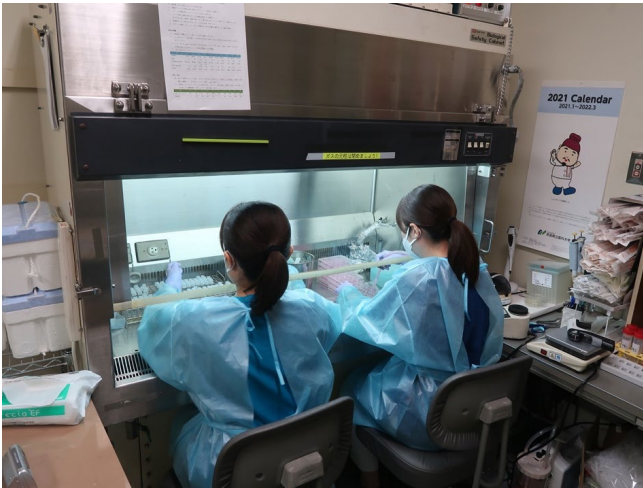
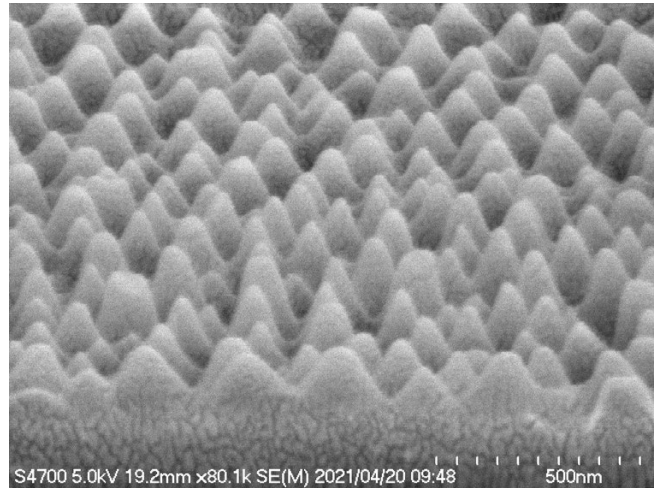


In addition to features such as "low reflection" and "high anti-fog", Nara Medical University* 1confirmed these new effects:

Sharp's Revolutionary "Moth-Eye Technology" Inactivates 99.675% Of Adhered New Coronavirus In 10 Minutes. * 2 **Demonstrating the effect**



• Experimental scene at Nara Medical University



• Electron micrograph of Moth-Eye structure

Sharp Display Technology Co., Ltd. (Headquarters: Kameyama City, Mie Prefecture, Chairman: Daisuke Oketani) is a research group of Professor Toshikazu Yano and Associate Professor Ryuichi Nakano of the Department of Microbial Infectious Diseases, Nara Medical University School of Medicine, and the MBT Consortium.* 3In collaboration with the group, we have demonstrated that our original "Moth-Eye Technology" is highly effective in inactivating the attached new coronavirus (SARS-CoV-2).

We have been conducting research on antibacterial properties using "Moth-Eye Technology", and joint research with Professor Suzuya of Fukushima Medical University School of Medicine.* 4We have proceeded with hygiene verification through industry-academia collaboration, such as confirming antibacterial properties.

In this joint research, it was discovered that the film with the Moth-Eye structure formed on the surface with a unique resin material inactivated the new coronavirus (SARS-CoV-2) adhering to the surface. A comparison test was done using film without Moth-Eye processing. With Moth-Eye processing, we demonstrated a 99.675% viral reduction in 10 minutes and a 99.968% viral reduction in 30 minutes.

In addition, even after cleaning the surface of the film with the Moth-Eye structure 100 times with alcohol, the infectious titer was found to decrease by 99.959% with respect to the reference sample after 30 minutes, confirming high durability.

<Comment by Professor Toshikazu Yano, Department of Microbial Infectious Diseases, Nara Medical University School of Medicine>

It was found that the film with the Moth-Eye structure formed on the surface with a unique resin material inactivates the new coronavirus (SARS-CoV-2) adhering to the surface, and the inactivating effect continues even after cleaning with alcohol. From the results of this test, it is considered that it may be effective in preventing contact infection by the new coronavirus.

