



Nanoporous Polymer Membrane Fabrication (20100133, Dr. Marc Hillmyer)

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Nanoporous Polymer Membrane for Ultrafiltration Applications

A method has been created for the fabrication of nanoporous polymers with potential applications in ultrafiltration and other size selective separation functions. The polymer materials are especially useful for lithium ion battery applications, where they act as a separation layer, preventing the anode and cathode from coming into contact, while the small pore size of the highly porous polymer membrane does not affect the movement of the lithium ions. The material is chemically and mechanically robust with controllable pore sizes and high void fractions.

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Polymer Membrane with Increased Chemical and Mechanical Stability

The method produces robust nanoporous membranes derived from perfectly linear polyethylene (LPE) – polylactide (PLA) triblock copolymers. The method produces a porous polymer membrane with a higher melting point, greater crystallinity and lower susceptibility to chemical reaction than currently used hydrogenated polybutadiene (hPB) materials. The synthesis method allows for a narrow pore size distribution, with materials with pore sizes of 24 nm and 38 nm synthesized to date.

BENEFITS OF NANOPOROUS POLYMER MEMBRANE:

- Nanoporous insulating membrane ideal for lithium battery and ultrafiltration applications.
- Chemically and mechanically robust, with higher melting point and crystallinity than currently used polymers.
- Narrow pore size distribution, with controllable pore size.

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