

1 striker 3 happiness

# MOSS · ONE



SM DOCTOR CO., LTD.



MOSSONE, a mosquito repellent for 365 days of safe, clean air,  
that repels mosquitoes, purifies the air and is antibacterial

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Photo-catalytic LED Mosquito Repellent Lamp that is not only faithfully functional but also can be used every day  
with perfect design and convenience





# 1 striker 3 happiness



## 1. Indoor (3.5W)

It is a mosquito repellent for children who are vulnerable to mosquitoes because they do not contain chemicals, when they are sleeping, pregnant women, and the elderly who have weak immunity. When our baby sleeps, it does not get bitten by mosquitoes and drinks good anion air, and it can be used as a sleeping light (mood light) brightness (3.5W).



## 2. Outdoor (6W)

It can be used as a vehicle air purifier to combat insect pests (moth 100%) and mosquitoes. It can be used as a lantern replacement for hiking, fishing and camping (brightness 6W). Mosquitoes and moths can't come close to food when you eat at night, so you can use it in a pleasant condition by purifying the old smell in the tent.

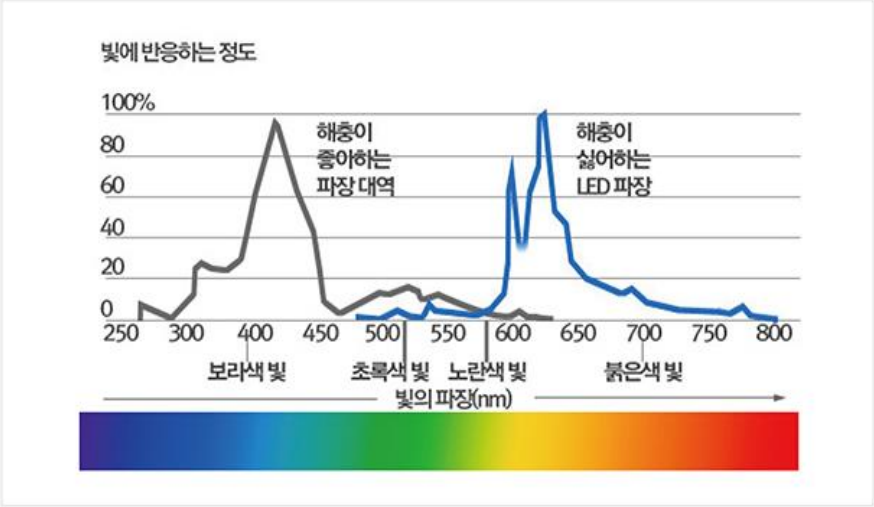


## 3. In overseas travel

When traveling abroad, this product cleanses various bacteria and odors and blocks access to mosquitoes.

Until now, it has been defenseless from mosquitoes and bugs when traveling abroad, but this product is a must-have item for safe travel.

# Special Feature



The pest control lamp has air purifying, sterilization & antibacterial functions basically with the pest control function through a thin film coating of nano photo-catalyst. It powerfully shows the mosquito-repelling function only with light wavelength by strengthening the functions of fine dust removal and sterilization with the strong oxidizing power of the photo-catalyst and emitting a specific wavelength (585- 613 nm) from the specific LED chip. The effective distance is more than 5 meters in all directions where the lamp emits light.

**Visible light not harmful to the human body with a wavelength of 585 ~ 613 nm**

Unlike the wavelength of 350 to 450 nm of commonly used traps with LED chips, it uses a wavelength of 585 to 613 nm, which is the wavelength that mosquitoes dislike, to emit light to repel mosquitoes.

**17.64 million anions generated and ozone-free 0.001um**

Anion has the functions of air cleaning and air purification and when you use it in a vehicle, you can enjoy the effects of preventing various bacteria and deodorizing the vehicle.

