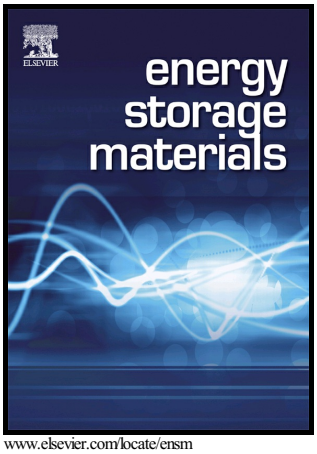

www.elsevier.com/locate/ensm

Tellurium-tin Based Electrodes Enabling Liquid Metal Batteries for High Specific Energy Storage Applications

Haomiao Li, Kangli Wang, Hao Zhou, Xiaolin Guo, Shijie Cheng, Kai Jiang

PII: S2405-8297(18)30205-8
DOI: https://doi.org/10.1016/j.ensm.2018.04.017
Reference: ENSM369

To appear in: *Energy Storage Materials*

Received date: 26 February 2018
Revised date: 11 April 2018
Accepted date: 13 April 2018

Cite this article as: Haomiao Li, Kangli Wang, Hao Zhou, Xiaolin Guo, Shijie Cheng and Kai Jiang, Tellurium-tin Based Electrodes Enabling Liquid Metal Batteries for High Specific Energy Storage Applications, *Energy Storage Materials,* https://doi.org/10.1016/j.ensm.2018.04.017

Tellurium-tin Based Electrodes Enabling Liquid Metal Batteries for High Specific Energy Storage Applications

Haomiao Li[1,2], Kangli Wang[1]*, Hao Zhou[2], Xiaolin Guo[2], Shijie Cheng[1], Kai Jiang[1,2]*

[1]State Key Laboratory of Advanced Electromagnetic Engineering and Technology, School of Electrical and Electronic Engineering, Huazhong University of Science and Technology, Wuhan, Hubei, China 430074.

[2]State Key Laboratory of Materials Processing, and Die & Mould Technology, School of Materials Science and Engineering, Huazhong University of Science and Technology, Wuhan, Hubei, China 430074.

kjiang@hust.edu.cn

klwang@hust.edu.cn

*Corresponding Author: Kai Jiang; Kangli Wang. Tel: 027-87559524.

Abstract

Developing high energy density batteries is of great significance for various energy storage applications. The novel liquid metal batteries (LMBs), with the merits of low-cost and long-lifespan, however deliver relatively low specific energy due to the electromotive force (EMF) limitation of bimetallic electrodes. Metalloid tellurium (Te) is a potentially high voltage electrode candidate for LMB, but challenged by its poor electronic conductivity and high solubility in molten salts. Herein, for the first time, we demonstrate a high voltage LMB with high energy density enabled by metalloid Te alloying with metallic Sn as positive electrode. This Te-Sn alloying strategy dramatically enhances the electronic conductivity of Te based electrodes, and suppresses the solubility of Te in molten salt electrolyte as well. The