

# Supporting information for Synthesis and Characterization of Gel Polymer Electrolyte Based on Epoxy Group via Cationic Ring- Open Polymerization for Lithium-Ion Battery

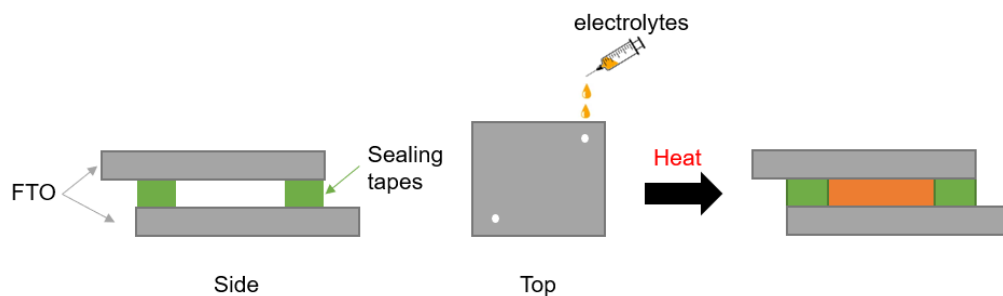
**Table S1.** Comparison of properties of polymer electrolyte reported based on ring-opening polymerization

Components	Salt/Pasticizer/Solvent	$\sigma(\text{mS/cm})^a$	Stability vs (Li <sup>+</sup> /Li) (V) and cathode	Ref.
PEO	LiTFSI/no/ACN	0.0004	4.8	1
DGEPEG, PEGDA	LiTFSI/no/no	0.053	4.7, LFP	2
POSS, P(EO-co-PO)	LiTFSI/ no/THF	0.11	5.4, LFP	3
GLYMO, EDGE	LiTFSI/no/Ethanol	0.026	4.9, LTO	4
GLYMO, DGEPEG	LiClO <sub>4</sub> /no/no	0.12	N/A	5
BDE, ED600	LiTFSI	0.5 <sup>b</sup>	4.51, LFP	6
PNGDE-1.5	LiFSI/no/no	1.57	4.0, LFP	This work

