Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.
This journal is © The Royal Society of Chemistry 2018

Covalently-linked metal–organic framework (MOF)-polymer all-solid-state electrolyte membrane for room temperature high performance lithium batteries

Zhinan Wang,[‡a] Shi Wang,[‡a] Ailian Wang,[a] Xu Liu,[a] Jie Chen,[a] Qinghui Zeng,[a] Lei Zhang,[b] Wei Liu,*[a] and Liaoyun Zhang*[a]

[a] *School of Chemical Sciences, University of Chinese Academy of Sciences, Beijing 100049, China. *E-mail: zhangly@ucas.ac.cn; weiliu@ucas.ac.cn*

[b] *College of Science, China University of Petroleum-Beijing (CUPB), Beijing 102249, China.*

[‡] Zhinan Wang and Shi Wang contributed equally to this work.

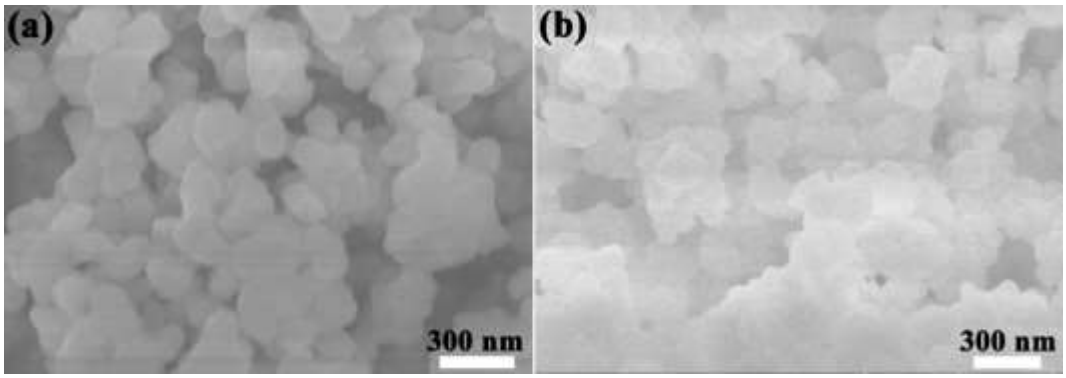

Figure S1. SEM images of (a) UiO-66-NH_2 and (b) M-UiO-66-NH_2, respectively.

