

2nd International Conference on

Battery and Fuel Cell Technology

July 27-28, 2017 | Rome, Italy

Improved electrochemical performances of lithium-ion batteries by adding ceramic nanoparticles

Dahee Jin

Hanbat National University, South Korea

To develop a pollution-free alternative energy source, which is the solution of the environmental and energy problems, and to strengthen the fuel efficiency regulation of motor vehicles to reduce greenhouse gas, as an important technology to solve these problems, implementation of the electric vehicle has emerged as an essential. Accordingly, the importance of the use of a lithium secondary battery that has an excellent cycle performance, high energy density and high-power density is increased. In this respect, it has replaced the LiCoO₂, graphite which has been conventionally used for Li (Ni, Co, Mn) O₂. However, Li (Ni, Co, Mn) O₂ is not showing good electrochemical performance at high voltage and temperature since decomposition of electrolyte and dissolution of transition metal. To solve this problem, studies have been made to improve using ceramic doping and surface coating. However, there is a problem of increase cost in the additional manufacturing process. Herein, we developed a facile cathode fabrication technique by introducing well-known alumina (Al₂O₃) ceramic filler during a cathode electrode preparation step. The effect of Al₂O₃ ceramic filler was characterized by scanning electron microscopy (SEM), electrochemical impedance spectroscopy (EIS), and X-ray photoelectron spectroscopy (XPS). The cycle performance of coin cells has lithium nitrate in the electrolyte at changing cut-off voltage. The coin cell added the ceramic filler exhibited an enhanced cycle performance at high voltage (3.0~4.5V vs. Li/Li⁺, C/2) and high temperature (60°C).

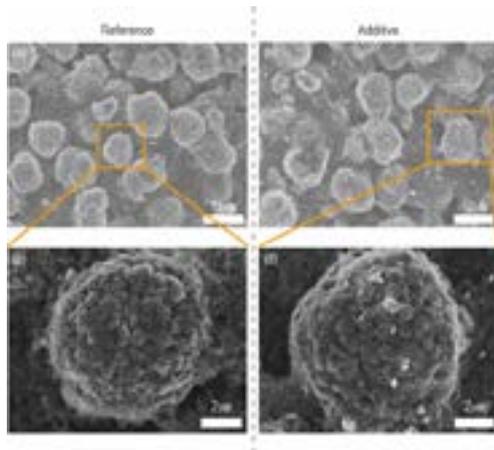


Figure 1: SEM image of (a) and (c) bare, (b) and (d) added ceramic filler.

Biography

Dahee Jin has her expertise in evaluation and passion in lithium secondary batteries in Hanbat National University as M.S. Candidate. She intensively research on Electrolyte additive and Lithium metal anode using lithium secondary batteries component.

dahee0324@gmail.com

Notes: