

Flexible Polyaniline-Based Composite Films for High-Performance Super Capacitors

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Abstract : Fabrication of a high-performance supercapacitor (SC) using a flexible cellulose-based composite film of polyaniline (PANI), reduced graphene oxide (RGO), and silver nanowires (AgNWs) is reported. The flexibility, high capacitive behaviour, and cyclic stability of the entire device make it a good candidate for wearable SCs. The results show that a capacitance as high as 73.4 F/g (1.6 F/cm²) at a discharge rate of 1.1 A/g is achieved by the device. In addition, the SC demonstrates a power density up to 468.8 W/kg and an energy density up to 5.1 wh/kg. The flexibility of the composite film is attributed to the binding effect of cellulose fibers as well as reinforcing effect of AgNWs. The excellent electrochemical performance of the device is found to be owing to the synergistic effect between PANI/RGO/AgNWs ternary in a cushiony cellulose matrix and porous structure of the composite.

Keywords : cellulose, polyaniline, reduced graphene oxide, silver, super capacitor

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