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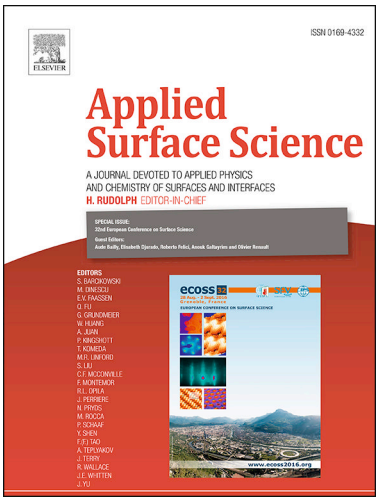

Full Length Article

Facile preparation of nitrogen-doped high-surface-area porous carbon derived from sucrose for high performance supercapacitors

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Facile preparation of nitrogen-doped high-surface-area porous carbon derived from sucrose for high performance supercapacitors

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Abstract: We propose a simple strategy that combines polymerization with chemical activation to prepare a new high-surface-area nitrogen-doped porous carbon (SU-NPC) using sucrose as a carbon precursor, urea as a nitrogen precursor and KOH as an activation reagent. Additionally, this method avoids the time-consuming and complex hydrothermal treatment and template method of traditional approaches. To further optimize the performance, we investigated the relationship between the structure of the SU-NPC-X (X is the activation temperature) and its electrochemical performance at different activation temperatures in detail. The as-prepared SU-NPC-750 not only featured a large specific surface area of 1751 m^2 g^{-1} with a microporous network but also possessed a 5.96% nitrogen content. In 6 M KOH, the SU-NPC-750 displayed the highest specific capacitance of 335 F g^{-1} at 1 A g^{-1} among all previously reported sucrose-derived porous carbon. Meanwhile, the SU-NPC-750 presents an outstanding rate performance with a 65% capacitance retention at 30 A g^{-1} and an excellent cycling stability with an approximately 95.5% capacitance retention over 10000 cycles. Moreover, the as-assembled symmetrical capacitor showed a high energy