Surfactant Assisted Synthesis of Rod-like LiFePO_4/C Composite with Cluster Texture as Cathode Material for Lithium Ion Batteries

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Rod-like LiFePO_4/C composite with cluster texture is successfully fabricated by a solvothermal method using polyethylene glycol (PEG) and water as co-solvent. The cetyltrimethyl ammonium bromide (CTAB) has been utilized as surfactant and found to play a crucial role for tailoring active material properties (e.g., crystal orientation, particle morphology, and electrochemical performance). This can be ascribed to the dual function of CTAB: adhering onto the special crystal surface for unique morphology, and acting as templet for the self-assembly. A reasonable growth mechanism of LiFePO_4/C particles with or without CTAB is proposed. By introducing 3 mmol CTAB surfactant, rod-like LiFePO_4/C composite with cluster texture is obtained, which exhibits good rate performance of 152.3 mAh/g at 0.2C and 90.9 mAh/g at 10C.

Keywords: Lithium ion batteries, Rod-like, LiFePO_4 , Solvothermal method, Surfactant.

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