Duke University
Office of Licensing & Ventures
Technology Opportunity

ACTIVE BIOFOULING CONTROL SYSTEM (ENVIRONMENTAL)

File #3720-1

Application

Duke University is seeking a company interested in commercializing a novel and versatile method of controlling the growth of biofouling. Surface biofouling, the unwanted accumulation of unwanted material, biomolecules, cells (including microbes) and attaching organisms (referred to as a biofilm) upon submersed surfaces, is a devastating problem in many industrial, military and medical applications. Examples include marine and industrial operations such as separations, transport, cooling, and environmental sensing. In general, biological organisms that live in marine environments have naturally solved the problem of fouling of their own surface by a number of strategies. However, biofouling (in which fouling species include biological molecules or organisms) has persisted as a significant and fundamental problem that hinders humankind's ability to interface with and manipulate biological systems. Previous methods to control biofouling have relied on: (i) coating materials that exude biocidal compounds; (ii) coating materials that exhibit contact biocidal or bio-inhibitory activity, (iii) coating materials that resist the short term accumulation of biofouling, (iv) coating materials from which accumulated biofouling is easily removed under shear. The first method is perhaps the most effective in providing long-term resistance to biofouling, but can have deleterious consequences by resulting in unwanted damage to the biological system (e.g., marine environment) with which the synthetic system is interfaced. The second, third and fourth methods have thus far achieved only limited, short term effectiveness.

Technology

Researchers at Duke University have developed dynamic topological surface technologies to better control biofouling. The Duke approach enables general solutions which are implementable over a large range of conditions, applications and devices / equipment.

Intellectual Property

Patent pending

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Inventors

Xuanhe Zhao, Ph.D., is an Assistant Professor of Mechanical Engineering and Material Sciences at Duke University. Dr. Zhao's current research centers on soft active materials (SAMs), which include dielectric elastomers, hydrogels, magnetic polymers, and muscles. By integrating experiment and theory, Zhao is studying the behaviors of SAMs driven by multiple thermodynamic forces (e.g., stress, electric field, magnetic field, chemical potential), and exploring SAMs' applications in various areas such as drug delivery, tissue engineering, energy harvesting, robotics, microfluidics, and water treatment.

Gabriel P. Lopez, Ph.D., is a Professor of Biomedical Engineering and Professor of Mechanical Engineering and Materials Science at Duke University. He also serves as Founding Director of the National Science Foundation's Research Triangle Materials Research Science and Engineering Center (Triangle MRSEC). Dr. Lopez's primary professional interests lie in research and education in biomaterials science and engineering, bioanalytical chemistry and biointerfacial phenomena.

Phanindhar Shivapooja is a student in the Biomedical Engineering Department at Duke University.

Qiming Wang is a student in the Department of Mechanical Engineering & Material Science at Duke University.

Contact

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