Supplementary Materials

Zanthoxylum bungeanum Waste-Derived High-Nitrogen Self-Doped Porous Carbons as Efficient Adsorbents for Methylene Blue

Yuhong Zhao [1,2], Qi Zhang [1], Zhuhua Gong [1], Wenlin Zhang [1,*], Yun Ren [1], Qiang Li [1], Hongjia Lu [1], Qinhong Liao [1], Zexiong Chen [1] and Jianmin Tang [1]

[1] Chongqing Key Laboratory for Germplasm Innovation of Special Aromatic Spice Plants, Institute of Special Plants, College of Smart Agriculture, Chongqing University of Arts and Sciences, Chongqing 402160, China; zyh0101hyz@163.com (Y.Z.); 18183376283@163.com (Q.Z.); 15208482161@163.com (Z.G.); reny1989@sina.com (Y.R.); liqiangxj@163.com (Q.L.); aaluhongjia@163.com (H.L.); lqhwisdom@126.com (Q.H.L.); chenzexiong1979@163.com (Z.C.); tangjmjy@163.com (J.T.)

[2] College of Biology and Food Engineering, Chongqing Three Gorges University, Chongqing 404199, China

* Correspondence: zhangwenlin@cqwu.edu.cn

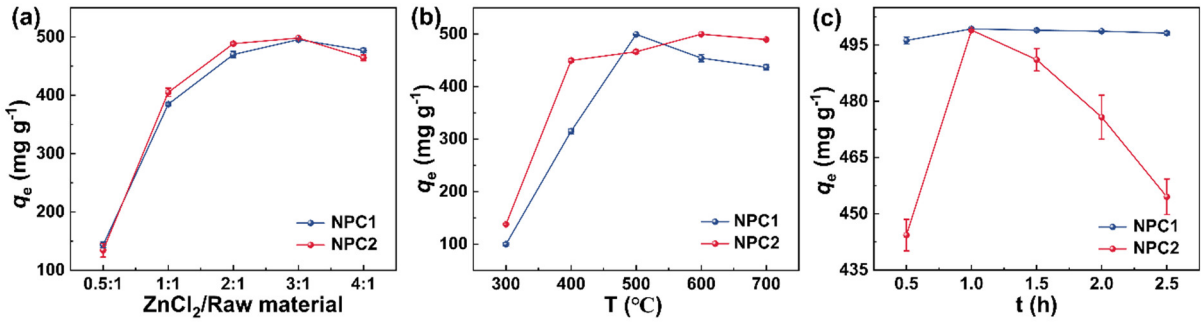

Figure S1. Effect of the preparation parameters of (a) MR (T: 500 °C, t: 1 h), (b) T (MR: 3:1, t: 1 h), (c) t (MR: 3:1, T: 500 °C (NPC1), 600 °C (NPC2)) of NPC1 and NPC2 towards MB adsorption (c_0: 500 mg L^{-1}, pH=12, 1 h, 25 °C).

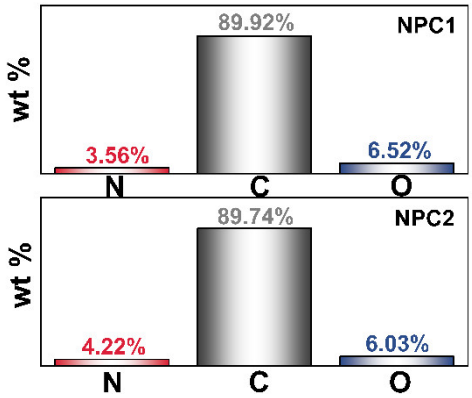

Figure S2. The relative elemental contents of NPC1 and NPC2 from XPS.

