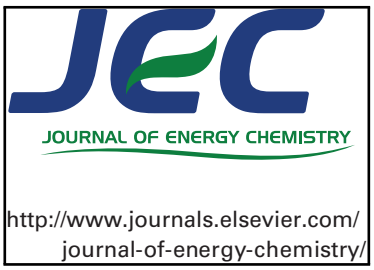

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Synthesis and electrochemical performance of micro-nano structured $LiFe_{1-x}Mn_xPO_4/C$ ($0 \le x \le 0.05$) cathode for lithium-ion batteries

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Abstract

Micro-nano structured $LiFe_{1-x}Mn_xPO_4/C$ ($0 \le x \le 0.05$) cathodes were prepared by spray drying, followed by calcination at 700 °C. The spherical $LiFe_{1-x}Mn_xPO_4/C$ ($0 \le x \le 0.05$) particles with the size of 0.5 to 5.0 μm are composed of lots of nanoparticles of 20 to 30 nm, and have the well-developed interconnected pore structure. In contrast, when Mn doping content is 3 mol% (x=0.03), the $LiFe_{0.97}Mn_{0.03}PO_4/C$ demonstrates maximum specific surface area of 31.30 m^2/g, more uniform pore size and relatively better electrochemical performance. The initial discharge capacities are 161.59, 157.04 and 153.13 mAh/g at a discharge rate of 0.2, 0.5 and 1 C, respectively. Meanwhile, the discharge capacity retentions are ~ 100% after 120 cycles. The improved electrochemical performance should be attributed to higher specific surface, smaller polarization voltage, and a high Li^+ diffusion rate due to the micro-nano porous structure and lattice expansion

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