Supporting Information (SI) for

Gel polymer electrolytes based on interconnected porous matrix functionalized with poly(ethylene glycol) brushes showing high lithium transference numbers for high charging-rate lithium ion batteries

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4 Pages, 6 Figures

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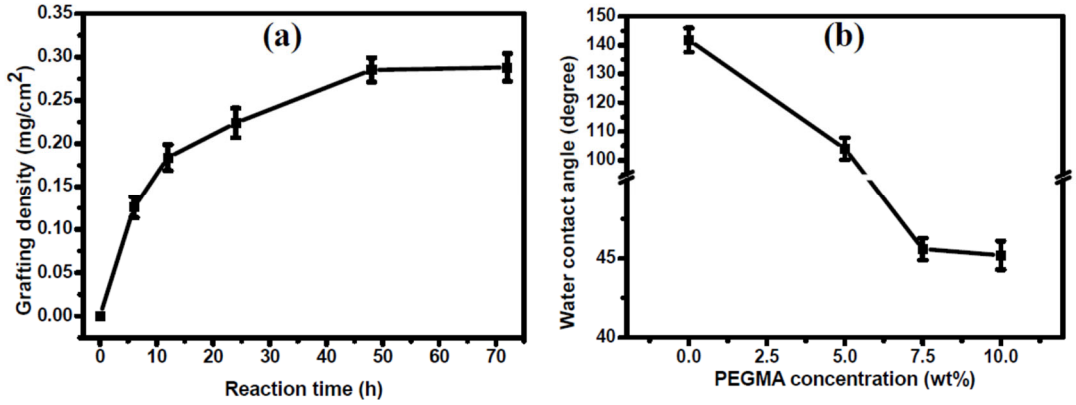


***Figure S1**. Surface initiated ATRP of PEGMA for incorporation of PEG brushes on the pore walls of PVDF-based interconnected porous membrane. (a) the reaction time-dependent grafting densities of PEGMA and (b) the effect of PEGMA concentration in the ATRP reaction on the water contact angles of functionalized PVDF membranes.*

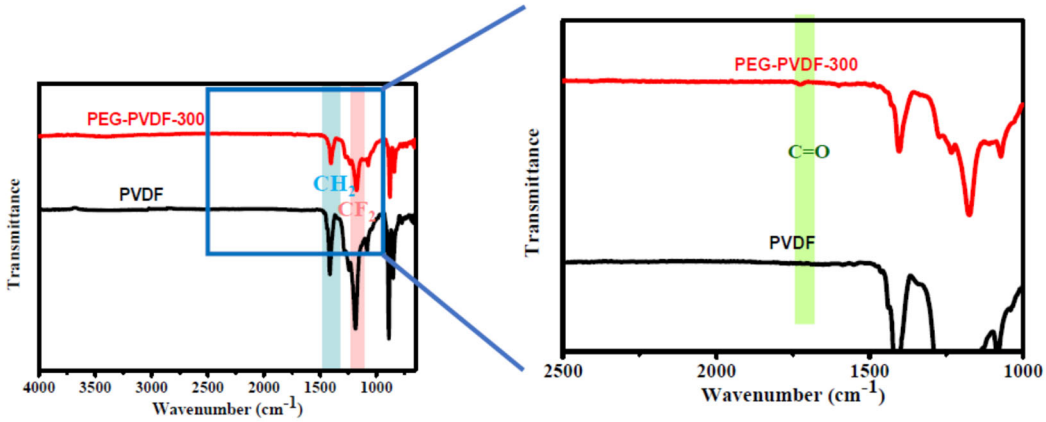


***Figure S2.** FTIR spectra for characterization of PEGMA-functionalized PVDF membranes.*

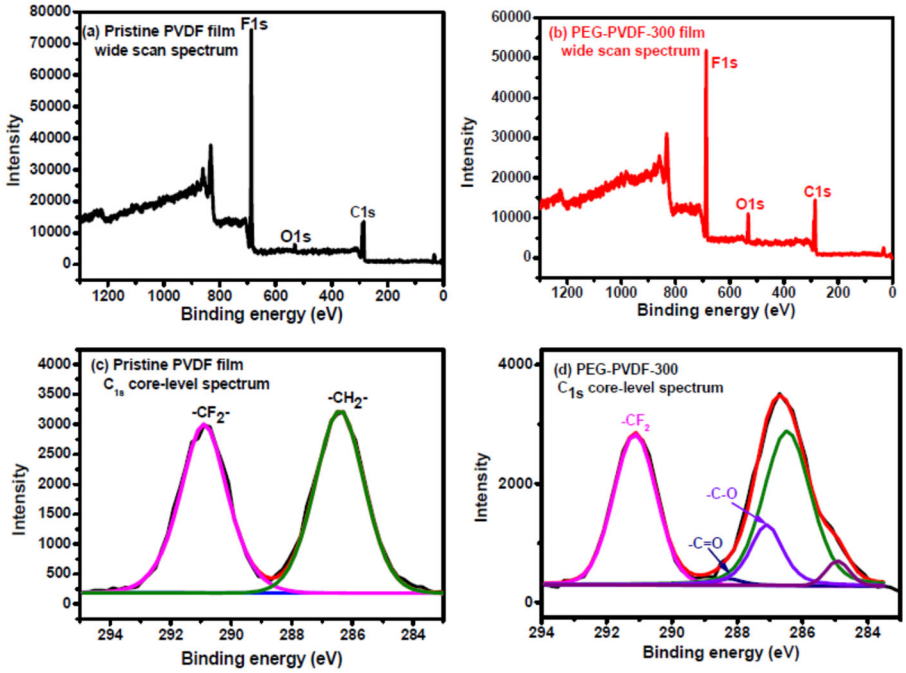
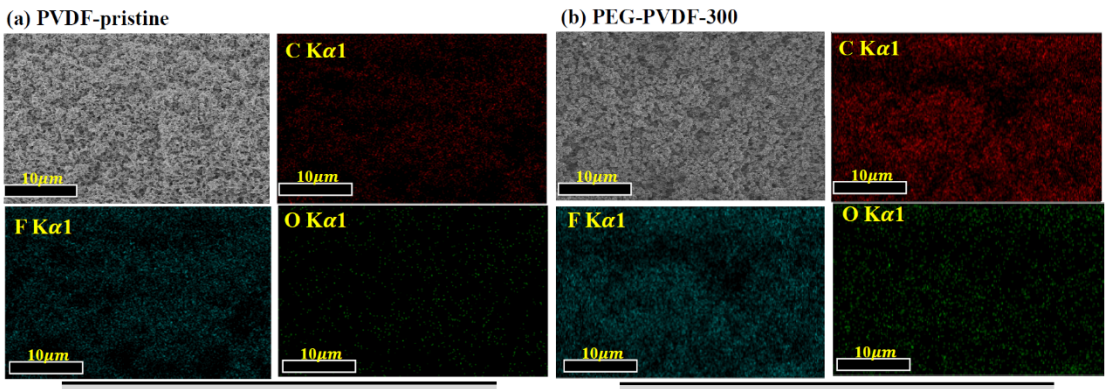


