Nanoporous Filtration Membrane from Block Copolymer

Technology #20120076

Robust and Flexible Nanoporous Filtration Membrane

A robust yet flexible nanoporous filtration membrane can be produced from block copolymer. The process begins by synthesizing a nanoporous cross-linked polystyrene-polyisoprene-polystyrene-polylactide tetrablock terpolymer that displays good tensile and elongation properties. Then the polylactide is removed via hydrolysis or reactive ion etching, resulting in a tough, self-assembling ABAC tetrablock polymer with highly uniform structure and pore size (ranging from 1 to 100 nm) distribution. Thin films of this nanoporous polymer are then created by spin coating and salt-plate transfer/film-transfer of the polymer onto a microporous polyethersulfone membrane support.

Filter for Liquids, Air and Gas

Nanoporous polymeric membranes are useful for a wide variety of fluid filtering operations, such as purifying drinking water, sterilizing cell culture media and making ultraclean water for semiconductor manufacturing processes. The membranes created by this technology hold promise in filtering fluids for the pharmaceutical, medical, electronics and food and beverage industries and have potential for use in surgical devices as well as for filtering air and/or gas in venting applications.

BENEFITS AND FEATURES OF NANOPOROUS FILTRATION MEMBRANE FROM BLOCK COPOLYMER:

- Small amount of block polymer needed to create thin selective layer
- One-step formation of uniform pore structure via hydrolysis
- Reduces or eliminates treatment with wetting agents to increase hydrophilicity
- Direct formation of self-assembled structure without quenching/annealing

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• No chemical crosslinking needed to impart tough mechanical properties

**Phase of Development**  Proof of Concept

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