

Supplementary information

A novel poly(ethylene glycol)–grafted poly(arylene ether ketone) blend micro-porous polymer electrolyte for solid-state electric double layer capacitors formed by incorporating chitosan-based LiClO₄ gel electrolyte

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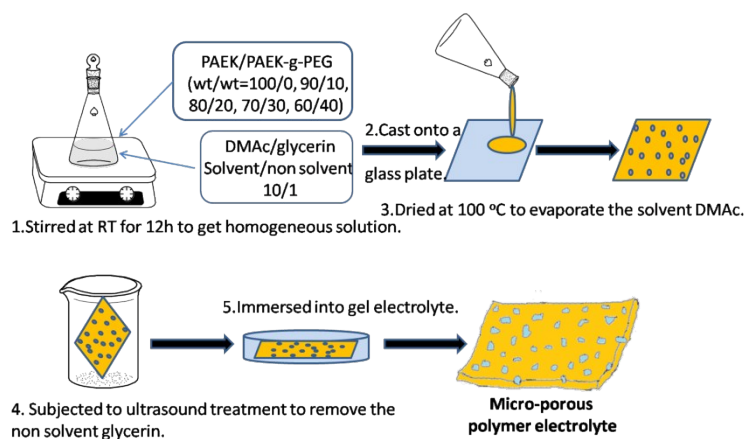
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Supplementary Figures



Scheme S1 Process for synthesizing the gel micro-porous polymer electrolyte.

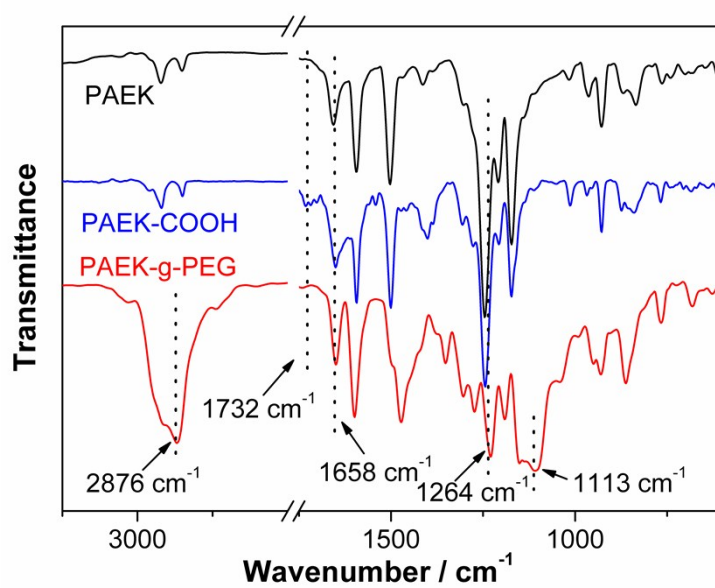


Fig. S1 FTIR spectra of PAEK, PAEK-COOH and PAEK-g-PEG.

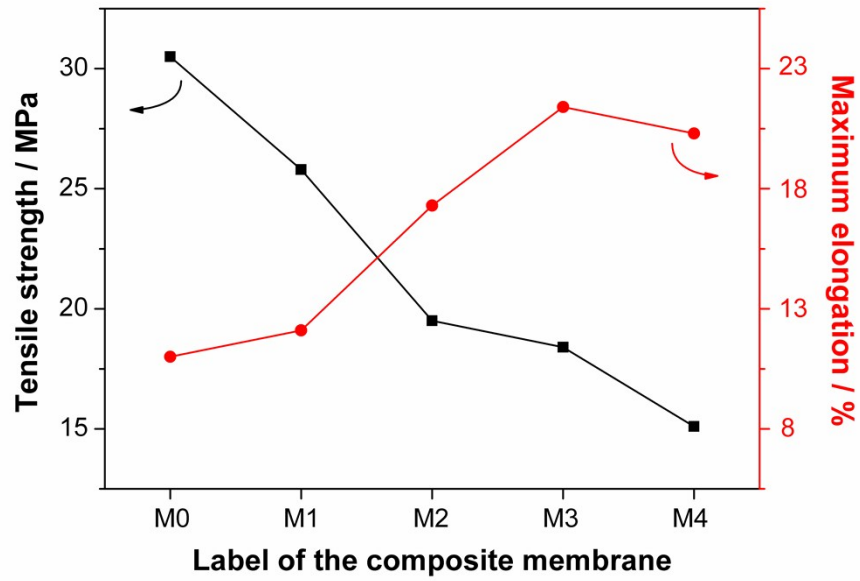


Fig. S2 The tensile strength and maximum elongation of the composite membranes (M0, M1, M2, M3, M4).

