Supporting Information

Carbon-Doped Porous Boron Nitride: Metal-Free Adsorbents for Sulfur Removal from Fuels

Jun Xiong,[a] Wenshuai Zhu,*[a] Hongping Li,[a] Lei Yang,[a] Yanhong Chao,[a] Peiwen Wu,[a] Suhang Xun,[a] Wei Jiang,[b] Ming Zhang[b] and Huaming Li*[b]

[a] *School of Chemistry and Chemical Engineering, Jiangsu University, 301 Xuefu Road, Zhenjiang 212013 (PR China)*

[b] *Insititute for Energy Research, Jiangsu University, 301 Xuefu Road, Zhenjiang 212013 (PR China)*

E-mail: zhuws@ujs.edu.cn (W. S. Zhu), lihm@ujs.edu.cn (H. M. Li)

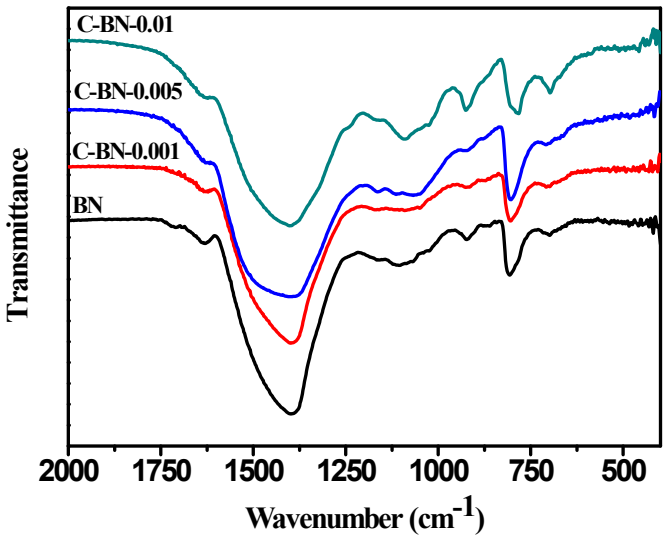

Figure S1. FT-IR spectra of BN, C-BN-0.001, C-BN-0.005, and C-BN-0.01.

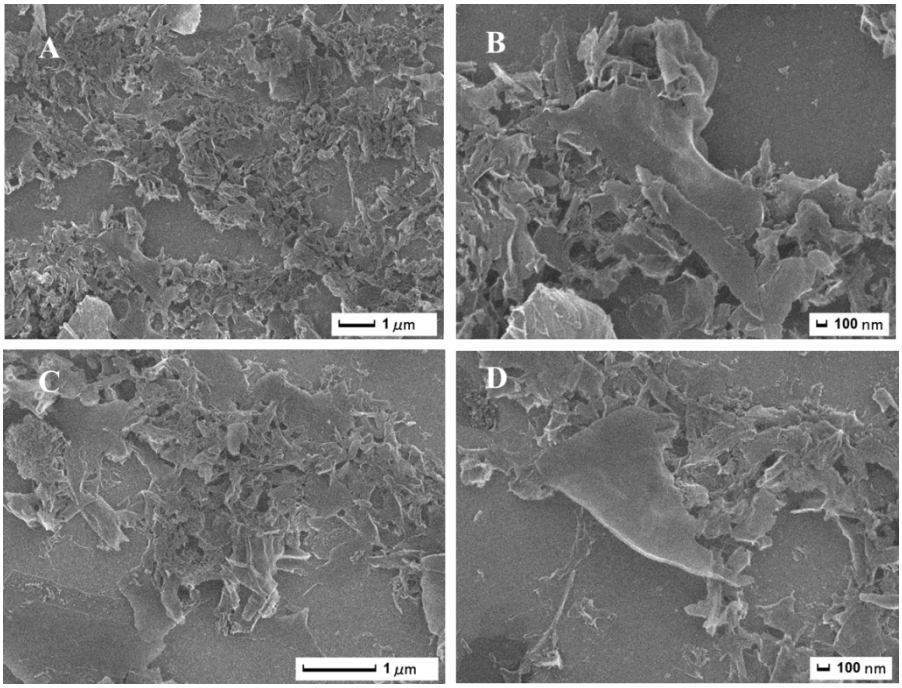

Figure S2. The SEM images of BN (A, B) and C-BN-0.005 (C, D).

