

SUPERHYDROPHOBIC SUPEROLEOPHOBIC SURFACE COATINGS

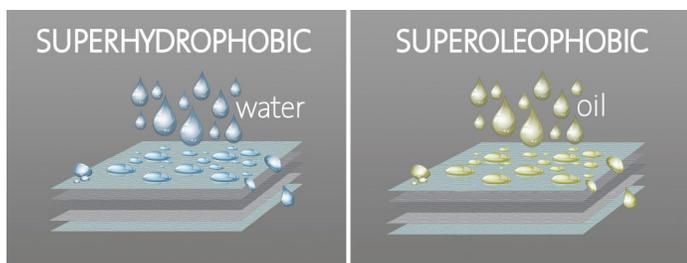
Research at Ohio State's Nanoprobe Laboratory for Bio and Nanotechnology and Biomimetics has recently developed a new novel coating which allows for superoleophobic and superhydrophobic properties. The filed patent application protects the multi-layered coatings and methods of surface treatment. The proprietary coating is comprised of known compounds and is applicable to a range of commercially viable applications. The final product has been shown to be mechanically durable and more effective than traditional coatings.

RESEARCH

The research performed in Dr. Bhushan's laboratory has led to a commercially viable 4-layer coating system that can be applied via spray coating, dip coating or other deposition processes. The simple fabrication procedure created and documented by the laboratory allows for the coating of surfaces that are superhydrophobic and/or superoleophobic. The patent-pending composite nanoparticle method of application was developed and then applied as a coating to investigate desired properties. To investigate the durability of the coating, hexadecane tilt angles were measured before and after tribometer wear experiments. When droplets of hexadecane were tilted or dragged over the location of the wear experiment, the wear track was not found to impede the motion of the droplet. When deposited directly onto the wear track, there was a small increase in tilt angle before the droplet rolls away. This suggests that any damage caused to the surface is minimal and only leads to an increase in pinning for droplets deposited directly over the wear location. The samples were found to have excellent wettability as well as other properties which include anti-smudge properties, transparency characteristics, and low drag properties.

INTELLECTUAL PROPERTY

Patent Pending 14/833,692 "Multilayer Coatings and Methods of Making and Using Thereof"



PROJECT GOALS

The Ohio State University is seeking industry partners who would benefit from this novel surface coating. The Center for Design and Manufacturing Excellence (CDME) will work with partners to develop samples of the novel coating application for initial testing. If customization of the coating deposition system is required for the industrial application, CDME and the industry partner will work directly with Dr. Bhushan's laboratory on a comprehensive research program. CDME will also work with partners to develop engineering solutions for the intended application of the coating. The goal of this program is the active commercialization of a series of durable and effective coating systems.

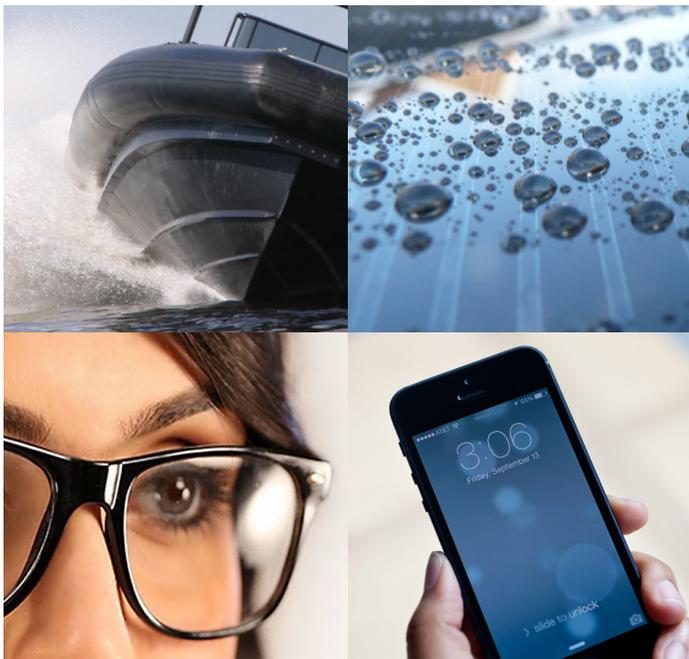
INVENTORS

Dr. Bharat Bhushan received an M.S. in mechanical engineering from the Massachusetts Institute of Technology, an M.S. in mechanics and a Ph.D. in mechanical engineering from the University of Colorado at Boulder, and an MBA from Rensselaer Polytechnic Institute at Troy, NY which he received in 1980. Dr. Bhushan's research focus includes areas of bio/nanotribology/nanomechanics, biomimics and nanomaterials. Dr. Bhushan has authored 8 scientific books, 90+ handbook chapters, and 800+ scientific papers. He has edited more than 50 books and holds 20 U.S. and foreign Patents.

Dr. Philip S. Brown is a postdoctoral researcher at The Ohio State University in coatings and materials science. He received his B.S. through Ph.D. from Durham University. Dr. Brown is investigating functional materials, coatings and surfaces for energy, biomedical, environmental, electronics, automotive, construction, and aerospace applications.

PROGRAM MANAGER

It is proposed that Mr. Matteo Triberti will lead this project for CDME. He has a Bachelors and Masters degree in Automotive Engineering and was a Research Associate Engineer for the Center for Automotive Research at The Ohio State University since 2013, leading commercialization of technologies. Matteo has experience with spray coating systems and their development for layered coating and deposition systems. He joined CDME in 2016 to lead engineering commercialization projects.



RECOGNITION

The technology has been recognized in various media outlets and through peer-reviewed awards including, but not limited to:

Dr. Bhushan and Dr. Brown being presented with an IChemE Global Award for Water Management and Supply on November 5, 2015 at the Chemical Engineer's (IChemE) Global Awards for their research "Separating oil from water."

The invention was ranked 42nd among the top 100 stories in 2015 by Discover magazine, reporting on complex subjects connecting everyday people with the greatest ideas and minds in science.

The invention has been recognized as one of 52 Insight's Top Ten Science Stories of 2015.

KEY FEATURES AND BENEFITS

- Transparency of the finished coating.
- Oil or water proofing ability.
- Easy coating and manufacturing process.
- Customizable based on application and need.
- Intellectual property protection pending.
- Durable and resilient based on initial testing,
- High contact angles for both water and oil.

MARKET OPPORTUNITIES

- **Anti smudge applications:** Electronics and Windows.
- **Anti fouling applications:** Reduced Drag, Boat Hulls.
- **Anti fogging applications:** Windshields, Eyewear.
- **Anti microbial applications:** Medical Environments.
- **Self cleaning applications:** Protective Films, Solar Cells.
- **Consumer goods applications:** Packaging, Containers.
- **Infrastructure applications:** Bridges, Buildings, Signage.
- **Food safety applications:** Flexible Packaging, Sterilization.

THE OHIO STATE UNIVERSITY

CDME is supporting the commercialization of technologies that emerge from Ohio State's annual research efforts. Ohio State has one of the largest research and development budgets of all universities. The amount of annual funding is a leading indicator of the breakthrough innovation occurring within the University. Recent annual highlights from OSU:

- » \$934 Million: Total research and development (R&D) expenditures
- » \$470 Million: Federal R&D expenditures
- » \$101 Million: Industry-sponsored research expenditures

Whether your interest is in licensing, sponsored research, joint ventures, investment, corporate giving or placement of our best students, Ohio State is here to help accelerate your business through innovation.

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