Supporting Information

Self-Assembly of Monodisperse Starburst Carbon Spheres into Hierarchically Organized Nanostructured Supercapacitor Electrodes

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Table S1. MSCS surface properties after heat treatment at 400 °C for 30 min.

Diameter (nm)	Zeta potential (mV)	Pore size (nm)	Specific surface area [m^2 g^{-1}]	Pore volume (mL g^{-1})
483	-9.30	1.81	1260	0.75

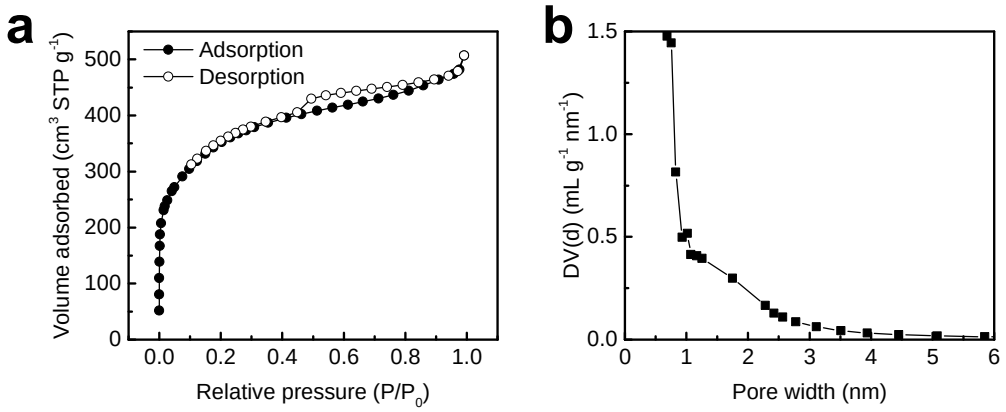

Figure S1. (a) Nitrogen adsorption-desorption isotherms of MSCS oxidized at 400 °C. (b) Calculated pore size distribution from (a).

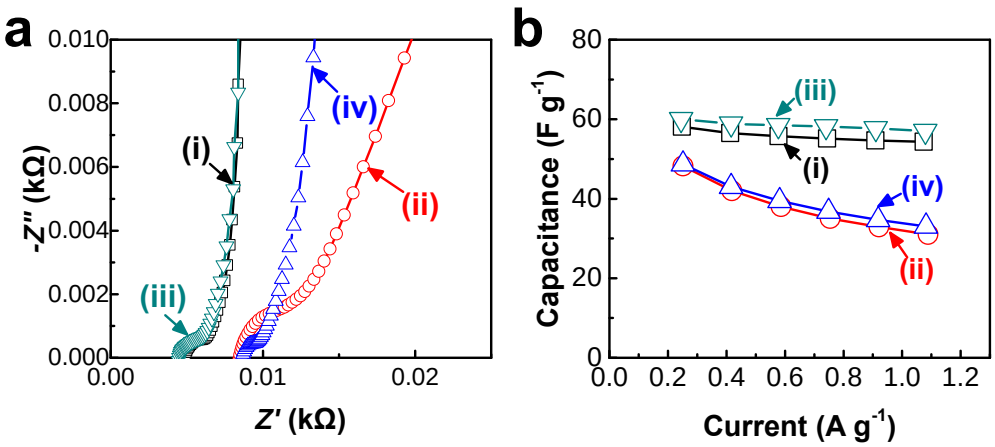

Figure S2. (a) Nyquist plots and (b) rate dependent capacitance of (i) MSCS-O dried at 40 °C, (ii) MSCS-D dried at 40 °C, (iii) MSCS-O additionally dried at 150 °C, and (iv) MSCS-D additionally dried at 150 °C.

