Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Trimodal hierarchical carbide derived carbon materials from steam and CO_2 activated wood templates for high rate lithium sulfur batteries

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Supporting Information

Table S1 – element composition of pyrolyzed wood, activated wood and activated wood-CDC samples determined by EDX measurements.

	C (at%)	O (at%)	Si (at%)	rest (at%)
*bio*C (from birch)	94.6	5.2	--	0.2
H_2O50	97.0	3.0	--	0
H_2O50_CDC	94.8	3.5	0.6	1.1
H_2O80_CDC	96.5	2.5	0.2	0.8
CO_2950_CDC	96.3	2.1	0.2	1.4

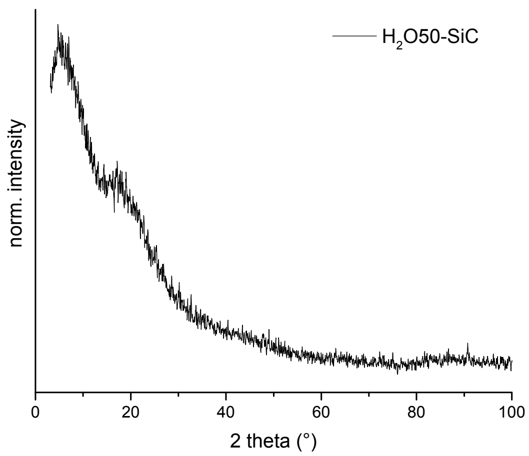

Figure S1 – XRD pattern of bioC/SiC composite H2O50-SiC showing the amorphous character of SiC.

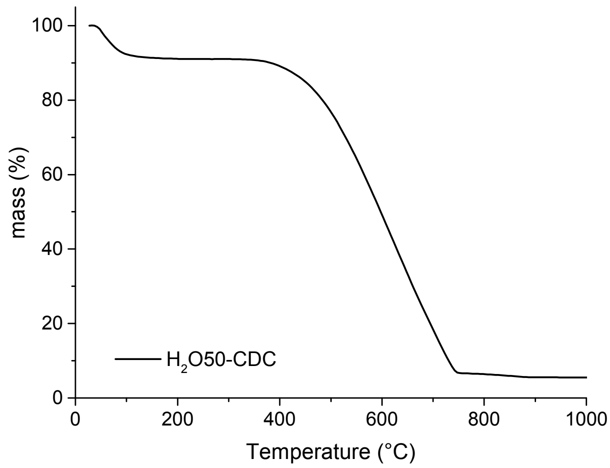

Figure S2 – TG analysis of H_2O50-CDC in air shows complete combustion of the material, indicating the high purity of carbon material.

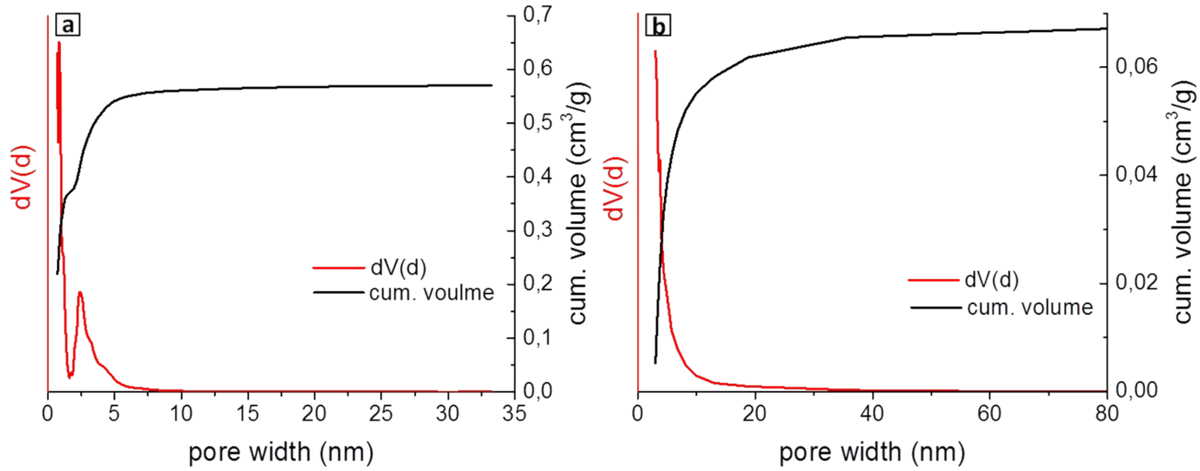

Figure S3 – Pore size distribution with cumulative pore volume of H_2O50-CDC calculated with a) QSDFT (slit, cylindrical pores, adsorption branch) and b) BJH theory.

