

Supporting Information

**Defect Engineering of Hierarchical Porous Carbon Microspheres
for Potassium-ion Storage**

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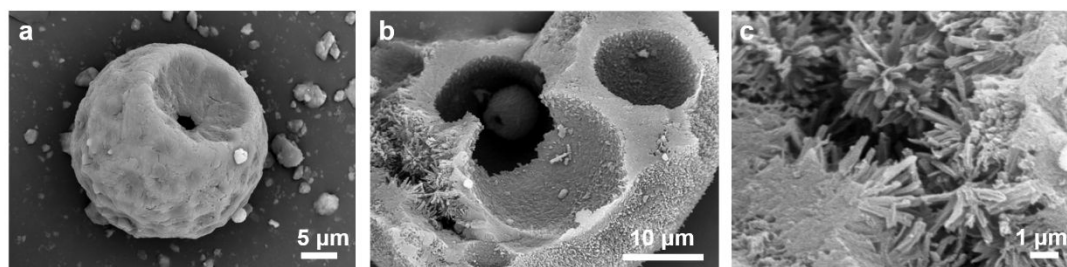


Fig. S1 SEM images of **a** $\text{CH}_3\text{C}_6\text{H}_4\text{SO}_3\text{Fe}$, **b** the broken S-CM-900 under high resolution, **c** the partial enlargement of **b**

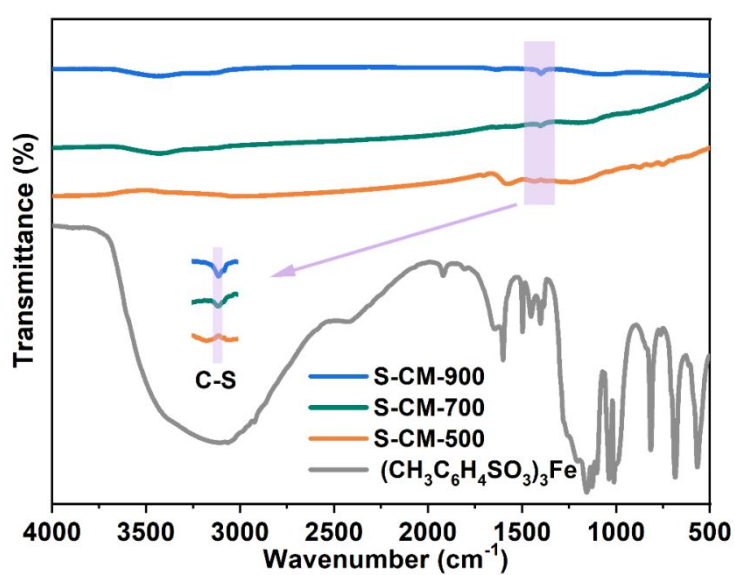


Fig. S2 FT-IR spectra of $\text{CH}_3\text{C}_6\text{H}_4\text{SO}_3\text{Fe}$ and S-CMs

