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Research •
End to foggy glasses with new NTU coating | **B8**

NTU team develops self-cleaning coating to beat foggy lenses

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Researchers at the Nanyang Technological University (NTU) say they have created a coating that can stop lenses from fogging faster than the blink of an eye.

When applied to plastic lenses, the coating can spread water droplets in 93 milliseconds. This dispersion of the droplets into a uniform film prevents fogging.

An average blink lasts about 100 milliseconds.

The team expects the coating to have applications in a myriad of objects, ranging from spectacles to surveillance cameras and even solar panels.

Professor Chen Zhong of the NTU School of Materials Science and Engineering said: "Most anti-fogging solutions today are temporary and have limited efficacy.

"Our team has demonstrated an approach that is fast to fabricate, taking around an hour, and produces long-lasting results, proving its potential for wide-ranging practical applications."

By tapping ultra-violet light for a full day, components in the coating can also break down dirt and bacteria.

While anti-fogging coating has been developed for industrial applications, such as on solar panels, widespread adoption has been hampered by durability issues, said the research team in a press release last week.

For instance, prior coating could not withstand washing and had to be reapplied regularly due to poor adhesion between the plastic surface and the coating.

Furthermore, it took a long time to apply and was prone to surface contamination by dirt or bacteria, demanding regular cleaning or replacement.

According to the researchers, these problems will be greatly reduced with the new coating that can be fabricated and applied quickly, "taking under an hour" to apply.

The team's findings were published last December in Applied Surface Science, the highest-ranked materials science journal internationally.

The new coating, which is made of a combination of silicon dioxide and titanium dioxide, is applied through a two-step technique.

All organic matter is first removed from the surface using an oxygen plasma, an ionised gas, to improve adhesion.

A laser is then used to deposit vaporised silicon dioxide and titanium dioxide directly on the surface into a thin, double-layer film.

This film is expected to last a long time, said Prof Chen, the co-principal investigator of the study.

"On surveillance cameras under normal conditions, this film can be estimated to last a few months to a year," he added.

The coating has other beneficial properties, such as being anti-reflective.

The NTU researchers have applied for a patent for the film and are looking to strike up industrial collaborations to take the innovation from the laboratory to market.

Dr Thomas Reindl, the deputy chief executive of the Solar Energy Research Institute of Singapore (Seris) at the National University of Singapore, said the new anti-fogging film invented by the NTU team sounds like "an interesting new method to enhance the self-cleaning of solar panels".

But he added that it has to be compared with existing solutions and checked for its compatibility with other components.

"Seris has tested various anti-soiling methods in the past, and hence we would be more than happy to apply it on actual solar panels to compare the benefits.

"We also need to see how the new method interacts with the anti-reflective coating, which is a standard feature of modern solar panels," said Dr Reindl.

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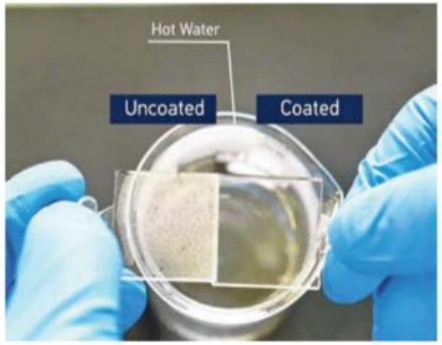

Above: PhD student Sun Ye with the new coating on a lens.

Left: When exposed to steam, fogging is observed on the uncoated plastic surface but not on the coated one. PHOTOS: NANYANG TECHNOLOGICAL UNIVERSITY

WIDE RANGE OF USES

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PROFESSOR CHEN ZHONG, of the NTU School of Materials Science and Engineering, on the new coating.