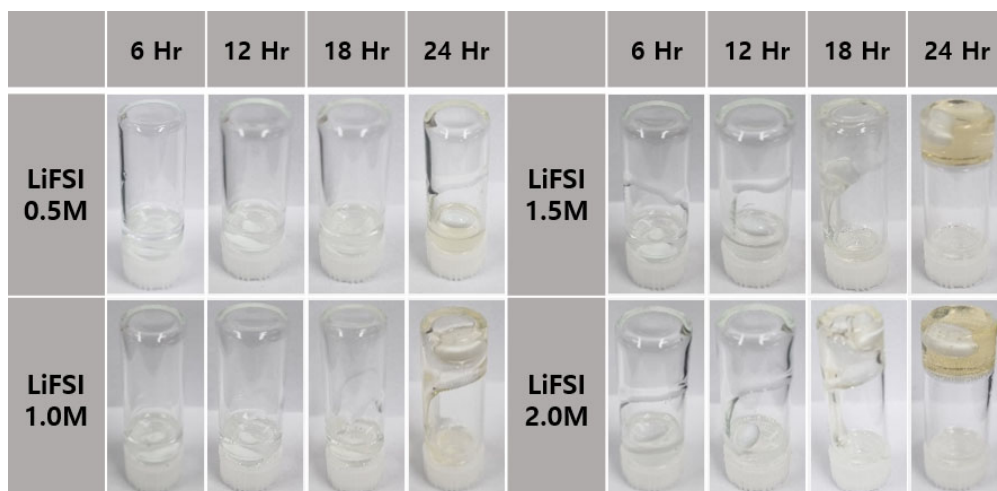
1) <sup>a</sup> at 25 °C unless notes

2) <sup>b</sup> at 45 °C

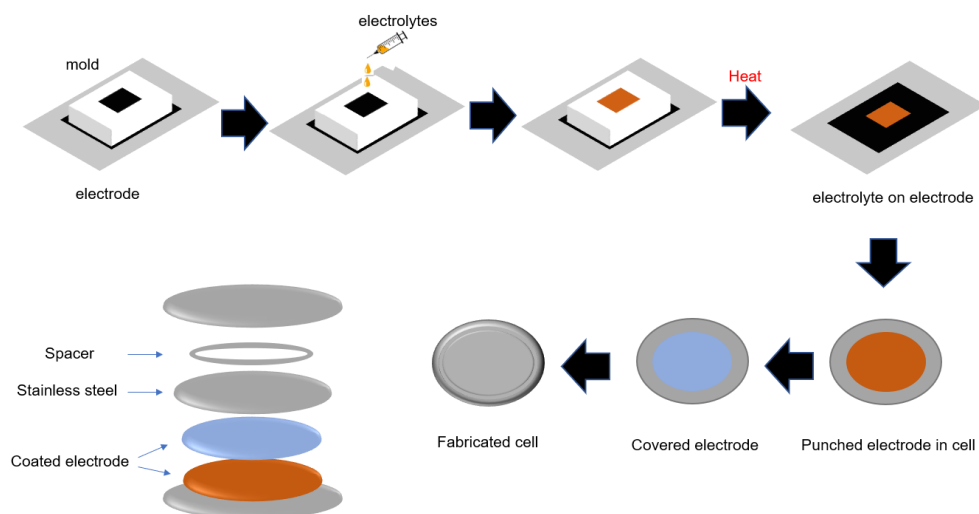
2) Acetonitrile (ACN), tetrahydrofuran (THF), lithium bis(trimethanesulfonyl)imide (LiTFSI), LiFePO<sub>4</sub> (LFP), Ni<sub>1/3</sub>Mn<sub>1/3</sub>Co<sub>1/3</sub>O<sub>2</sub> -NMC, Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> (LTO), Poly (ethylene oxide) (PEO), Diglycidylether of polyethylene glycol (DGEPEG), Poly (ethylene glycol) diacrylate (PEGDA), Polyhedral oligomeric silsequioxane (POSS), Poly(ethylene-co-propylene oxide) (P(EO-co-PO)), (3-glycidyoxypropyl) trimethoxy silane (GLYMO), Ethyl glycol diglycidyl ether (EDGE), Bisphenol A diglycidyl ether (BDE), O,O-bis(2-aminopropyl) polypropylene glycol-*block*-polypropylene glycol (ED600)



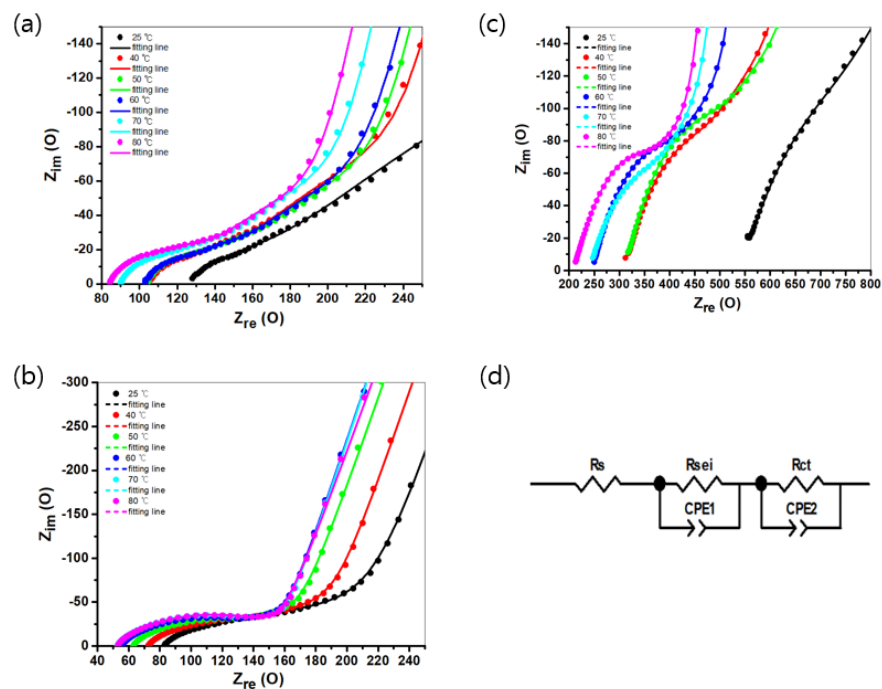
**Figure S1.** Fabrication of asymmetry dummy cell for measuring ionic conductivity.



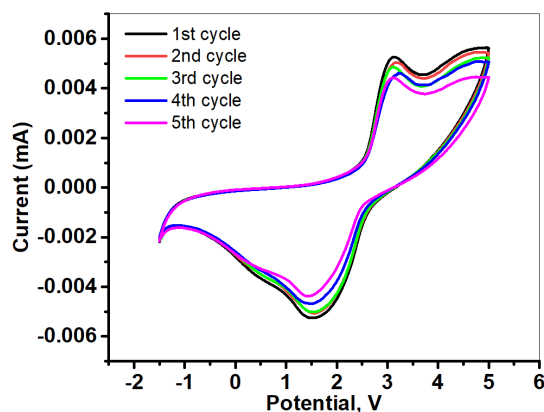
**Figure S2.** Photographing of various concentrations LiFSI with PNGDE up to 24 h.



**Figure S3.** Fabrication and in situ process of coin cell without separator.



**Figure S4.** Nyquist curves of PNGDE1 (a), PNGDE1.5 with fitting plots (b) and PNGDE2 (c); equivalent circuit (d).



**Figure S5.** Cyclic voltammetry profiles of PNGDE 1.5 over potential range from -1.5 to 5.0 V, scanning rate of 1 mV/s at room temperature.

## References

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