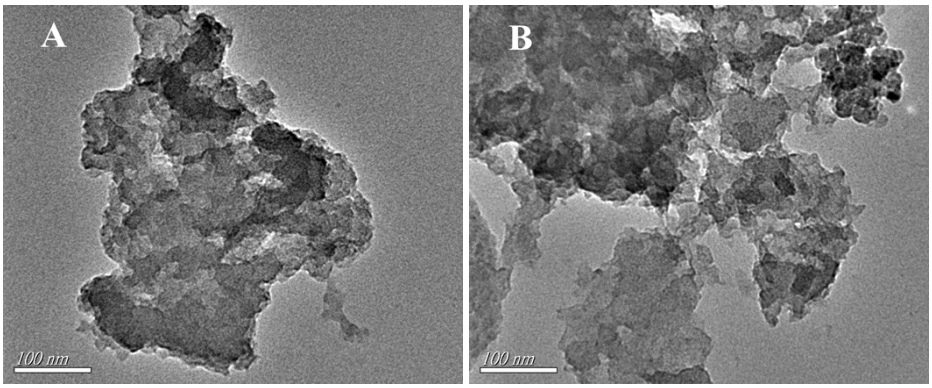

Figure S3. The TEM images of C-BN-0.01.

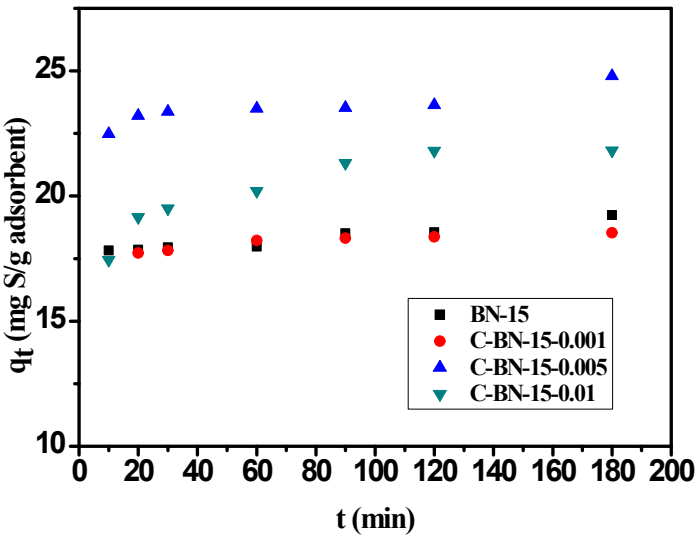

Figure S4. The adsorption capacity of different BN samples of BN-15, C-BN-15-0.001, C-BN-15-0.005, and C-BN-15-0.01.

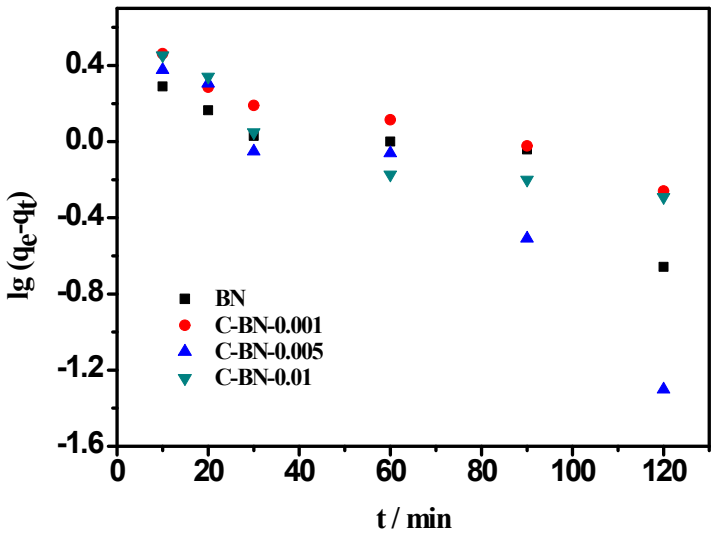

Figure S5. The plots of pseudo-first-order kinetic model for DBT adsorption on the BN, C-BN-0.001, C-BN-0.005, and C-BN-0.01.

