

## Microstructural and Electrochemical Investigation of Carbon Coated Nanograined LiFePO<sub>4</sub> as Cathode Material for Li-Batteries

**Authors :** Rinlee Butch M. Cervera, Princess Stephanie P. Llanos

**Abstract :** Lithium iron phosphate (LiFePO<sub>4</sub>) is a potential cathode material for lithium-ion batteries due to its promising characteristics. In this study, pure LiFePO<sub>4</sub> (LFP) and carbon-coated nanograined LiFePO<sub>4</sub> (LFP-C) is synthesized and characterized for its microstructural properties. X-ray diffraction patterns of the synthesized samples can be indexed to an orthorhombic LFP structure with about 63 nm crystallite size as calculated by using Scherrer's equation. Agglomerated particles that range from 200 nm to 300 nm are observed from scanning electron microscopy images. Transmission electron microscopy images confirm the crystalline structure of LFP and coating of amorphous carbon layer. Elemental mapping using energy dispersive spectroscopy analysis revealed the homogeneous dispersion of the compositional elements. In addition, galvanostatic charge and discharge measurements were investigated for the cathode performance of the synthesized LFP and LFP-C samples. The results showed that the carbon-coated sample demonstrated the highest capacity of about 140 mAhg<sup>-1</sup> as compared to non-coated and micrograined sized commercial LFP.

**Keywords :** ceramics, energy storage, electrochemical measurements, transmission electron microscope

**Conference Title :** ICMSME 2017 : International Conference on Materials Science and Mechanical Engineering

**Conference Location :** Singapore, Singapore

**Conference Dates :** January 08-09, 2017