Supporting Information for

Supercritical CO₂ Assisted Synthesis of 3D Porous SiOC/Se Cathode for Ultrahigh Areal Capacity and Long Cycle Life Li-Se Batteries

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Element —		Weight (%)	
Element —	SiOC	ARC-SiOC	ARC-SiOC-Se
С	57.2	87.8	43.2
Si	16.4	1.2	0.8
Ο	26.4	11.0	4.8
Se	0	0	51.2

Table S1 EDS results of SiOC, ARC-SiOC and ARC-SiOC-Se composites.



Fig. S1 XRD patterns (a) and FT-IR spectra (b) of SiOC, ARC-SiOC and ARC-SiOC-Se.



Fig. S2 TGA result of SiOC, ARC-SiOC, and ARC-SiOC-Se composite.

Table S2 The percentage of C-C/C=C, C-O and Si-O-C units in SiOC and ARC-SiOC.

Samples	C-C/C=C	C-O	Si-O-C
SiOC	52.1%	20.3%	27.6%
ARC-SiOC	73.2%	21.1%	5.7%



Fig. S3 Galvanostatic discharge-charge profiles (a) and cycling performance (b) of ARC-SiOC at 0.1 C in the voltage range of 0.8-3.0 V.



Fig. S4 CV curves (a-c) and overpotential values (d) of ARC-SiOC-Se electrodes with various Se loadings.



Fig. S5 Cyclic stability and Coulombic efficiency of ARC-SiOC-Se electrodes with various Se loadings at high current density of 1C.



Fig. S6 A comparison of specific energy density based total weight (cathode, electrolytes, current collectors, separator, and anode) between ARC-SiOC-Se and commercialized cathode materials.



Fig. S7 Nyquist plots of the cell after 200 cycles.