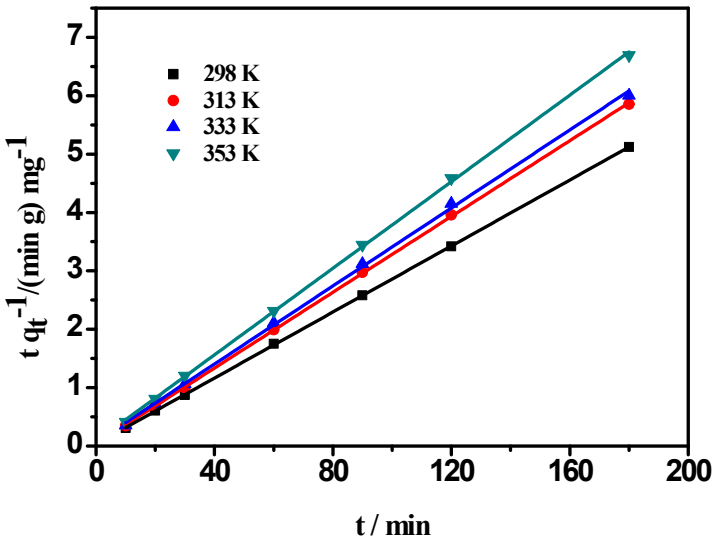

Figure S6. The plots of pseudo-second-order kinetic model for DBT adsorption on the C-BN-0.005 at different temperature.

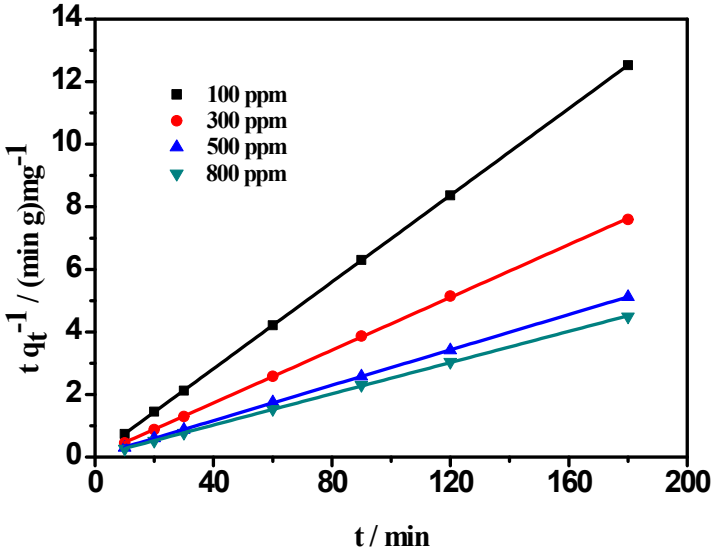

Figure S7. The plots of pseudo-second-order kinetic model for DBT adsorption on the C-BN-0.005 at different initial sulfur concentration.

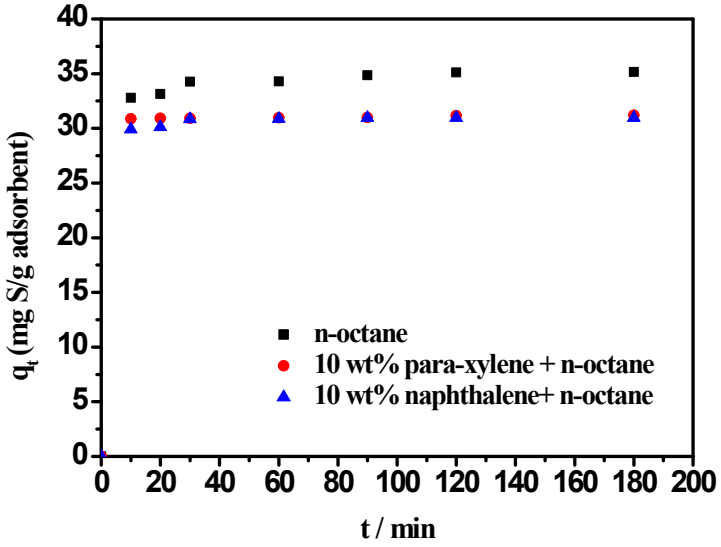

Figure S8. The adsorption capacity of C-BN-0.005 samples for DBT when adding naphthalene or para-xylene.

Experimental conditions: 500 ppm initial sulfur concentration, V (oil) = 20 mL, m (adsorbent) = 0.05 g, T = 298 K, atmospheric pressure.

