

A Pore-less Biopolymer-based Separator with Simple Synthesis for the Next-generation Battery

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Li-ion batteries (LIBs) are applied to various products such as electric vehicles and energy storage devices. As the demand for high energy density batteries increased, Li-metal as the anode showed a potential to replace graphite. However, Li-metal batteries should surmount the problems with Li dendrites.

Among the component of the battery, the separator provides a migration path for Li-ions to move, prevents electrons from flowing directly through the electrolyte. The polyolefin-based membranes have been commercialized as the LIB separator. However, it is easy to short circuit because Li dendrites can penetrate large pores.

Therefore, in this study, we fabricated a pore-less biopolymer-based separator for the Li-metal battery. Natural polymers show a wide range of properties depending on the type and molecular weight of the material. Also, by adding an ion conductive material and guiding agent, we expect to improve the ion conductivity. By controlling the molecular weight of materials, we made the separator with an optimized ion migration path and mechanical strength, which applies to the Li-metal battery system.