

Author's Accepted Manuscript

A Li-ion sulfur full cell with ambient resistant Al-Li alloy anode

Ju Sun, Qingcong (Ray) Zeng, Ruitao Lv, Wei Lv, Quan-Hong Yang, Rose Amal, Da-Wei Wang



www.elsevier.com/locate/ensm

PII: S2405-8297(18)30154-5
DOI: <https://doi.org/10.1016/j.ensm.2018.04.003>
Reference: ENSM355

To appear in: *Energy Storage Materials*

Received date: 10 February 2018
Revised date: 4 April 2018
Accepted date: 4 April 2018

Cite this article as: Ju Sun, Qingcong (Ray) Zeng, Ruitao Lv, Wei Lv, Quan-Hong Yang, Rose Amal and Da-Wei Wang, A Li-ion sulfur full cell with ambient resistant Al-Li alloy anode, *Energy Storage Materials*, <https://doi.org/10.1016/j.ensm.2018.04.003>

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 galley proof before it is published in its final citable 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.

A Li-ion sulfur full cell with ambient resistant Al-Li alloy anode

Ju Sun^a, Qingcong (Ray) Zeng^a, Ruitao Lv^{b,c}, Wei Lv^d, Quan-Hong Yang^e, Rose Amal^a, Da-Wei Wang^{a*}

^aParticles and Catalysis Research Group, School of Chemical Engineering, The University of New South Wales, Sydney, NSW 2052, Australia

^bState Key Laboratory of New Ceramics and Fine Processing, School of Materials Science and Engineering, Tsinghua University, Beijing 100084, China

^cKey Laboratory of Advanced Materials (MOE), School of Materials Science and Engineering, Tsinghua University, Beijing 100084, China

^dShenzhen Key Laboratory for Graphene-based materials and Engineering Laboratory for Functionalized Carbon Materials, Graduate School at Shenzhen, Tsinghua University, Shenzhen, 518055, China

^eKey Laboratory for Green Chemical Technology of Ministry of Education, School of Chemical Engineering and Technology, Tianjin University, Tianjin, 300072, China

*Corresponding author. Tel.: +61-2-9385-7355. da-wei.wang@unsw.edu.au

Abstract

Lithium (Li) metal as anode for Li-S batteries has encountered some issues, eg., dendrite formation and ambient instability, both of which imposed safety problems on the operation and manufacturing of Li metal sulfur batteries. Exploring safer Li metal replacement is thus of fundamental and technical importance for enabling Li-metal-free sulfur batteries. Aluminium (Al) is an appealing Li-alloy anode material for the sake of its high capacity, natural abundance, and safety. Pairing Al-Li alloy with sulfur (S) could be a promising strategy to achieve high-energy rechargeable batteries with improved safety. Herein we show the suppressed dendrite growth and the enhanced ambient stability of Al-Li alloy anode. A Li-metal-free Li-ion sulfur battery was assembled with an Al-Li alloy anode, a sulfurized polyacrylonitrile cathode and a carbonate electrolyte. This Li-ion sulfur full cell exhibited good reversibility and stability, with a slow decaying rate at 0.09% per cycle. The specific energy of the full cell based on the total weight of active materials is estimated to be in a range of 589~762 Wh/kg.

Download English Version:

<https://daneshyari.com/en/article/7962443>

Download Persian Version:

<https://daneshyari.com/article/7962443>

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