I Doping 1D $\text{Li}_4\text{Ti}_5\text{O}_{12}$ Nanofibers as Anode Materials for Lithium-Ion Battery

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One-dimensional (1D) nanostructures provide shortened Li^+ diffusion pathways, structural stability and large interfacial area between the active material and electrolyte, which enhances the reversibility and cycling performance of spinel $\text{Li}_4\text{Ti}_5\text{O}_{12}$ (LTO). Herein, we have successfully synthesized iodine (I) doping 1D LTO nanofibers by an electrospinning technique and studied the I doping effect on the lattice parameter, morphology and electrochemical properties of 1D LTO nanofibers. The 1D $\text{Li}_4\text{Ti}_5\text{O}_{12-x}\text{I}_x$ ($x=0.3$) nanofibers have excellent rate capability, specific capacity and cycling stability because of the shortened diffusion length for Li^+ transport, which are mainly due to cubic lattice parameter of LTO increase with I doping. Also, Cyclic voltammetry (CV) and Electrochemical impedance spectroscopy (EIS) results confirmed that I doping can reduce the electrochemical polarization of LTO and increase the lithium ion diffusion coefficient, which can improve the electrochemical performance of LTO.

Keywords: $\text{Li}_4\text{Ti}_5\text{O}_{12}$, Anode material, I-doping, Electrospinning, Lithium-ion battery

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