

Innovative Air Purification Proven To Kill Viruses And Bacteria

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Photocatalytic Filter Technology Proves Effective Against Viruses & Bacteria

Since 2016, the state Korea Institute of Civil Engineering and Building Technology (KICT) has been developing special photocatalytic filter systems. Based on a chemical reaction triggered by UV light and with the help of released oxygen radicals, these systems purify the air by demonstrably decomposing and neutralizing 99.99% of toxins, viruses and bacteria. With AiroDoctor, this filter technology is now also available on the European market.

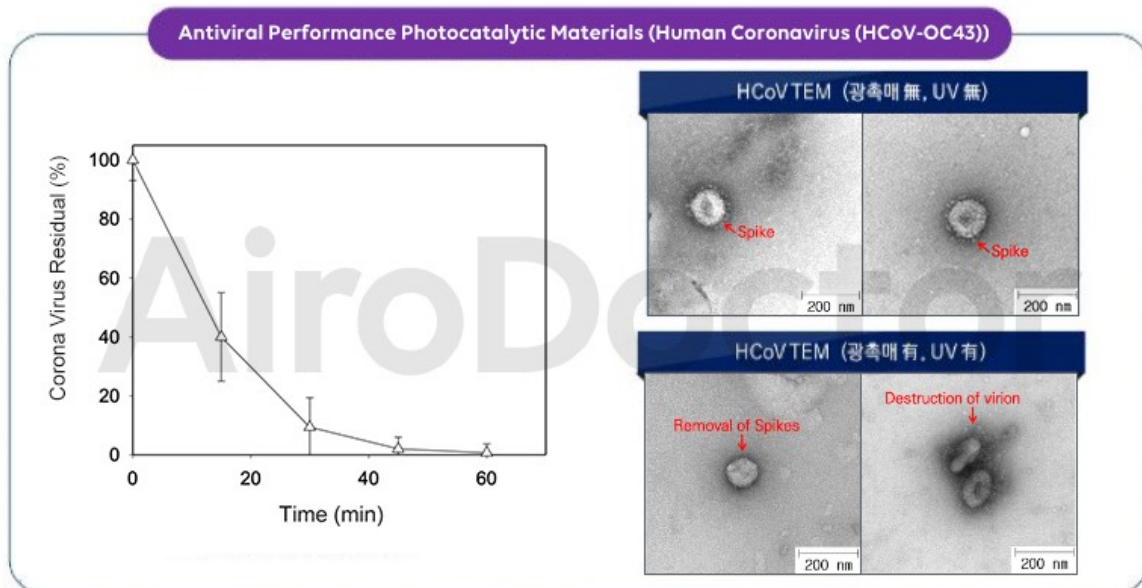


Fig. 1: Antiviral performance evaluation of photocatalytic materials using the Human Corona Virus HCoV-OC43

(1)

Advantages and Features of the Photocatalytic Filter Technology

Compared to conventional filter technologies, which absorb even smallest particles to accumulate them in a filter fabric, photocatalysis destroys the accumulated toxic gases and germs without leaving any harmful residues. This prevents a renewed emission of the pollutants and pathogens, as for example during transport or maintenance. Another advantages of a photocatalyst is that it has an extremely long service life; it shows hardly any signs of wear and tear and it does not require a filter change. In addition, the AiroDoctor uses UV LEDs with a narrow-band spectrum instead of UV lamps, whose broadband spectrum has an ineffective wavelength range in the fight against viruses and bacteria.

Test Results Stir Up Hope

In intensive test phases, the effectiveness and application advantages of the photocatalytic filter technology were finally proven. Japanese and South Korean institutes confirm that 99.9% of *E. coli*, salmonella, bacteriophages, rotaviruses, noroviruses, influenza and corona viruses are either destroyed or rendered harmless. This concerns MERS coronaviruses, SARS coronaviruses and as confirmed by the South Korean research institute KICT, the photocatalytic filter also eliminates the novel corona virus SARS-CoV-2 (formerly known as "HCoV-19").

