Supporting Information

Poly (3, 4-ethylendioxythiophene) coated sulfur for flexible and binder-free cathode of lithium-sulfur batteries

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**Figure S1.** Thermogravimetric analysis (TGA) curve of a) diamond sulfur b) sphere sulfur c) D-sulfur/SWCNT electrode d) S-sulfur/SWCNT electrode recorded in the range of 20–400 °C in argon.
Figure S2. X-ray diffraction patterns (XRD) of D-sulfur and S-sulfur. The sharp diffraction peaks are characteristic XRD patterns of sulfur, which denoted that sulfur exists in both of material.

Figure S3. N$_2$ adsorption/desorption isotherm of D-sulfur and S-sulfur. The BET surface area of D-sulfur is 10.8 m$^2$/g, which main originates from the surface area of D-sulfur. In contrast, the BET surface area of S-sulfur is 8.5 m$^2$/g.
Figure S4. Stress–strain curves of flexible D-sulfur/SWCNT electrode and SWCNT film.

Figure S5. The Coulomb Efficiency of D-sulfur/SWCNT electrode and S-sulfur/SWCNT electrode