

News Manufacturing Materials

New coating 'self-cleans' and prevents fogging

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A new type of coating for plastic surfaces prevents fogging and 'self-cleans', claims its developers at Nanyang Technological University, Singapore (NTU Singapore).

Durable anti-fogging coating for plastic surfaces developed by NTU Singapore scientists



The coating of a thin double layered silicon dioxide-titanium dioxide film is applied through a two-step technique: the plastic surface is first treated with oxygen plasma, then the thin double layered film is deposited on the plastic surface using pulse laser deposition.

When subjected to abrasion using a cheese cloth pad, a standard test for optical coating, and an adhesion test using cellophane tapes, the coating maintained good durability.

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Fogging occurs when water vapour condenses as water droplets on a surface, and so the anti-fogging performance of coating is measured by the speed at which the condensed water droplets spread into a uniform film that does not block vision. In experiments on the new coating, digital fast frame imaging showed a water droplet spreading within 93 milliseconds.

The findings by the NTU team have been published in *Applied Surface Science*.

Anti-fogging sprays and wipes are popular products among eyeglass wearers, particularly during the COVID-19 pandemic when mask wearers sought to prevent condensation obscuring their view.



The new type of coating – when applied on a plastic surface, prevents fogging and 'self-cleans', overcoming the need for frequent reapplications (Image: NTU Singapore)

Anti-fogging coatings are also used in solar panels, windshields and displays or lenses that are used in humid environments.

Researchers elsewhere have developed anti-fogging coatings for plastics but the NTU Singapore team said two of the biggest barriers to their widespread adoption are the long processing time for fabrication and poor durability.



its potential for wide-ranging practical applications.”

| Sunlight exposure

Titanium dioxide has photocatalytic ability which allows it to self-clean by reacting with and removing organic residues under ultraviolet light exposure.

In lab tests of its self-cleaning ability the newly developed coating was able to break down contaminants on the plastic surface after a full day of ultraviolet light exposure.

Co-lead researcher, Professor Rajdeep Singh Rawat, Head, Natural Sciences & Science Education Academic Group at the National Institute of Education, NTU, said: “Our innovation is promising for use in industrial applications of various optical components, for example, on surveillance camera protective covers.

“The ability for the coating to self-clean makes it a low-maintenance and trouble-free solution since the cover may be less obscured by surface dirt and grime, providing a clearer view for surveillance.”

The research team has filed a Singapore patent for the innovation and the team is looking for industrial collaborations to take the innovation to market.