- * 1 Public university corporation. President / President: Yuji Hosoi, Kashihara City, Nara Prefecture, founded in April
- * 2 1945. The action of losing the infectivity of the virus.
- * 3 General incorporated foundation. Chairman: Yuji Hosoi. Established to achieve the idea of MBT (Medicine-Based Town), which brings medical knowledge to all industries to bring about innovation, and currently more than 210 companies from almost all industries participate.
See
- * 4 PLoS ONE 12 (9): e0185366.

(<https://doi.org/10.1371/journal.pone.0185366>)

[Homepage] <https://corporate.jp.sharp/> [Headquarters] 1

Takumi-cho, Sakai-ku, Sakai-shi, Osaka 590-8522

[Contact] Press: Chairman's Office Public Relations Osaka (050) 5213-6795 / Tokyo (050) 5357-5959

- About our original "Moth- Eye Technology"

We have developed a technology that results in "low reflection" and "high anti-fog properties" by applying the special processing (Moth-Eye Technology) used in LCD panels, to the surface of the film.

To achieve "low reflection", the surface reflection is significantly reduced by continuously changing the refractive index of external light. Thanks to the Moth-Eye structure, surface reflection of about 0.3% / surface is achieved.

As for the "high anti-fog properties", by forming a Moth-Eye structure on the surface of a unique resin material, the surface area of water droplets and droplets adhering to the film surface can be quickly expanded.

This results in a temperature difference and high humidity environment. Fogging due to dew condensation and exhalation is prevented (achieving an anti-fog effect).

In addition to the "low reflection" and "high anti-fog properties", the new coronavirus (SARS-CoV-2) can be prevented by applying a special technology.

We have introduced a Moth-Eye structure on the film that is formed, using our original resin material. It has been demonstrated that it is highly effective in inactivating SARS-CoV-2.

The "Moth-Eye Technology" with anti-virus effect was added to the "Anti-Virus Nanostructure" for greater anti-virus results.

We will continue to develop the "Anti-Virus Nanostructure" Technology that will contribute to solving social issues.

■ Outline of verification test

• Testing organization: Nara Medical University School of Medicine

• Test sample:

- Film with Moth-Eye structure (50 x 50 mm)

- Film with Moth-Eye structure cleaned 100 times with alcohol (50 x 50 mm)

- Film without Moth-Eye processing (50 x 50 mm) as a reference sample

• Test virus: New coronavirus (SARS-CoV-2)

(In this test, the effect on the new coronavirus adhering to the film surface was verified)

• Test content (Fig. 1) :

1. As a test method, ISO 21702 (anti-viral activity of plastics and other non-porous surfaces).
2. Adopted a method based on (measurement) (a dropping method jointly researched with Professor Suzuya of Fukushima Medical University).
3. Inoculate 10 microliters of the new coronavirus into the test product. Spread the virus solution evenly.
4. After confirming that the surface of the test sample is dry in the safety cabinet, leave it to stand for a certain period of time under the conditions shown in Table 1.
5. After the action time (1 minute, 10 minutes, 30 minutes), the wash solution was added to the test sample to collect the virus.
6. Infected Vero E6 cells with the recovered fluid. 2. After that, the viral infectivity titer (PFU / sample) was measured by the plaque method.

