Facile Fabrication of CF_x -Pt Composites as a High-Performance Cathode for Primary Lithium Batteries

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doi: 10.20964/2019.06.02

Received: 28 January 2019 / Accepted: 10 March 2019 / Published: 10 May 2019

In the present work, graphite fluoride-platinum(CF_x -Pt) composites synthesized via a novel and simple in situ method are discussed as very promising cathodes for primary lithium-ion batteries. The influence of platinum on the performance of CF_x was investigated through X-ray diffraction, X-ray photoelectron spectroscopy, transmission electron microscopy, high-resolution transmission electron microscopy and electrochemical measurements. We found that the emergence of semi-ionic C-F bonds and the uniform dispersion of platinum on the surface of CF_x during the modification process are the most important factors for improving the electrochemical performance of the cathode material. With the conductivity provided by the platinum, the CF_x -Pt cathode achieved a higher discharge capacity and a higher rate capability compared with those of the pristine CF_x cathode; the CF_x -Pt cathode exhibited a discharge capacity of 600 mAh g^{-1} , an excellent power density of 8692 W kg^{-1} at a current density of 5 C, and a plateau of 2.0 V. More importantly, as a kind of lubricant, CF_x makes it difficult to uniformly disperse modifying materials across its surface. However, our method opens a new avenue for the better dispersion of modifying materials on the surface of CF_x .

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