Yolk-shell Co_3O_4 -CoO/Carbon Composites for Lithium-Ion Batteries with Enhanced Electrochemical Properties

Gongrui Wang¹, Yanshuang Meng^{1,2,*}, Lei Wang¹, Jun Xia¹, Fuliang Zhu^{1,2}, Yue Zhang^{3,*}

¹ School of Materials Science and Engineering, Lanzhou University of Technology, Lanzhou 730050, China

² State Key Laboratory of Advanced Processing and Recycling of Non-ferrous Metals, Lanzhou 730050, China

³ Department of Mechanical and Industrial Engineering, Texas A&M University-Kingsville, Kingsville, Texas, 78363, USA

*E-mail: mengyanshuang@163.com, yue.zhang@tamuk.edu

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A novel yolk-shell structured Co_3O_4 -CoO/Carbon (Co_3O_4 -CoO/C) composite was prepared and applied as cathode active materials in lithium ion batteries. The composites were prepared through a facile copolymerization of ionic liquid and acrylonitrile, which were used as carbon sources, followed by carbonization. The yolk-shell structure of the composite endows the electrodes with excellent cycling performance due to improved electronic conductivity, reduced strain and depressed aggregation of active materials compared with bare Co_3O_4 . Thus, the Co_3O_4 -CoO/C composite showed a high reversible capacity and cycling life of $590 \text{ mAh}\cdot\text{g}^{-1}$ after 50 charge/discharge cycles at a current rate of $890 \text{ mAh}\cdot\text{g}^{-1}$.

Keywords: Co_3O_4 -CoO/Carbon Composites; Yolk-shell structure; Lithium-ion batteries

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