Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electrochemical properties of Li2FeSiO4/C nanocomposites prepared by sol-gel and hydrothermal methods AJAY KUMAR, Wayne State University, O.D. JAYAKUMAR, Bhabha atomic research centre, VAMAN M. NAIK, University of Michigan Dearborn, GHOLAM A. NAZRI, RATNA NAIK, Wayne State University — Li_2FeSiO_4 is considered as potential cathode material for next generation lithium ion batteries because of its high specific theoretical capacity, low cost, and safety. However, it suffers from poor electronic conductivity and slow lithium ion diffusion in the solid phase. To address these issues, we have studied mesoporous Li_2FeSiO_4/C composites synthesized by sol-gel (SG) and hydrothermal (HT) methods using tri-block copolymer (P123) as carbon source and structure directing agent. The structure and morphology of the composites were characterized by XRD, SEM and TEM and the surface area and pore size distribution were measured by using N_2 adsorption/desorption. Galvanostatic cycling, electrochemical impedance spectroscopy, and cyclic voltammetry were used to evaluate the electrochemical performance of the Li_2FeSiO_4/C composites. The Li_2FeSiO_4/C (HT) composites show a superior electrochemical performance compared to Li_2FeSiO_4/C (SG). At C/30 rate, the discharge capacity of Li_2FeSiO_4/C (HT) reached ˜276 mAh/g in the 1.5-4.6 V window and shows better rate capability and stability at high rates. We attribute the improved electrochemical performance of Li_2FeSiO_4/C (HT) to its large surface area and reduced particle size. The details of the study will be presented.

Ajay Kumar
Wayne State University

Date submitted: 07 Nov 2015 Electronic form version 1.4