

Accepted Manuscript

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PII: S0167-577X(17)30930-8
DOI: <http://dx.doi.org/10.1016/j.matlet.2017.06.038>
Reference: MBLBLUE 22750

To appear in: *Materials Letters*

Received Date: 6 April 2017
Revised Date: 24 May 2017
Accepted Date: 8 June 2017

Please cite this article as: X. Zhou, J. Xu, W. Zhu, X. Wang, Z. Liu, N. Yuan, J. Ding, A new laminated structure for electrodes to boost the rate performance of long linear supercapacitors, *Materials Letters* (2017), doi: <http://dx.doi.org/10.1016/j.matlet.2017.06.038>

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A new laminated structure for electrodes to boost the rate performance of long linear supercapacitors

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Abstract

In this study, a new laminate CNT sheet/AgNWs/CNT sheet structure is proposed to improve the rate performance of solid-state long linear supercapacitors. The fabricated 16 cm long linear supercapacitor with a ~40 μm diameter electrode has a specific length capacitance of 6.26 mF cm^{-1} at 20 mV s^{-1} . Further, it exhibits good capacitance behavior even at scan rate of 100 mV s^{-1} . AgNWs/CNT sheet improves the axial electron transport greatly and consequently boosts the rate performance of linear supercapacitor. Serially connected linear supercapacitors were found to possess good electrochemical performance, and the device was able to illuminate an electronic watch successfully. This study provides an effective method to enhance the rate performance of long linear supercapacitors, which has potential applications in wearable and portable electronics and micro robots.

Keywords: energy storage and conversion; carbon materials; long linear supercapacitors; high rate

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