

METHODOLOGICAL INSIGHTS INTO SULFUR IMMOBILIZATION TECHNIQUES ON COMMERCIAL CARBON FOR LITHIUM-SULFUR BATTERIES

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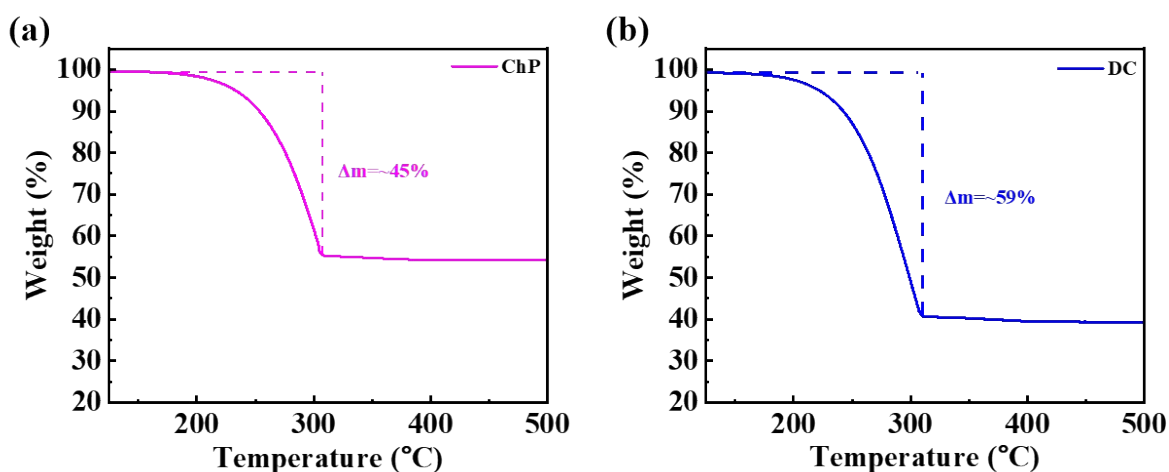


Figure S.1 - TGA results of AB@S composites by ChP (a) and DC (b) with sulfur to AB ratio according to the stoichiometry

Table S.1 - CHNS analysis of AB and AB@S composites

Sample	C (wt. %)	H (wt. %)	N (wt. %)	S (wt. %)	H/C ratio
AB	98±0.46	0	1.54±0.01	0	0
AB@S by ChP	23.4±0.24	0	1.44±0.22	74.5±1.08	0
AB@S by BM	29.8±0.02	0	1.50±0.09	73.3±0.03	0
AB@S by MD	29.3±0.02	0	1.36±0.09	73.2±0.03	0
AB@S by DC	30.2±0.59	0	0.07±0.06	69.8±1.32	0

Table S.2 - The specific surface area, pore volume and pore size of AB and AB@S composites for four methods

Material	Surface area, m² g⁻¹	Pore volume, cm³ g⁻¹	Pore size, nm	BJH Desorption average pore width, nm
AB	76.65 ± 0.61	0.206 - 0.213	8.13 - 10.74	11.13
AB@S via ChP	7.33 ± 0.08	0.030 - 0.034	9.21 - 16.57	24.16
AB@S via BM	16.06 ± 0.05	0.063 - 0.071	9.65 - 15.80	18.85
AB@S via MD	9.83 ± 0.05	0.037 - 0.041	9.47 - 14.94	19.44
AB@S via DC	16.15 ± 0.61	0.067 - 0.074	9.53-16.50	19.99