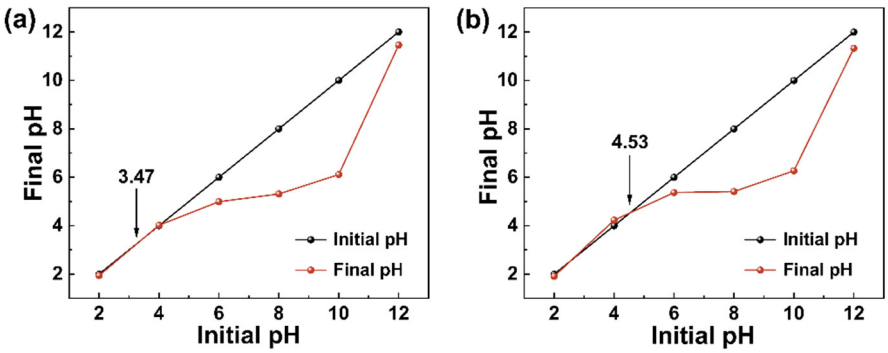

Figure S3. Zero charge point of of NPC1(a) and NPC2 (b).

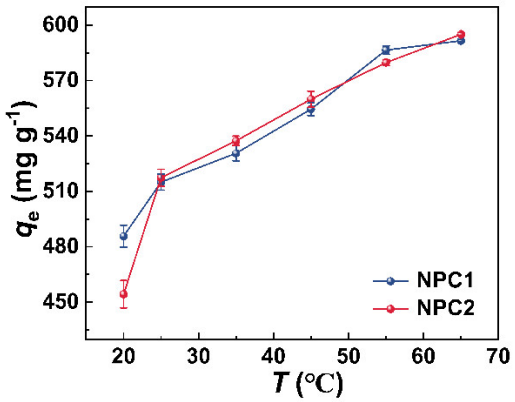

Figure S4. Changes in q_e of NPC1 and NPC2 for MB with T (c_0: 600 mg L^{-1}, pH: 12, 1 h).

Table S1. Comparison of specific surface area and total pore volume of NPC1, NPC2 and other carbon materials.

Carbon materials	S_{BET} (m^2 g^{-1})	V_T (m^3 g^{-1})	References
Groundnut shell activated carbon	412	0.322	[1]
Green solid waste N-self-doped porous carbon	632.76	0.35	[2]
Coconut shell magnetic activated carbon	747.71	0.42	[3]
Pomelo peel waste-derived porous carbon	939.4	0.62	[4]
Pineapple peel activated carbon	1160.07	0.544	[5]
Seaweed activated carbon	1238.491	/	[6]
Industrial alkali lignin N-doped porous carbon	1309	0.733	[7]
Myristica fragrans shell activated carbon	1462	0.873	[8]
NPC1	**1492.9**	**1.01**	**This work**
NPC2	**1712.7**	**0.85**	**This work**

Table S2. Comparison of surface N content of obtained of NPC1, NPC2 and other N-self-doped carbon materials.

N-self-doped carbon materials	N (at. %)	References
Lignin N, O-codoped porous carbon	1.07	[9]
N/S self-doping hierarchical porous carbon	1.24	[10]
Platanus acerifolia (Aiton) Willd. fruit-derived nitrogen-doped porous carbon	1.31	[11]
Garlic peels nitrogen self-doped porous carbon	1.77	[12]
Water hyacinth N-self-doped porous carbon	2.73	[13]
Honeycomb-like N/O self-doped hierarchical porous carbons derived from low-rank coal	2.9	[14]

N-self-doped porous carbon derived from animal-heart	3.03	[15]
Poplar catkin N-doped hierarchical porous carbon	3.16	[16]
Semi-coking wastewater derived N–O–S self-doped porous carbon	3.39	[17]
NPC1	**3.56**	**This work**
NPC2	**4.22**	**This work**

Table S3. Comparison of q_m of NPC1, NPC2 and other waste-based carbon materials.

Carbon materials	q_m (mg g^{-1})	References
Eggshell membrane porous biochar adsorbent	110.38	[18]
Coconut shell magnetic activated carbon	156.25	[3]
Pineapple peel activated carbon	165.17	[5]
Seaweed activated carbon	243.839	[6]
Myristica fragrans shell activated carbon	346.85	[8]
Iron doped activated carbon derived from *Delonix regia* barks	357.142	[19]
Heavy bio-oil porous biochar	411	[20]
Cyanobacteria-plastic composite carbon	490	[21]
NPC1	**568.18**	**This work**
NPC2	**581.40**	**This work**

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