Preparation of Cobalt/Coal–Based Activated Carbon Composites with Synergistic Electrochemical Performance

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A facile precipitation approach has been developed to prepare cobalt/coal–based activated carbon composites as an electrode material for supercapacitors. The existence of coal–based activated carbon facilitates the dispersion of Co particles. The electrochemical performance of Co/coal–based activated carbon composites had been characterized by cyclic voltammetry, galvanostatic charge/discharge tests and electrochemical impedance spectroscopy. The specific capacitance of the as–prepared composite material approaches 615 F g^{-1} at a current density of 2 A g^{-1} . And the composite electrode delivers an excellent rate capacity of 495 F g^{-1} even at a current density as high as 20 A g^{-1} . The impressive performance could be ascribed to the synergistic effect of the combination of the pseudocapacitive cobalt nanoparticles and the coal–based activated carbon matrix.

Keywords: Cobalt; Coal–based activated carbon; Supercapacitors; Composites

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