Supporting information for:

CO_2 adsorption on crab shell derived activated carbons: contributions of micropores and nitrogen-containing groups

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Table S1 Comparison of CO_2 adsorption at 25 ℃ on different activated carbons

Precursors	N content (%)	CO_2 pressure (bar)	CO_2 uptake (mmol/g)	S(CO_2/N_2)	Ref.
Olive stones	/	0.15/1.0	1.02/3.0	15.2[a]	S1
Carbide	/	1.0	4.1	/	22
Eucalyptus saw dust	/	0.15/1.0	1.23/4.8	5.4[b]	S2
Corn cob	0.01	0.15/1.0	~0.56/1.5	/	S3
Fungi	/	0.15/1.0	~0.9/3.4	18.5[c]	S4
Celtuce leaves	/	0.15/1.0	~0.93/4.36	/	S5
Pine nut shell		0.15/1.0	2.0/5.0	/	11
Phenolic resin	/	0.15/1.0	~1.22/4.37	/	8
Phenolic resin	/	0.2/1.0	1.42/4.55	/	S6
Petroleum pitch	/	1.0	4.7	2.4[b]	S7
Petroleum pitch-phenolic resin	/	0.15/1.0	~0.73/2.7	15.4[c]	30
CNTs-phenolic resin	/	0.15/1.0	1.18/3.45	19.8[c]	S8
Polypyrrole	8.95	0.15/1.0	1.4/4.8	26.5[a]	14
Polyindole	4.17	0.15/1.0	~1.63/3.42	58.9[c]/31.8[a]	13
Polyindole-modified Graphene oxide sheets	4.64	0.15/1.0	~1.05/3.0	23[c]/39.7[a]	17
Polyaniline	6.6	0.15/1.0	1.38/4.30	8.42[b]	27
Polyacrylonitrile	1.8	0.15/1.0	~1.25/5.14	/	S9
Chitosan	4.59	0.15/1.0	~1.26/3.86	21[b]	S10
Urea formaldehyde resin	13.87	0.15/1.0	~0.95/3.26	/	S11
Melamine formaldehyde resins	31.7	1.0	1.03	/	36
Bean dreg	2.8	0.15/1.0	1.34/4.24	/	34
Algae-glucose	1.47	0.15/1.0	~1.13/4.5	17.3[a]	S12
Phenolic resin-dicyandiamide	6.7	0.15/1.0	~1.0/3.2	/	36
Crab shell	6.35	0.15/1.0	1.57/4.37	23.1[a]	This study

[a] Selectivity calculated using IAST method, $S(CO_2/N_2) = \frac{q_{CO_2,0.15bar}}{q_{N_2,0.85bar}} \times \frac{0.85}{0.15}$.

[b] Selectivity calculated using single component gas adsorption capacity at 1 bar, $S(CO_2/N_2) = \frac{q_{CO_2,1.0bar}}{q_{N_2,1.0bar}}$.

[c] Selectivity calculated using the ratios of the Henry's law constants, which is estimated from the initial slopes of CO_2 ($^{I_{CO_2}}$) and N_2 ($^{I_{N_2}}$) adsorption isotherms, $S(CO_2/N_2) = {}^{I_{CO_2}}/I_{N_2}$.

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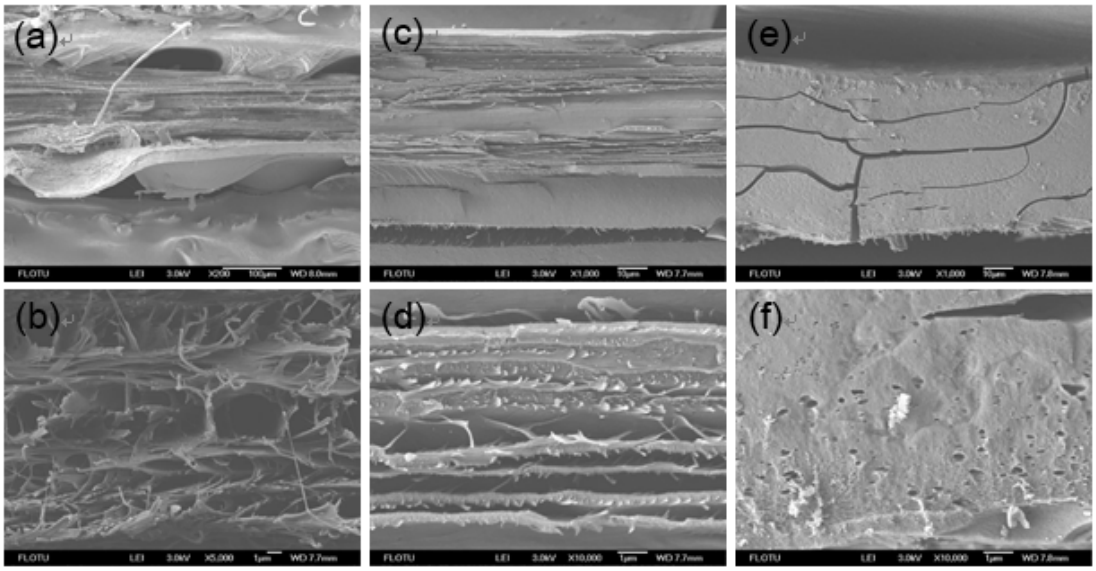

