THE STRAITS TIMES

NTU develops new 'self-cleaning' anti-fogging coating

When applied to plastic lenses, the coating can spread water droplets in 93 milliseconds. PHOTO: NANYANG TECHNOLOGICAL UNIVERSITY

Gena Soh

PUBLISHED FEB 22, 2022, 6:28 PM SGT

SINGAPORE - 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 coatings have been developed for industrial applications, such as on solar panels, widespread adoption has been hampered by durability issues, said the team in a press release on Tuesday (Feb 22).

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

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

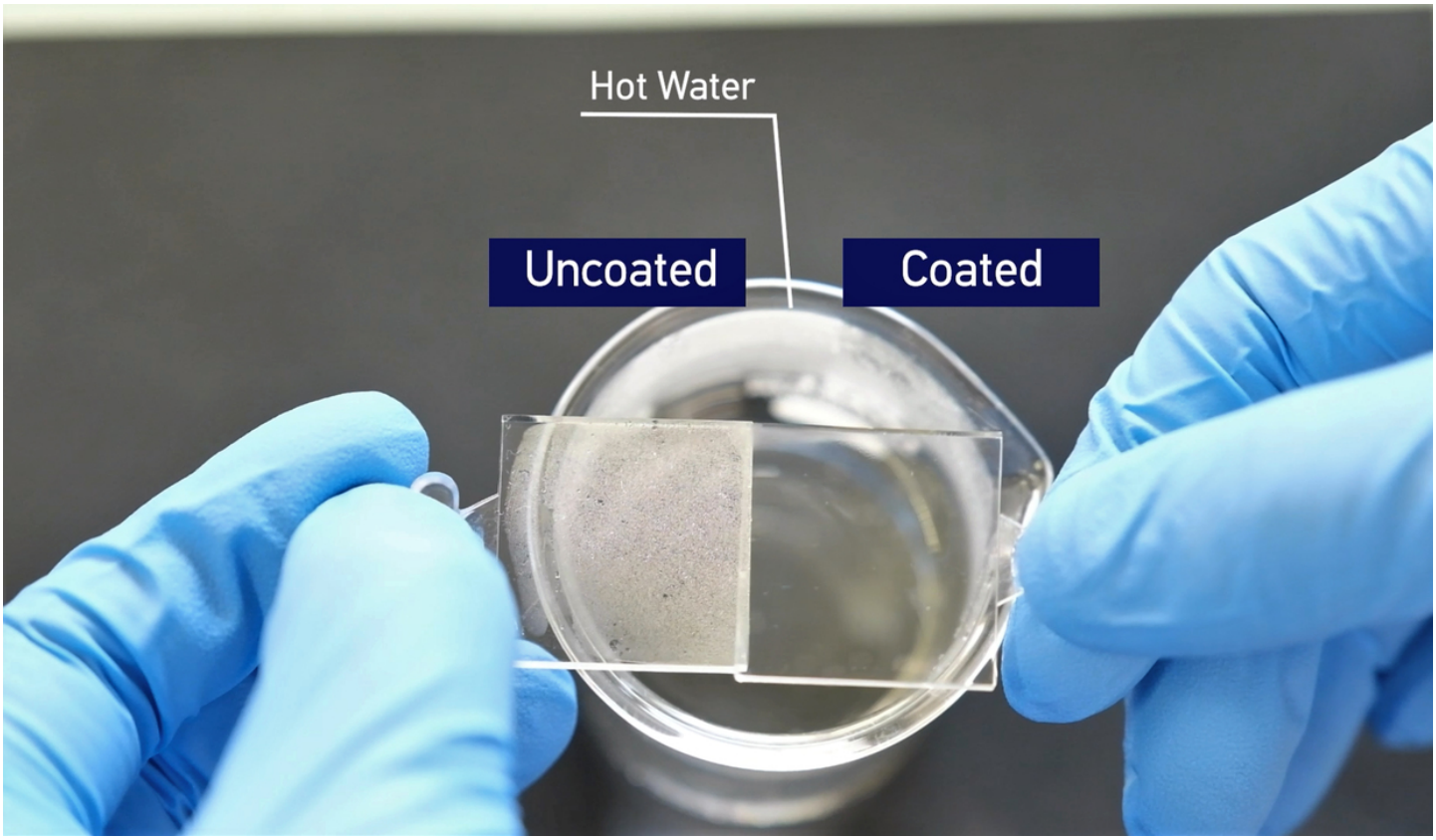
According to the researchers, these problems will be greatly reduced with the new coating that can be fabricated and applied quickly, "taking under an hour" to apply.

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

The new coating, 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.



When exposed to steam from hot water, fogging is observed on the uncoated plastic substrate, while no water vapour condensation is seen on the coated sample. PHOTO: NANYANG TECHNOLOGICAL UNIVERSITY

According to the team, the application of the film uses "common industrial methods", and is not expected to increase the cost of products substantially when manufactured at scale.

Furthermore, 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.

It also has a superior visible light transmittance of up to 89 per cent on a regular plastic lens, about 5 per cent better than the same lens without a coating.

This makes the film particularly suitable for consumer eye-glasses, and Prof Chen estimates it could last for as long as "several years".

MORE ON THIS TOPIC

Blue light filtering glasses: Just how effective are they?

SIA applies self-disinfecting coating in planes as it prepares to carry more passengers

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 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.