Short Communication

Ultrafine Tin Dioxide Nanoparticles Grown on Nitrogen-doped Graphene with Rich Pyrrolic Nitrogen for Excellent Supercapacitor Performance

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Composites of ultrafine tin dioxide nanoparticles grown on nitrogen-doped graphene (SnO₂@NG) with high pyrrolic nitrogen content are successfully prepared via a one-step method by employing graphene oxide, tin chloride, and urea as raw materials. Morphology and microstructure of SnO₂@NG are characterized by transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), and thermogravimetric analysis (TGA), revealing evenly dispersed SnO₂ nanoparticles on the surface of nitrogen-doped graphene sheets and a SnO₂ content of 54.23%. The SnO₂@NG electrode exhibits a specific capacitance of 289.5 F/g at a current density of 0.5 A/g in 0.5 mol/L Na₂SO₄ solution and retains 92.85% of its initial capacitance after 2000 charge/discharge cycles. These results prove that SnO₂@NG is an excellent material for high-performance supercapacitors.

Keywords: tin dioxide, nitrogen-doped graphene, supercapacitors.

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