

- Supporting Information -

Polar Electrospun-nanofiber PVDF Separators for Lithium-Sulfur Batteries with Enhanced Charge Storage Capacity and Cycling Durability

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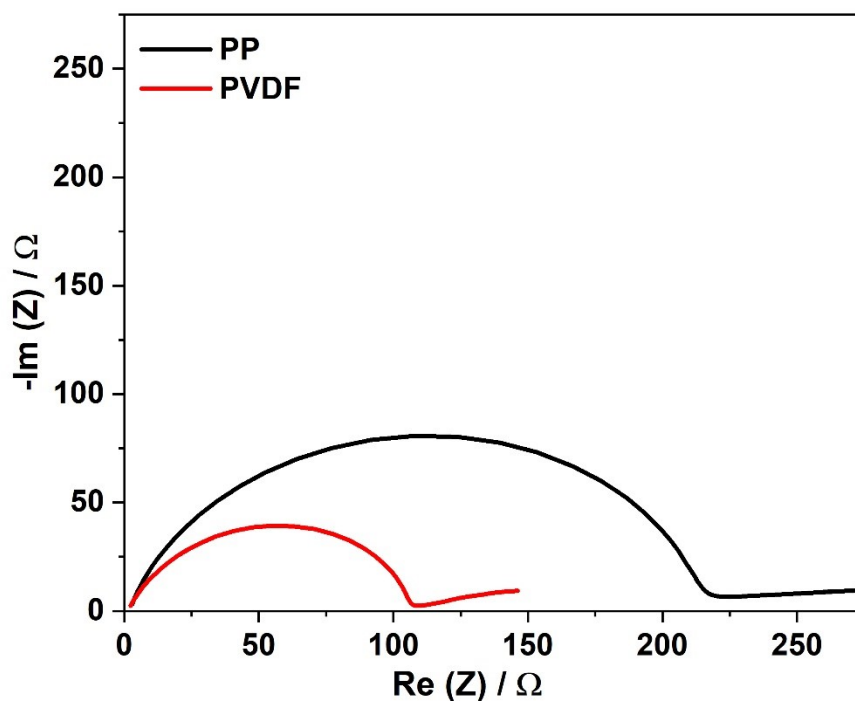


Figure S1: Nyquist plots obtained for separate symmetrical cells with PVDF and PP separator.

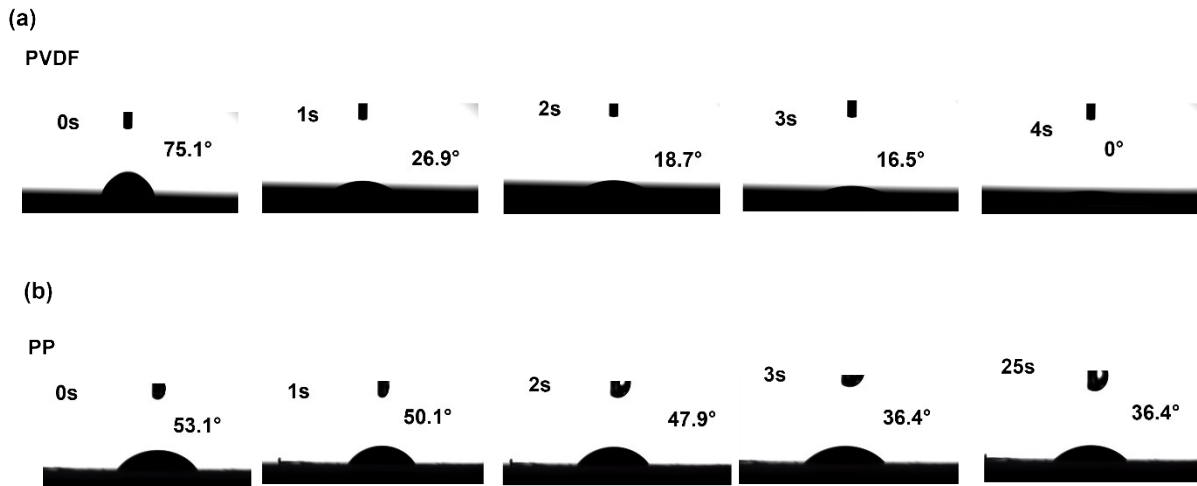


Figure S2: Dynamic contact angle measurements with electrolyte for (a) PVDF and (b) PP separator

