TECHNOLOGY

Method of Modifying Filtration Membranes

OVERVIEW

Background:

Polyethylene glycol (PEG) has been widely used and proven to be very efficient as an antifouling agent to reduce non-specific adsorption of proteins. Unfortunately, the chemical structure of PEG can be altered in the presence of oxygen and transition metal ions, thus damaging its ability to repel non-specific protein adsorption. Therefore, the application of PEG in numerous environments, where various metal ions, oxygen, and biomacromolecules exist, is severely limited. There are other conventional polymeric brushes that can be used to create non-fouling surfaces. These polymer brushes typically contain flexible chains and hydrophilic pendant groups. Representative examples include poly(2-hydroxyethyl methacrylate) (PHEMA), poly(ethylene glycol) methacrylate (PEGMA), polyvinylpyrrolidone (PVP), poly(meth)acrylic acid (PAA), and polyacrylamide (PAAm). Although these polymer brushes have good antifouling properties, all suffer from one or more problems associated with, for example, chemical stability, biocompatibility, and long-term antifouling capability.

Innovation:
Researchers at the University of Maryland have developed a novel nanostructured material and invented a simplistic yet highly efficient strategy for grafting such material onto silicon membranes, with the goal to significantly improve the hemocompatibility and fouling resistance drastically extend the lifetime of a membrane. This method provides a very effective engineering solution to designing an antifouling, biocompatible membrane. In fact, using aldrich humic acid as a model foulant, we have also shown that this grafting method improved the antifouling performance of the membrane due to a combined effect of reduced specific binding, strong hydrophilic repulsion, and steric repulsions.

Advantages:
· High biocompatibility
· Exceptional antifouling properties

Applications:
· Biomedical devices
· Water purification membranes
· Desalination
· Energy fuel purification membranes

CONTACT INFO

UM Ventures
0134 Lee Building
7809 Regents Drive
College Park, MD 20742
Email: umdtechtransfer@umd.edu
Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Pending

LICENSE STATUS

Available for exclusive or non-exclusive license

CATEGORIES

- Materials

EXTERNAL RESOURCES

PS-2013-126