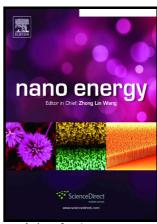
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Integrated paper electrodes derived from cotton stalks for high-performance flexible supercapacitors

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ACCEPTED MANUSCRIPT

Integrated paper electrodes derived from cotton stalks for high-performance

flexible supercapacitors

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Abstract

With the rapid development of flexible electronics, new opportunities are opening up for paper-based

electrodes. Herein, an integrated paper electrode consisting of homogeneously mixed cellulose fibers,

activated carbon (AC), and carbon black is fabricated using cotton stalks as the raw material.

Assembled from two such electrodes, the flexible supercapacitor exhibits high energy density, high

power density, and outstanding cyclability. Remarkably, the thickness and AC mass loading of the

paper electrode can be easily scaled up to commercial levels (610 μm and 9.8 mg cm⁻²), while still

delivering great performances. Moreover, it is demonstrated that the replacement of AC with Ni-Co

layered double hydroxide or Fe₂O₃ can result in paper-based asymmetric supercapacitor with

extremely high energy density (331 uWh cm⁻² and 10.3 mWh cm⁻³), substantially outperforming

conventional paper-based supercapacitors. The fabrication methodology of integrated paper

electrodes in this report manifests great potential, offering a new vision for flexible energy storage.

Key Words: Biomass, Cellulose, Paper, Flexibility, Supercapacitors.

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