Slippery Liquid-Infused Porous Surfaces (SLIPS) with Improved Antifouling Properties, Small Molecule Release

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WARF: P160308US02

Inventors: David Lynn, Uttam Manna

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing antifungal and antibacterial polymer-based SLIPS that inhibit microbial adhesion as well as kill/attenuate pathogens in surrounding media.

The newly designed materials can promote the sustained release of small molecule compounds such as broad spectrum antimicrobial, antifungal and/or quorum sensing agents.

Overview

Slippery liquid-infused porous surfaces (SLIPS) are an emerging class of materials with unique antifouling properties and applications ranging from biomedical device coatings and consumer products to industrial equipment.

UW–Madison researchers, led by Prof. David Lynn, developed a method to fabricate SLIPS via the infusion of oils into reactive polymer multilayers (see WARF reference number P150342US02). They have continued to investigate the potential of SLIPS as reservoirs for the controlled release of active agents, with a focus on the design of multifunctional chemical-eluting SLIPS capable of combating pathogens through non-biocidal strategies.

The Invention

Building on their work, the researchers have now developed SLIPS capable of preventing adhesion and colonization by bacterial/fungal pathogens, and also killing and/or attenuating non-adherent pathogens in surrounding media. The new approach exploits the polymer and liquid oil phases of the slippery materials to sustain the release of small molecule compounds.

This controlled release approach improves the inherent antifouling properties of SLIPS, has the potential to be general in scope and expands the potential utility of slippery, non-fouling surfaces in diverse contexts.

Applications

- State-of-the-art SLIPS on objects of arbitrary shape, size and topology, e.g., curved surfaces, inside hollow tubes, packaging and more

Key Benefits

- Improves antifouling properties
- Enables the controlled release of small molecules and other agents
- Chemically and physically durable

Stage of Development

The researchers have demonstrated that SLIPS fabricated using nanoporous polymer multilayers can prevent short and longer term colonization and biofilm formation by four common pathogens (*Candida albicans*, *Pseudomonas aeruginosa*, *E. coli* and *Staphylococcus aureus*).

In addition, the polymer and oil phases comprising these materials can be exploited to load and sustain the release of triclosan, a model hydrophobic and broad spectrum antimicrobial agent, into surrounding media. This approach both improves the inherent antifouling properties of the materials and endows them with the ability to efficiently kill planktonic pathogens.

The development of this technology was supported by WARF Accelerator. WARF Accelerator selects WARF's most commercially promising technologies and provides expert assistance and funding to enable achievement of commercially significant milestones. WARF believes that these technologies are especially attractive opportunities for licensing.

Tech Fields

- Materials & Chemicals : Polymers
- Medical Devices : Other medical devices

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867