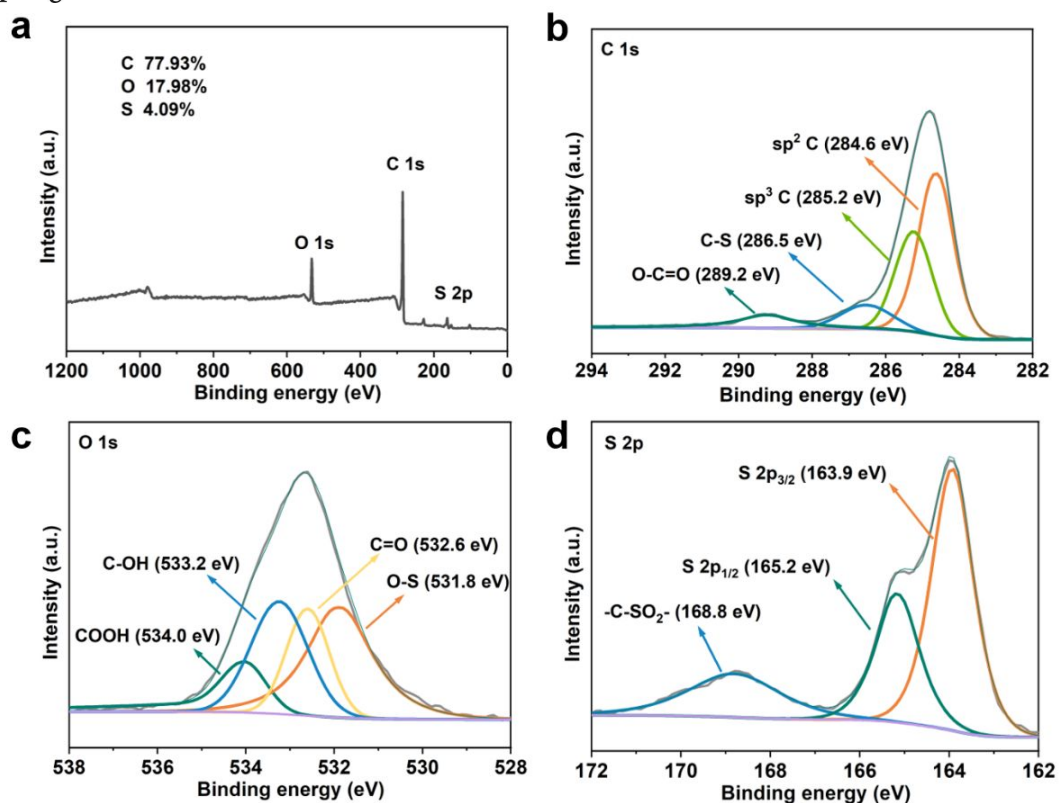


Fig. S3 a Full-spectrum XPS survey, b C 1s, c O 1s, d S 2p XPS spectra of S-CM-500