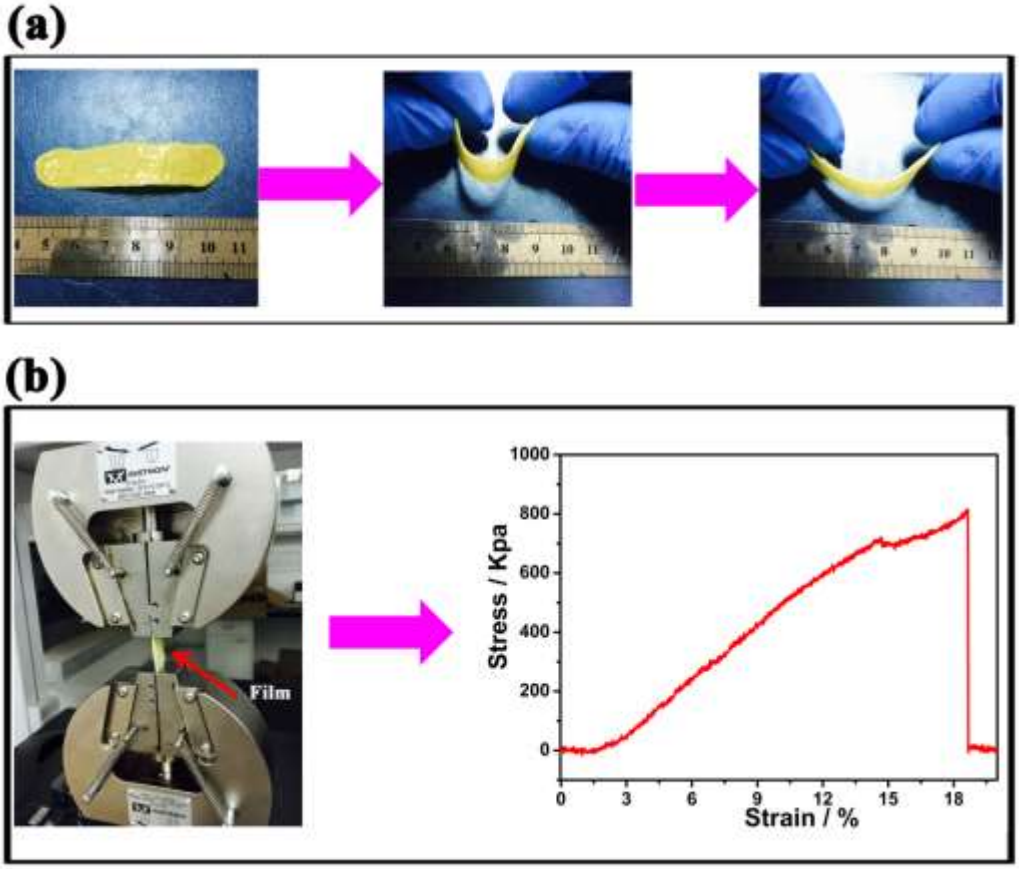

Figure S2. (a) The flexible and free-standing HSPE-1-8 film, which is used to test the mechanical strength. (b) The stretching device and the corresponding stress-strain curve of the HSPE-1-8 film.

Figure S2a shows that the free-sanding HSPE-1-8 can be easily bent without breaking. It is seen in Figure S2b that the film exhibits a tensile strength of 820 Kpa (with an elongation-at-break value at ~20 %), indicating the film has good mechanical strength.

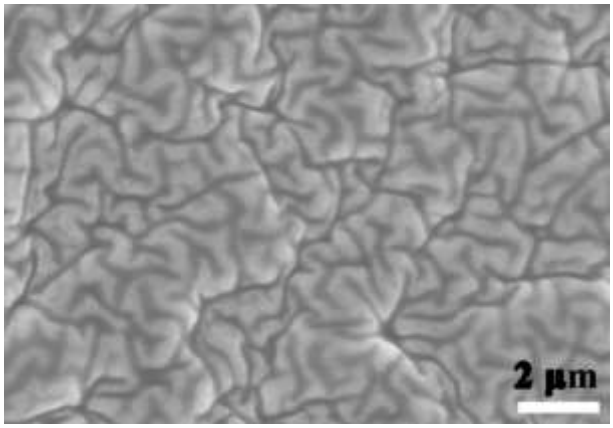

Figure S3. SEM image of HSPE-1-8, which shows obvious microphase separation phenomenon.

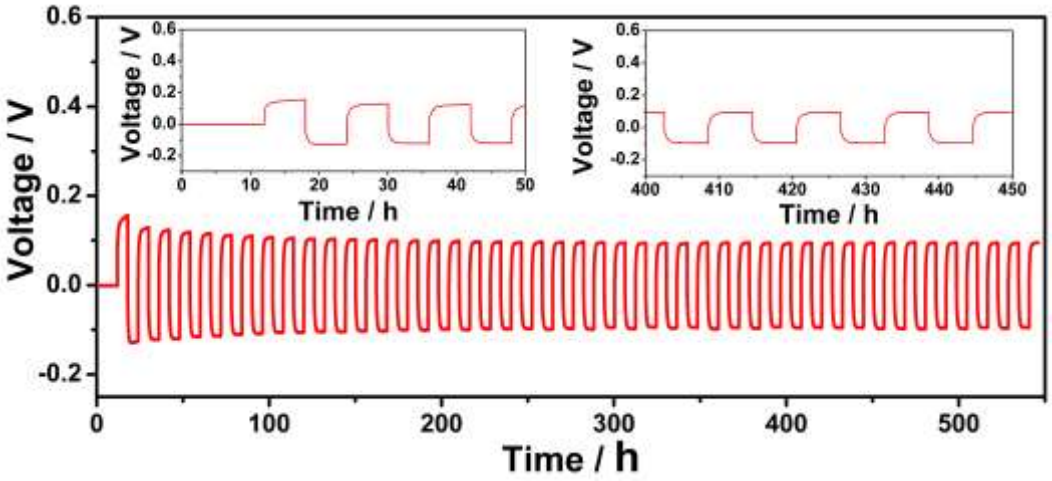

Figure S4. Li plating/stripping experiments of the Li/HSPE-1-8/Li symmetric cell at the current density of 50 μA cm^{-2} (cycled at RT). The insets present the Li plating/striping at the selected potential profiles.

Figure S4 shows galvanostatic cycling curve of the Li/HSPE-1-8/Li symmetric cell at the current density of 50 μA cm^{-2} (cycled at RT). It is seen that the battery maintains a low voltage polarization without short circuiting after cycling for over 550 h, which suggests that the HSPE-1-8 has the ability to suppress the growth of lithium dendrites (highly stable cycling stability and reversibility for the lithium plating/stripping in the HSPE-1-8-based symmetric cell).