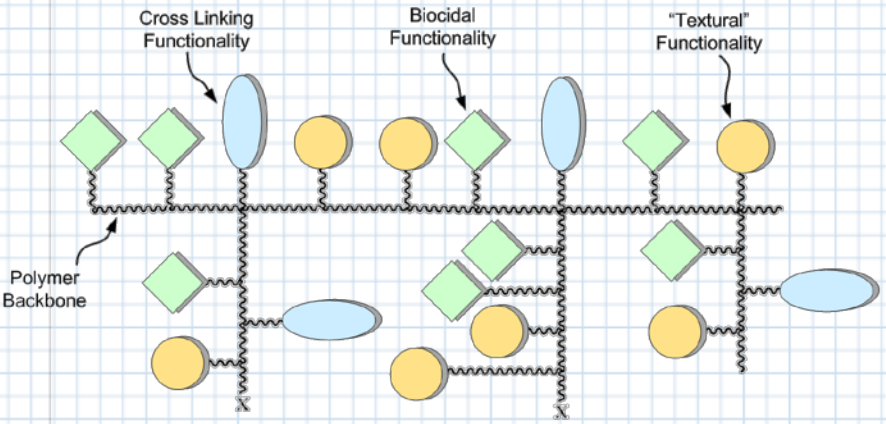
Non-Confidential Description

Novel Environmentally Friendly Coatings for Marine and Medical Applications

Technology Case: RFT-179

Invention Summary

Scientists at North Dakota State University have combined biocidal and fouling release activities into a single polymeric formulation to develop a unique environmentally friendly coating that holds promise in both marine and medical applications. This novel formulation consists of biocidal moieties that are tethered to its polymer matrix, which in turn prevent them from leaching into the environment.



One exemplary embodiment of a polymer that may be used to prepare the disclosed polymer matrix.

Studies have demonstrated this biocidal moiety to be capable of killing several types of marine organisms that come in contact with the coating surface. Their complementary fouling release property enables those marine organisms not affected by the biocide to be easily sloughed off.

Besides marine applications, this coating has been shown to render anti-microbial properties on medical devices.

Benefits

- **GREEN TECHNOLOGY!** Biocidal components are tethered to prevent them from leaching into the environment.
- **Marine applications:** Ship hulls and other exterior surfaces exposed to marine water.
- **Medical Application:** Medical devices and hospital settings.

Invention Premise

It is well known that ammonium salts deter settlement of organisms such as bacteria.

- This invention relates to coating formulations based on the modification of moisture cure siloxane elastomers with an alkoxysilane functional polymer containing ammonium salt groups. The mechanical properties of these coatings are similar to silicone elastomers, yet the coating contains biocidal

moieties to deter settlement of organisms. To inhibit leaching of toxic components into the water, biocide moieties are tethered to the polymer matrix.

- Antifouling performance has been evaluated by assessing the ability of the novel coating to inhibit or minimize bacterial biofilm formulation. Trials have been carried out on several marine and medically relevant microorganisms.

Patents

This technology is patented with fully preserved US patent rights (issued US patent 7,771,833), and is available for licensing/partnering opportunities.

This technology is patent pending with fully preserved patent rights in Japan and is available for licensing/partnering opportunities.

The Lead Inventor

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Senior Research Scientist

Dr. Bret Chisholm received his B.S. degree in Chemistry from North Dakota State University in 1989 and his Ph.D. in Polymer Science in 1993 from the University of Southern Mississippi. After graduation, Chisholm was employed by General Electric (GE) for 11 years and worked in the areas of organic coatings, combinatorial/high-throughput methods, hybrid organic-inorganic coatings, polymer blends, crystalline polymers, and ionomers. In October of 2004, Chisholm joined the Center for Nanoscale Science and Engineering as a Senior Research Scientist and Director of the Combinatorial Materials Research Laboratory. He is also an Adjunct Professor for the Department of Coatings and Polymeric Materials and serves as a thesis advisor for several graduate students. Chisholm holds 20 U.S. patents and has authored more than 100 publications.

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