

## **A hydrothermal carbonization process for the preparation of activated carbons from hemp straw : an efficient electrode material for supercapacitor application**

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### **ABSTRACT**

In the present study, a hemp straw activated carbon (HSAC) was simply prepared by hydrothermal process followed by a pre-oxidization and carbonization by KOH solid-state activation. The as-synthesized HSAC shows abundant porosity, which is designed to be beneficial to the fast transportation of electrolyte. The preparation conditions for HSACs under different mass ratios of KOH:precursors were optimized, and the sample obtained by a mass ratio of 4:1 showed an outstanding capacitive property (specific capacitance of 279 F g<sup>-1</sup> at 0.5 A g<sup>-1</sup> current density). Besides, the capacitance of 91.6% was retained after 5000 charge-discharge cycles under 2 A g<sup>-1</sup> current density. The resulting symmetrical supercapacitor obtained by using the HSAC electrodes exhibited an excellent electrochemical performance, which successfully illuminated a LED light. The HSAC has great potentials as electrode material for high-performance supercapacitor, which opens a new way for value increment of natural products.

### **KEYWORDS**

Hydrothermal method; Hemp straw; Activated carbon; Electrode material; Supercapacitor

**ACKNOWLEDGEMENTS**

This work was supported by the National Key Research and Development Program of China (2016YFC0202900), National Natural Science Foundation of China (21567015), Natural Science Foundation of Gansu Province (17JR5RA109), and Gansu Provincial Party Committee Young Creative Talents (Ganzutongzi, 2017/121).