Integrated Polyaniline-coated CF_x Cathode Materials with Enhanced Electrochemical Capabilities for Li/CF_x Primary Battery

Lei Li, Ling Zhu, Yong Pan^{*}, Weixin Lei^{*}, Zengsheng Ma, Zhenzhen Li, Juanjuan Cheng, Jie Zhou

Hunan Provincial Key Laboratory of Thin Film Materials and Devices, Xiangtan University, Xiangtan, Hunan 411105 China

^{*}E-mail: ypan@xtu.edu.cn, wxlei@xtu.edu.cn

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A core/shell structure CF_x (x = 1)/polyaniline integral composites are synthesized via an in situ chemical oxidative polymerization method at 0 °C. The effects of the amount of aniline monomers (CF_x powers : aniline monomers = 4:1, 2:1, 4:3 in a weight ratio marked CF_x4:1, CF_x2:1, CF_x4:3 separately) are studied. The polyaniline is evenly coated on the surface of graphite fluoride and the appropriate thickness of polyaniline layer is about 160~180 nm. Synthetic materials discharge rate can reach up to 8 C, which is much higher than most of the currently available CF_x cathodes and the pristine CF_x. CF_x2:1 and CF_x4:3 discharge capacity still keep more than 700 mAh g⁻¹ at 6 C and the power density can reach up to more than 10000 W Kg⁻¹ at 8 C. All these can be attributed to the conductive polyaniline coating, which provides the exterior connectivity between particles for facile electron conduction, resulting in high-rate performance, high discharge capacity, high discharge voltage and high power density.

Keywords: Graphite fluoride Polyaniline Li/CF_x primary battery

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