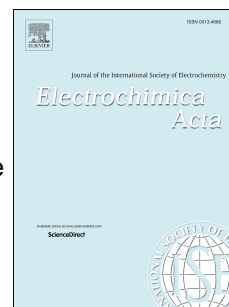


Accepted Manuscript

Biomass-derived nitrogen-doped porous carbon with superior capacitive performance and high CO₂ capture capacity

Huanming Wei, Jing Chen, Ning Fu, Haijun Chen, Hualin Lin, Sheng Han



PII: S0013-4686(17)32766-4

DOI: [10.1016/j.electacta.2017.12.192](https://doi.org/10.1016/j.electacta.2017.12.192)

Reference: EA 30980

To appear in: *Electrochimica Acta*

Received Date: 8 September 2017

Revised Date: 30 December 2017

Accepted Date: 31 December 2017

Please cite this article as: H. Wei, J. Chen, N. Fu, H. Chen, H. Lin, S. Han, Biomass-derived nitrogen-doped porous carbon with superior capacitive performance and high CO₂ capture capacity, *Electrochimica Acta* (2018), doi: 10.1016/j.electacta.2017.12.192.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Biomass-derived nitrogen-doped porous carbon with superior capacitive performance and high CO₂ capture capacity

Huanming Wei¹, Jing Chen¹, Ning Fu, Haijun Chen, Hualin Lin* and Sheng Han*

*School of Chemical and Environmental Engineering, Shanghai Institute of Technology,
Haiquan Road 100, 201418, Shanghai, P. R. China.*

(¹These two authors contributed equally to this work. *Corresponding author. E-mail address: lhl6534@163.com (H.-L.L.) Tel.: +86 17701878558; fax: +86 21 60873228; E-mail address: hansheng654321@sina.com (S. Han.) Tel.: +86 21 60873560; fax: +86 21 60873560)

Abstract

Nitrogen-doped porous carbon is synthesised through a low-cost approach that utilise water chestnut as a carbon source and melamine as a nitrogen source through potassium hydroxide (KOH) activation for 2 h at 600 °C–900 °C. The obtained samples exhibit predominant characteristics with highly developed micropores, an ultralarge specific surface area (3401 m² g⁻¹) and a high nitrogen content (4.89 at.%). These characteristics endow nitrogen-doped porous carbon with a high specific capacity of 346 F g⁻¹ and a high energy density of 22.4 W h kg⁻¹ at 0.5 A g⁻¹ in 6 mol dm⁻³ KOH. It also exhibits an excellent cycling stability with a retention of nearly 97.6% capacity after 5000 cycles at 1 A g⁻¹. In addition, the unique pore structure and high nitrogen content of porous carbon provide an important contribution to CO₂ adsorption capacity, which can reach up to 6.0 mmol g⁻¹ (at 0 °C and 1 bar) and 4.7 mmol g⁻¹ (at 25 °C and 1 bar), and to high CO₂/N₂ selectivity. Results show that the synthesised porous carbon exhibit considerable potential in electrochemical energy

Download English Version:

<https://daneshyari.com/en/article/6603990>

Download Persian Version:

<https://daneshyari.com/article/6603990>

[Daneshyari.com](https://daneshyari.com)