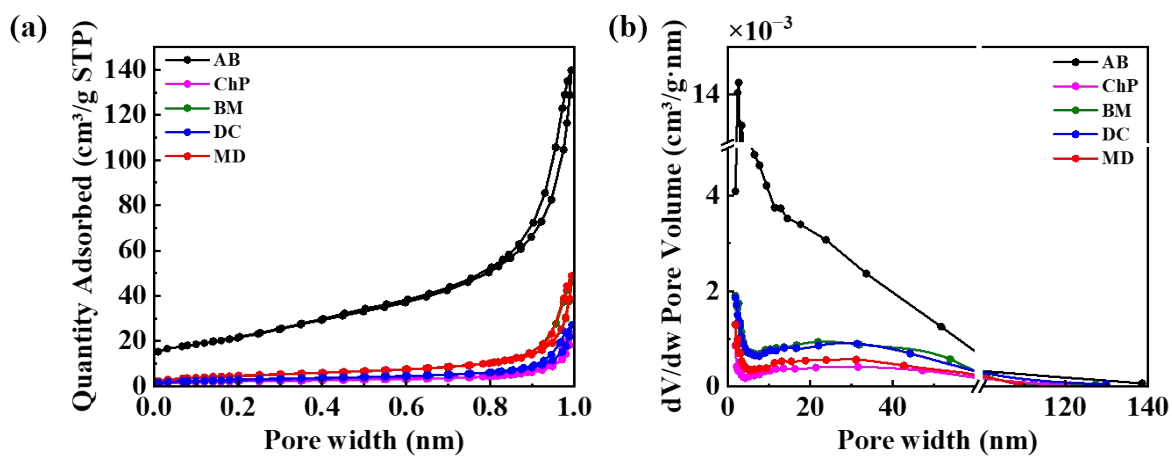


Figure S.2 - (a) N₂ adsorption/desorption isotherms and (b) pore size distribution for AB and AB@S composite by four methods

