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Supporting Information

Solution-processable $Li_{10}GeP_2S_{12}$ solid electrolyte for composite electrode in all-solid-state lithium batteries

Genxi Yu, Yaping Wang, Kai Li, Daming Chen, Liguang Qin, Hui Xu, Jian Chen*, Wei Zhang, Peigen Zhang, Zhengming Sun*

Jiangsu Key Laboratory of Advanced Metallic Materials, School of Materials Science and Engineering, Southeast University, Nanjing 211189, P. R. China

*Corresponding author. *E-mail: zmsun@seu.edu.cn; j.chen@seu.edu.cn

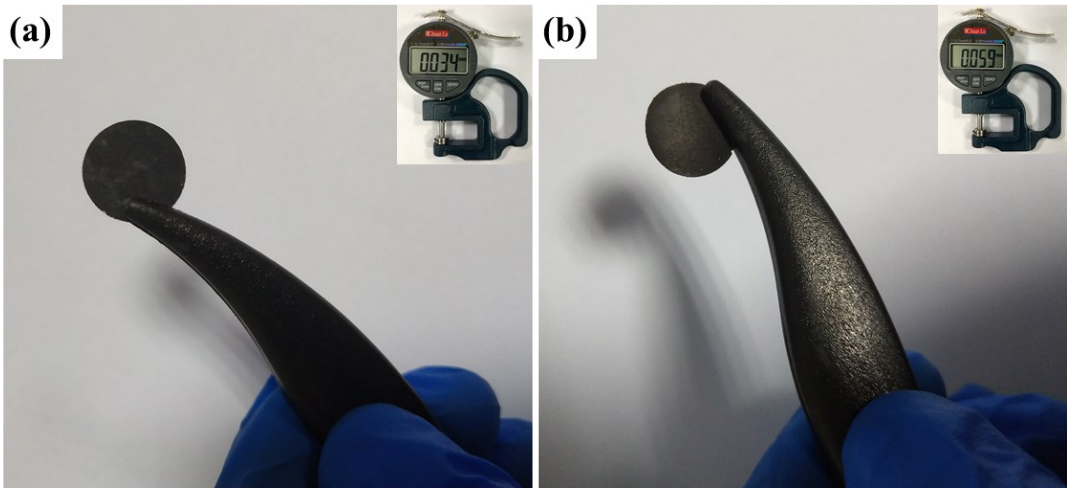

Figure. S1 (a), (b) photographs of the LCO electrode before and after infiltration of solution-processed LGPS-PVDF, respectively. inset shows the thickness of LCO and LGPS-PVDF@LCO composite electrode.

