

Effect of ball-milling condition on electrochemical properties of LiFePO₄-C cathode materials

Bo Jin, En Mei Jin, Kyung-Hee Park, Bok-Kee Park*, Hal-Bon Gu

Dept. of Electrical Eng. Chonnam National Univ., Division of Electricity & Information Communication Howon Univ.

Abstract : LiFePO₄-C cathode materials were prepared by hydrothermal reaction and ball-milling. In order to enhance the electronic conductivity of LiFePO₄, 10% of acetylene black was added. During the ball-milling, different revolutions per minute (100, 200 and 300 rpm) was carried out. The structural and morphological performance of LiFePO₄-C powders were characterized by X-ray diffraction and scanning electron microscope. The X-ray diffraction results demonstrated that LiFePO₄-C powders had an orthorhombic olivine-type structure with a space group of Pnma. LiFePO₄-C/Li batteries were characterized electrochemically by charge/discharge experiments. The charge/discharge experiments indicated that LiFePO₄-C/Li batteries by 300 rpm of the ball-milling exhibited the best electrochemical performance with the discharge capacity of 126 mAh/g at a discharge rate of 0.1 mA/cm².

Key Words : Ball-milling; Lithium-ion batteries; Cathode materials; Orthorhombic; Hydrothermal reaction