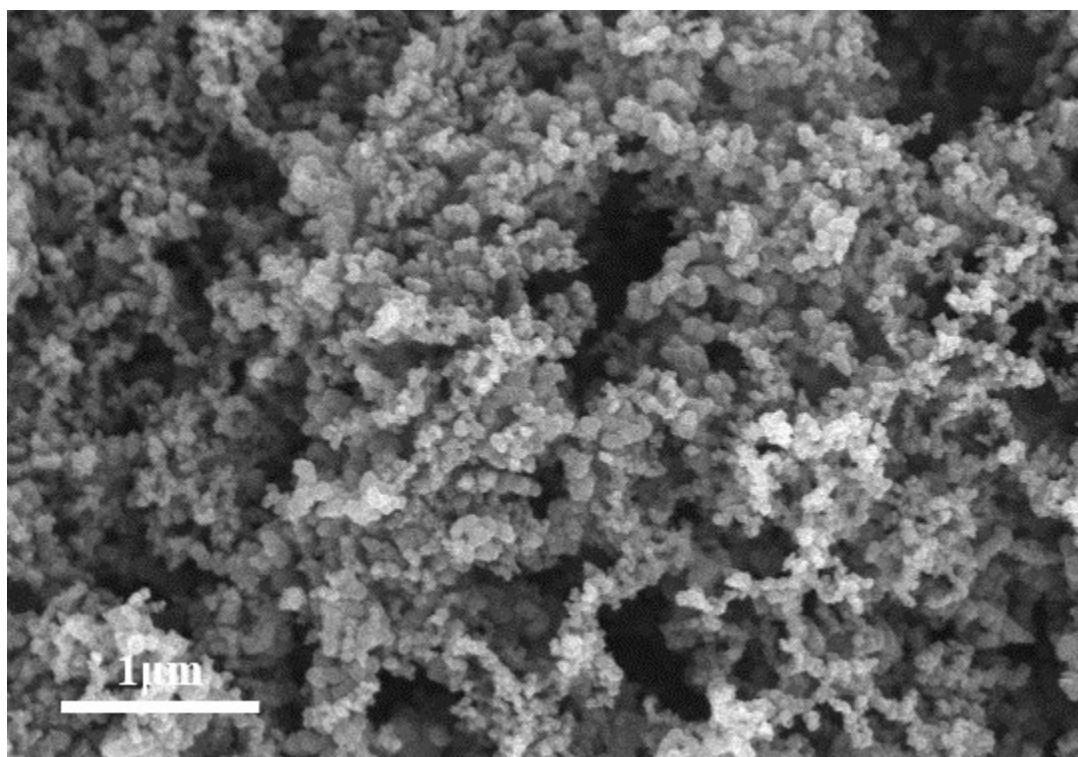


Figure S.3 - SEM image of AB

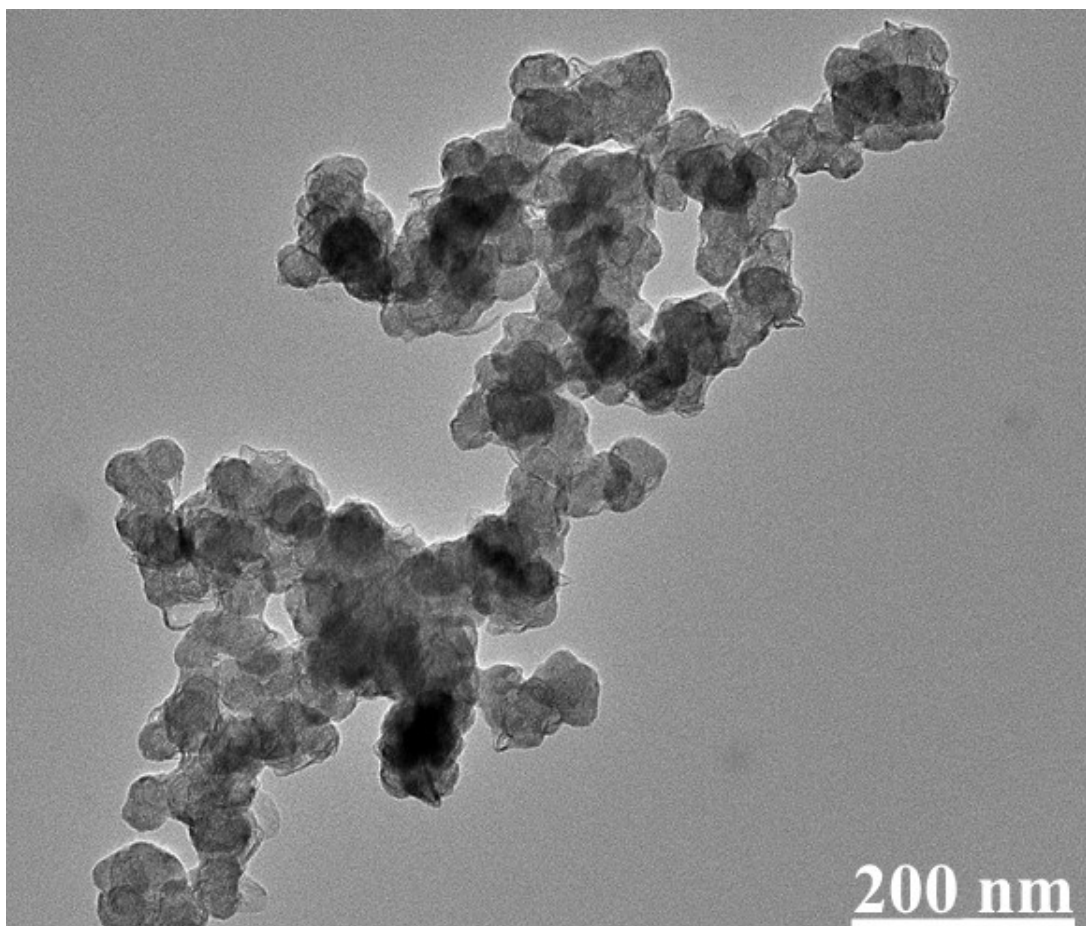


Figure S.4 - TEM image of AB

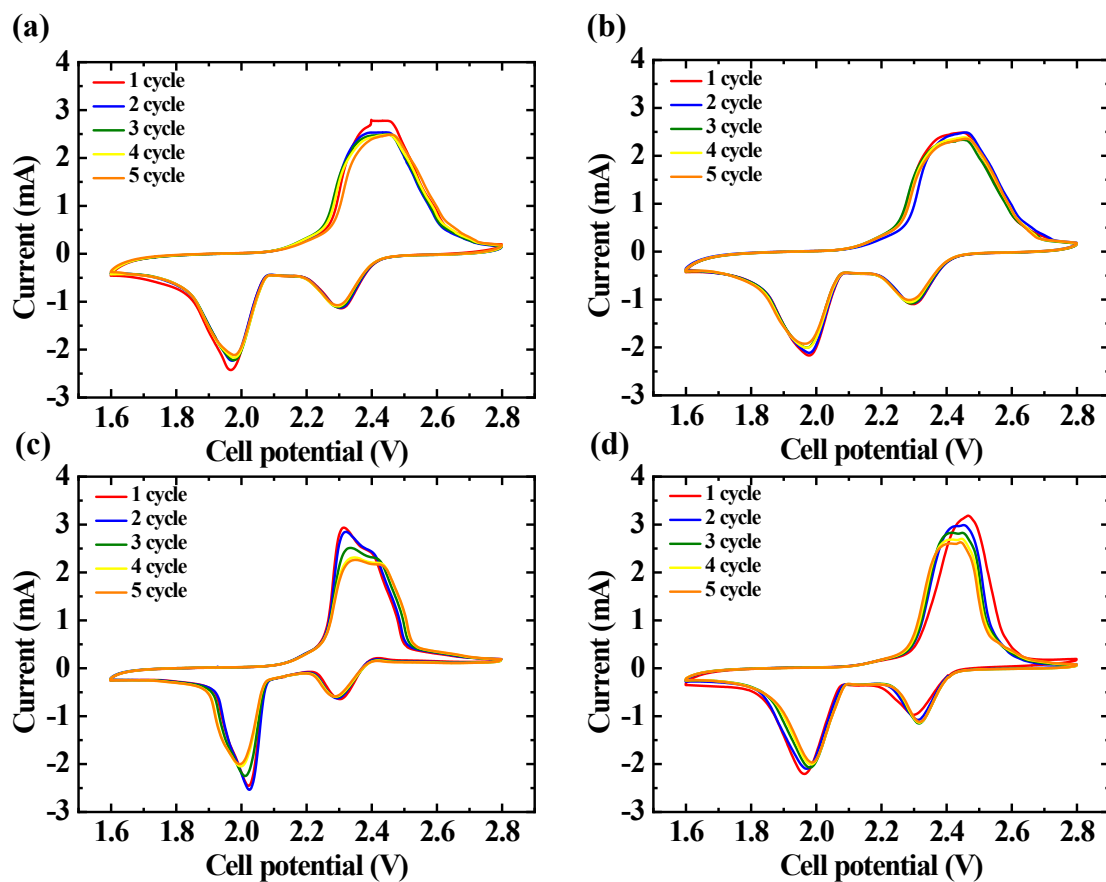


Figure S.5 – CV curves of AB@S cathode obtained by ChP (a), BM (b), DC (c), and MD (d) methods

Table S.3 - Literature reports on S@AB composites prepared by various methods

Method	Current density/current rate, mA g ⁻¹ /C	Initial discharge capacity, mAh g ⁻¹	Final discharge capacity at 100 th cycle	Capacity retention/decay rate, %	Sulfur loading, %
ChP ¹	0.12	925	361	39	62
ChP ²	0.2	1002.2	-	39.4 (80 th cycle)	67
ChP ³	0.1	707	441	68,7 (20 th to 100 th)	55.3
ChP ⁴	0.12	1202.3	380	31.6	54
BM ⁵	0.2	1116	453 (200 th)	0.29 per cycle	-
BM ⁶	0.5	~460	~400	86.9	68.1
BM ⁶	0.5	~820	850	100	57.2

DC ⁷	0.1	1203	585 (50 th)	48.4	56
DC ⁸	0.2	1004	-	41.1	80
DC ⁹	0.1	918	805(35 th)	87.7	-
MD ¹⁰	0.5	1067.4	-	82	55.7
MD ¹¹	0.5	~900	~450	50	60
MD ¹²	0.1	~800	~400	51	63

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