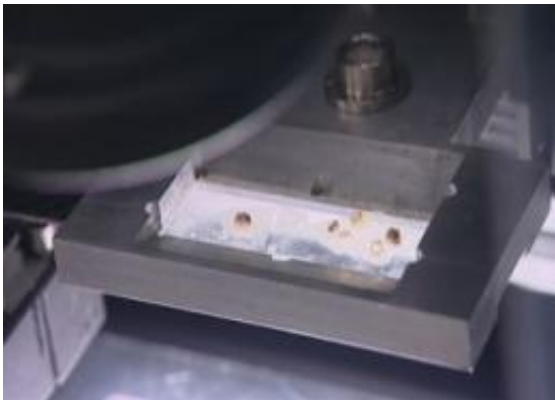


Innovative anti-biofouling technologies can make shipping more eco-friendly

June 23 2011, by Annette Ostrand



Organisms that stick to the lower structures of ships increase fuel consumption and costs of maintenance substantially. Currently, the organisms are killed with toxic biocides, but these chemicals need to be removed to protect our environment. Researchers are trying to develop environmentally friendly anti-biofouling technologies, such as nano-structured surfaces that make organisms fall off when the ships move.

Organisms, such as algae and barnacles, sticking to the lower structure of ships are increasing the required propulsive power. It is estimated that ships' [fuel consumption](#) could be reduced by up to forty percent by removing those [organisms](#). Erosive systems containing biocides are mainly used for this purpose. However, the use of eco-friendly

alternatives such as silicon based fouling release coatings, nearly all enhanced with an oil additive, have increased lately. Researchers at GE Global Research Center in the U.S. have shown that organisms react differently to the various silicone fouling release coatings, and [coating](#) type crossed with oil type is very important when it comes to establishing an organism's attachment strength magnitude.

However, there is a need for improved eco-friendly alternatives and researchers are working on solutions. For example, scientists at the University of Gothenburg in Sweden have developed what they call a "low emission" approach where avermectins, a class of antibiotics, are included. Only very small amounts are released, since the substances in the coating are tightly associated with the binding matrix agent. The scientists found that 1mg avermectin/gr coating very effectively hindered adult barnacles from colonization, but a similar coating did not disturb barnacle larvae. The reason is that the barnacles first encounter the avermectin when they try to stick tighter to the surface and the avermectin then make them detach. This principle was named post settlement inhibition (PSI) because this coating only seems to influence adult barnacle growth.

Another innovation that neither involves toxic substances currently used nor nanoparticles, has been developed by researchers connected to the European Commission-funded project AMBIO (Advanced Nanostructured Surfaces for the Control of Biofouling). Their coating technology that can replace the toxic biocides technology is instead based on nano-patterning. Molecules within their innovative paint will arrange themselves in a checkerboard pattern where hydrophobic nanosized points are combined with hydrophilic nanosized points. This texture makes it very hard for [algae](#) and barnacles to hold on to the surface and the water's friction will remove them.

Although a coating alternative that do not release any toxic substances

into the environment appears to be the safest choice, the AMBIO coating technology will first be studied extensively in a real world setting to make sure it has the right properties, for example that it can last five years on ships, before it can become commercially available.

Source: Youris.com

Citation: Innovative anti-biofouling technologies can make shipping more eco-friendly (2011, June 23) retrieved 16 June 2024 from <https://phys.org/news/2011-06-anti-biofouling-technologies-shipping-eco-friendly.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.