There is a chance that the solvents used for MSCS assembly are not completely removed by drying at 40 °C for 24 h. This is particularly possible for the MSCS-D electrode which is grown out of 1-butanol, which shows a boiling point of ~117 °C (vs. ethanol, used for the MSCS-O electrode assembly, which boils at 78 °C). Solvent remaining in the electrodes may prevent ions from getting close to the electrode surface. Electrochemical impedance spectroscopy (Figure S2a) indicates this may be the case. In Nyquist plots, the semi-circle at the high frequency region is related to the charge transfer resistance (R_{CT}) at the electrode/electrolyte interface. In this study, the micro- and mesopores are primarily defined by the individual MSCSs, thus the MSCS-O and MSCS-D electrodes should have the same micro- and mesopore distributions, and thus the R_{CT}s of the two MSCS electrodes should be similar. But, initially, the MSCS-D electrode showed a larger radius semi-circle than MSCS-O. After drying at 150 °C for 1 h, we note that the R_{CT} of

MSCS-D electrode is significantly changed, which is similar to that of MSCS-O, so we speculate that there was some amount of 1-butanol retained in MSCS-D electrode after drying at 40 °C, while the R_{CT} of the MSCS-O electrode remains almost unchanged when dried at 150 °C, indicating that there was little ethanol retained in the MSCS-O electrode after drying at 40 °C. In addition to R_{CT}, most of the electrochemical performances for the MSCS electrodes change slightly when dried at 150 °C for 1 h but overall relationship between the properties of the two electrodes is not changed by the higher temperature drying step.

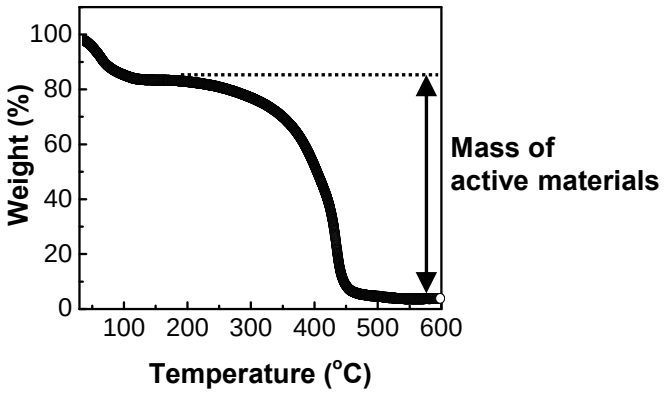

Figure S3. TGA of MSCSs performed under air.

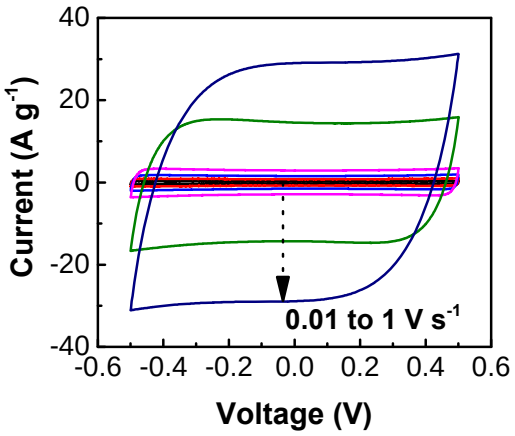

Figure S4. CV curves of MSCS-O electrode at scan rates ranging from 0.01 to 1 V s^{-1}.

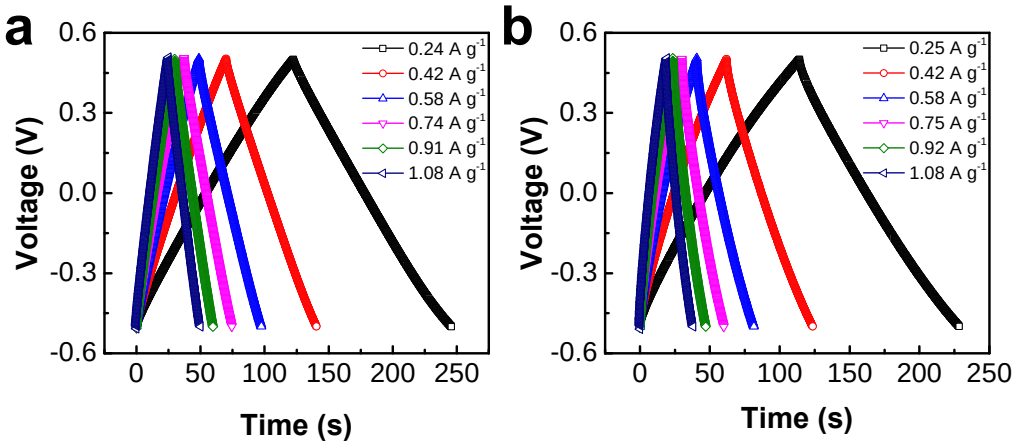

Figure S5. GCD curves of (a) MSCS-O and (b) MSCS-D electrodes at different currents.