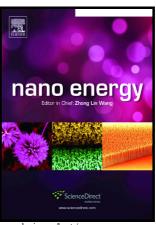
## Author's Accepted Manuscript

An Integrally-designed, Flexible Polysulfide Host for High-performance Lithium-sulfur Batteries with Stabilized Lithium-metal Anode

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An Integrally-designed, Flexible Polysulfide Host for

High-performance Lithium-sulfur Batteries with Stabilized

Lithium-metal Anode

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**Abstract** 

Fast capacity degradation and low sulfur loading hamper lithium-sulfur batteries

from practical application. We present here a flexible and robust paper electrode

consisting of carbon nanotubes (CNT) and activated carbon nanofibers (ACNF)

loaded with MnO2 nanosheets to serve as an efficient sulfur host for Li/dissolved

polysulfide batteries. This integrally-designed flexible host facilitates high sulfur

loading, improves sulfur utilization, and suppresses effectively the parasitic shuttle.

Accordingly, the Li/dissolved polysulfide cells with high sulfur loading exhibit a

high-rate capacity of 780 mAh g<sup>-1</sup> at 2C rate and a high capacity retention of 64%

over 300 cycles, demonstrating great promise for practical applications of Li-S

batteries. In addition, a stable lithium-metal anode resulting from the suppressed

shuttle effect is also proved to contribute significantly to the promising cycling

performance.

Keywords: lithium-sulfur batteries, flexible electrodes, polysulfide trapping,

manganese dioxide

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1. Introduction

1

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