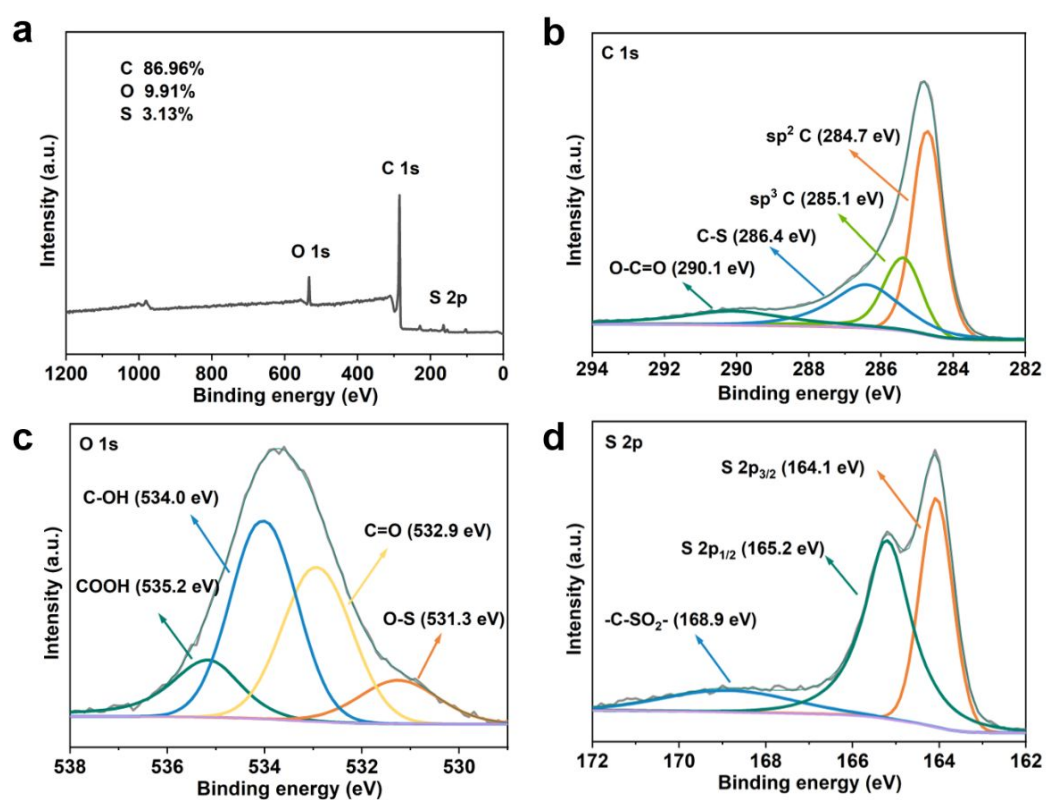


Fig. S4 a Full-spectrum XPS survey, b C 1s, c O 1s, d S 2p XPS spectra of S-CM-900

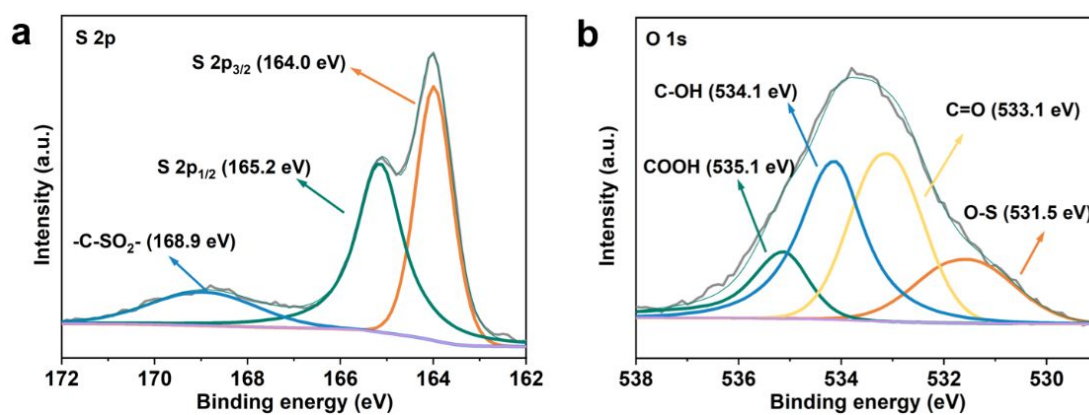


Fig. S5 **a** S 2p and **b** O 1s XPS spectra of S-CM-700

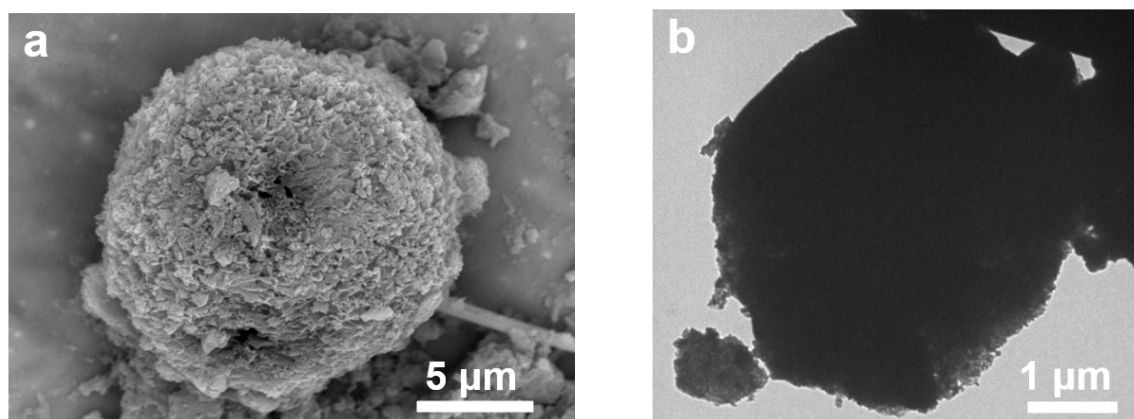


Fig. S6 **a** SEM and **b** TEM images of S-CM-700 anodes after 220 cycles at 50 mA g⁻¹