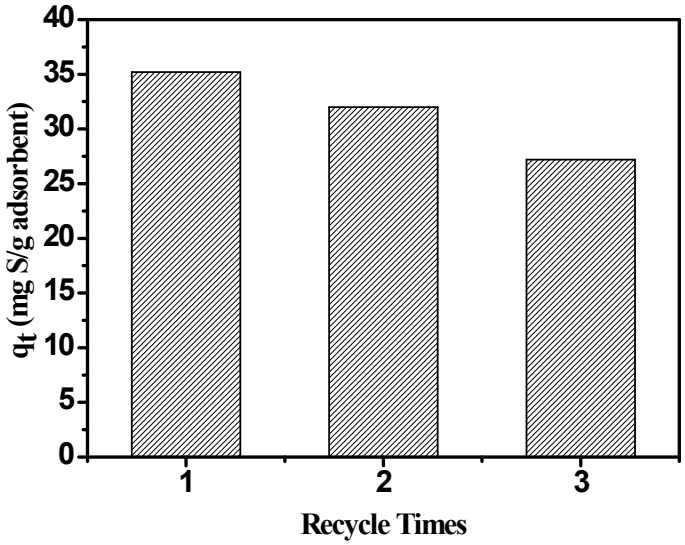

Figure S9. The recycle times of the DBT removal with C-BN-0.005 as adsorbent.

Experimental conditions: 500 ppm initial sulfur concentration, V (oil) = 20 mL, m (adsorbent) = 0.05 g, T = 298 K, atmospheric pressure.

Table S1. Adsorptive capacities of different adsorbents for DBT.

Entry	Adsorbent	Initial concentration (ppm(S))/System	T (K)	Adsorptive capacity (mg S/g adsorbent)	Ref.
1	UMCM-150	300/fixed bed	room temperature	25.1	1
2	Ag-MSN.	500/ batch	room temperature	12.7	2
3	CMK-5	654.8/ batch	298	21.75	3
4	porous glass beads	500/ batch	303	8.58	4
5	PTA@MIL-101(Cr)	500/batch	293	11.34	5
6	MOF-derived porous carbon	<160/batch	298	26.7	6
7	IFMC-16	1500/ batch	298	50	7
8	C-BN-0.005	500/ batch	298	49.75	This work

1. K. A. Cychosz, A. G. Wong-Foy, A. J. Matzger, J. Am. Chem. Soc., 2009, **131**, 14538-14543.
2. J. M. Palomino, D. T. Tran, J. L. Hauser, H. Dong, S. R. J. Oliver, *J. Mater. Chem. A*, 2014, **2**, 14890-14895.
3. N. Farzin Nejad, E. Shams, M. K. Amini, J. C. Bennett, *Micropor. Mesopor. Mater.*, 2013, **168**, 239-246.
4. C. Shen, Y. J. Wang,* J. H. Xu, Y. C. Lu and G. S. Luo, *Green Chem.*, 2012, **14**, 1009-1015.
5. S. Y. Jia, Y. F. Zhang, Y. Liu, F. X. Qin, H. T. Ren, S. H. Wu, *J. Hazard. Mater.*, 2013, **262**, 589-597.
6. Y. W. Shi, X. W. Zhang, L. Wang, G. Z. Liu, *AIChE J.*, 2014, **60**, 2747-2751.
7. W. W. He, S. L. Li, W. L. Li, J. S. Li, G. S. Yang, S. R. Zhang, Y. Q. Lan, P. Shen, Z. M. Su, *J. Mater. Chem. A*, 2013, **1**, 11111-11116.

Table S2. Pseudo-second-ordered kinetic parameters for adsorption DBT on C-BN-0.005 at different temperature and initial sulfur concentration.

Condition	q_e (mg S/g adsorbent)	k_2 (g mg^{-1} min^{-1})	h (mg g^{-1} min^{-1})	R^2
298 K	35.39	23.44×10^{-3}	29.36	0.9996
313 K	30.82	27.91×10^{-3}	26.51	0.9999
333 K	29.94	16.16×10^{-3}	14.49	0.9992
353 K	26.98	17.16×10^{-3}	12.49	0.9996
100 ppm	14.43	93.53×10^{-3}	19.48	0.9999
300 ppm	23.71	41.26×10^{-3}	23.19	0.9999
500 ppm	35.39	23.44×10^{-3}	29.36	0.9996
800 ppm	40.05	25.48×10^{-3}	40.87	0.9998