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The influence of improved carbon coating layer with nanometer-sized CeO_2 interconnector on the enhanced electrochemical performance of LiMnPO_4

Fang-Jie Chen, Fen Tao, Chun-Mei Wang, Wen-Long Zhang, Li Chen*

Department of Chemistry, Tianjin University, Tianjin 300072, People's Republic of
China

Abstract

The CeO_2/C hybrid coated LiMnPO_4 composites are prepared via a simple and effective wet chemical process followed by heat treatment at $550\text{ }^\circ\text{C}$. The nanometer-sized CeO_2 acts as an interconnector in carbon network, and its influence on the electrochemical performance is investigated in detail. The 0.25 wt.% CeO_2 -modified LiMnPO_4/C (sample-0.25) exhibits the highest discharge capacity and the best cycle life, which can deliver an initial capacity of 139.9 mAh g^{-1} at 0.1 C and still retain a reversible capacity of 120.4 mAh g^{-1} after 50 cycles (capacity retention of 86.1 %). While for pristine LiMnPO_4/C (sample-0), only 94.4 mAh g^{-1} can be obtained at the 50th cycle, corresponding to 72.9 % of its initial discharge capacity (129.5 mAh g^{-1}). Scanning electron microscopy (SEM), transmission electron microscopy (TEM) and X-ray diffraction (XRD) results confirm that an integrated and hybrid CeO_2/C coating layer is formed on LiMnPO_4 surface and its existence has no influence on the

* Tel.: +86 22 27892379; Fax: +86 22 27403475.

E-mail address: chenli_su@eyou.com (L. Chen)

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