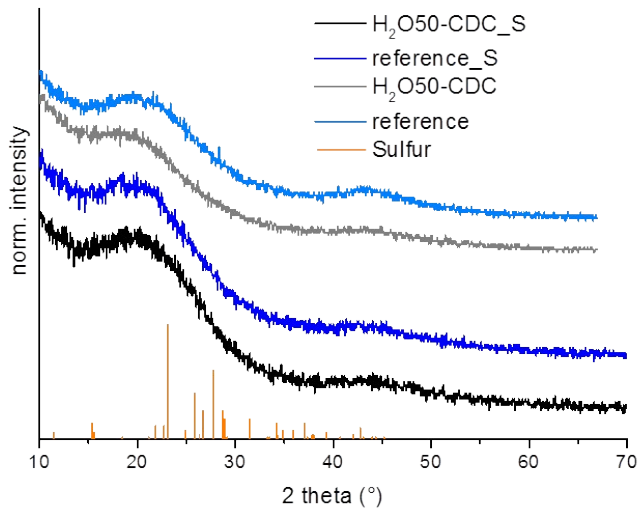

Figure S4 - XRD pattern of the activated wood-CDC, the reference material, and C/S composites as well as pristine sulfur.

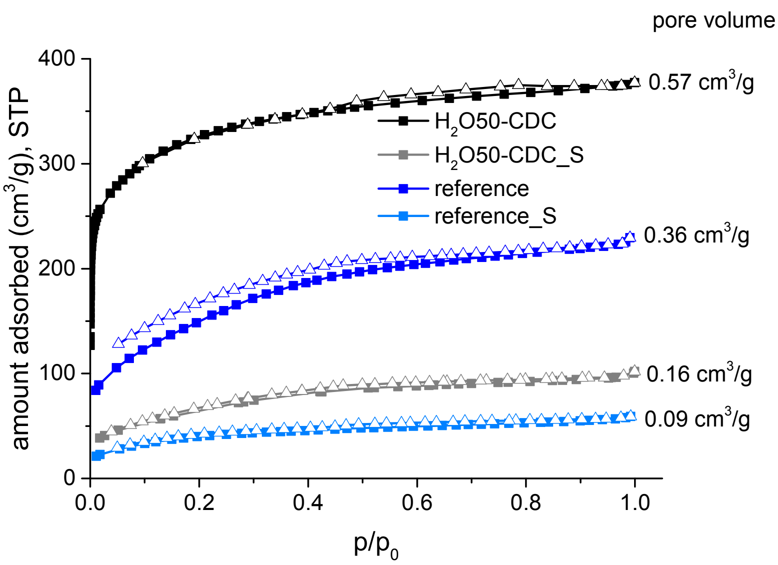

Figure S5 - Nitrogen physisorption isotherms steam activated wood-CDC and reference material pristine and sulfur melt infiltrated, respectively.

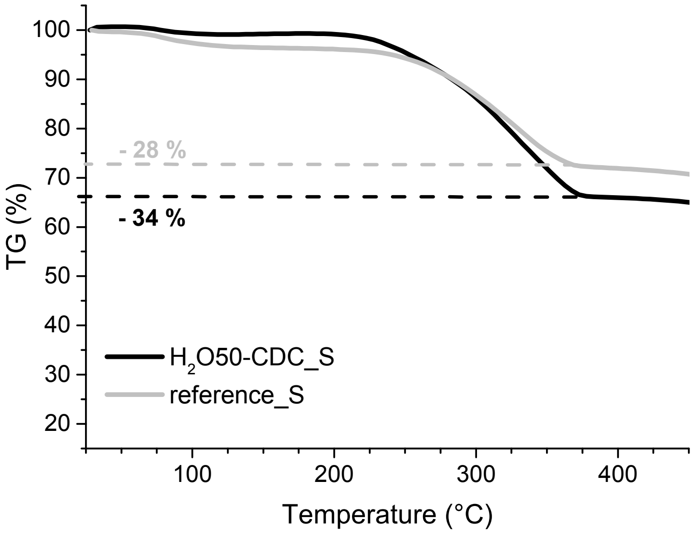

Figure S6 – TG analysis of C/S composites H_2O50-CDC_S and reference_S under inert atmosphere. Sulfur loadings are calculated from mass loss.