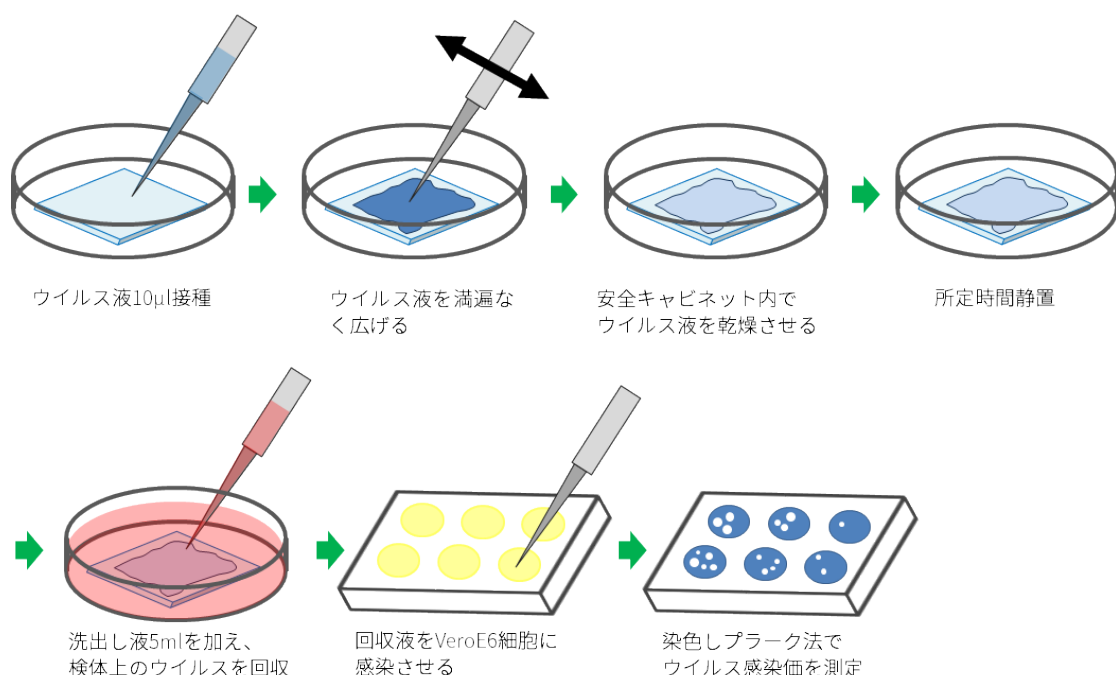


Table 1. Duration of action on test sample

Test Sample	Duration of action			
	0 minutes	1 minute	10 minutes	Half an hour
Film without moth-eye processing	○	○	○	○
Film with moth-eye structure		○	○	○
The surface that formed the moth eye structure Film cleaned 100 times		—	—	○

○: Measured twice each

The inactivating effect and reduction rate are calculated as follows:

$$\text{Inactivating effect (Mv)} = \log (Ct/Nt)$$

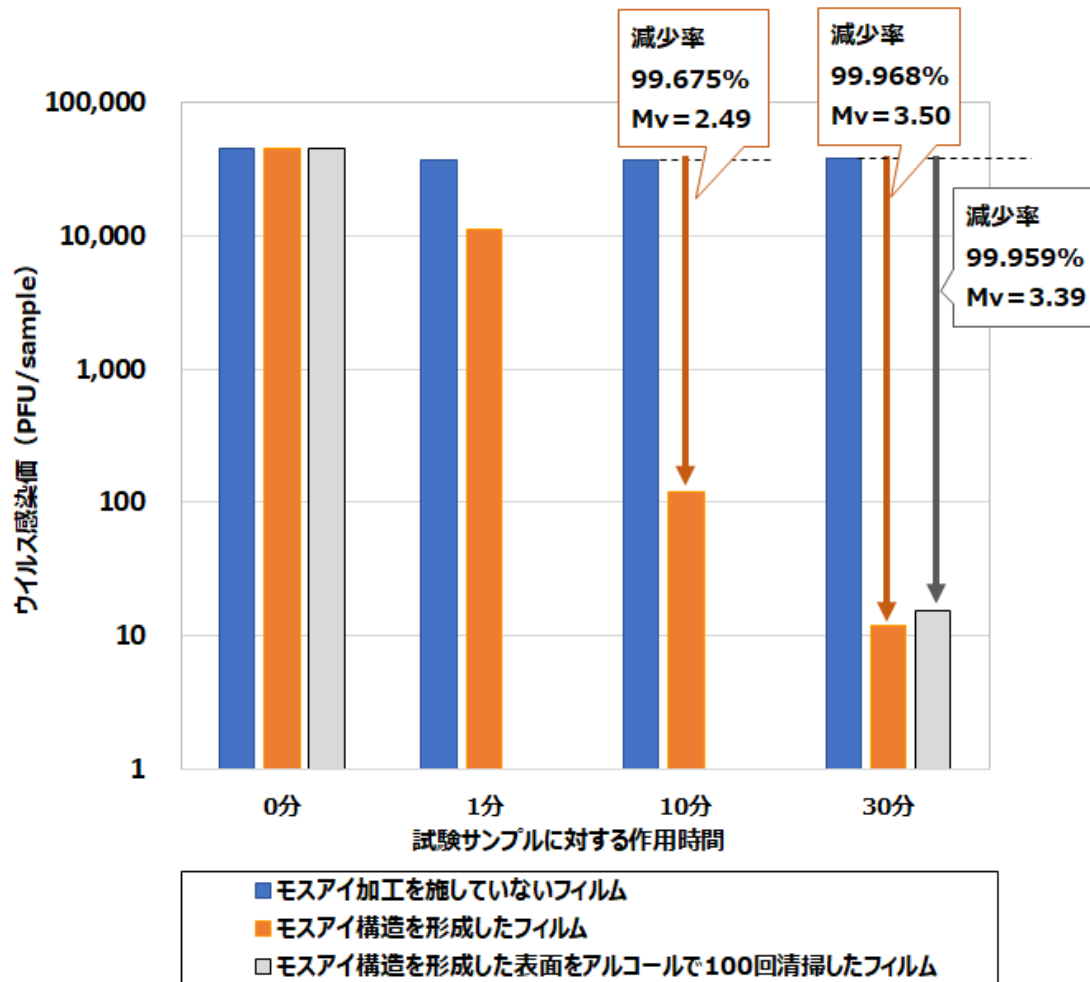
$$\text{Rate of decrease} = (1 - Nt/Ct) \times 100\%$$