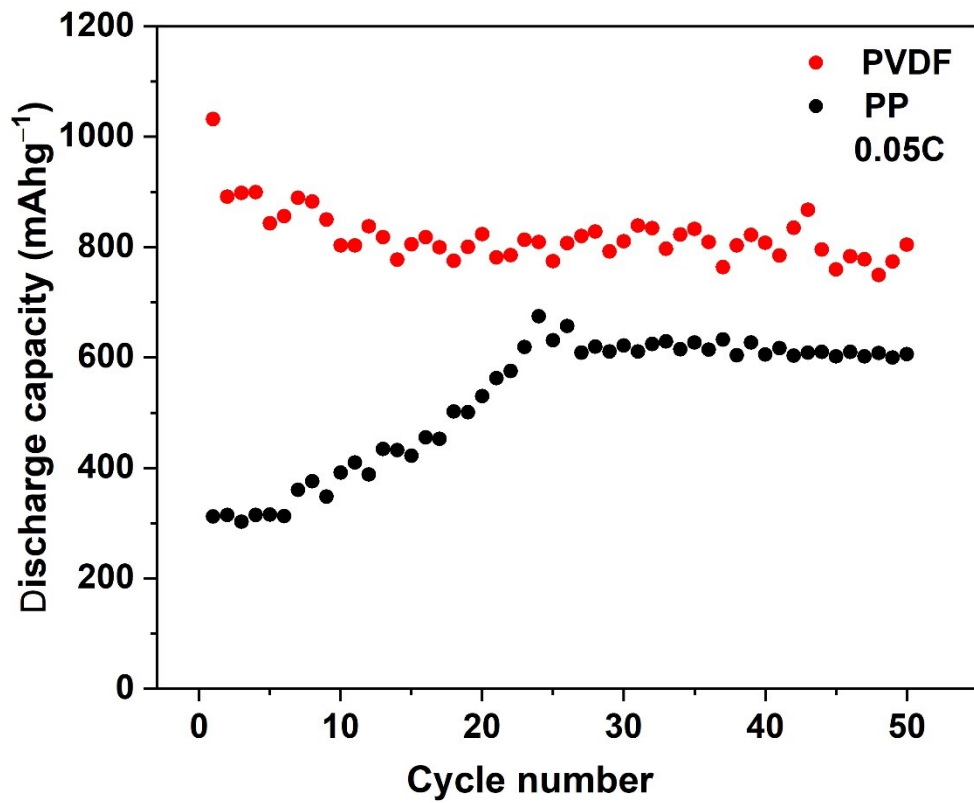


Figure S3: Cycling performance at 0.05C rate of LSB's with PP and PVDF separators.

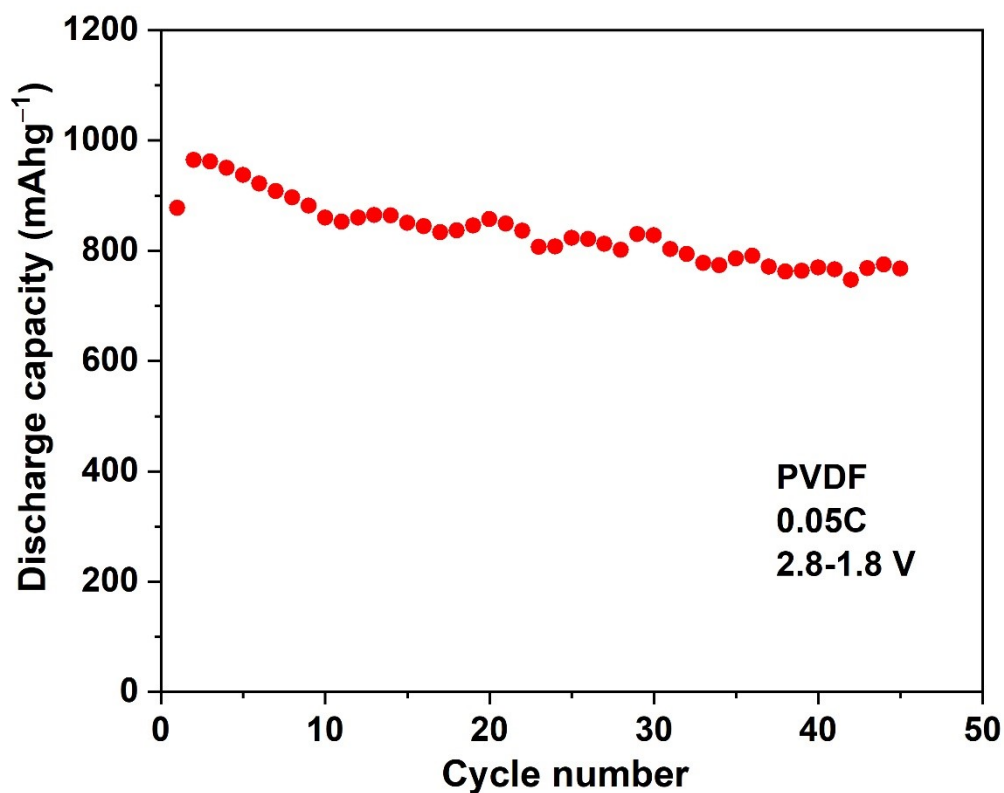


Figure S4: Cycling performance at 0.05 C rate of a replicate LSB cell with PVDF separator