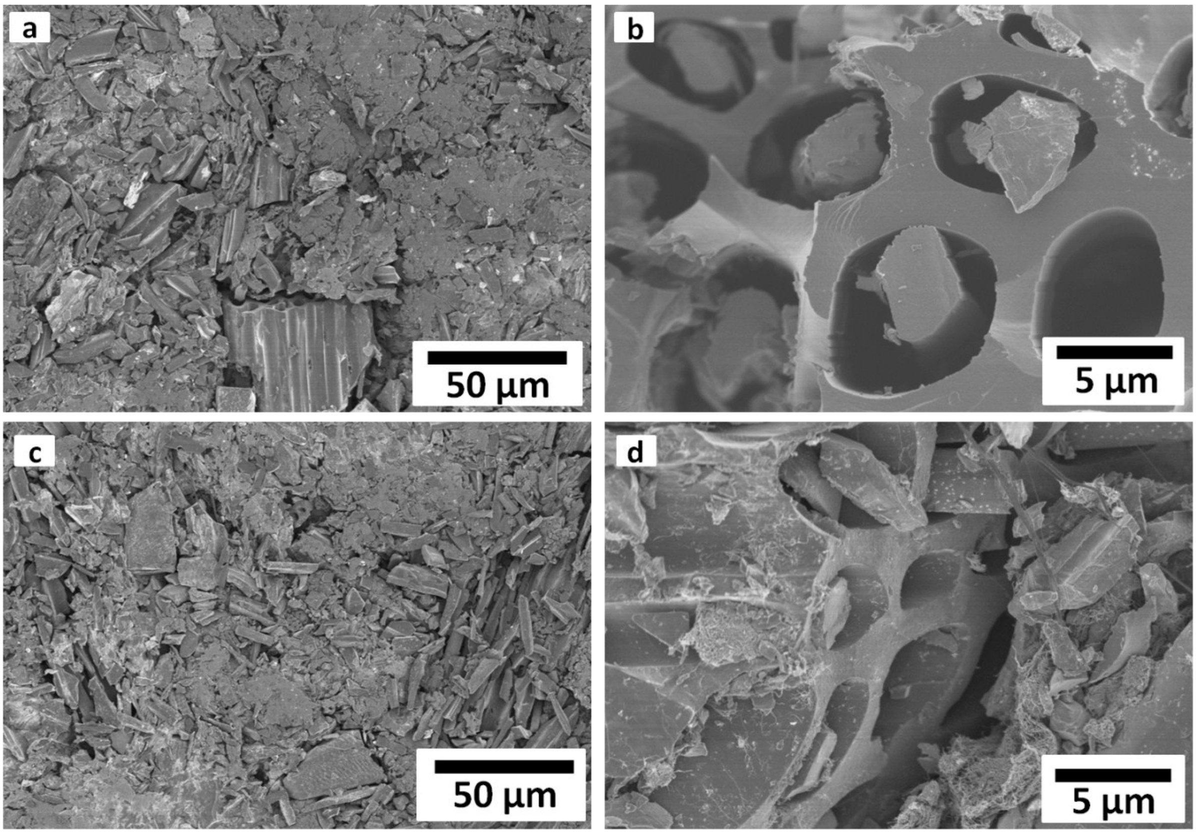

Figure S7 - SEM images of sulfur cathodes prepared from reference_S (a, b) and H_2O50-CDC_S (c, d), respectively, showing the surface morphology (low resolution) and single particle structure (high resolution).

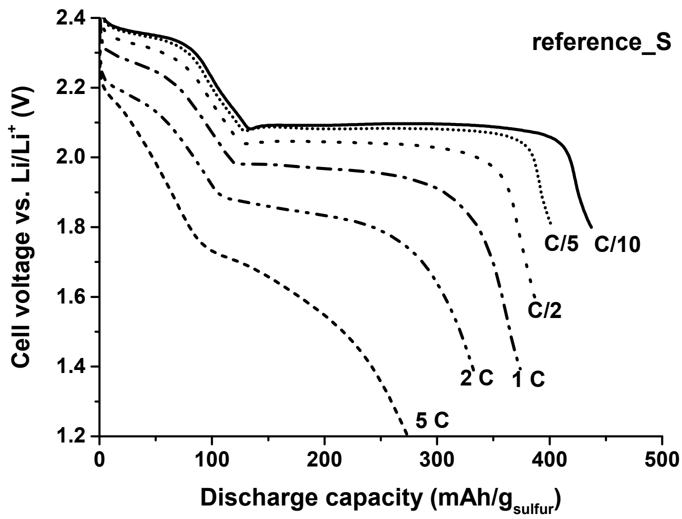

Figure S8 - Typical discharge voltage profiles of reference material at different rates (taken from each 5 th cycle).

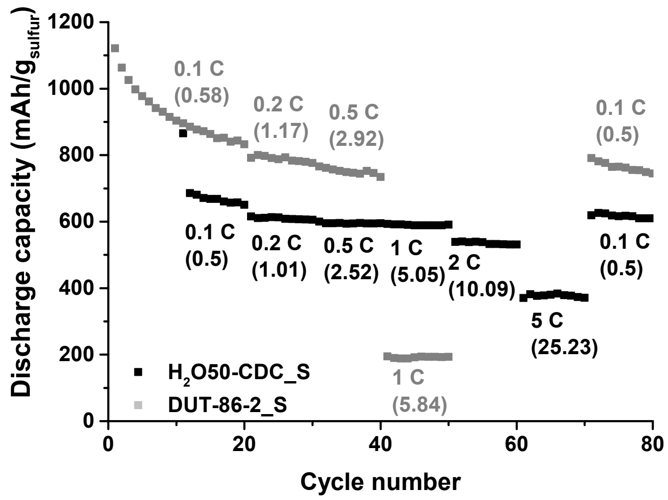

Figure S9 - Rate capability of H_2O50-CDC_S in comparison to ordered hierarchical porous carbon DUT-86-2_S[46]. Note the similar current densities as well as the strong capacity drop at 1 C for DUT-86-2_S.