Fabrication of N-doped Carbon Derived from poly(acrylonitrile)-ionic Liquid Copolymer and Application in Lithium Ion Batteries

Lei Wang¹, Fuliang Zhu¹, Jun Xia¹, Gongrui Wang¹, Yanshuang Meng^{1,3,*}, Yue Zhang^{2,*}

¹ School of Materials Science and Engineering, Lanzhou University of Technology, Lanzhou 730050, China

² Department of Mechanical and Industrial Engineering, Texas A&M University-Kingsville, Kingsville, Texas, 78363, USA

³ State Key Laboratory of Advanced Processing and Recycling of Non-ferrous Metals, Lanzhou 730050, China

*E-mail address: mengyanshuang@163.com, yue.zhang@tamuk.edu

doi: 10.20964/2017.07.78

Received: 12 April 2017 / Accepted: 19 May 2017 / Published: 12 June 2017

Nitrogen-doped carbon materials have been prepared by soap-free emulsion with poly(acrylonitrile) (PAN) and poly(acrylonitrile)-ionic liquid copolymer (PAN-PIL) as carbon sources. The carbonized PAN-PIL (CPAN-PIL) shows a higher nitrogen content (6.80 at.%) than the carbonized PAN (CPAN) (2.32 at.%). The ionic liquid copolymer introduced graphitic nitrogen to CPAN-PIL, which was not observed in CPAN. The high nitrogen content and graphitic nitrogen improved the electrical conductivity and increased the number of active sites. Therefore, CPAN-PIL displayed a specific capacity of 381 mAh g⁻¹ after 50 cycles, which is 23% higher than the specific capacity of CPAN.

Keywords: Poly(acrylonitrile)-ionic liquid copolymer; N-doped carbon; Lithium ion batteries

[FULL TEXT](#)

© 2017 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).