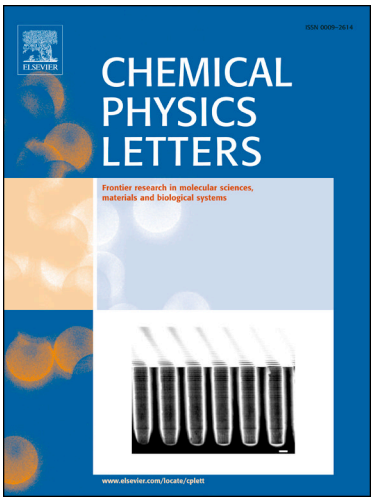

Research paper

Activated carbon derived from harmful aquatic plant for high stable supercapacitors

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Activated carbon derived from harmful aquatic plant for high stable supercapacitors

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Abstract: Considering cost and environmental protection, the harmful aquatic plant altemanthera philoxeroides derived carbon material with super high specific surface area (2895 m^2 g^{-1}) is an ideal electrode material for supercapacitor. The structure and composition of these carbon materials were characterized by SEM, EDS, XPS and BET measurements. The obtained material exhibits a maximum specific capacitance of 275 F g^{-1} at 0.5 A g^{-1} and retains a capacitance of 210 F g^{-1} even at 50 A g^{-1}. In addition, it also shows excellent capacity retention of 5000 cycles at 10 A g^{-1}.

Keywords: Harmful aquatic plant; Carbon materials; Porous materials; High stability; Supercapacitor

Introduction

Supercapacitors as an ideal energy-storage device have attracted plenty attentions due to their high power density, long cycle life, and fast charging time.[1-3] According to the charge-storage mechanism, it can be separated into two categories: double layer capacitors (EDLCs) and pseudocapacitors. The energy storage of EDLCs has been derived from the nonfaradic surface charge accumulation at electrode and electrolyte interfaces. Recently, biomass derived activated carbon as electrode for supercapacitors have been attracted extensive attention due to their unique structure, high specific surface area, low-cost and abundant porosity than other carbon materials.[4]

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