Supplementary Materials for

2,5-dimercapto-1,3,4-thiadiazole Modified Gel Electrolyte for Reduced Shuttle Effect and Enhanced Redox Kinetics of Lithium–Sulfur Batteries

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Supplementary figures

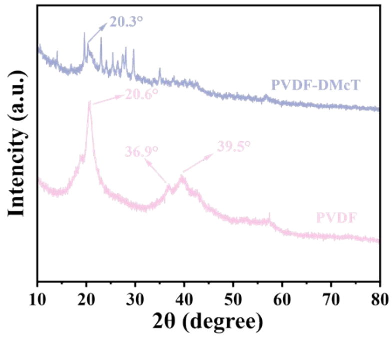

Fig. S1 XRD patterns of PVDF and PVDF-DMcT samples.

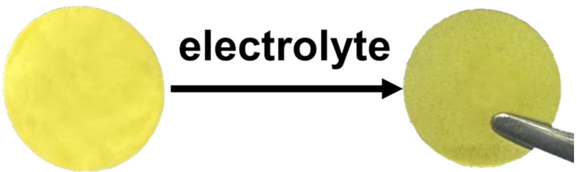

Fig. S2 Photos of PVDF-DMcT GEP before and after absorbing LiTFSI.

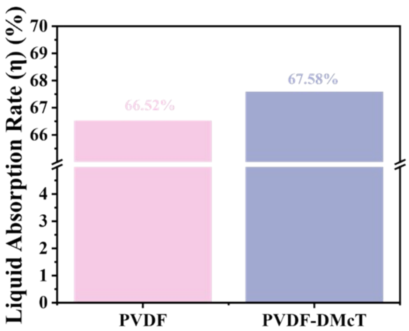

Fig. S3 Liquid absorption rate of PVDF GE and PVDF-DMcT GE.

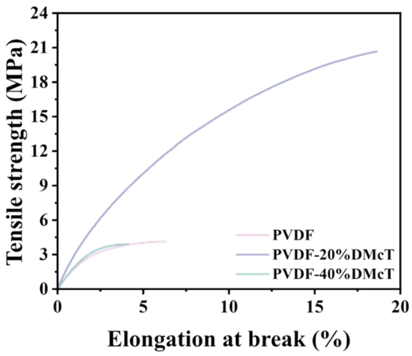

Fig. S4 The tensile strength-elongation at break curves of PVDF, PVDF-20%DMcT, and PVDF-40%DMcT films.

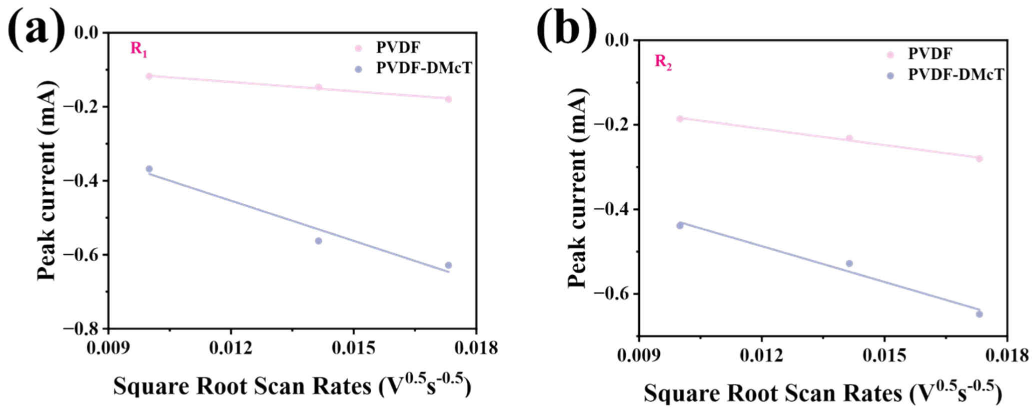

Fig. S5 Fitting plot of peak current at the (a) R_1 and (b) R_2 peaks versus the square root of scan rate.

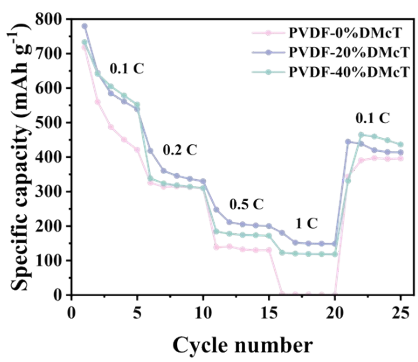

Fig. S6 Rate performances of the Li-S batteries based on PVDF and PVDF-DMcT GE from 0.1 to 1 C.

