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thinking beyond the box ...

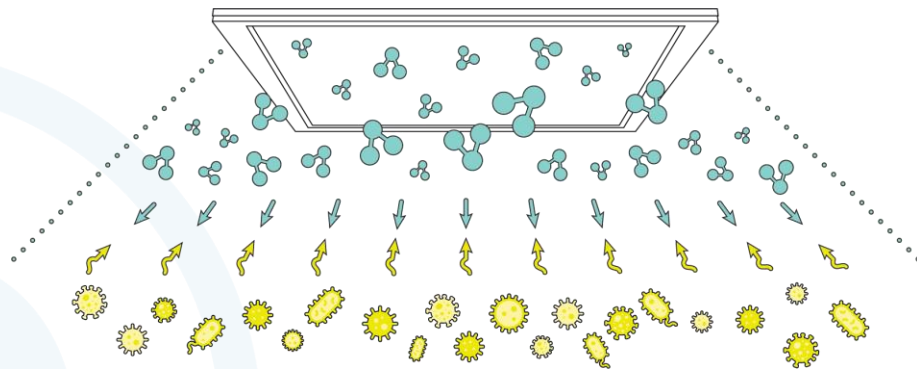
HYPERION

ANTI-VIRAL LIGHTING SOLUTIONS

POWERED BY LIGHTICO



Hyperion



Hyperion uses light on the visible spectrum to excite the photocatalyst (TiO_2) and generate Photocatalytic Oxidation (PCO), oxidising pathogens that come into range. By using light on the visible spectrum this process is created safely by replacing existing LED lights already in use in most environments.

PCO is proven to safely kill viruses & bacteria

Hyperion

Hyperion uses Titanium dioxide (TiO_2) as a photocatalyst to generate an area of Photocatalytic Oxidation that is able to inactivate pathogens (like bacteria and viruses).

Titanium dioxide (TiO_2) has been widely used as a photocatalyst in many environmental and energy applications due to its efficient photoactivity, high stability, low cost, and safety to the environment and humans.

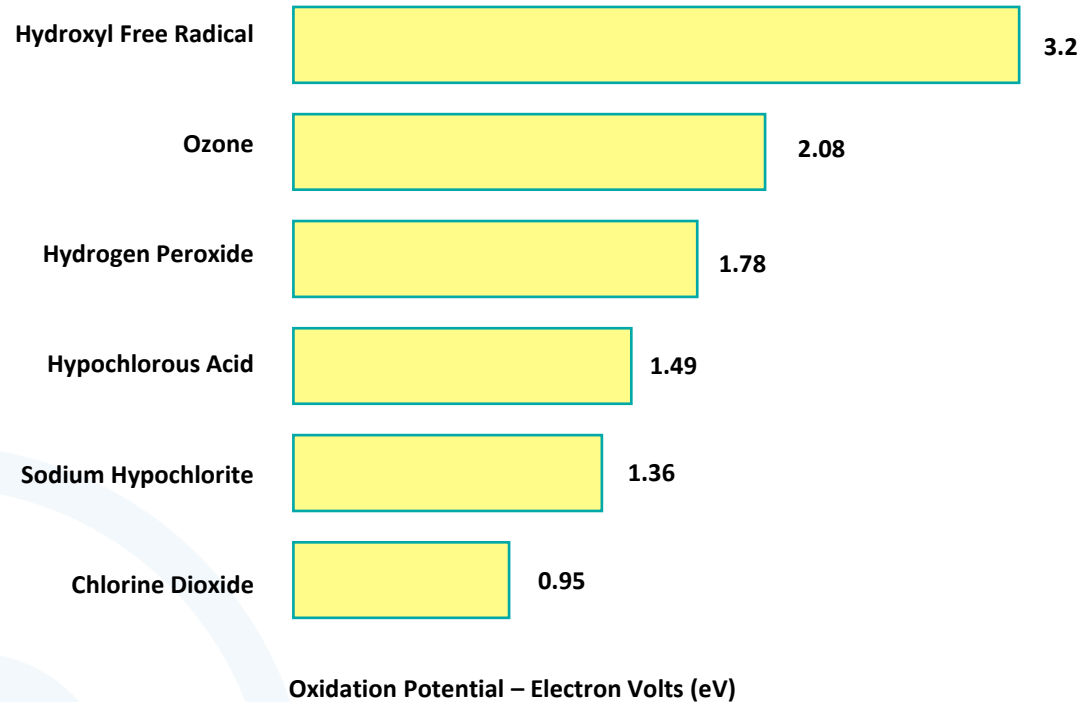
Photocatalysis is the activity occurring **when a light source interacts with the surface of semiconductor materials**, the so called photocatalysts.

