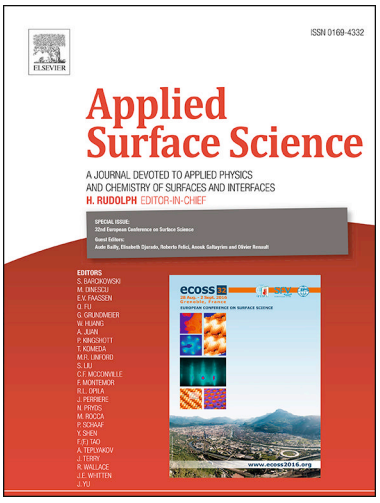

Full Length Article

Molten salt synthesis of nitrogen and oxygen enriched hierarchically porous carbons derived from biomass via rapid microwave carbonization for high voltage supercapacitors

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Molten salt synthesis of nitrogen and oxygen enriched hierarchically porous carbons derived from biomass via rapid microwave carbonization for high voltage supercapacitors

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Abstract: Nitrogen and oxygen enriched hierarchically porous carbons (NOHPCs) derived from biomass have been successfully prepared by rapid microwave carbonization coupled with molten salt synthesis method in only 4 min. $ZnCl_2$ plays important roles as microwave absorber, chemical activation agent and porogen in this process. NOHPC-1:10 sample possesses the maximum specific surface area of 1899 m^2 g^{-1} with a pore volume of 1.16 cm^3 g^{-1} and mesopore ratio of 70%, as well as nitrogen content of 5.30 wt% and oxygen content of 14.12 wt%. When evaluated as an electrode in a three-electrode system with 6 M KOH electrolyte, the material exhibits a high specific capacitance of 276 F g^{-1} at 0.2 A g^{-1}, with a good rate capability of 90.9% retention at 10 A g^{-1}. More importantly, the symmetric supercapacitor based on NOHPC-1:10 in 1 M Na_2SO_4 electrolyte exhibits a high energy density of 13.9 Wh kg^{-1} at a power density of 120 W kg^{-1} in a wide voltage window of 0-1.6 V, an excellent cycling stability with 95% of capacitance retention