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**Synthesis of porous carbon spheres derived from lignin through a facile method
for high performance supercapacitors**

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Abstract

Porous carbon spheres (PCS) derived from lignin have been prepared through a facile method and fabricated as electrodes for electric double-layer capacitors. Spherical shaped mixtures of liginosulfonate and crystalized KOH are formed by spray drying of a solution of liginosulfonate and KOH. Activation by KOH is performed at high temperatures along with liginosulfonate carbonization. With an appropriate pore structure, the obtained PCS have a specific surface area of 1372.87 m² g⁻¹ and show a capacitance of 340 F g⁻¹ in 3 M KOH at a current density of 0.5 A g⁻¹. Moreover, a symmetric supercapacitor fabricated using the PCS as electrodes show a maximum capacitance of 68.5 F g⁻¹, and an energy density of 9.7 W h kg⁻¹ at a power density of 250 W kg⁻¹. The capacity retention is more than 94.5% after 5000 galvanostatic

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