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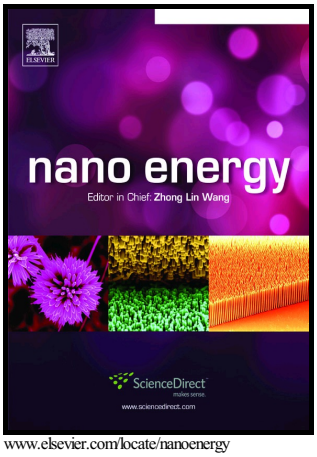

www.elsevier.com/locate/nanoenergy

PII: S2211-2855(18)30678-5
DOI: https://doi.org/10.1016/j.nanoen.2018.09.034
Reference: NANOEN3039

To appear in: *Nano Energy*

Received date: 9 July 2018
Revised date: 14 September 2018
Accepted date: 16 September 2018

Cite this article as: Zhenyu Xing, Gaoran Li, Serubbabel Sy and Zhongwei Chen, Recessed Deposition of TiN into N-doped Carbon as a Cathode Host for Superior Li-S Batteries Performance, *Nano Energy,* https://doi.org/10.1016/j.nanoen.2018.09.034

Recessed Deposition of TiN into N-doped Carbon as a Cathode Host for Superior Li-S Batteries Performance

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Abstract

In this work, we put forward a novel cathode host for Li-S batteries by loading titanium nitride (TiN) nanoparticles into the pores of N-doped carbon as a proof-of-concept. The selection of TiN arises from its strong binding ability with polysulfide and its exceptionally high conductivity of 5×10^6 S/m. As for N-doped porous carbon, it provides necessary physical adsorption and extra chemical adsorption sites from the N-doping. Besides the above advantages, the most substantial merit endowed to this structure is the pore-loaded TiN design. The carbon pore size confines the TiN precursors to the nanoscale and prevents otherwise subsequent agglomeration of TiN nanoparticles. Moreover, the pore-loaded TiN design, with fully exposed adsorptive surface and highly dispersed adsorptive sites, guards against the blocking of future sulfur infiltration and Li^+ diffusion. The advantages of the TiN

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