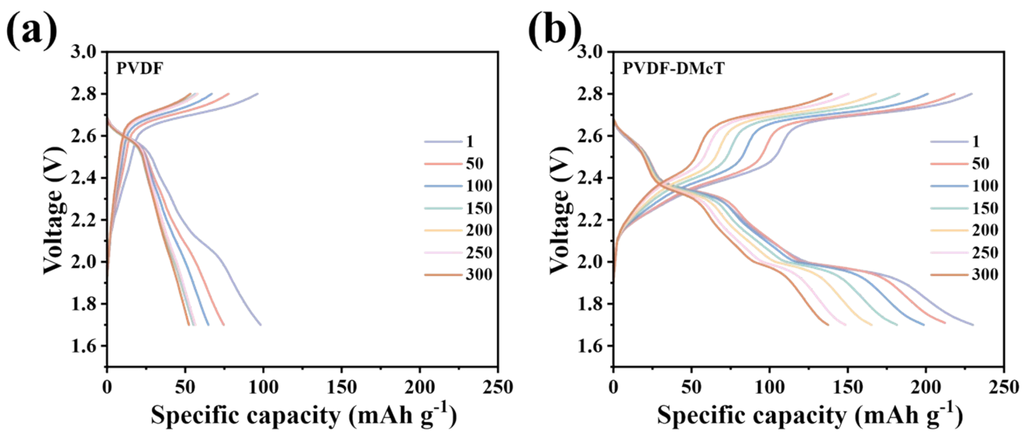

Fig. S7 Charge/Discharge profiles of Li-S cells based on PVDF and PVDF-DMcT GEs at different cycles at 0.5 C.

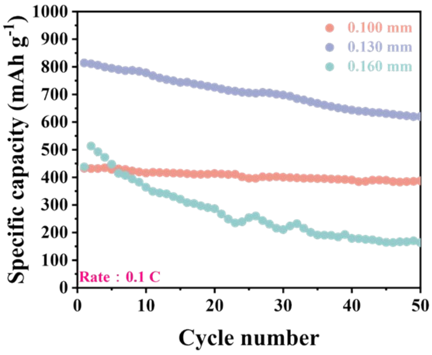

Fig. S8 Cycling performances of Li-S batteries with different PVDF-DMcT GE thicknesses.

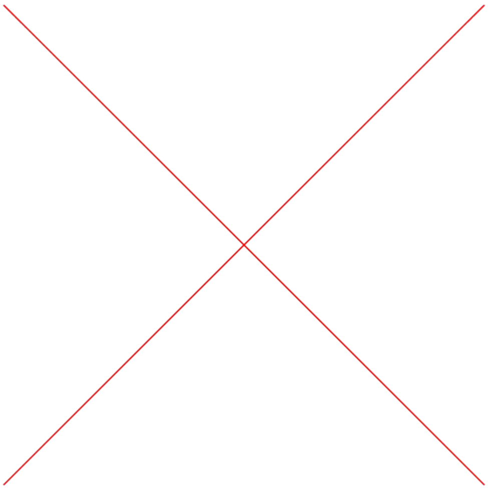

Fig. S9 Lithium ions transference number with different PVDF-DMcT GE thicknesses.

Table S1. The battery performance under the similar sulfur loading.

	The present work	**Julen Castillo et al.** [1]	**Jeong Mu Heo et al.** [2]	**Mingjia Lu et al.** [3]	**Rui Li et al.** [4]	**Yan Xia et al.** [5]	**Longyan Li et al.** [6]
S loading ($mg\ cm^{-2}$)	**1.5**	**1.5**	**Not indicated**	**1**	**1.5**	**1.7**	**1.8**
Cycles	**300**	**20**	**100**	**200**	**150**	**40**	**50**
0.1 C Discharge capacity (mAh/g)	**813.8**	**~680**	**899**	**Not indicated**	**~780**	**744.3**	**675**

Reference:

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2. J. M. Heo, J. Mun and K. H. Lee, *Macromolecular Research*, 2024, **32**, 187-196.
3. M. Lu, K. Chen, Z. Jia, J. Ren, P. He, S. Yang, R. Bagherzadeh, F. Lai, Y.-E. Miao and T. Liu, *Energy Storage Materials*, 2024, **73**, 103870.
4. R. Li, Q. Chen, J. Jian, Y. Hou, Y. Liu, J. Liu, H. Xie and J. Zhu, *Journal of Power Sources*, 2024, **624**, 235521.
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6. L. Li, Y. Chen, X. Guo and B. Zhong, *Polymer Chemistry*, 2015, **6**, 1619-1626.