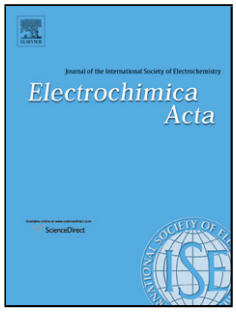

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Authors: Mei Wang, Yifei Ma

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Nitrogen-doped graphene forests as electrodes for high-performance wearable supercapacitors

Mei Wang[1,2,3] and Yifei Ma[1,2,*]

[1]State Key Laboratory of Quantum Optics and Quantum Optics Devices, Institute of Laser Spectroscopy, Shanxi University, Taiyuan, Shanxi 030006, China.

[2]Collaborative Innovation Center of Extreme Optics, Shanxi University, Taiyuan, Shanxi 030006, China.

[3]Department of Energy Science, Sungkyunkwan University, Suwon, 440-746, South Korea

*Corresponding author: E-mail address: mayifei@sxu.edu.cn

Highlights

- N-doped graphene forest (GF) is successfully synthesized by in-situ PECVD process.
- Morphology of N-doped GF electrode realizes a better in-plane electron transfer.
- Areal and volumetric capacitances increase 26 % and 89 % by the N-doping of GF.
- Energy and power densities increase 87% and 50 % by the N-doping of GF.
- The N-doped GF-based EDLC shows excellent bendability and reliable durability.

Abstract

Recently, a graphene forest (GF) is synthesized by a plasma enhanced chemical vapor deposition (PECVD) process, which subverts the stereotyped morphology of vertical graphene. The GF is demonstrated to possess excellent performance in flexible and bendable electrical double-layer capacitors (EDLCs). In this work, synthesis process of the GF has been optimized and N-doped GF is successfully achieved by introducing NH_3 as the nitrogen precursor during the PECVD process. The N-doping obviously affects the morphology of the GF and