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Characterization of iridium dioxide-carbon nanotube nanocomposites grown onto graphene for supercapacitor

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Abstract

Carbon nanotubes (CNTs) with a honeycomb arrangement were designed onto graphene as the electrochemical electrodes. The honeycomb arrangement provided a relatively larger surface area to store more ions with a stronger structure to maintain long-term surface morphology. The combination of CNTs and graphene exhibited robust durability during electrochemical performance. The pseudo-capacitive property of IrO_2 was coated onto the CNT surface to enhance the capacitance. Cyclic voltammetry and charging-discharging measurements were used to examine the electrochemical behaviors. The CNTs/graphene and IrO_2/CNTs/graphene capacitances were 3.93 and 129.40 F/g, respectively. The designed electrode demonstrates excellent characteristics and is appropriate for electrochemical applications.

Keywords: Supercapacitor; Graphene; Iridium dioxide; Carbon nanotube; Honeycomb

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