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Microporous carbon nanofibers prepared by combining electrospinning and phase separation methods for supercapacitor

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Abstract

Microporous carbon nanofibers (MCNFs) derived from polyacrylonitrile nanofibers were fabricated via electrospinning technology and phase separation in the presence of polyvinylpyrrolidone (PVP). PVP together with a mixed solvent of N, N-Dimethylformamide and dimethyl sulfoxide was used as pore-forming agent. The influences of PVP content in casting solution on the structure and electrochemical performance of the MCNFs were also investigated. The highest capacitance of 200 F/g was obtained on a three-electrode system at a scan rate of 0.5 A/g. The good performance was owing to the high specific surface area and the large amount of micropores, which enhanced the absorption and the transportation efficiency of electrolyte ion during charge/discharge process. This research indicated that the combination of electrospinning and phase separation technology could be used to fabricate microporous carbon nanofibers as electrode materials for supercapacitors with high specific surface area and outstanding electrochemical performance.

Keywords: Supercapacitor; Electrospinning; Nanofiber; Phase separation

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