Short Communication

Novel fabrication of $\text{Li}_4\text{Ti}_5\text{O}_{12}$ coated LiMn_2O_4 nanorods as cathode materials with long-term cyclic stability at high ambient temperature

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Spinel LiMn_2O_4 has attracted increasing interest as promising cathode material owing to its low cost, high safety, and environmental friendliness. But the further development of LiMn_2O_4 is restricted by fast capacity fading upon cycling, especially at high temperatures. Herein, the one-dimensional (1D) $\text{Li}_4\text{Ti}_5\text{O}_{12}$ coated LiMn_2O_4 nanorods (LMO-LTO) are successfully prepared by combining sol-gel and solid-state calcination method and ultimately enhance the cathode utilization in high-temperature and long-cycling conditions. The as-prepared LMO-LTO cathode delivers a high initial discharge capacity of 128.5 mAh g^{-1} at 0.1 C rate and exhibits a promising discharge capacity over 74.5 mAh g^{-1} at 10 C rate. Even under an elevated temperature of 55°C , it still maintains 74.8% of its initial capacity at 1 C rate. Furthermore, the electrochemical impedance spectra (EIS) measurement confirm that compared with the pure LiMn_2O_4 nanorod, lower the charge transfer resistance (R_{ct}) and enhanced Li^+ diffusion coefficient are also strong evidences of the improved electrochemical performance of LiMn_2O_4 nanorods after $\text{Li}_4\text{Ti}_5\text{O}_{12}$ coating.

Keywords: Lithium-ion batteries; LiMn_2O_4 nanorods; $\text{Li}_4\text{Ti}_5\text{O}_{12}$ coating; High ambient temperature

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