Short Communication

Facile Hydrothermal Synthesis of Manganese Dioxide/Nitrogen-Doped Graphene Composites as Electrode Material for Supercapacitors

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We report a simple and efficient approach for the *in-situ* decoration of manganese dioxide (MnO₂) nanoparticles onto nitrogen-doped graphene (NG) using polyvinylpyrrolidone (PVP) as the dispersing agent and stabilizer. The morphology and microstructure of the as-prepared MnO₂/NG composites were characterized by transmission electron microscopy and X-ray photoelectron spectroscopy. The results show that a uniform dispersion of MnO₂ nanoparticles with a mean size of about 10–20 nm was successfully anchored on the NG surfaces. Furthermore, the electrochemical capacitive behaviors of the MnO₂/NG hybrid materials were investigated by cyclic voltammetry (CV) and galvanostatic charge–discharge (GCD). The MnO₂/NG composites delivered a high specific capacitance of 302 F/g at 1 A/g in 1 M Na₂SO₄ electrolyte; they also showed good cycling stability with 88.9% retention rate of specific capacitance after 1000 cycles of charge and discharge. This study provides a rational device for designing high-performance MnO₂-based supercapacitors.

Keywords: Supercapacitor, manganese dioxide, nitrogen-doped graphene, electrode material

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