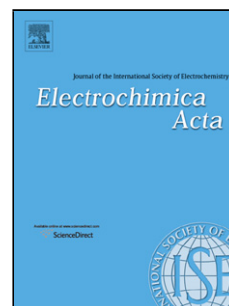


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**NI/NIO BASED 3D CORE-SHELL FOAM ANODE FOR LITHIUM ION BATTERIES**

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An innovative route to obtain Ni/NiO core-shell foam-based anodes for lithium-ion batteries is presented. Commercial Ni foams are conformally coated with NiO by ionic liquid-based electrodeposition. The electrochemical behavior of the resulting Ni/NiO electrodes in half coin cells with lithium counter electrode is investigated. The results are qualitatively correlated to the microstructural properties, including effects of the thermal annealing at 500°C, of the NiO shell. The formation a NiO sub-layer by the thermal oxidation of the Ni foam seems to play a crucial role in the enhanced performance of the annealed Ni/NiO anodes, which exhibit a reversible discharge capacity around 0.8 mAh/cm<sup>2</sup>. Furthermore, the Ni/NiO core-shell foam-based anodes are evaluated in full coin Li-ion cells with high voltage LiMn<sub>0.8</sub>Fe<sub>0.2</sub>PO<sub>4</sub> cathode. Promising cyclability is reached in NiO-LMFP coin cells under cycling at 0.4C.

*Keywords:* Lithium-ion battery, nickel oxide, core-shell, conversion reaction, electrodeposition, ionic liquids.

## **1. Introduction**

Rechargeable lithium-ion batteries (LIBs) with high-energy density have received much research effort because of the increasing power demand of portable electronic devices and electrical vehicles. The combination of high performance electrode materials coupled with advanced electrode

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