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Abstract

Anodic electrodepositing manganese oxide into a graphene hydrogel not only improves the carbon material's capacitive performance, but surface chemical environment of the GO framework is also affected. Apart from the deposition of nano-sized manganese oxide (about 6 nm), Fourier transform infrared spectroscopy, X-ray photoelectron spectroscopy and cyclic voltammetry results confirm that reduction on oxygen-containing functional groups takes place during the anodic process. After the electrodeposition, weakness of the graphene hydrogel in capacitance is mitigated by the incorporation of the pseudo-capacitive material, with an almost 100 percent increase. And the composite electrode possesses superior rate capability, reversibility and cycling stability (only 8% deterioration in capacitance after 6000 charge/discharge cycles) as well.

Key words: Graphene hydrogel; Electrodeposition; Manganese oxide; Capacitive performance

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