Ct: Film without Moth-Eye processing. Infectious value after hours

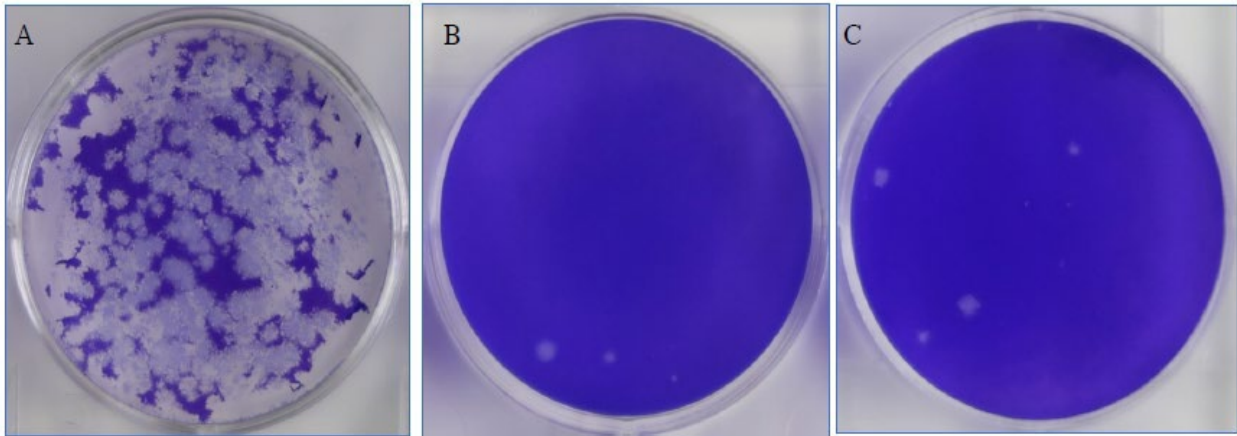
Nt: Test sample. Infectious value after hours

● Result:

The film with the Moth-Eye structure used in this test and the film with the Moth-Eye structure formed on the surface cleaned 100 times with alcohol were found to inactivate the new coronavirus (SARS-CoV-2). We have confirmed that "Moth- Eye Technology" may be effective in preventing contact infections caused by the new coronavirus (Figs. 2 and 3). We have not verified the effects on floating viruses and the effects on the human body.



・ Figure 2. Change in duration of action of viral load



• **Figure 3. Photograph of plaque after 30 minutes of action**

* The part where the white color is missing indicates the part where the cell was infected with the new coronavirus.

A: Film without Moth-Eye processing

B: Film with Moth-Eye structure

C: Film with Moth-Eye structure, that has been cleaned 100 times with alcohol.