

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Use of TiO_2 nano particles in Sulfur electrodes to enhance cyclability of Li-S batteries¹ RUCHIRA DHARMASENA, GAMINI SUMANASEKERA, Department of Physics- University of Louisville, JACEK JASINSKI, ARJUN THAPA, MAHENDRA SUNKARA, Conn center-University of Louisville — Herein we investigate a novel and facile technique to fabricate Sulfur cathode for Li-S batteries with better cyclability and higher stable gravimetric capacity of around 750 mAh/g over 50 cycles. In this study we have experimented the use of TiO_2 nano particles to prevent polysulfide dissolution into the electrolyte. Absorption and adsorption properties of TiO_2 nano particles are used to trap Lithium Polysulfides. Excellent electrical conductivity property of carbonized polyacrylonitrile (PAN) carbon fibers is effectively used in this technique to establish better electrical connection to Sulfur in the bulk electrode. The thermal annealing technique we use in this work introduces a facile way to load Sulfur into the electrode. Mechanical properties of the Sulfur electrode is improved using a relatively easy way to sustain expansion and contraction at stable coulombic capacity with almost 100 % efficiency. The mechanism of the said Sulfur electrode is discussed in detail using cyclic voltammetry and Impedance spectrum analysis.

¹Funded by KY EPSCoR, project number T1 2014-2019

Ruchira Dharmasena
conn center-University of Louisville

Date submitted: 27 Nov 2015

Electronic form version 1.4