Hyperion uses TiO_2 as a photocatalyst.

This technology was first identified by AKIRA FUJISHIMA & KENICHI HONDA in 1972 and was quickly utilised in the reduction of cyanide in water.

UV radiation of 320-380 nm has been previously used to excite the photocatalyst (TiO_2). However, long term exposure of the skin to this level of radiation can be harmful to human skin.

Hyperion does not use UV light



The excited photocatalyst (TiO₂) on the surface of Hyperion generates Photocatalytic Oxidation (PCO) with more efficiency and with less risk to humans and animals than similar methods currently being used to deep clean environments.

Hyperion is the safest and most efficient cleaning solution

Oxidation Potential

The differing oxidation potential, or disinfection ability of similar types of disinfection, is measured in Electron Volts and provide an Oxidation Potential.

By exciting the TiO₂, photocatalytic oxidation is generated which releases Hydroxyl Free Radicals. It is these free radicals that attach to micro organisms, changing their structure and destroying the bonds that link the carbon and oxygen atoms.

Other methods and substances that use a similar process are things like Ozone and Hydrogen Peroxide. However, there are risks to humans and animals while these materials are being used, meaning that spaces need to be sealed during their application.

With an oxidation potential of 3.2 eV, Hydroxyl Free Radicals generated by TiO₂ PCO are significantly more efficient at deactivating pathogens than bleach (Hydrogen Peroxide).

Testing for SARS-CoV-2

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the technical name of the virus that causes the coronavirus disease, COVID-19. As of January 2021, over 1.84m people worldwide have died from COVID-19.

Tests were conducted by the University of Patras in Greece to quantify the effectiveness of Hyperion against airborne SARS-CoV-2.

Active SARS-CoV-2 was placed on a lab plaque, 15 cm below the light panel surface. The light and test sample were placed in a 6m³ sterilised chamber. No air movement was to applied to the chamber.

The light was switched on and samples taken at specific 15 minute intervals.

Over the course of 60 minutes exposure to Hyperion the following levels of viral load were recorded:

Time sample taken	Viral Load Reduced
15 mins	0%
30 mins	28%
45 mins	43%
60 mins	72%

In laboratory conditions Hyperion is PROVEN to kill SARS-CoV-2.

Current research identifies the half-life of SARS-CoV-2 when airborne at 3 hours* increasing the risk of transmission and surface contamination significantly.

Testing for MRSA

Staphylococcus aureus (MRSA) is a type of bacteria that's resistant to several widely used antibiotics. This means infections with MRSA can be harder to treat than other bacterial infections.

The full name of MRSA is methicillin-resistant *Staphylococcus aureus*. Often called a "superbug".

Tests were conducted by the Guang Zhou Institute of Microbiology to quantify the effectiveness of Hyperion against MRSA.

MRSA was released into a 3m³ sealed test chamber and samples were taken after 60 minutes exposure to Hyperion. These results were compared to the level of bacteria in the chamber after 60mins without the light turned on.

After 3 x 60 minutes exposure to Hyperion the following bacteria levels were recorded:

	Original Bacteria Count	Bacteria Count after Treatment	Reduction
Test 1	1.17 x 10 ⁵	1.12 x 10 ⁴	90.4%
Test 2	1.10 x 10 ⁵	1.13 x 10 ⁴	89.7%
Test 3	1.14 x 10 ⁵	1.16 x 10 ⁴	89.8%

In laboratory conditions Hyperion is PROVEN to kill 90% of MRSA bacteria.

**From over 80,000 cases of bacterial infections in the UK (including MRSA) over 12,000 people die*.
MRSA accounts for an extra 1 million extra hospital days at the cost of £380m****

Testing for E. Coli

Escherichia coli (E. Coli) are bacteria found in the environment, foods, and intestines of people and animals. The bacterium is found in faeces and can survive in the environment. E. Coli bacteria can cause a range of infections including urinary tract infection, cystitis (infection of the bladder), and intestinal infection. E. Coli bacteraemia (blood stream infection) may be caused by primary infections spreading to the blood.

In the past 12 months there have been 43,990 hospital admissions from E. Coli infection in the UK NHS.

