



## Comparative study on the properties of carbon prepared from different lignin resources

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### ABSTRACT

Bio-based carbon particles were produced from different technical lignins, including Kraft lignin, soda lignin, lignoboost and hydrolysis lignin, with different carbonization temperatures (1000 °C and 1400 °C). The structure, morphology, electrical conductivity, and electrochemical performance of the obtained carbon particles were systematically analyzed. The results demonstrate that the lignin resources and carbonization processes have significant impact on the structure and properties of the carbon particles. Kraft lignin carbonized up to 1400 °C gives the highest BET surface area (646 m<sup>2</sup> g<sup>-1</sup>), which makes it a good candidate for making supercapacitors electrodes and a capacitance of 97.2 F g<sup>-1</sup> has been obtained with an energy density of 48.6 Wh kg<sup>-1</sup> at a power density of 180 W kg<sup>-1</sup> at current density of 0.1 A g<sup>-1</sup>. Soda lignin carbonized up to 1400 °C has showed somewhat graphite like structure and provided highest electrical conductivity of 335 S m<sup>-1</sup>. These conductive carbon particles can be utilized as reinforcements in composites or can be used for producing electromagnetic interference shielding materials (EMI shielding materials).



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