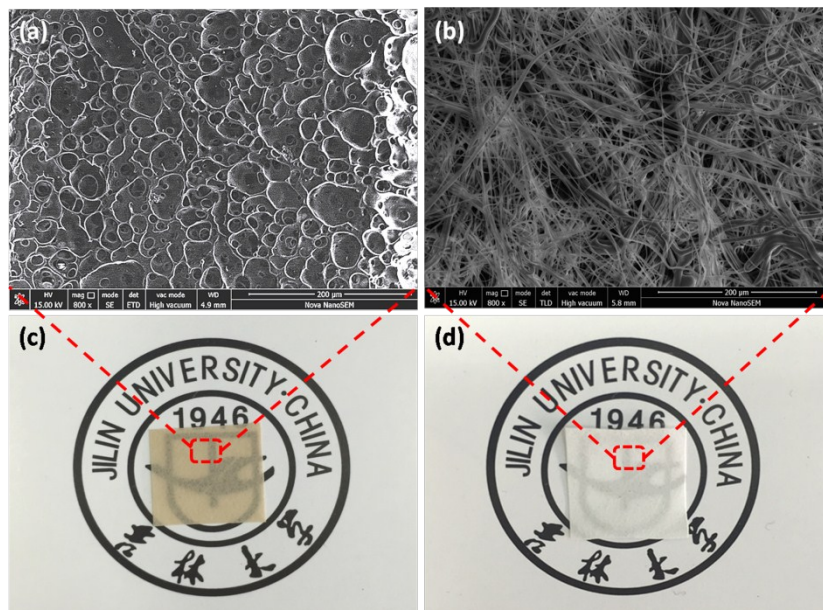


Fig. S3 The SEM images of surface of (a) M3 and (b) commercial separator and the digital photos of (c) M3 and (d) commercial separator.

Supplementary Table

Table S1. Comparison of performances S-EDLC-E2 and our laboratory previously reported EDLCs containing the same electrodes.

Polymer electrolyte ^a	Specific capacitance ^b (F g ⁻¹)	E_{cell} ^b (Wh kg ⁻¹)	P_{cell} ^b (W kg ⁻¹)	Voltage (V)	Ref.
E2	118.63	7.87	95.97	1.5	This work
PAES-Q-1.1 ^c	92.79	2.61	23.20	1	[S1]
PAES-Q/PVP-40% ^d	130.29	4.13	209.41	1	[S2]
PAEK-PEG-40% ^e	92.84	4.90	81.63	1.5	[S3]

^a All the electrodes in our laboratory are activated carbon electrodes without further modification.

^b Specific capacitance, energy density and power density were obtained at current density of 1 A g⁻¹ (PAES-Q-1.1 was obtained at 0.1 A g⁻¹).

^c PAES-Q-1.1 separator is prepared by quaternary ammonium functionalized poly(arylene ether sulfone)copolymer in our previous work.

^d PAES-Q/ PVP-40% is prepared by quaternary ammonium functionalized poly(arylene ether sulfone)/ poly(vinylpyrrolidone) composite gel electrolyte in our previous work.

^e PAEK-PEG-40% represents poly(aryl ether ketone)–poly(ethylene glycol) copolymer solid polymer electrolyte.

Supplementary References

[S1] P.F. Huo, S.L. Zhang, X.R. Zhang, Z. Geng, J.S. Luan and G.B. Wang, *J. Membr. Sci.*, 2015, **475**, 562.

[S2] P.F. Huo, Y. Liu, R.Q. Na, X.R. Zhang, S.L. Zhang and G.B. Wang, *J. Membr. Sci.*, 2016, **505**, 148.

[S3] R.Q. Na, P.F. Huo, X.R. Zhang, S.L. Zhang, Y.L. Du, K. Zhu, Y.N. Lu, M.H. Zhang, J.S. Luan and G.B. Wang, *RSC Adv.*, 2016, **6**, 65186.