Tests were conducted by the Guangdong Detection Center of Microbiology to quantify the effectiveness of Hyperion against E Coli.

The same method was used to that in the MRSA trials.

After 3 x 60 minutes exposure to Hyperion following percentages of bacteria were eliminated:

Test 1 = 82.31%

Test 2 = 80.77%

Test 3 = 81.67%

Average Kill Rate = 81.58%

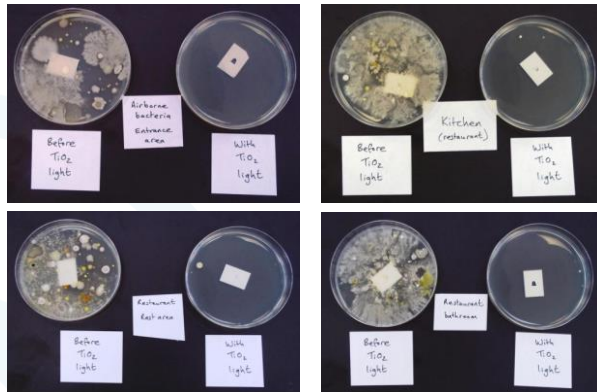
In laboratory conditions Hyperion is PROVEN to kill E. Coli to an 81% effectiveness.

The annual cost of E. Coli bacteraemia was estimated to be £14,346,400, with third-generation cephalosporin resistance associated with excess costs per infection of £420*

Real World Testing in UK Restaurant

In March 2020 a field trial was conducted in a UK restaurant to ascertain the effectiveness of the Hyperion in a real world environment.

Petri dishes of Tryptone Soy Agar (TSA) were positioned throughout the restaurant and airborne bacteria were collected. After collection of samples, TSA plates were returned to the Test laboratory for incubation at 30° for 48h, producing the bacterial colonies shown here:



Samples were taken in the following locations and a kill rate identified:

Entrance = 100%

Kitchen = 95.7%

Bathroom = 99.06%

Waiting Area = 98.83%

In a real world setting Hyperion is PROVEN to kill 98.40% of airborne bacteria

A newly published scientific review by the Food Standards Agency (FSA) has estimated that around 2.4 million cases of foodborne illness occur every year in the UK.*

Surface Anti-Bacterial Testing

As well as acting as a photocatalyst, TiO₂ has antimicrobial properties that deactivate virus and bacteria when coming into surface contact.

These properties were investigated by the Guang Zhou Institute of Microbiology by applying certain bacteria to the surface of the Hyperion panel and a control panel without the TiO₂ treatment.

Samples were taken 24 hours after applying the bacteria and compared to the control.

After 24 hours the following kill rates were calculated:

Escherichia coli (E coli) = 99.9%

Staphylococcus aureus (MRSA) = 99.9%

Klebsiella pneumoniae = 99.8%

Candida albicans = 88.2%

In laboratory conditions the Hyperion surface is PROVEN to kill E. Coli to a 99.9% effectiveness.

E. coli bacteraemia places a substantial cost burden on NHS hospitals, being associated with an excess length of stay of almost four days per infection and an annual cost of over £14 million*

Room tests for NO₂ and CO

Tests have been conducted to quantify the effectiveness of Hyperion in dealing with potential toxins in the air.

The toxins identified were Nitrogen Dioxide (NO₂) and Carbon Monoxide (CO). Both toxins, generated by vehicle engines, are significant contributors to urban pollution.

Testing apparatus were established in an enclosed room, approximately 3m² with a suspended ceiling 2.5m high. 2 Hyperion LED panels were installed in the ceiling and wired into the existing lighting circuit.

Damp wood was burnt inside the room, allowing smoke to fill the room increasing the CO and NO₂ levels, well beyond background norms.

The lights were switched on and a timer started to measure the reduction of the respective levels of CO and NO₂ over time.

The results are detailed here.

NO₂ – 100% of the NO₂ detected in the room was removed within 1 min 26 seconds.

CO – 67.39% of CO was removed from the room in 6mins. A 25% reduction was achieved within 3 minutes making the room safe to occupy.

In an enclosed room all NO₂ was removed in less than 1.5 minutes and safe levels of CO achieved in 3 mins.

Two million Londoners – including more than 400,000 children – are living in areas which exceed legal limits for air pollution*

For further information and on the
Hyperion anti-viral lighting solutions
range, please call us on

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or email us at

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