

Synergistic enhancement of supercapacitance upon integration of nickel (II) octa [(3,5-biscarboxylate)-phenoxy] phthalocyanine with SWCNT-phenylamine

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ABSTRACT

Supercapacitive behaviour of a novel functional material, nickel (II) octa [(3,5-biscarboxylate)-phenoxy] phthalocyanine (NiOB CPPc) upon covalent integration with phenylamine functionalized single-walled carbon nanotubes (SWCNT-phenylamine) is reported for the first time. The supercapacitive behaviour of the hybrid (NiOB CPPc-SWCNT-phenylamine) was investigated using galvanostatic charge–discharge and electrochemical impedance spectroscopy. Using a more reliable galvanostatic charge–discharge method, the NiOB CPPc-SWCNT-phenylamine hybrid exhibited superior geometrical capacitance ($\sim 186 \text{mFcm}^{-2}$) compared to either NiOB CPPc ($\sim 54 \text{mFcm}^{-2}$) or SWCNT-phenylamine ($\sim 74 \text{mFcm}^{-2}$) at a current density of $138 \mu\text{Acm}^{-2}$. The NiOB CPPc-SWCNT-phenylamine gave excellent stability of over 1000 charge–discharge continuous cycling.