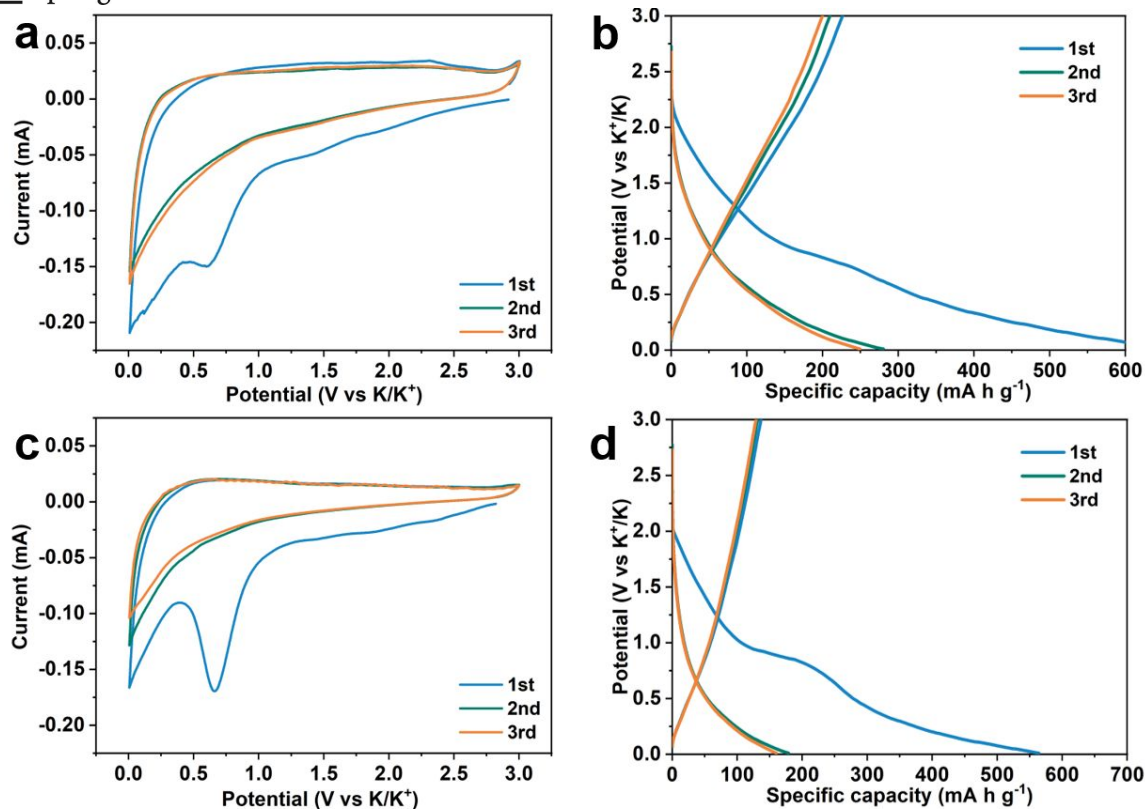


Fig. S7 **a** CV curves at 0.1 mV s⁻¹, **b** charge–discharge profiles at a current density of 100 mA g⁻¹ of S-CM-500; **c** CV curves at 0.1 mV s⁻¹, **d** charge–discharge profiles at a current density of 100 mA g⁻¹ of S-CM-900

