Well-dispersed multi-doped LiFePO₄/C composite with excellent electrochemical properties for lithium-ion batteries

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Multi-doped LiFePO₄/C composites are synthesized from FeC₂O₄, Li₂CO₃ and electroless nickel plating wastewater. Scanning electron microscopy in combination with laser particle size analysis, reveals that the material prepared at 700 °C for 10 h consists of narrow-distribution well-dispersed submicron particles. The XRD refinement corroborates that Ni, Co and Mn have been successfully embedded into LiFePO₄. The electrochemical measurements show that the sample gives the first discharge specific capacities of 167.5, 152.3 and 116.8 mAh·g⁻¹, with the capacity retentions of 99.1%, 98.5% and 97.9% after 300 cycles at 25, 0 and -20 °C, respectively.

Keywords: Lithium-ion battery; Lithium iron phosphate; Multi-doping; Low-temperature electrochemical properties

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