Fig. S1 SEM images of pristine crab shell (after acid treatment and drying, a and b), carbonized sample (c and d) and KOH activated sample (CS-650-1.5, e and f)

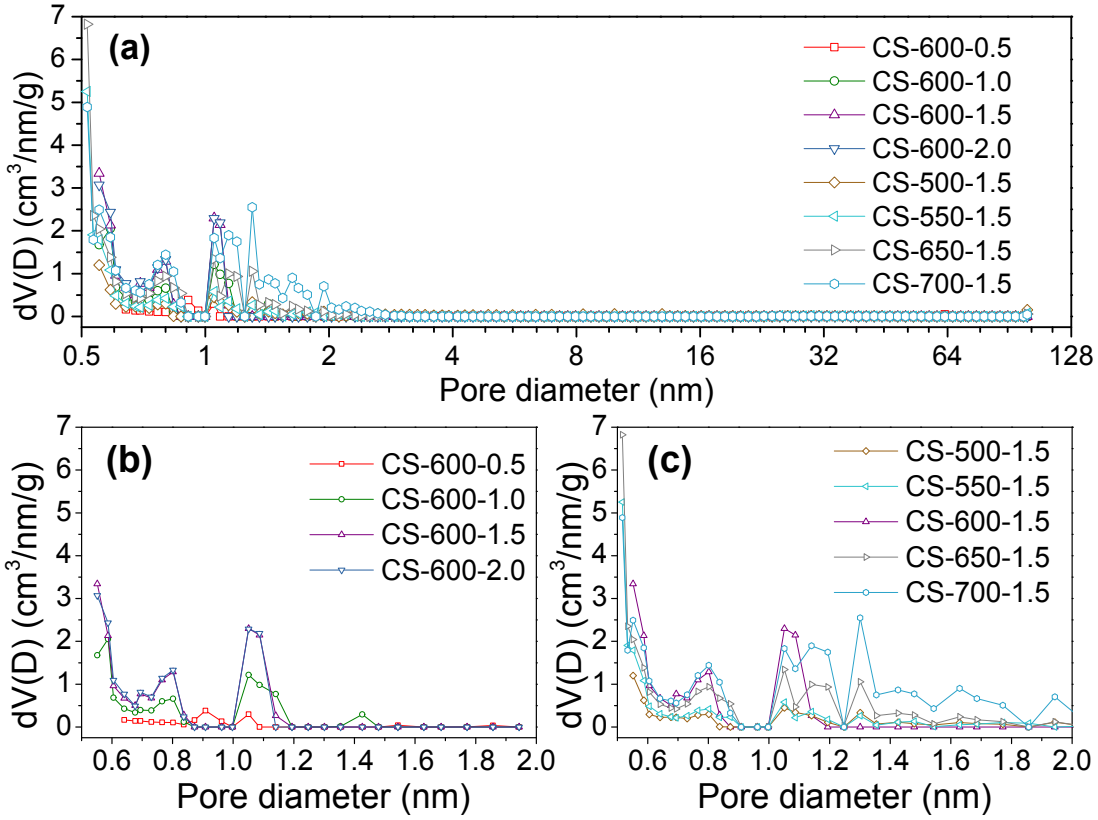

Fig. S2 Pore size distribution of crab shell derived activated carbons prepared at different KOH/C ratios and activation temperatures at pore sizes below 100 nm (a), and below 2 nm (b and c)

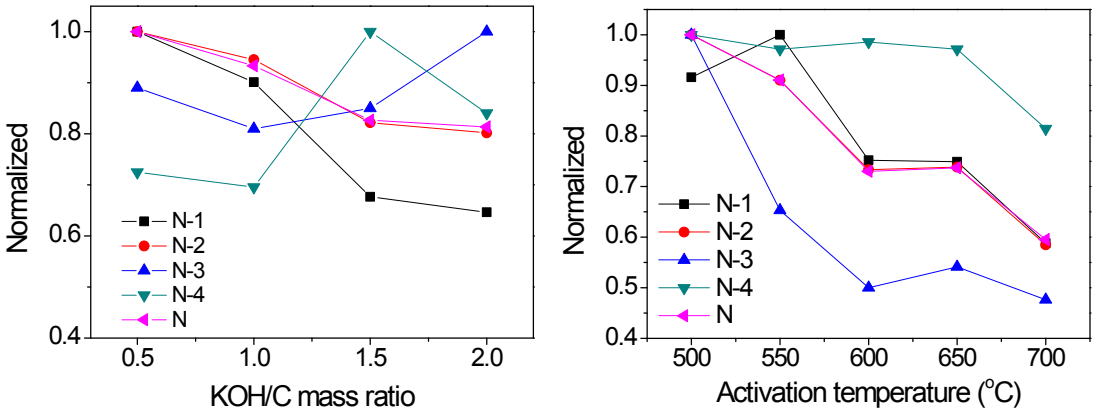

Fig. S3 Variation of nitrogen species on the activated carbons prepared at different KOH/C ratios and activation temperatures