

Zongying Xu, Yu Li, Dandan Li, Dawei Wang, Jing Zhao, Zhifeng Wang,  
 Mohammad N. Banis, Yongfeng Hu, Huaihao Zhang

To appear in: *Applied Surface Science*

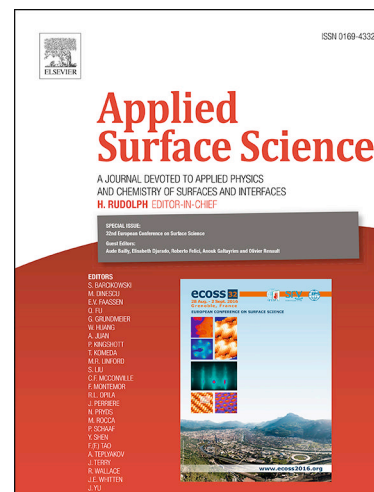
Received Date: 15 December 2017

Revised Date: 5 March 2018

Accepted Date: 12 March 2018

Please cite this article as: Z. Xu, Y. Li, D. Li, D. Wang, J. Zhao, Z. Wang, M.N. Banis, Y. Hu, H. Zhang, N-enriched multilayered porous carbon derived from natural casings for high-performance supercapacitors, *Applied Surface Science* (2018), doi: <https://doi.org/10.1016/j.apsusc.2018.03.100>

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.



# N-enriched multilayered porous carbon derived from natural casings for high-performance supercapacitors

Zongying Xu <sup>a</sup>, Yu Li <sup>a</sup>, Dandan Li <sup>a</sup>, Dawei Wang <sup>a</sup>, Jing Zhao <sup>a,\*</sup>, Zhifeng Wang <sup>a</sup>,  
Mohammad N. Banis <sup>b</sup>, Yongfeng Hu <sup>b</sup>, Huaihao Zhang <sup>a,\*</sup>

<sup>a</sup> School of Chemistry and Chemical Engineering, Yangzhou University, Yangzhou  
225002, PR China

<sup>b</sup> Canadian Light Source, 44 Innovation Boulevard, Saskatoon, SK S7N 2V3, Canada

**Abstract:** In this study, N-enriched multilayered porous activated carbon (LPAC), using natural casings as precursor, was fabricated by a facile carbonization and subsequent KOH activation procedure. The influence of the mass ratio of KOH to carbonized material on pore-structure and surface element composition of LPACs was investigated by a variety of means, such as SEM, HRTEM, BET, Raman, XRD, XPS and XAS. Owing to the unique multilayered texture and nitrogen (N) and oxygen (O) rich feature of natural casings, the resulting LPACs possess interconnected and developed porous structure with N- and O-enriched functional groups, contributing to larger pseudocapacitance. With the rise of mass ratio, the specific surface area (SSA) and average pore size of LPACs increased. The final materials were endowed with a desirable SSA ( $3100 \text{ m}^2 \cdot \text{g}^{-1}$ ) and high N content (6.34 at%). Meanwhile, N- and O-enriched LPAC-4 exhibited a high specific capacitance ( $307.5 \text{ F} \cdot \text{g}^{-1}$  at a current density of  $0.5 \text{ A} \cdot \text{g}^{-1}$  in 6 M KOH aqueous solution), excellent rate performance (63.4% capacitance retention at  $20 \text{ A} \cdot \text{g}^{-1}$ ) and good cycling stability (7.1% capacitance loss

Download English Version:

<https://daneshyari.com/en/article/7834640>

Download Persian Version:

<https://daneshyari.com/article/7834640>

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