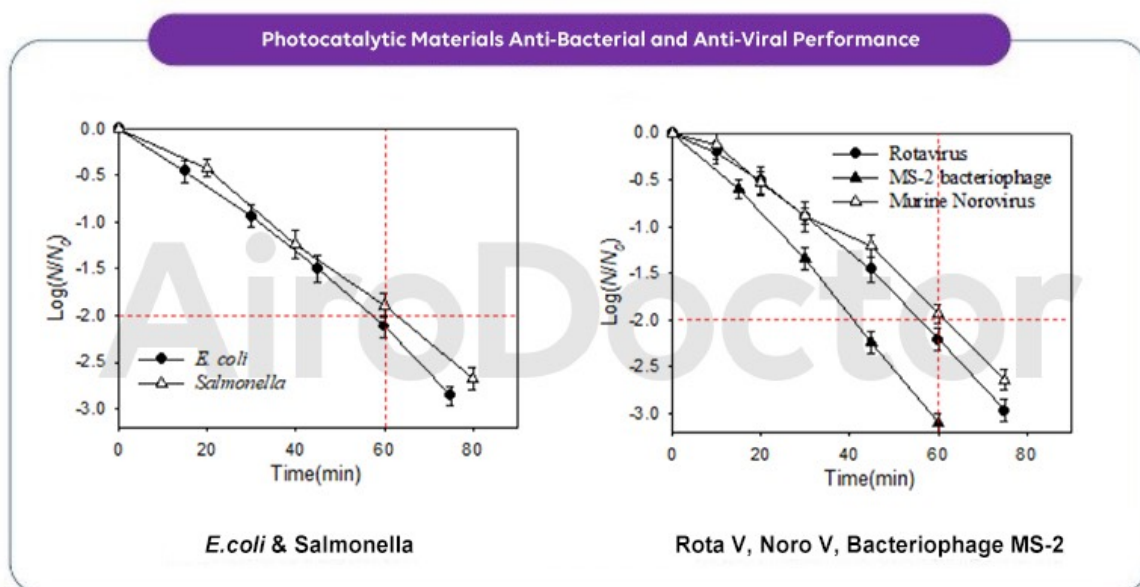


Fig. 2: Antimicrobial and antiviral performance of photocatalytic material (1)

Photocatalysis in Times of Corona

After the corona outbreak, KICT initially sent 25 of its photocatalytic filters to the Daegu and Gyeongbuk Province, a million-strong metropolis with inhabitants that were particularly affected by Sars-CoV-2. This first step served to equip emergency centers with powerful air purifiers. The South Korean Task Force to Combat Novel Viruses was able to show that the filters attached to the existing room air filters worked effectively in eliminating pathogens. The KICT is currently promoting the development and production of photocatalytic filters.

AiroDoctor – A Photocatalysis Technology for Public and Private Institutions

The AiroDoctor is a compact and powerful air purifier and sterilizer coming to Europe for public and private institutions. It is equipped with a quadruple filter combination and uses pre-filters, high-efficiency particulate air filters (HEPA) and UV-LED photocatalysis filters to adsorb, decompose and neutralize the entire spectrum of pollutant particles, viruses, bacteria and odors up to 99.9%. This is done without any harmful residues in a sustainable and eco-friendly way. Furthermore, AiroDoctor's photo catalytic filter is not only coated, it also consists of 250 grams of solid titanium dioxide (TiO₂). This makes it the only filter of its kind and, thanks to its large surface effect, it is particularly wear-resistant and durable. One AiroDoctor is sufficient for rooms with a floor space of up to 200 square metres and is operated without the addition of ozone or chemical substances. The AiroDoctor is approved for continuous operation and is suitable for all types of facilities: Hospitals, medical practices, laboratories, retirement homes as well as kindergartens, offices and stores.

Thanks to its fine-pored structure, the AiroDoctor keeps particles classified as PM2.5 (diameter < 0.1 µm) and also the airflow inside the device for longer. The intentionally increased retention time thus ensures a higher and more effective irradiation time of the substances to be destroyed.

(1) Korea Conformity Laboratory KCL, JeonBok University, Yonsei University, Kanagawa Institute of Industrial Science and Technology (KISTEC), Photocatalysis International Research Center (PIRC)