Short Communication

In Situ Synthesis of Nanosized NiO Encapsulated in Graphene as High-performance Supercapacitor Cathode

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NiO nanoparticles embedded in graphene nanosheets (GNS) were successfully prepared by coprecipitation and pyrolysis beforehand. The three-dimensional GNS matrix with interconnected pore network structure can be filled with electrolyte ions serving as a double ion buffer pool during charge and discharge. High conductivity graphene, as a three-dimensional network, can be used to support the fast transmission of charge inside the NiO electrode during charging and discharging processes and meanwhile increase the performance rate. Hence, the NiO/GNS nanocomposites exhibit specific capacitance value of 1125.8 F g⁻¹ at a current density of 2 A g⁻¹ in 2 M KOH solution. This composite exhibits a good cyclic stability, with a small loss of 5.2% of maximum capacitance over a consecutive 2000 cycles, indicating that the prepared NiO/GNS nanocomposites serve as potential and promising candidates for supercapacitor electrodes.

Keywords: Graphene; Nickel oxide; Nanocomposites; Energy storage and conversion; Supercapacitors

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