

## Development of Electrodes for Electric Double Layer Capacitor from Technical Lignins through Electrospinning, Carbonization and Steam Activation

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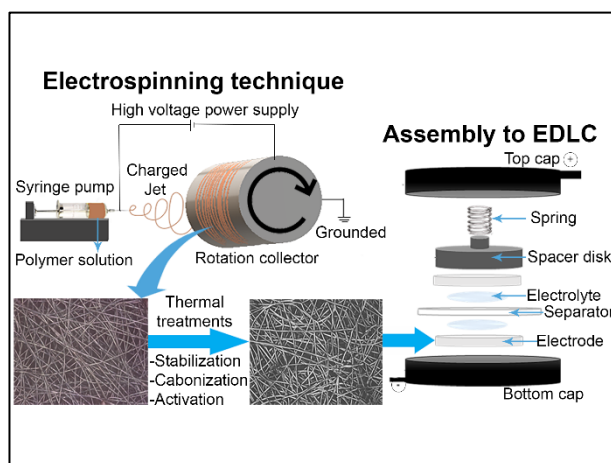
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Lignin is an abundant natural polymer after cellulose. We have already demonstrated to prepare activated carbon fibers (ACFs) from several technical lignins. As one of their applications, we attempted to fabricate electrodes for electric double layer capacitor (EDLC) with them. EDLC is one of electric energy storage devices that has several advantages over secondary battery, such as high power density and long cycle life. However, a demerit of EDLC is lower energy density than that of secondary battery.

First, the electrode was prepared from several technical lignins by electrospinning followed by carbonization and steam-activation. EDLC was assembled with the resultant ACFs and organic electrolyte. The EDLC showed excellent electrochemical performance, such as large specific capacitance, low electric resistance and large energy density. Very recently, we succeeded in the fabrication of another EDLC with much larger energy density than that of previous one. This EDLC was assembled with lignin-based ACFs and an ionic liquid as an electrolyte. Therefore, we have developed a novel preparation method of lignin-based ACFs suitable for EDLC with the ionic liquid. The detail process to fabricate EDLC is reported in this conference.

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A schematic diagram for the development of electrode for electric double-layer capacitor (EDLC).

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Research Interest: Elucidation of wood cell wall,  
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