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Slippery surfaces or how simple modification of surface can change material properties and applications

A simple, nontoxic and inexpensive method to prepare surfaces that repels a variety of liquids and solids has immediate relevance in many industrial applications. Unwanted interactions between liquids and surfaces are currently a limiting factor nearly everywhere liquids are handled or encountered. The slippery liquid-infused porous surfaces (SLIPS) technology, inspired by the Nepenthes pitcher plant, was introduced by recently and provides unique capabilities that are unmatched by any other liquid-repellent surface technologies.[1] SLIPS surfaces function under high pressure conditions, instantly self-heal imperfections, provide optical transparency, repel ice nucleation, and are ultra-repellent to pure and complex fluids such as blood, crude oil, brine as well as solids such as ice and wax. Biofilms are attracting increasing attention by the scientific community due to their significant health and economic impact. Development of multifunctional coating, which will prevent the growth and proliferation of biofilms on a variety of surfaces, is highly important. My approach is to apply a combination of nanomaterials to form multifunctional non-toxic coating that will exhibit antibacterial properties followed by surface lubrication with biofouling release properties. This approach was tested on various grade titanium and stainless steel surfaces and was modeled against concentrated solutions of *Staphylococcus aureus* as well as exposed the green algae *Chlamydomonas reinhardtii* culture showing excellent repellent performance.[2]

[1] Wong T-S, *et.al*. Bioinspired self-repairing slippery surfaces with pressure-stable omniphobicity. Nature 477, 443-447 (2011).

[2] Tesler A.B. *et.al*. Extremely durable biofouling-resistant metallic surfaces based on electrodeposited nanoporous tungstite films on steel. Nature Communications 6, 8649 (2015).

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