Synthesis of Porous Fiber-like CoMn$_2$O$_4$ Derived from Cotton Template as Lithium Ion Battery Anodes

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Porous fiber-like CoMn$_2$O$_4$ has been prepared by a cotton template route. The fiber-like CoMn$_2$O$_4$ with hausmannite-type structure is composed of numerous nanoparticles with an average size of ~100 nm. A Brunauer-Emmett-Teller (BET) surface area of 12.28 m$^2$ g$^{-1}$ and mesoporous structure can be calculated from N$_2$ adsorption-desorption isotherms for porous fiber-like CoMn$_2$O$_4$. As anode of lithium ion battery, the CoMn$_2$O$_4$ obtained from 600$^\circ$C shows a reversible discharge capacity of 867.0 mAh g$^{-1}$ and a capacity retention ratio of 86.8% after 60 cycles at a current rate of 200 mA g$^{-1}$. Even at a high rate of 1 A g$^{-1}$, the sample still delivers a stable discharge capacity of 546.0 mAh g$^{-1}$. These promising electrochemical performances could be attributed to the unique porous fiber structure of CoMn$_2$O$_4$.

Keywords: Cotton template, porous fiber-like CoMn$_2$O$_4$, lithium ion battery, anode materials.

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