High Performance Supercapacitor based on Polypyrrole /Melamine Formaldehyde Resin Derived Carbon Material

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In this study, N-doped super-activated carbon material was synthesized using melamine formaldehyde (MF) resin as carbon source and sequent KOH-activation method. Polypyrrole nanofibers (PPy) were further polymerized on the MF resin derived carbon (MFC). The PPy/MFC composite possesses high surface area, which is suitable for high performance supercapacitor electrode materials. Electrochemical measurements indicate the hybrid PPy/MFC electrode yielded the highest specific capacitance of 336.8 F g⁻¹ at a current density of 1 A g⁻¹ (in 6 M KOH). The PPy/MFC electrode also keeps a high capacitance retention ratio of 94.3% after 3000 cycles. Given the potential massive production and excellent electrochemical performance, The PPy/MFC nanocomposites are promising electrode materials for supercapacitor applications.

Keywords: Supercapacitor; N-doped super-activated carbon; Melamine formaldehyde resin; Polypyrrole, Nanocomposite

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