Supporting Information for

Sulfur-rich Carbon Cryogel for Supercapacitor with Improved Conductivity and Wettability

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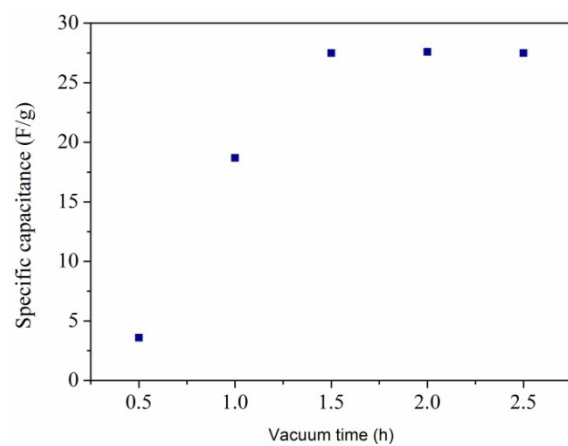
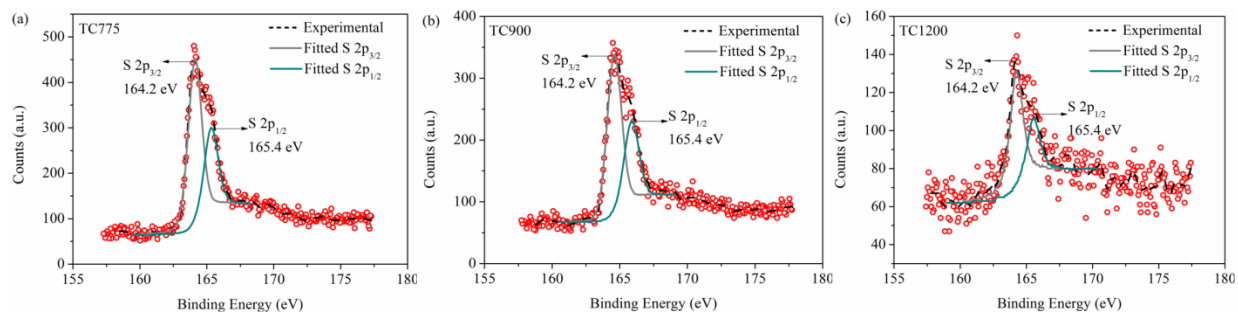Figure S1 The changing trend of specific capacitance with varied vacuum time.

Figure S2 High resolution XPS patterns of S 2p for TC775, TC900 and TC1200.

Figure S2 illustrates the high resolution XPS pattern of S 2p for TC775, TC900 and TC1200. The specific peak positions of S 2p are fixed at 164.2 eV (S $2p_{3/2}$) and 165.4 eV (S $2p_{1/2}$) among three samples, indicating that thiophene-like sulfur incorporated into graphite structure was the single status of sulfur species in the TC samples.
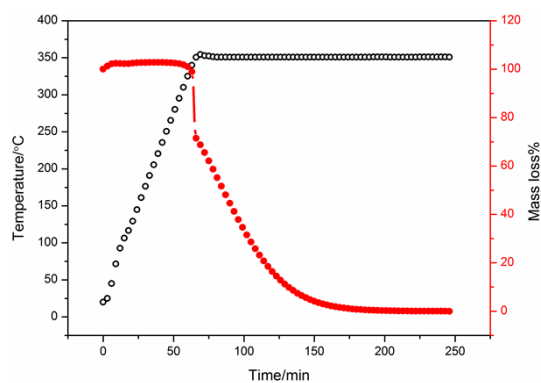
Figure S3 TG pattern of F127, which was heated with 5 °C/min rate from room temperature to 350 °C

and kept for 3 h in 350 °C under 20 ml/min nitrogen flow.

