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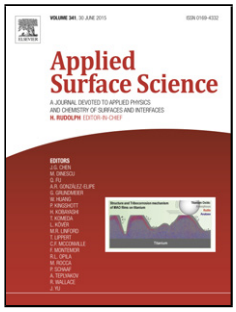

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Facile route to covalently-jointed graphene/polyaniline composite and its enhanced electrochemical performances for supercapacitors

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Graphical abstract

Highlights

1. A novel synthetic approach to graphene/polyaniline composite is developed.
2. Covalently bonds are introduced between graphene and polyaniline.
3. The composite exhibits great electrochemical property with capacitance of 489 F g^{-1}.

Abstract

A polyaniline/graphene composite with covalently-bond is synthesized by a novel approach. In this way, graphene oxide is functionalized firstly by introducing amine groups onto the surface with the reduction of grapheme oxide in the process and then served as the anchor sites for the growth of polyaniline (PANI) via in-situ polymerization. The composite material is characterized by Electron microscopy, the resonant Raman spectra, X-ray diffraction, Transform Infrared spectroscopy and X-ray photoelectron spectroscopy. The electrochemical properties of the composite are measured by cyclic voltammetry, electrochemical impedance spectroscopy and galvanostatic charging/discharging. With the functionalization process, the graphene/polyaniline composite electrode exhibits remarkably enhanced electrochemical performance with specific capacitance of 489 F g^{-1} at 0.5 A g^{-1}, which is superior to those of its individual components. The outstanding electrochemical performance of the hybrid can be attribute to its covalently synergistic effect between graphene and polyaniline, suggesting promising potentials for the application in