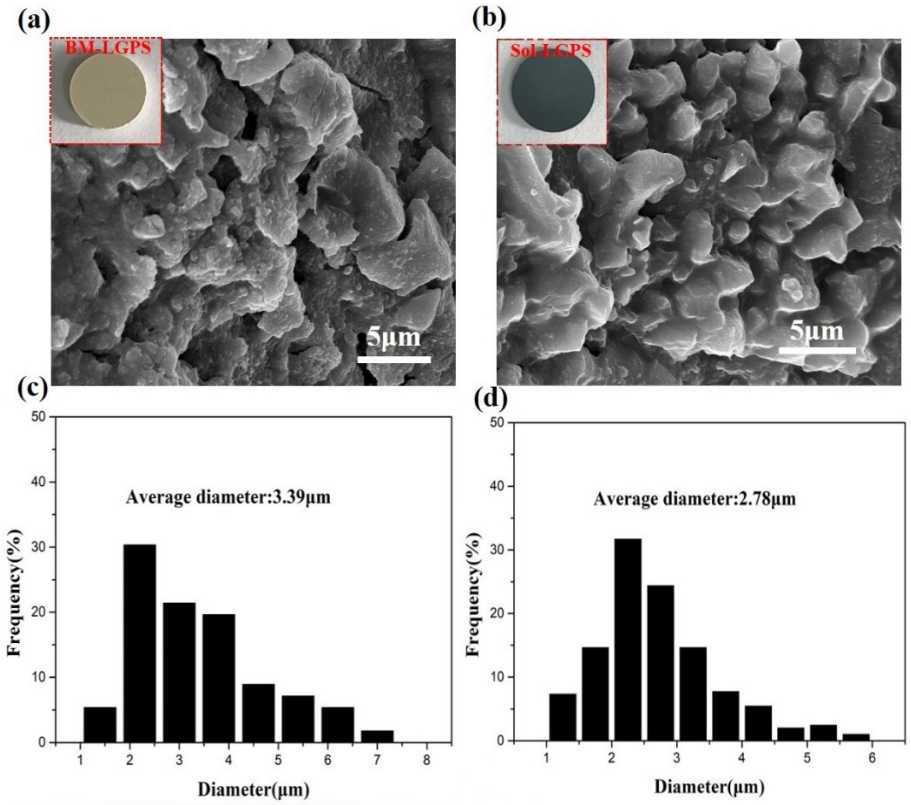

Figure. S2 (a), (b)Surface SEM images of the BM-LGPS and Sol-LGPS pellets, respectively. The insets in (a) and (b) are the corresponding digital photograph. (c), (d) Distribution of the BM-LGPS and Sol-LGPS particle size, respectively.

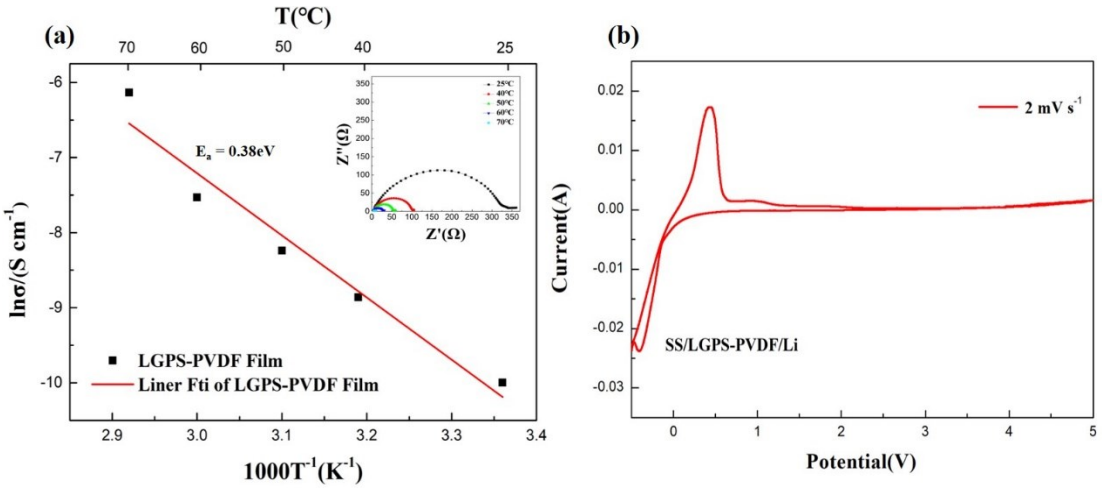

Figure. S3 (a) Arrhenius plots of the Li^+ ionic conductivity for LGPS-PVDF composite electrolyte. The EIS spectrum at different temperature is shown in the magnified insertion. (b)Cyclic voltammograms of LGPS-PVDF composite electrolyte at a scan rate of 2 mV s^{-1} in Li/LGPS-PVDF/SS cell. At 25 °C.

