National Aeronautics and
Space Administration

Materials and Coatings

Lotus Coating

Mitigating Dust Accumulation and Repelling Liquids

The NASA Goddard Space Flight Center has developed a unique formulation of a Lotus leaf-like nano-textured dust mitigation coating, with hydrophobic properties. Originally developed to address a large scale problem of dust accumulation and contamination in dusty space environments such as the moon, Mars, comets, asteroids, and other planetary bodies, the coating can be used for other space applications and aeronautical applications, as well as earth-based ground applications. The Lotus Coating is a lightweight passive coating that also has super-hydrophobic properties and can prevent a variety of particles, liquids, or ice from sticking to the coated surface.

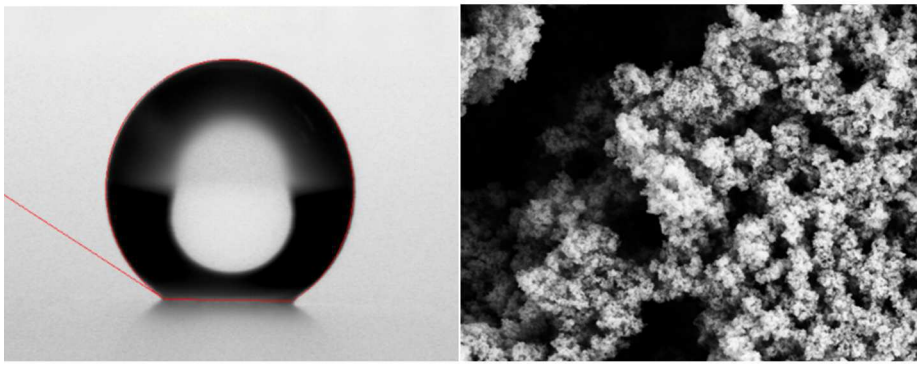
BENEFITS

- Can be used for dust, liquid, and ice mitigation
- Able to coat virtually any surface
- Easy to formulate & apply

technology solution

THE TECHNOLOGY

This durable, transparent, nano-textured coating can be applied via a wet chemistry process to variety of rigid and flexible surfaces by spin coating, brush application, or spray application, making it applicable for many purposes beyond space flight and aeronautical applications. The coatings unique nano-textured surface and overcoat reduces surface energy and contact surface area, giving the coating anti-contamination and self cleaning properties that minimize dust, liquid, and ice accumulation on its surface, similar to a leaf on the Lotus plant. The coating is low outgassing, stable in vacuum, and can survive harsh spaceflight environments. Depending on requirements, the Lotus Coating can be tailored to fit the specific needs of a project or customer. This customization makes the Lotus system far more adaptive, allowing for a more diverse range of applications.



Water droplet on Lotus WC2 coating with 150 degree contact angle (left); and Microscopic nano-texture of Lotus WC2 (right)

APPLICATIONS

The technology has several potential applications:

- Works in air, as well as vacuum systems
- Ideal for surfaces that can not be easily cleaned
- Can be used on spacecraft surfaces, like radiators, mirrors, and solar arrays
- Potential in textile, automotive, health, pharmaceutical, electronics, aeronautics
- Potential clean room surfaces, building and construction industry, solar arrays, etc.

PUBLICATIONS

Patent Pending

More Information

National Aeronautics and Space Administration

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NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

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