Synthesis and Characterization of Porous $LiFePO_4$ / CMK-3 Nanocomposite Electrode Materials for Lithium Ion Batteries

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A novel method for the preparation of porous LiFePO4 /CMK-3 nanocomposite electrode materials for lithium ion batteries has been investigated.
A hexagonally ordered mesoporous silica molecular sieve SBA-15 was synthesized and used as a template for the synthesis of a mesoporous CMK-3. Characterization of the produced mesoporous materials by XRD, nitrogen sorption, SEM, and TEM confirmed the formation of well-ordered hexagonal mesostructures. The CMK-3, a conductive framework, was infiltrated with the LiFePO4 precursors to increase the electrode/electrolyte interface and improve the rate capability of the battery. The final LiFePO4/CMK-3 nanocomposite has a mesoporous channel structure. The composites were calcined at increasing temperatures, from 650℃ to 800℃, to determine the structural and sintering effects on the electrochemical properties of the materials. The samples were characterized using SEM, TEM, nitrogen sorption, and XRD analysis prior to electrochemical testing. The capacity of the LiFePO4/CMK-3 electrodes tested at 0.1C discharge rate.