

Solvothermal synthesis of SnO₂/graphene nanocomposites for supercapacitor application.

ABSTRACT

A facile solvent-based synthesis route based on the oxidation–reduction reaction between graphene oxide (GO) and SnCl₂·2H₂O has been developed to synthesize SnO₂/graphene (SnO₂/G) nanocomposites. The reduction of GO and the in situ formation of SnO₂ nanoparticles were achieved in one step. Characterization by X-ray diffraction (XRD), ultraviolet-visible (UV–vis) absorption spectroscopy, Raman spectroscopy, and field emission scanning electron microscopy (FESEM) confirmed the feasibility of using the solvothermally treated reaction system to simultaneously reduce GO and form SnO₂ nanoparticles with an average particle size of 10 nm. The electrochemical performance of SnO₂/graphene showed an excellent specific capacitance of 363.3 F/g, which was five-fold higher than that of the as-synthesized graphene (68.4 F/g). The contributing factors were the synergistic effects of the excellent conductivity of graphene and the nanosized SnO₂ particles.

Keyword: Nanocomposites; Capacitors; Graphene; Tin oxide.