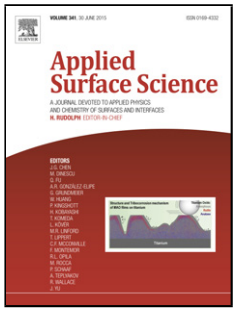


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# Walnut shell derived porous carbon for a symmetric all-solid-state supercapacitor

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Highlights

- Walnut shells derived porous carbon provides useful materials for energy storage.
- The obtained porous carbon materials can reach 255 F/g at 0.5 A/g.
- Porous carbon materials were used for symmetric all-solid-state supercapacitors.
- The symmetric all-solid-state supercapacitor exhibits good electrochemical performances.

## Abstract

Low-cost easily available walnut shells were used as the carbon source to prepare the porous carbon materials. The walnut shell derived porous carbon material was prepared using a simple hydrothermal method followed by the activation routes with $K_2CO_3$. The specific capacitance of this carbon material was 255 F/g at 0.5 A/g. Meanwhile, the obtained carbon material was used as the electrode material in a symmetric all-solid-state supercapacitor. The assembled all-solid-state supercapacitor device exhibits good electrochemical performances including a high specific capacitance (138 mF/cm$^2$ at 1mA/cm$^2$) and good stability (96% capacitance retention after 3000 cycles). This new material makes full use of walnut shell waste to provide a useful material for energy storage.

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