Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

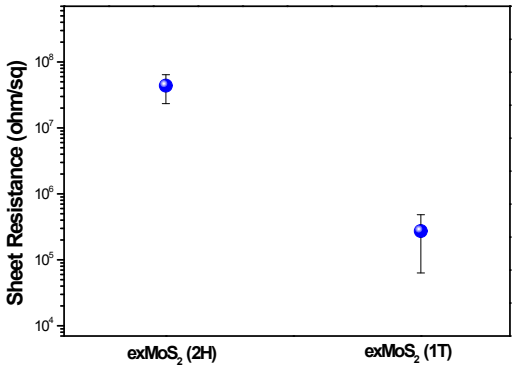

Fig. S1. Sheet resistance of the 2H and 1T exMoS$_2$ films

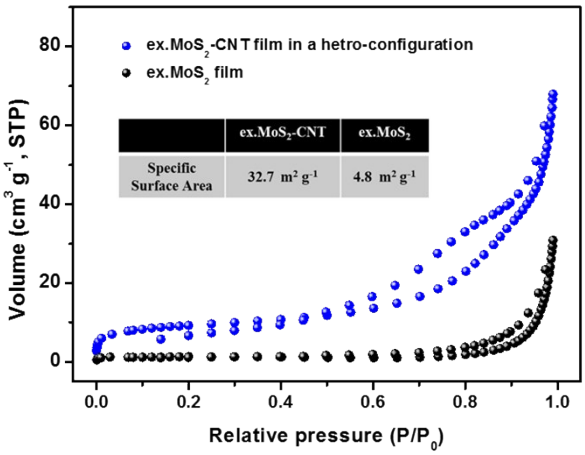

Fig. S2. N_2 isotherms with the calculated specific surface area (as given in the inset table) and average pore volume of the prepared films (ex.MoS$_2$ film and the e.ex.MoS$_2$-CNT film in the hetero-configuration)

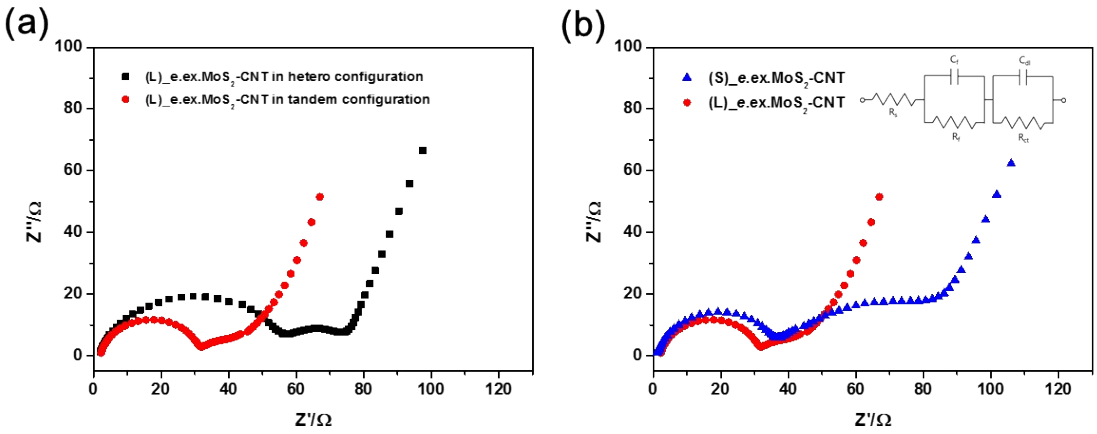

Fig. S3 a) Impedance spectra of (L)_*e*.ex.MoS_2-CNT in hetero and tandem configurations; b) Impedance spectra of (L)_e.ex.MoS_2-CNT and (S)_e.ex.MoS_2-CNT in the tandem configuration bifunctional separators. (R_s: solution resistance, R_f: film resistance, R_{ct}: charge transfer resistance, C_f: film capacitance, C_{dl}: double layer capacitance)