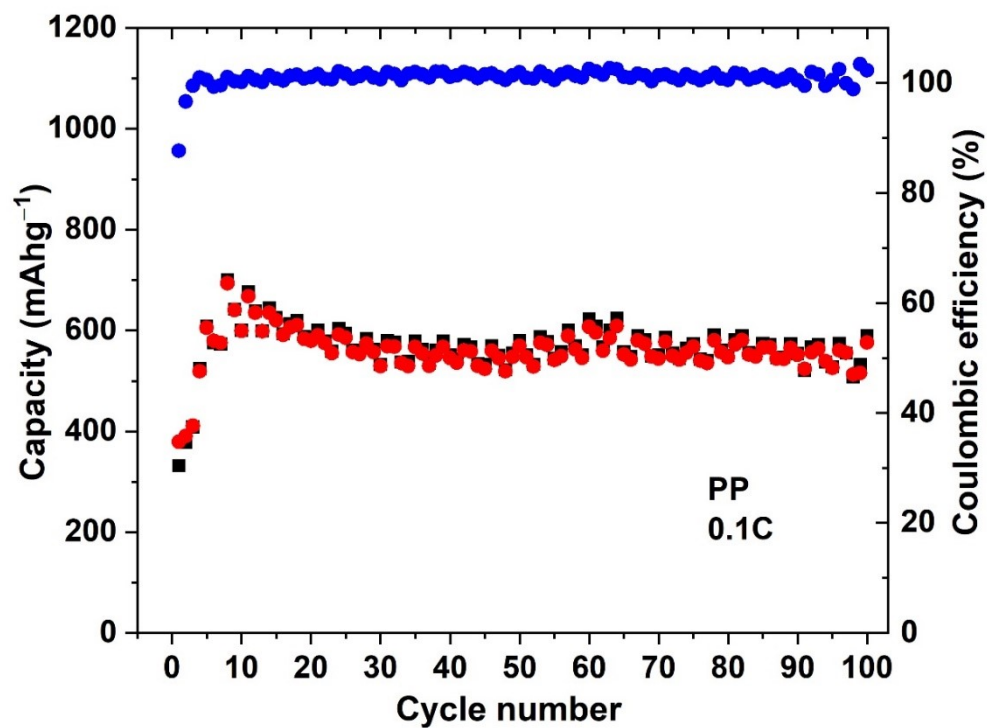


Figure S5: Cyclic performance and coulombic efficiency of an LSB with PP separator.

Table S1: Fitting parameter values for Nyquist plots before and after cycling of LSB cells with PP separator. R-e = electrolyte resistance, R-ct = charge-transfer resistance, R-SEI = resistance of solid electrolyte interphase, R-film = related to Li₂S/Li₂S₂ film, and Ws = Warburg. CPE-ct, CPE-SEI and CPE-film represent constant phase elements associated with R-ct, R-SEI and R-film, respectively.

Circuit element	Before cycling	After cycling
R-e / ohm	3.2	7.0
R-ct / ohm	33.3	2.9
R-SEI / ohm	-	1.84
R-film / ohm	-	4.0
Ws / ohm s ^{-1/2}	5.7	0.9
CPE-ct / F s ^{a-1}	16.9 × 10 ⁻⁶	0.3 × 10 ⁻⁶
CPE-SEI / F s ^{a-1}	-	18.5 × 10 ⁻²
CPE-film / F s ^{a-1}	-	0.4 × 10 ⁻³

Table S2: Fitting parameter values for Nyquist plots before and after cycling of LSB cells with PVDF separator. R-e = electrolyte resistance, R-ct = charge-transfer resistance, R-SEI = resistance of solid electrolyte interphase, R-film = related to $\text{Li}_2\text{S}/\text{Li}_2\text{S}_2$ film, and Ws = Warburg. CPE-ct, CPE-SEI and CPE-film represent constant phase elements associated with R-ct, R-SEI and R-film, respectively.

Circuit element	Before cycling	After cycling
R-e / ohm	2.9	3.9
R-ct / ohm	19.1	0.4
R-SEI / ohm	-	1.0
R-film / ohm	-	0.9
Ws / ohm s ^{-1/2}	2.9	2.5
CPE-ct / F s ^{a-1}	25.1×10^{-6}	3.1×10^{-6}
CPE-SEI / F s ^{a-1}	-	0.1×10^{-3}
CPE-film / F s ^{a-1}	-	3.1×10^{-2}