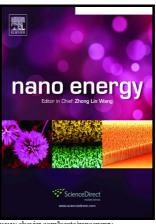
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High-performance pouch-type hybrid supercapacitor based on hierarchical $NiO-Co_3O_4-NiO$ composite nanoarchitectures as an advanced electrode material

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Abstract

The core-shell-like architectures consisting of NiO nanosheet arrays grafted Co₃O₄-NiO fish thorns-like nanostructures (NiO NSAs@Co₃O₄-NiO FTNs) were successfully prepared by a simple solution-based method. With an aid of ammonium fluoride (NH₄F), the morphological evolution of Co₃O₄-NiO FTNs was elaborated effectively. Subsequently, the NiO NSAs were uniformly decorated on Co₃O₄-NiO FTNs to form a core-shell-like composite material for positive electrode in hybrid supercapacitors (HSCs). The core-shell-like composite exhibited a large surface area with high open porous channels, which intend to deliver high areal capacity of 313.9 μAh/cm² (at 4 mA/cm²) in 1 M KOH, and it is 1.84 and 3.9 times higher than solitary Co₃O₄-NiO FTNs and solitary NiO NSAs electrodes. Furthermore, we fabricated a pouch-type HSC with core-shell-like NiO NSAs@Co₃O₄-NiO FTNs as a positive electrode and activated carbon as a negative electrode in aqueous alkaline electrolyte. At a current density of 2 mA/cm², the fabricated HSC provides high areal capacitance of 623.5 mF/cm² with a maximum energy density of 216.1 μWh/cm² and power density of 27.7 mW/cm². In addition, the HSC showed

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