Supporting information

MOF-derived nanoporous multifunctional fillers enhancing performances of polymer electrolytes for solid-state lithium batteries

*Jian-Fang Wu, Xin Guo**

Laboratory of Solid State Ionics, School of Materials Science and Engineering, Huazhong University of Science and Technology, Wuhan 430074, P.R. China

---

** Authors to whom correspondence should be addressed.*

Tel: +86-27-87559804*; Fax:* +86-27-87559804*; E-mail: xguo@hust.edu.cn*

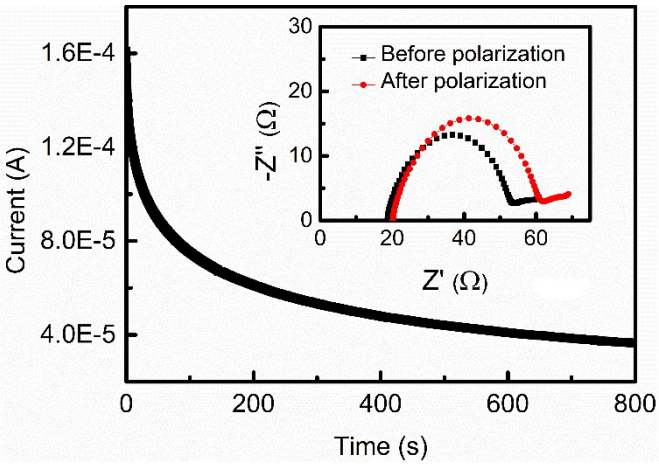

Figure S1 DC polarization curve of UIO/Li-IL. The inset shows AC impedance spectra of symmetric cell before and after DC polarization.

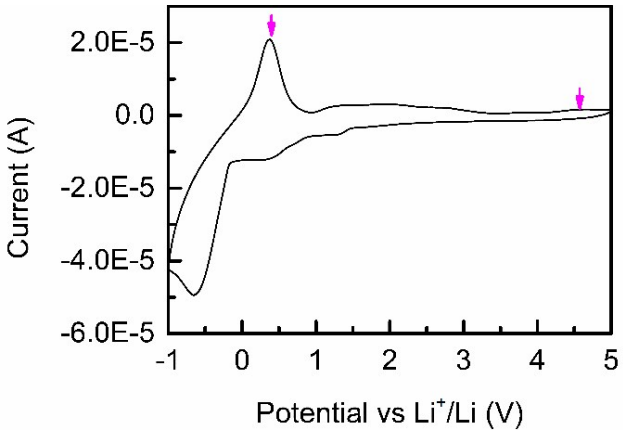

Figure S2 Cyclic voltammetry curve of the PEO solid electrolyte at a scan rate of 0.5 mV s^{-1}.

In the CV curve of the PEO solid electrolyte (Figure S2), there shows a strong peak in the region of 0~0.5 V, which can be ascribed to the Li plating/stripping, and a weak peak at about 4.5 V, which is due to the oxidation of the solid electrolyte.

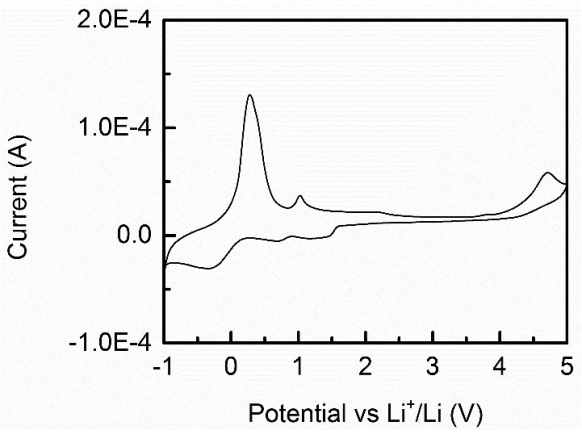

Figure S3 Cyclic voltammetry curve of the Li-IL electrolyte at a scan rate of 0.5 mV s^{-1}.

In the CV curve of the Li-IL electrolyte (Figure S3), there shows a strong peak in the region of 0~0.5 V, which can be ascribed to the Li plating/stripping, and two peaks at 1 V and about 4.5 V, which are due to the reaction between Li-IL and the Li electrode.

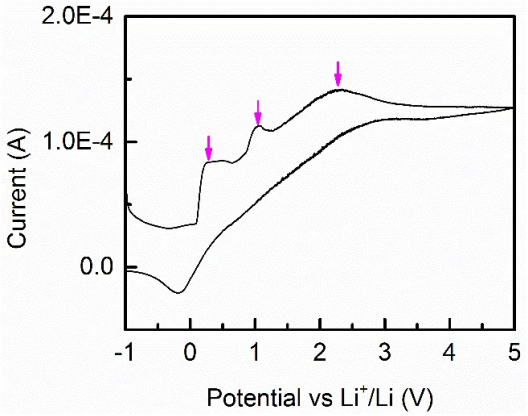

Figure S4 Cyclic voltammetry curve of the UIO/Li-IL (15/16) at a scan rate of 0.5 mV s^{-1}.

To evaluate the stability of UIO-66, the UIO/Li-IL with high UIO-66 content is chosen for the CV test. In the CV curve of UIO/Li-IL (15/16) (Figure S4), there shows a peak in the region of 0~0.5 V, which can be ascribed to the Li plating/stripping, a peak at 1 V, which is due to the reaction of Li-IL, and a peak in the region of 1.5~3 V, originating from the reaction of UIO-66 with metallic Li.

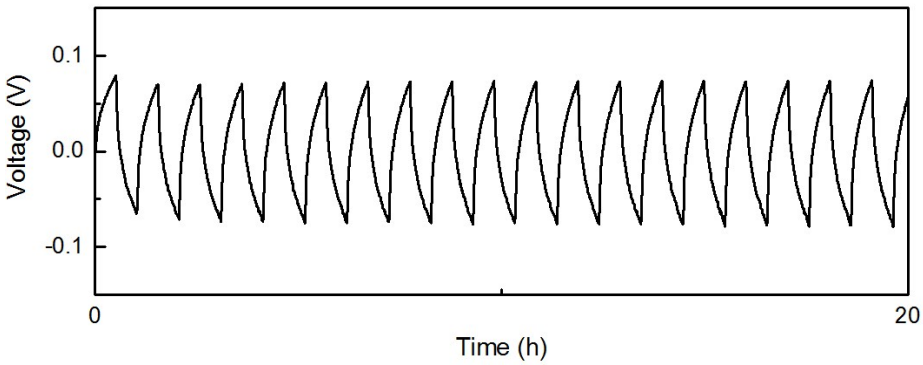

Figure S5 Voltage profile of the Li/UIO/Li-IL(3/4)/Li cell at 60 °C.

As shown in Figure S5, the voltages of the cell in individual cycles are identical, demonstrating stable Li plating/stripping in UIO/Li-IL, and no electronic conduction.