Figure S3. *XPS spectra for characterization of PEGMA-functionalized PVDF membranes. (a) and (b): wide scan XPS spectra; (c) and (d): XPS C_{1s} core-level spectra.*



Map Sum Spectrum			
Element	Line Type	Weight %	Atomic %
C	K series	45.4	56.6
F	K series	53.3	42.2
O	K series	1.3	1.2
Total		100	100

Map Sum Spectrum			
Element	Line Type	Weight %	Atomic %
C	K series	50.9	61.7
F	K series	44.0	33.7
O	K series	5.1	4.6
Total		100	100

Figure S4. *Cross-sectional SEM micrograph and EDX elemental mapping on (a) PVDF and (b) PEG-PVDF-300 membrane. Elemental analysis data is included for quantitative analysis.*

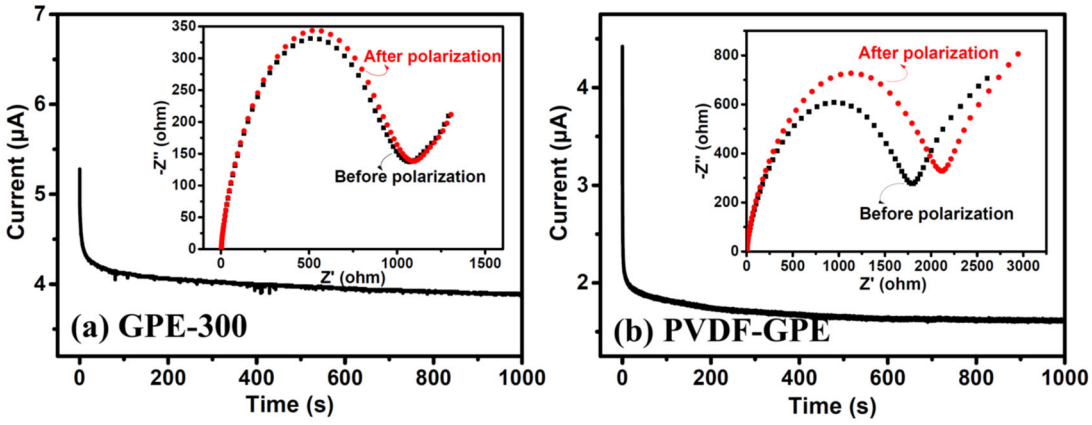


Figure S5. *Chronoamperometry profiles of (a) GPE-300 and (b) PVDF-GPE based symmetric Li/GPE/Li cells at a polarization potential of 10 mV (Insert is the EIS curves before and after polarization).*

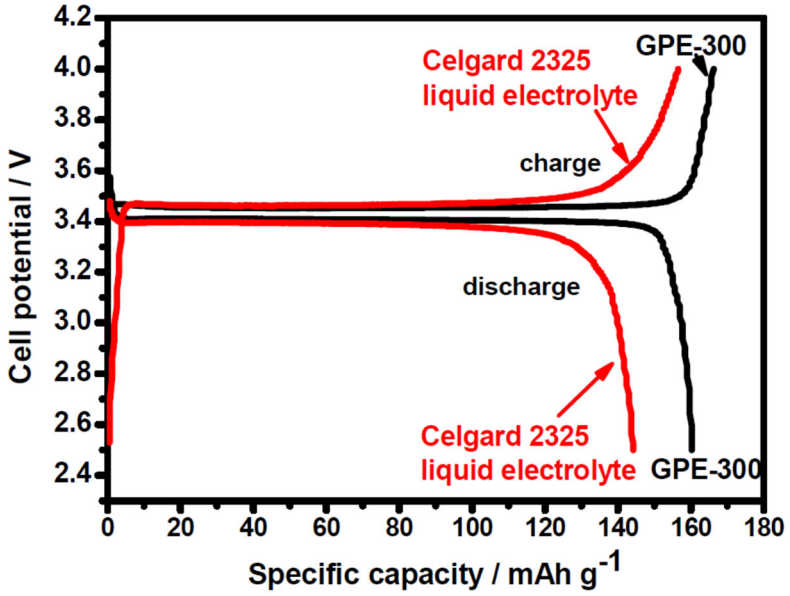


Figure S6. *The initial charge-discharge curves under 0.2C for LFP/GPE-300/Li cell. The data recorded on the sample made with Celagrd2325/liquid electrolyte being included for comparison.*