Mesoporous Gd_2O_3/NiS_2 microspheres: a novel electrode for energy storage applications

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Abstract

Development of novel Faradic electrode with excellent rate capability and long-lasting characteristics determines the performance of supercapacitor (SC) in current scenario. Rare-earth metal oxides have received considerable attention in SC domain with high volumetric energy density and capacitive performance. In this context, we have fabricated gadolinia/nickel sulphide nanocomposite via simple chemistry approach followed by two step hydrothermal method. Especially, the gadolinia/nickel sulphide nanocomposite synthesized in the current study offers high specific capacitance (354 F g^{-1} at a constant current density of 0.5 A g^{-1}), low charge transfer resistance (6.37 Ω) and outstanding cycle life (1.3% loss capacitance loss even after 5000 continuous charge/discharge cycles). Such enduring energy characteristics of gadolinia based nanocomposite will create a huge impact in the future energy storage systems