Figure S3 shows the TG pattern of F127 after undergoing heat treatment. The spot arrow pointed

is the time when temperature reached 350 °C. It can be seen that after 150 minutes heat treatment under

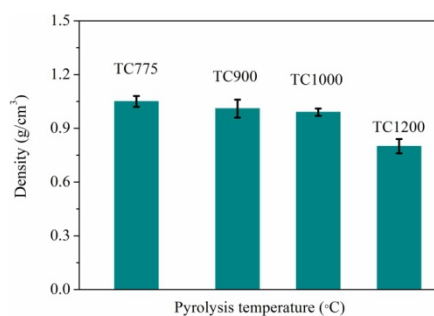350 °C, the weight loss of F127 was 100%, indicating that the F127 burnt out.

Figure S4 Density values of TC samples

The density values of four samples are as follows: 1.05±0.03 (TC775), 1.01±0.05 (TC900), 0.99±0.02 (TC1000) and 0.80±0.04 (TC1200) g/cm³, respectively. It shows that the density was nearly the same in sample TC775, TC900 and TC1200, even though the varied specific surface area induced by different pyrolysis temperatures. The density value of sample TC1200 had a largely drop due to its nearly doubled pore volume compared to other samples. A little higher density of TC775 might be ascribed to the higher sulfur content (the atomic weight of sulfur is heavier than that of carbon) and lower specific surface area compared to other samples.
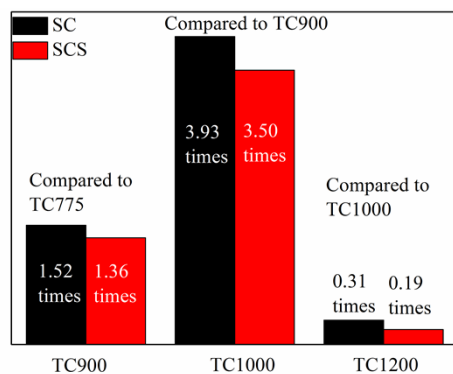
Figure S5 The changing trend of specific capacitance (SC) and specific capacitance normalized to surface area (SCS). Data of each sample were calculated using the each sample's corresponding value of SC and SCS divided by that of nearest formal samples. For example, the data 1.52 times of TC775 is to divide the SC of TC900 by that of TC775.
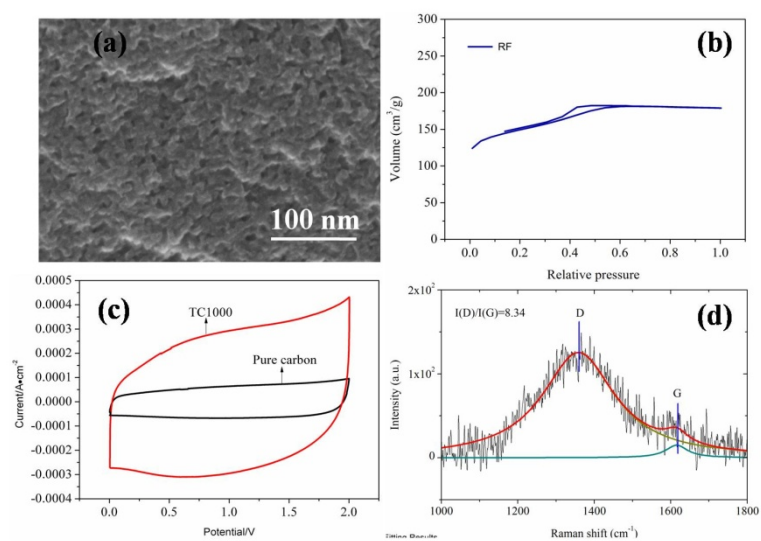
Figure S6 (a) SEM image of sample RF derived pure porous carbon (b) nitrogen sorption isotherm of sample RF (c) CV curves of sample RF and TC1000 at 10 mV/s scan rate (d) deconvoluted Raman spectra of sample RF showing D and G bands.

Table S1 Nitrogen sorption data and specific capacitance normalized to surface area (SCS) for samples

RF.

ID	S_{BET} m²/g	S_{Meso}	S_{Micro}	V_{Meso} cm³/g	V_{Micro}	D_{Meso} Nm	SCS F/m²
RF	479.5±4.1	134.2±3.5	329.3±4.1	0.220±0.005	0.311±0.005	3.1±0.2	0.0064±0.0005