"NOVEL ANTI-ADHESIVE, ANTI-ICING COATINGS AND METHODS FOR PRODUCTION" VCU # 11-64, 11-79

Applications

- Foul release coatings
- Marine antifouling, for shipping, naval vessels or underwater applications
- Anti-icing coatings, power generation applications
- Biomedical applications to reduce biofouling
- Purification of fluorous polyoxetane diols

Advantages

- Low adhesion, oil resistant, and improved toughness
- Nontoxic and environmentally-friendly no leaching of cyclics
- Adaptability to commercially available intermediates
- Scalable and easily manufactured, cost-effective
- Nontoxic and environmentally-friendly no leaching of cyclics

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Market Need

Minimizing adhesion of biofouling is a major goal for several industries. Marine biofouling, for example, affects shipping, naval vessels, aquaculture and offshore oil operations and leads to numerous problems including increased drag on vessels, increased fuel charges and decreased operational efficiency. In addition, icing on aircrafts leads to increased fuel consumption, engine damage and pollution from the current de-icing agents, and has been estimated to decrease power production by wind turbines by almost 50%. To solve this problem, various biocides have been incorporated in coatings, however, this often results in leached biocides that are harmful to the environment. To solve this, silicone-based nontoxic coatings have been used, but their durability and toughness are not adequate.

Technology Summary

Researchers at VCU have developed anti-adhesive coatings to minimize fouling in a variety of applications. These coatings have good oil resistance and a strong adhesive effect with respect to seaweed, barnacles, and other marine organisms, but unlike the current technology, these coatings are nontoxic and environmentally friendly. They could also be used to prevent adhesion of ice (See Fig. Ice Release properties), which could greatly reduce expenses associated with icing on airplanes, ships, power lines and wind turbines. These coatings have several advantages including improved toughness while maintaining surface characteristics that minimize adhesion of fouling and ice. They are also easily manufactured and adaptable to a variety of commercially available resin intermediates. The technology involves a new purification process for fluorous polyoxetane diols, which is important for independently enhancing coating surface and bulk mechanical properties.

Hybrid coating	0.07 MPa
Super F-1 coating_Wearlon	0.12 MPa
Superhydrophobic_Cohen(MIT)	0.17 MPa
Polyurethane	1.0 MPa

Technology Status

Patent pending: U.S. and foreign rights are available. Coatings have been created and tested.
This technology is available for licensing to industry for further development and commercialization.