

[0004] There exists a need for a coated expanded fluoropolymer membrane having a uniform coating and substantially no collapse or shrinkage. There exists a need for a method of coating an expanded fluoropolymer membrane with a uniform hydrophilic coating that does not cause the membrane to collapse or shrink.

SUMMARY OF THE INVENTION

[0004a] In one aspect, there is provided an article comprising:

- a. an expanded fluoropolymer;
- b. a vapor deposited hydrophilic coating on the expanded fluoropolymer,
wherein the coating comprises a copolymer formed from the polymerization of
at least one hydrophilic monomer with at least one fluoromonomer to form the
coating on the expanded fluoropolymer.

[0004b] In another aspect, there is provided an article comprising:

- a. an expanded fluoropolymer;
- b. a vapor deposited coating on the expanded fluoropolymer,
wherein the coating comprises a copolymer formed from the evaporation,
condensation and subsequent polymerization of at least one non-wetting
monomer with at least one fluoromonomer to form the coating on the expanded
fluoropolymer, and
wherein the non-wetting monomer is cross-linked to the fluoromonomer.

[0005] The invention ~~present disclosure~~ is directed to articles comprising an expanded fluoropolymer having a coating of at least one non-wetting hydrophilic monomer and at least one fluoromonomer and methods to produce the same. The expanded fluoropolymer membrane may be an expanded polytetrafluoroethylene (ePTFE), membrane, and may comprise a microstructure of substantially only fibrils. The expanded fluoropolymer membrane may comprise a coating of a copolymer having at least one non-wetting monomer, and at least one fluoromonomer. In some embodiments the copolymer coating comprises a non-wetting monomer cross-linked with a fluoromonomer.

[0006] The copolymer may comprise a fluoromonomer including but not limited to a fluoroacrylate, perfluoroacrylate, or perfluoroalkyl-2-hydroxypropylmethacrylate. The copolymer may comprise a carboxylic group, or acrylic acid. The non-wetting monomer may comprise a hydrophilic monomer. The non-wetting monomer may have a surface energy of at least 5 dynes/cm greater than the expanded fluoropolymer.

[0007] In some embodiments, the expanded fluoropolymer membrane is rendered hydrophilic and in some embodiments the coating is a conformable coating. The specific surface area of the coated expanded fluoropolymer membrane may be $10\text{m}^2/\text{g}$ or more. The expanded fluoropolymer membrane may be greater than $20\mu\text{m}$ thick and may have an effective amount of coating on both a first coated surface and a second non-coated surface, such that both the first and second surfaces are hydrophilic.

[0008] The copolymer coating on the expanded fluoropolymer membrane may comprise a hydrophilic monomer that is copolymerized and cross-linked to a fluoroacrylate monomer. In other embodiments the hydrophilic monomer may be cross-linked to a fluoromonomer by a multifunctional acrylate.

[0009] The copolymer may be flash evaporated and condensed onto the expanded fluoropolymer membrane and then polymerized to produce a hydrophilic