

Abstract Submitted  
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**Enhanced electrochemical performance of graphene modified LiFePO<sub>4</sub> as a cathode material for lithium ion batteries** KULWINDER SINGH DHINDSA, BALAJI PRASAD MANDAL, MING-WEI LIN, MARYAM NAZRI, GHOLAM ABBAS NAZRI, Wayne State University, Detroit, Michigan, USA, VAMAN M. NAIK, University of Michigan, Dearborn, Michigan, USA, PREM VAISHNAVA, Kettering University, Flint, Michigan, RATNA NAIK, ZHIXIAN ZHOU, Wayne State University, Detroit, Michigan, USA — We synthesized LiFePO<sub>4</sub>/graphene nano-composites using a sol-gel method by adding water dispersed graphene oxide to the LiFePO<sub>4</sub> precursors during the synthesis. The graphene oxide was subsequently reduced to graphene by annealing the composite which was confirmed by Raman spectroscopy and X-ray Photoelectron spectroscopy. The electronic conductivity of the composite was found to be six orders of magnitude higher than that of pure LiFePO<sub>4</sub>. Scanning Electron microscopy and Transmission electron microscopy images show LiFePO<sub>4</sub> particles are wrapped in uniformly distributed graphene sheets throughout the material forming a three dimensional conducting network. At low currents, (C/3), the capacity of the composite cathode reaches 160 mAh/g, which is very close to the theoretical limit. More significantly, the graphene wrapped LiFePO<sub>4</sub> shows a dramatically improved rate capability up to 27C, and excellent charge-discharge cycle stability over 500 stable cycles as compared to the pure LiFePO<sub>4</sub>.

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