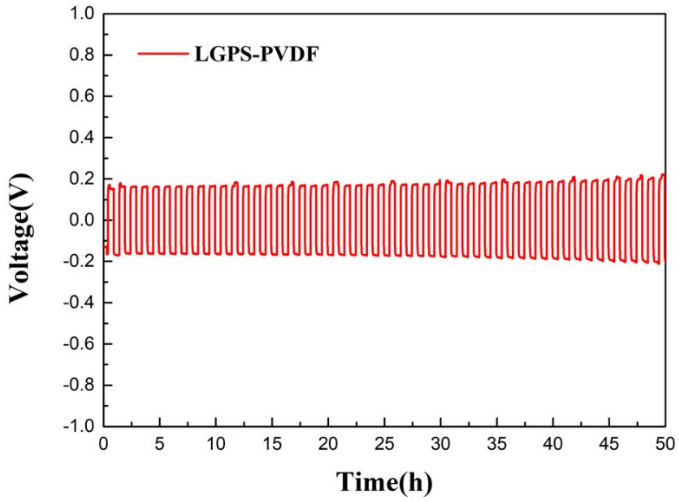

Figure. S4 Galvanostatic lithium deposition-stripping profiles of a symmetric Li/SE/Li (SE = LGPS-PVDF) cell. Current: 0.5mA cm^{-2} at 25°C.

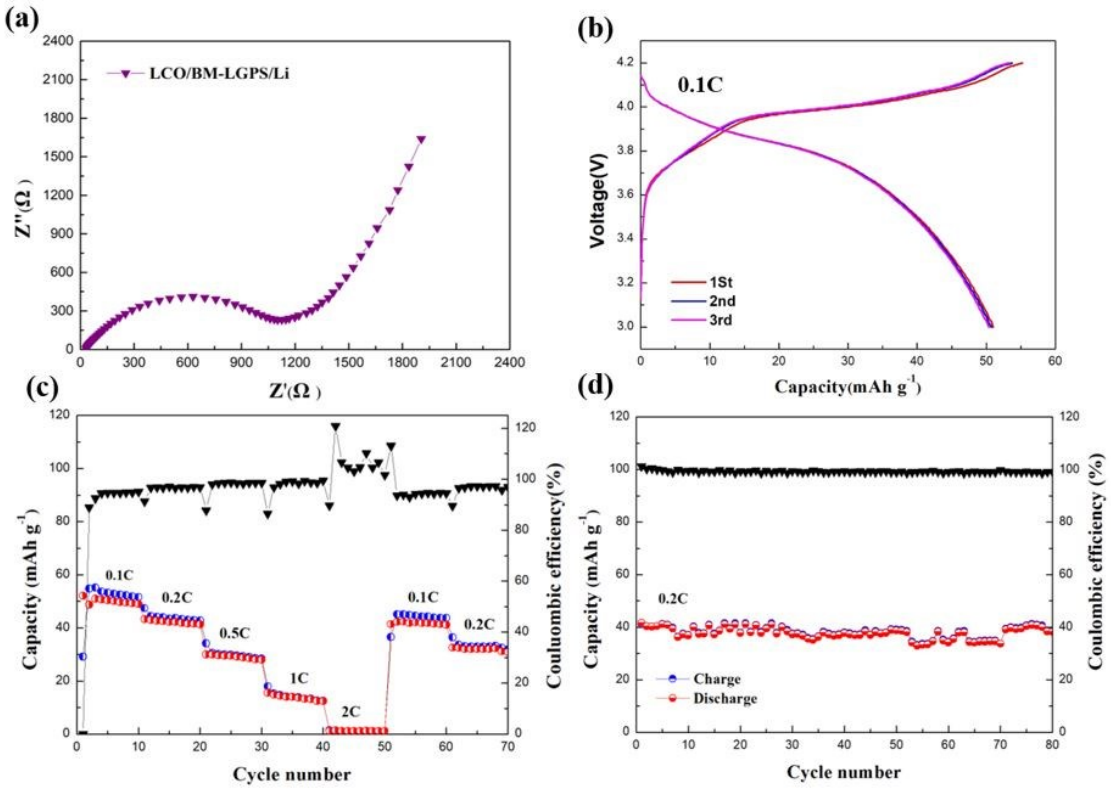

Figure. S5 Electrochemical characterization of all-solid-state LCO/Li half-cells employing the BM-LGPS electrolyte at 50 °C. (a) Nyquist plots (b) First three cycles charge-discharge voltage profiles at 0.1C (~0.14 mA cm^{-2}). (c) Rate performances at different current density of 0.1-2.0 C. (d) Cycling performance at 0.2 C for LCO/Li solid-state cells (3.0-4.2 V).