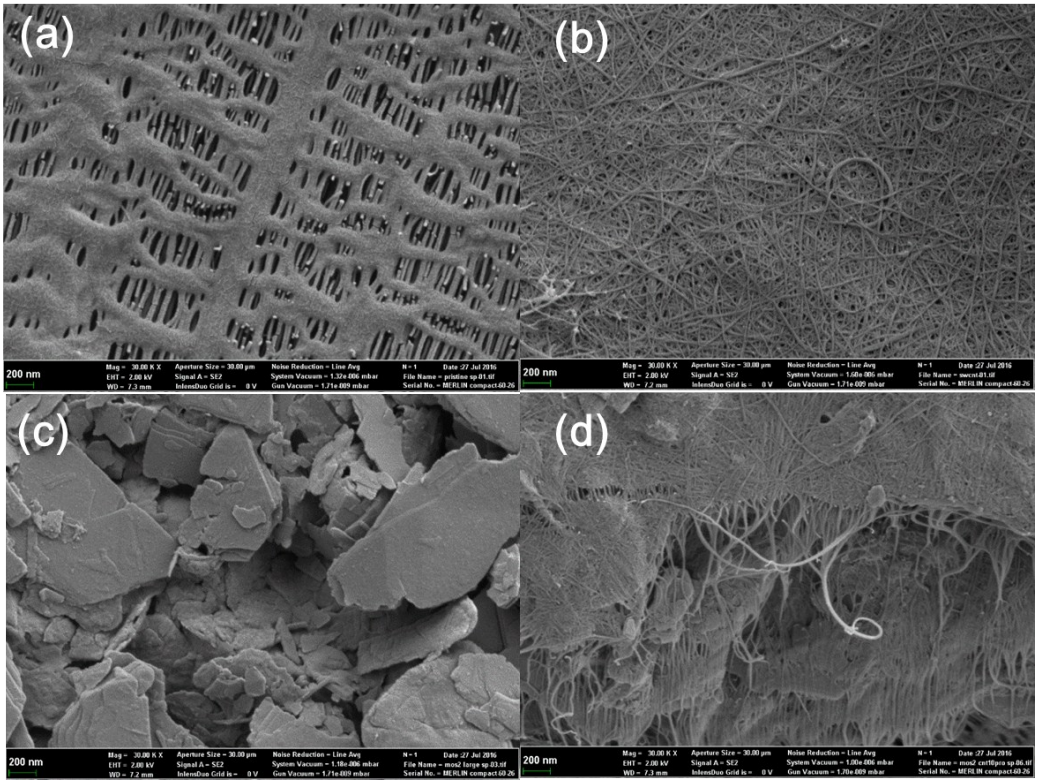

Fig. S4. SEM images of a) Celgard separator, b) CNT coated separator, c) *e*.ex.MoS_2 at 1V coated separator, and d) *e*.ex.MoS_2 and CNT mixture-coated separator

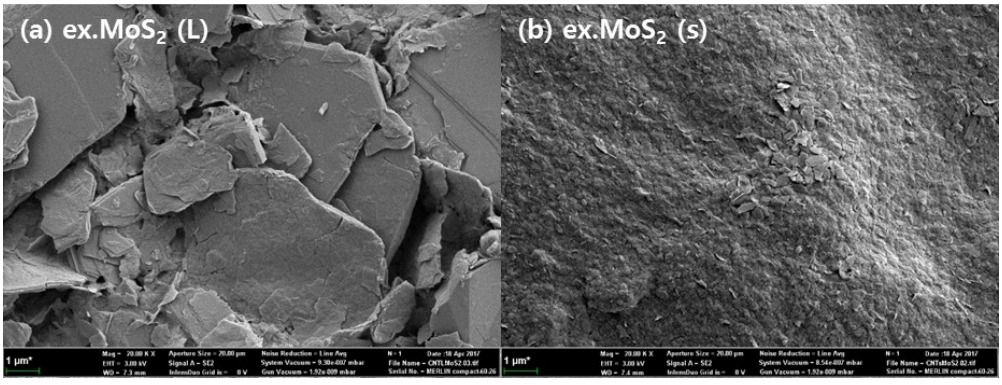

Fig. S5. SEM images of the bifunctional separators coated with a) *e*.ex. MoS_2 at 1V large size (L), b) *e*.ex.MoS_2 at 1V small size (s)

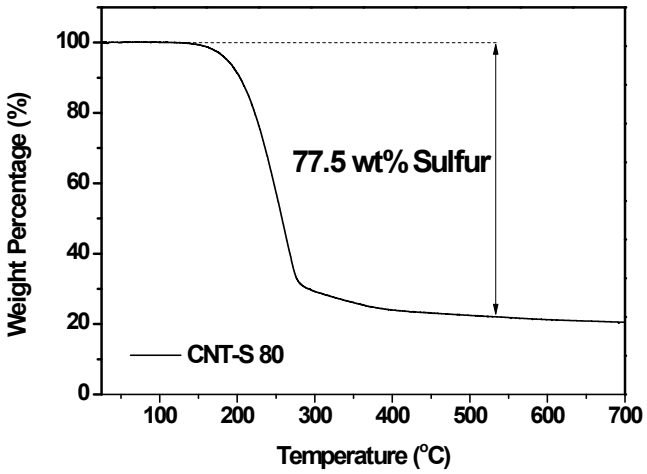

Fig. S6. Thermogravimetric analysis of the CNT-S composite for the electrochemical tests (denoted as CNT-S 80)

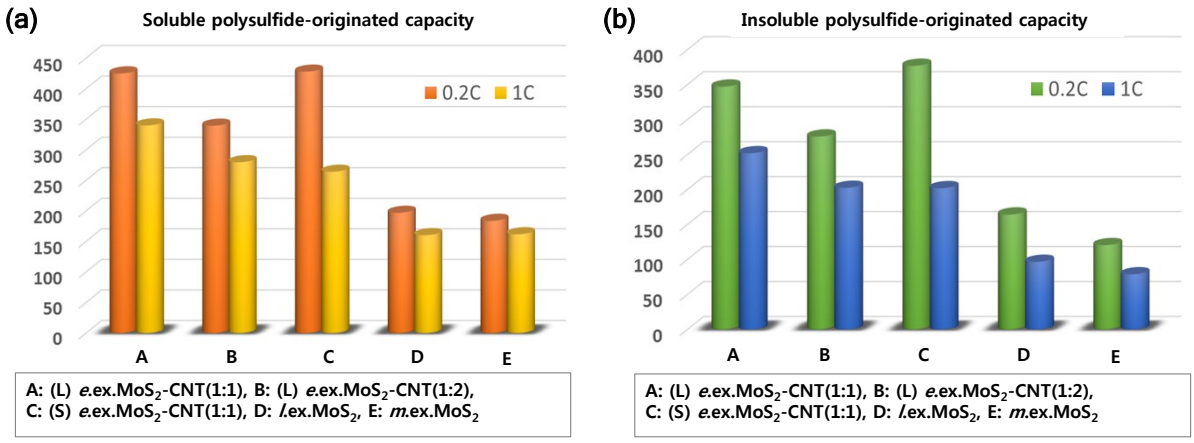

Fig. S7. The analysis on the electrochemical performances of the samples in order to understand the synergistic effects on the soluble polysulfide- and the insoluble polysulfide-originated capacities.