

Coating Surfaces with Superhydrophobic Powder

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Technology Summary

Researchers at ORNL have developed a method of modifying existing coating techniques to include a bonded superhydrophobic outer coating layer. Superhydrophobic powder will not readily bond to most substrates directly, since superhydrophobic powder is almost entirely made up of fluorinated particles of silica glass, which is chemically inert to most materials. In a standard electrostatic powder spraying process, dry resin powder is sprayed on to a given substrate. The powder adheres to the substrate by electrostatic forces and becomes permanently bonded to the substrate after the resin powder is heated and/or cured.

The developed method is an improvement over standard methods.

The novel method could be used to make large superhydrophobic surface areas on a wide variety of substrate materials. The resulting coating can completely repel water and heavy oils leading to potential applications in a number of areas including, but not limited to superhydrophobic, anti-corrosion, anti-icing, and antibacterial coatings.

Advantages

- Allows large, regular or irregular shaped surfaces of nearly any type of material to be coated with superhydrophobic powder
- Resulting coating will repel water, reduce viscous drag, be resistant to water based corrosion, and be self-cleaning

Potential Applications

- Marine coatings
- Torpedo coatings
- Anti-icing coatings
- Anti-bacterial and/or self-cleaning coatings
- Other fluid dynamic and heat transfer applications

Patent

Patent Application in preparation

John Simpson. *Method for Applying and Bonding Superhydrophobic Powder to Large Surface Areas*

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