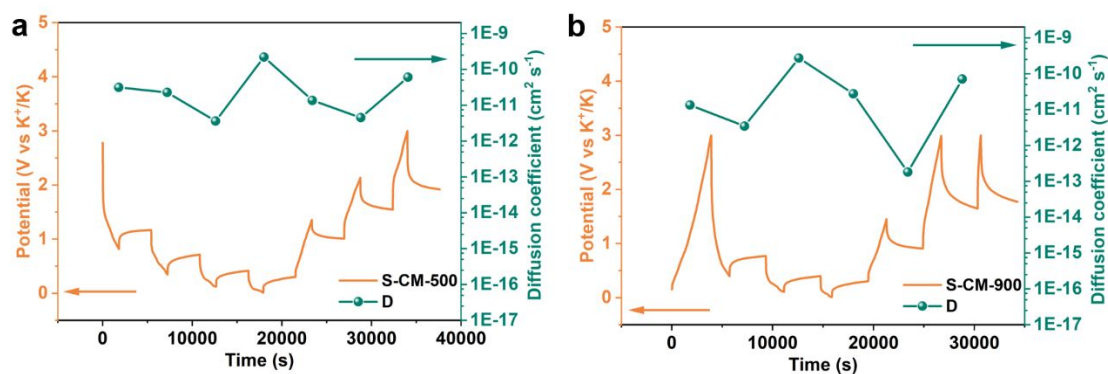


Fig. S8 The GITT profiles and the corresponding K⁺ diffusion coefficients of **a** S-CM-500 and **b** S-CM-900

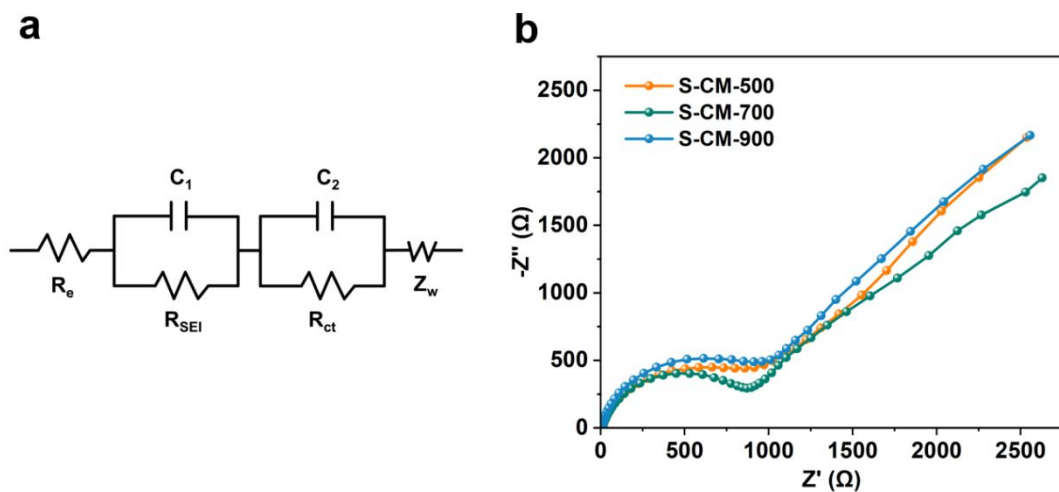


Fig. S9 **a** Equivalent circuit of S-CMs after cycles; **c** nyquist impedance plots after 1 cycle of S-CMs

Table S1 The XPS composition of S-CMs

Sample name	C [atom %]	O [atom %]	S [atom %]	S/O
S-CM-500	77.93	17.98	4.09	0.23
S-CM-700	84.20	10.50	4.37	0.42
S-CM-900	86.96	9.91	3.13	0.32

Table S2 Resistance value of S-CM-700 anodes after different cycles

Component	Original	10th	20th	50th
R_{SEI}/Ω	0	298.9	299.6	300.1
R_{ct}/Ω	1569	1099	945	803

Table S3 Resistance value of different samples after 1 cycle

Component	S-CM-500	S-CM-700	S-CM-900
R_{SEI}/Ω	322	203	221
R_{ct}/Ω	1220	1074	1252