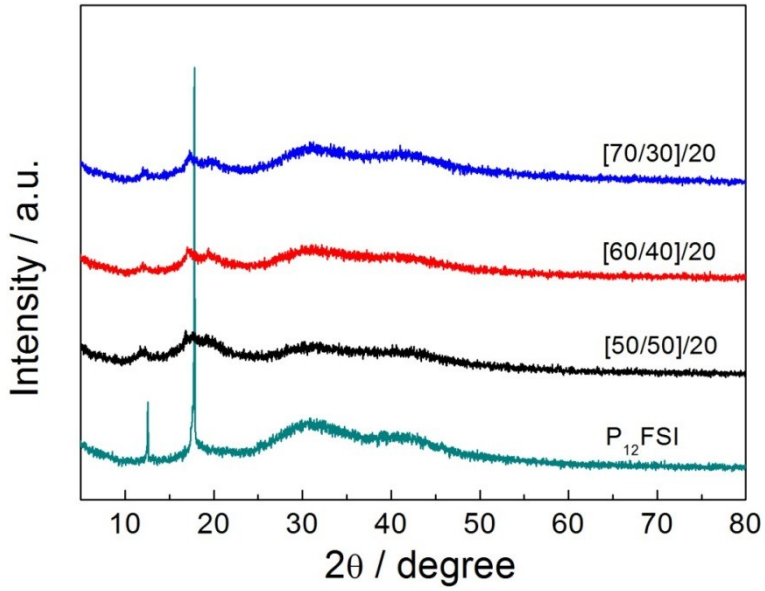

Fig. S2. XRD patterns of $P_{12}FSI$ and PIL-$P_{12}FSI$ SPE samples with different weight ratio of PIL/$P_{12}FSI$.

It can be seen that $P_{12}FSI$ shows two characteristic peaks at about 13° and 18°. When $P_{12}FSI$ is introduced in the SPEs, its characteristic peaks disappear, and the SPE samples are amorphous.

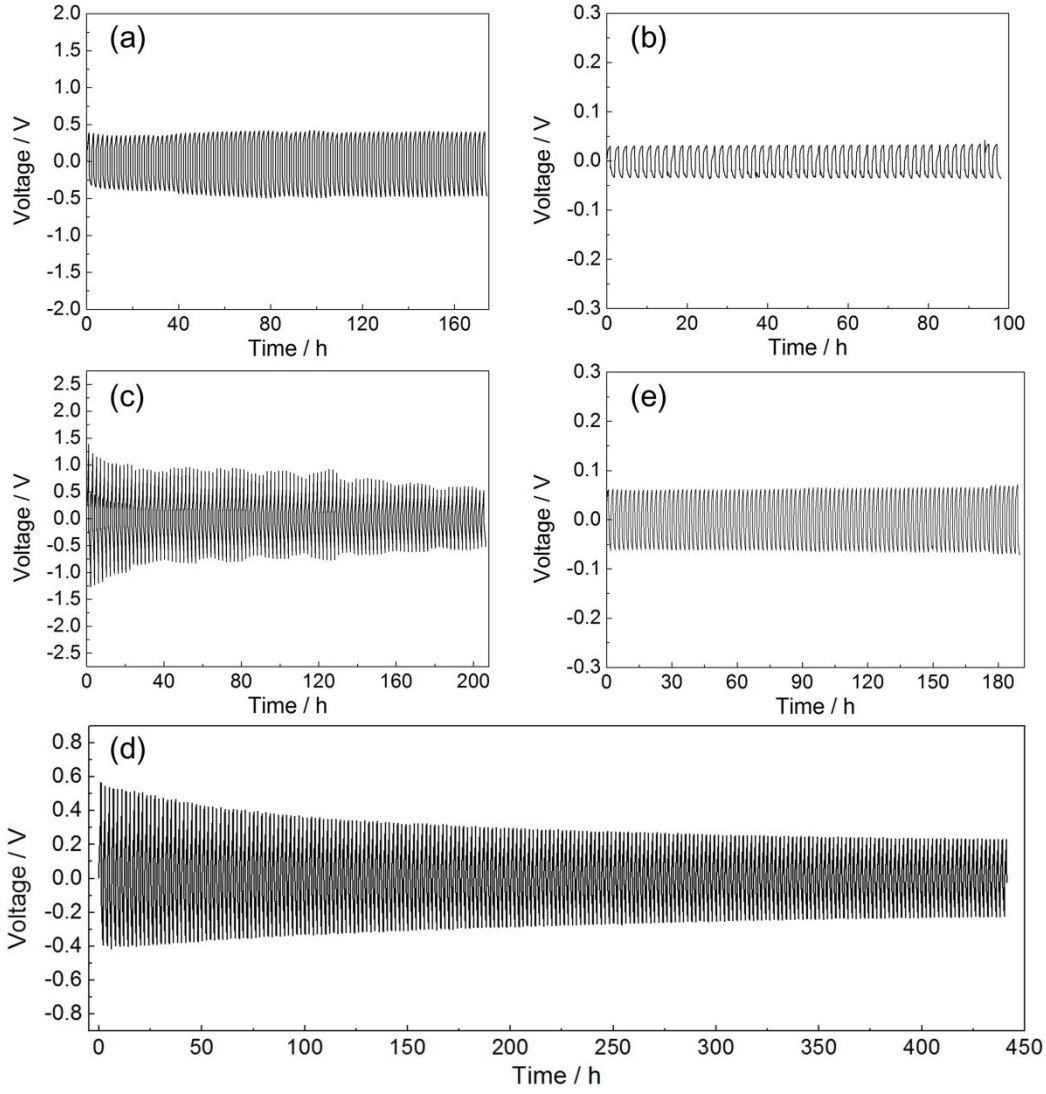

Fig. S3. Time-dependent voltage profiles for symmetrical Li/[50/50]/20 SPE/Li cells under the current density of 0.1 mA cm^{-2} at (a) 25 °C and (b) 80 °C; and profiles under the current density of 0.2 mA cm^{-2} at (c) 25 °C, (d) 40 °C and (e) 80 °C.