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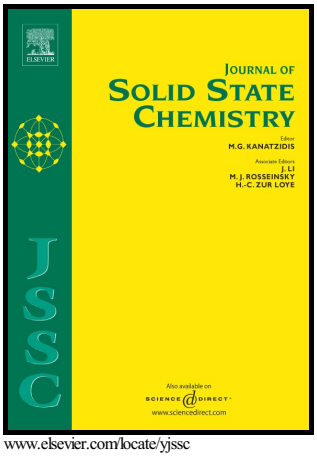

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Porous $MnCo_2O_4$ as superior anode material over $MnCo_2O_4$ nanoparticles for rechargeable lithium ion batteries

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Abstract

Pyro synthesis is a method to coat nanoparticles by uniform layer of carbon without using any conventional carbon source. The resultant carbon coating can be evaporated in the form of CO or CO_2 at high temperature with the creation of large number of nanopores on the sample surface. Hence, a porous $MnCo_2O_4$ is successfully synthesized here with the same above strategy. It is believed that the electrolyte can easily permeate through these nanopores into the bulk of the sample and allow rapid access of Li^+ ions during charge/discharge cycling. In order to compare the superiority of the porous sample synthesized by pyro synthesis method, $MnCo_2O_4$ nanoparticles are also synthesized by sol-gel synthesis method at the same parameters. When tested as anode materials for lithium ion battery application, porous $MnCo_2O_4$ electrode shows high capacity with long lifespan at all the investigated current rates in comparison to $MnCo_2O_4$ nanoparticles electrode.

Graphical Abstract Legend (TOC Figure)

This paper highlights the novel synthesis of porous $MnCo_2O_4$ by the use of two-step facile and low-cost pyro−synthesis method. Since, pyro−synthesis is a method to uniformly coat the nanoparticles by layer of carbon without using any conventional carbon source, the resultant carbon coating can be evaporated in the form of CO or CO_2 at high temperature with the creation of large number of nanopores on the sample surface. Hence, a porous $MnCo_2O_4$ is successfully synthesized here with full of the intrapores and interparticle pores, which is more