Activated Porous Carbon Nanofibers for High-Performance Supercapacitors

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The pursuit of high-capacitance carbon materials is urgently needed for supercapacitors, which are among the most promising energy storage devices. Herein, we developed an effective KOH-activation method to improve the porous structures of electrospun carbon nanofibers for high-performance supercapacitors. In detail, polyacrylonitrile (PAN) and polymethyl methacrylate (PMMA) polymer blend solutions were electrospun to fabricate carbon nanofibers for pure PAN and, PAN:PMMA (80:20). PMMA was used as a sacrificial polymer to create pores. Furthermore, the KOH-activation method was applied to improve the pores of PAN:PMMA (80:20) at 600° C. The obtained KOH-activated PAN:PMMA (80:20) exhibits an excellent specific capacitance of 440 F g⁻¹ at a current density of 0.25 A g⁻¹ and a superior cycling stability of 95% after 5000 cycles. The present research contributes to the implementation of KOH-activation that results in excellent performance compared to carbon nanofibers reported thus far. Our work demonstrates that KOH-activation is an outstanding method to promote the performance of supercapacitors. Therefore, such a strategy could be a promising method to fabricate high-performance supercapacitors.

Keywords: Activation, Carbon nanofibers, Supercapacitors

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