Polypyrrole-coated Graphite Fluorides with High Energy and High Power Densities for Li/CF_x battery

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Polypyrrole (PPy) coated graphite fluorides (CF_x) composites have been prepared via in situ chemical oxidative polymerization. The influence of coating thickness on the electrochemical performances of PPy-coated CF_x (CF_x@PPy) cathodes has been investigated. The results show that the rate capability of CF_x@PPy cathodes are improved compared with that of pristine CF_x cathode. The PPy coating serves as the path for charges transfer from the surface of CF_x to the reaction interface. The conductivity of CF_x@PPy increases with the growing PPy coating, however, too thick PPy coating may inhibit the lithium ions transfer and even pull down the discharge capacity. Finally, the CF_x@PPy composite with a PPy coating thickness of 80 nm exhibits a superior rate capability and a maximum delivered power density up to 7091 W kg⁻¹ at 6 C.

Keywords: Graphite fluoride; Polypyrrole; CF_x@PPy; battery

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