

Superoleophilic Particles and Coatings

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Technology Summary

Researchers at ORNL have developed a superoleophilic coating that pins a layer of oil to a specially coated substrate and particularly to the surface of the coating. The pinning action keeps the oil from leeching out of the coating, even when the coating is submerged in water or subjected to very wet conditions. This enables the oil to persist on the surface of the coating without significantly reducing the coated surface's coefficient of friction.

The superoleophilic coating uses non-organic based polysiloxane oils in conjunction with porous nano-textured superhydrophobic powders like diatomaceous earth or specially processed and treated spindolally-decomposed borosilicate glass. Unlike current approaches to coating surfaces to protect against water or oxygen damage, the superoleophilic coating will not need to be replaced or maintained as frequently due to the layer of oil providing a semi-permanent oil barrier to the substrate.

The oil barrier provides anti-corrosion and anti-fouling properties to the coated material. In addition, the pinned oil layer can also mitigate or prevent icing. It also provides a degree of anti-bio-fouling protection against microbial and marine organisms. The resulting coating could lead to potential applications in a number of areas including, but not limited to anti-corrosion, marine, anti-icing, and antibacterial coatings.

Advantages

- Keeps a layer of oil from leeching out of a coating even when exposed to extreme conditions
- No effect on coated surface's coefficient of friction
- Requires less frequent maintenance or replacement

Potential Applications

- Marine coatings
- Torpedo coatings
- Anti-icing coatings
- Anti-bacterial and/or self-cleaning coatings

Patent

Patent pending

John Simpson, *Superoleophilic Particles and Coatings and Methods of Making the Same*, patent application filed October 8, 2010.

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