Pacific Northwest
NATIONAL LABORATORY

SLIC Foul-Release Coating

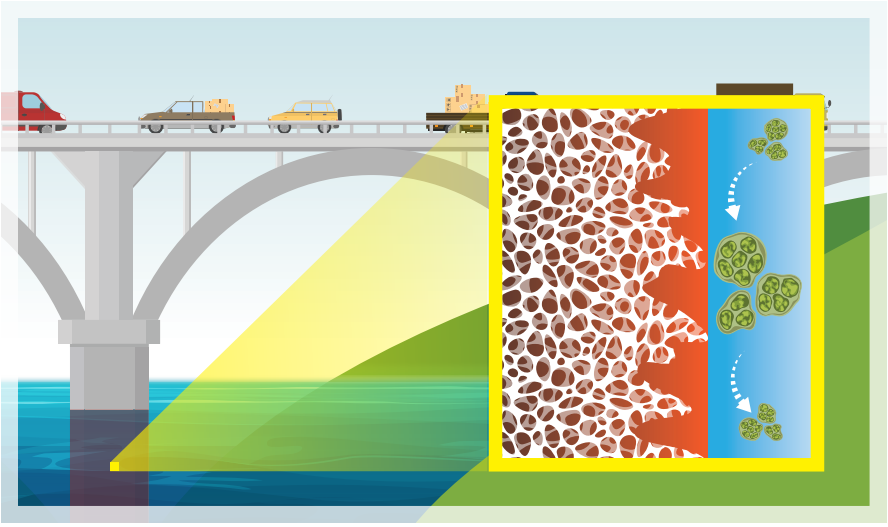
Protection from Biofouling

Next-Generation, Nontoxic Coating

Environmentally Friendly, Easily Applied to Large or Complex Surfaces

There is a way after all for humankind and Mother Nature to live harmoniously in wet environments where microscopic communities of organic matter and cells live, thrive, and infiltrate man-made surfaces. These tiny organisms have a way of wreaking havoc on critical infrastructure, maritime shipping, ocean-rigging platforms, and much more. Their habitation is costing industry billions of dollars annually in capital and operating costs due to equipment damage, decreased operating efficiency, increased energy expenditure, or maintenance downtime. But a new discovery at Pacific Northwest National Laboratory not only minimizes nature's impact, it enables us to navigate the ecosystem in a "slick" unimpeded manner. Best of all, the innovation won't harm these living organisms in the process.

Combining chemistry and materials science, PNNL researchers developed a next-generation, nontoxic coating, that can be easily applied onto a surface so that slime and unwanted organisms can be washed or wiped away in a safe, environmentally friendly manner. SLIC Coating, short for Superhydrophobic Lubricant Infused Composite, can be quickly and inexpensively sprayed onto any large or complex (think ridged or irregular) surface to add foul-release functionality.



PNNL's SLIC Foul-Release Coating provides extended protection from harmful biofouling and can be used on critical infrastructure, maritime ships, ocean-rigging platforms, hydroelectric powerplants, as well as in food, agriculture, and medical environments.

A SLIC Engineered Solution

Compatible with Tie-Coat Layers

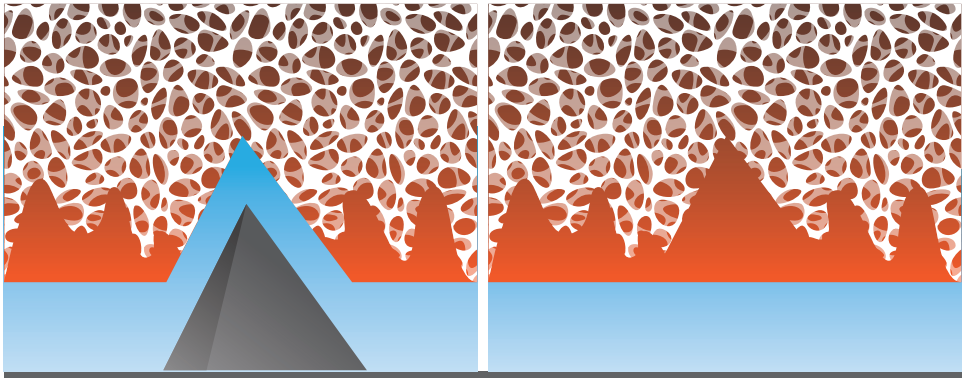
What makes PNNL's SLIC Coating unique is that is was designed to ensure its chemical composition would be compatible with today's primer and tie-coat layers, making it cost-effective and reliable with existing coating systems and structures. Without the need for heat or priming chemicals, applying the material is as simple as spraying, brush painting, rolling on, or dip coating.

As the name implies, SLIC is super slick. Ten times more slippery than Teflon, unwanted organisms "slide off," providing extended protection from harmful biofouling. The patented-innovation combines a porous material—such as silica, metals, metal oxides, ceramics, or diatomaceous earth—with a polymer binder and an infused lubricant oil, all of which are inexpensive, readily available, and safe for people and the environment. The textured surface is formed using one of these smaller, porous particles that trap the oil throughout the material.

To further enhance performance, SLIC Coating can be decorated by nanometer-scale features, think thousands of times smaller than a human hair. Advanced versions of the coating can also include an additional structural element, such as a fiber reinforcement, that will improve the durability.

Self-Healing for Added Durability

If the coating is chipped or scratched for any reason, SLIC is resilient—even to the point of self-repairing. How? The coating's material structure is engineered at three levels to be self-replenishing and impervious to damage. The textured surface, which traps lubricant, is found uniformly throughout the coating's thickness. Scratches and surface damage have little effect—much like scratching a sponge's rough surface reveals the same rough surface throughout. Furthermore, lubricant that eventually wears off can also self-replenish. That means despite damage, SLIC Coating will continue to protect your asset.



This microscopic view illustrates SLIC Coating being scratched. The lubricating oil fills the void, "repairing" the material's surface.

Ready for Licensing

SLIC Foul-Release Coating is immediately available for licensing in multiple industrial applications where hydrophobic and antifouling properties are key. As a U.S. Department of Energy national laboratory, much of the federally funded research conducted at PNNL results in intellectual property. One of our primary missions is to move this innovation to markets where they can make a positive societal impact and increase U.S. industrial competitiveness.

- **Hydroelectric Powerplants**
- **Harbor Facilities & Structural Members**
- **Food & Agricultural Processing Plants**
- **Maritime Shipping**
- **Bridges & Infrastructure**
- **Medical**

For more information on SLIC Coating, contact:

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View all of our intellectual property at https://availabletechnologies.pnnl.gov

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