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Effect of Surfactants on the Physical Properties and Electrochemical Performance of LiFePO $_4$  Cathode Material for Lithium Ion Batteries K. BAZZI, R. NAIK, G.A. NAZRI, Wayne State University, M. NAZRI, Applied Sciences Inc., Cedarville, Ohio, V. NAIK, Department of Natural Sciences, University of Michigan-Dearborn, B.P. MANDAL, Wayne State University, P.P. VAISHNAVA, Department of Physics, Kettering University, Flint, Michigan — Use of lithium iron phosphate in lithium ion battery is hampered by the poor electronic conductivity and slow lithium ion diffusion. Several methods have been tried to improve the conductivity. Carbon coating is found to be very suitable way to enhance the electronic conductivity. Here, we report synthesis of carbon coated  $LiFePO_4$  composite materials using lauric, myristic, and oleic acid as source of carbon. The phase purity of these three LiFePO<sub>4</sub>/C composites was confirmed by X-Ray Diffraction. The quality of carbon coating has been investigated by Raman spectroscopy. In all the samples, the carbon content is found to be approximately 10%. SEM and TEM investigations reveal that the surfactants coat the  $LiFePO_4$  particles uniformly with carbon and the coating reduces the particle size to approximately 30 nm. Due to high electrical conductivity, controlled particle size and suitable microstructure, among the three  $LiFePO_4$  coated samples, the sample prepared in presence of lauric acid exhibited superior electrochemical performance in terms of specific capacity, the cycling stability and delivered high discharge capacity of  $\sim 140 \text{ mAhg}^{-1}$  at C/2 rate.

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