Short Communication

Facile Preparation of Hierarchical Porous Carbon from Orange Peels for High-Performance Supercapacitor

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In this study, resource-rich, renewable, and low cost orange peel was used as the precursor for the synthesis of hierarchical porous carbon (HPC). HPC was prepared by activation through etching with potassium hydroxide solution and one-step pyrolysis. Employing SEM, TEM, and other characterization methods, the micro-morphology and structure of HPC were analyzed, and its electrochemical performance was evaluated. Results show that the HPC material had a high specific surface area of 864.78 m²/g, excellent capacitance performance (264 Fg⁻¹ at 1A/g) and long-term cyclic stability (specific capacitance retention reached 95.36% after 2000 charge-discharge cycles). Even when the current density was increased 10 times, the capacitance was 242 Fg⁻¹ (10 A/g). Its performance was much better than typical carbon materials. This study provides a way to effectively use biomass resources to prepare cost-effective activated carbon materials for supercapacitors in energy storage.

Keywords: Hierarchical porous carbon; Orange peels; Supercapacitors; Electrochemical performance

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