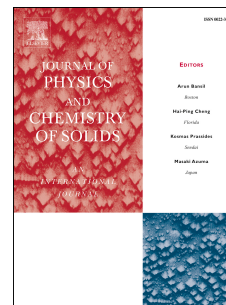


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L-lactic acid and sodium p-toluenesulfonate co-doped polypyrrole for high performance cathode in sodium ion battery

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Abstract In this work, polypyrrole (PPy) was co-doped with L-lactic acid (LA) and sodium p-toluenesulfonate (TsONa) for high performance cathode in sodium ion battery (SIB) via facile one-step electropolymerization on Fe foil. The as-synthesized LA/TsONa co-doped PPy cathode was investigated in terms of scanning electron microscope (SEM), Fourier transform infrared spectroscopy (FTIR), galvanostatic charge/discharge and cyclic voltammetry (CV). The results suggested that some oval-bud-like LA/TsONa co-doped PPy particles did form and tightly combine with the surface of Fe foil; furthermore, LA/TsONa co-doped PPy cathode also delivered higher electrochemical performances than TsONa mono-doped PPy cathode. For example, the initial specific discharge capacity was as high as about 124 mAh/g, and the reversible specific capacity still maintained at about 110 mAh/g even after 50 cycles, higher than those of TsONa mono-doped PPy cathode. The synergy effect of multi components of LA/TsONa co-doped PPy cathode should be responsible for high electrochemical performances.

Keywords: L-lactic acid, Sodium p-toluenesulfonate, Co-doped, Polypyrrole cathode, Sodium ion battery

1 Introduction

Lithium ion battery (LIB) has captured the worldwide attentions in the fields of portable electronic devices and electrical vehicles due to its many merits such as high

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