**Polycarbonate**

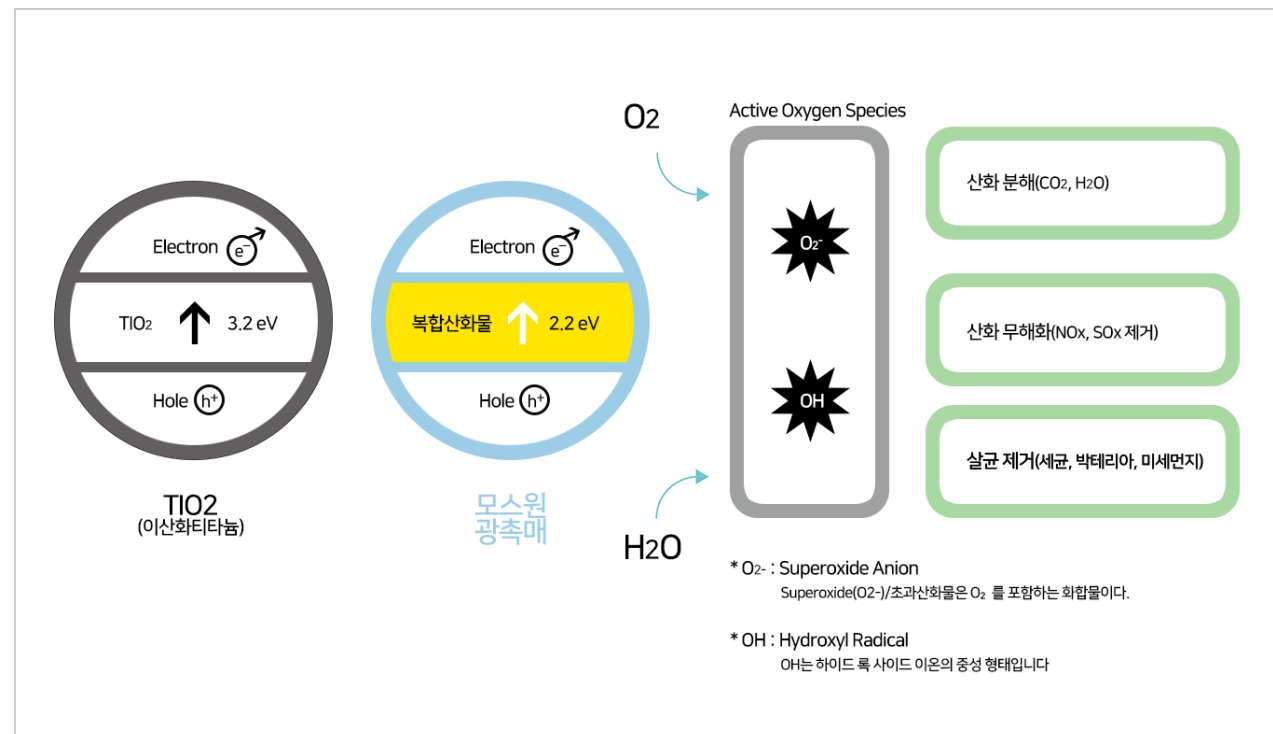
The lamp case is also not easily broken using the polycarbonate material used for automobile glass and a special heat sink is used to increase the durability of the product.

**5V USB for indoors & for vehicles, camping & fishing**

Highly utilized being USB powered and no additional costs required.

# The effect of MossOne's visible light-sensitive photocatalyst

Photocatalyst oxidizes and reduces surrounding chemicals in the process of converting chemical energy into light energy. Titanium oxide (TiO<sub>2</sub>) functions to oxidize and decompose harmful substances, thereby purifying the environment (pollutant-removing, antibacterial and deodorizing effects). In particular, it effectively reduces the cause of fine dust (PM2.5), such as nitrogen oxide (Nox), sulfur oxide (Sox), ammonia (NH<sub>3</sub>), and volatile organic compounds (VOC). Normal titanium dioxide reacts only to ultraviolet rays below 400nm; thus, the reaction is minimal in visible light. **The photocatalyst used in coating MossOne is a complex metal oxide photocatalyst that increases photosensitivity to the visible light range by doping transition metal ions and nitrogen ions with titanium dioxide.**



< 모스원에 사용된 광촉매 원리 >



## Air purification (17.64 million anions, ozone-free 0.01um)

Although not visible, allergens and contaminants and pollutants may accumulate indoors. Daily household products and items may emit harmful particles or contaminate the air.



## Sterilization and antibacterial functions (nano photo-catalytic effect)

Photo-catalyst has been implemented for sterilization and antibacterial functions by removing odors and bacteria such as bacteria, mold, acetaldehyde, ammonia, hydrogen sulfide with its strong oxidation effect.

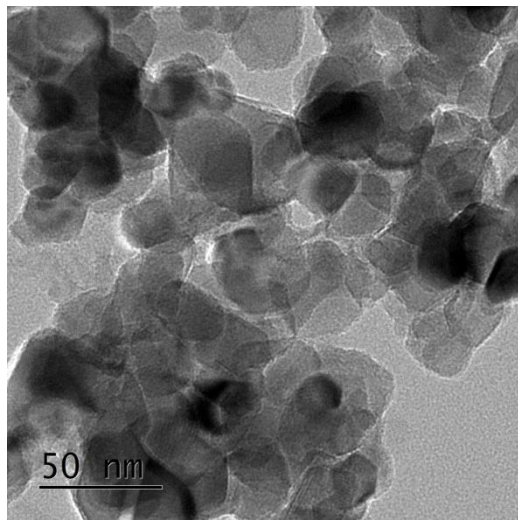


## Competitiveness & easy maintenance

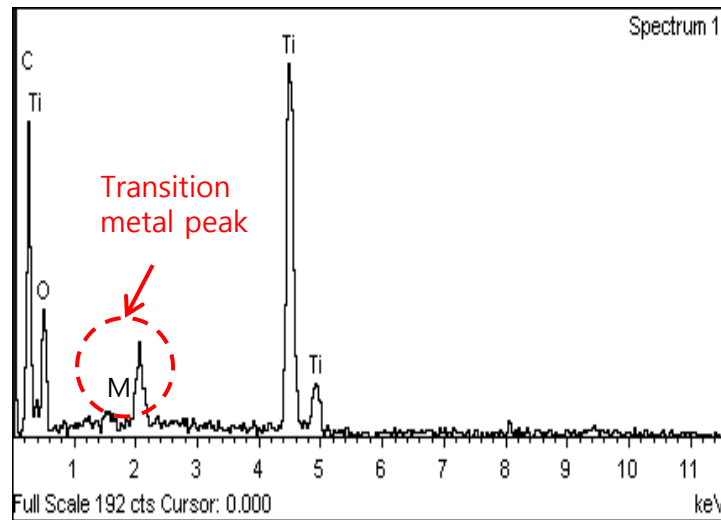
Easy to install, easy to maintain, durable and affordable with excellent performance.

# 1. The photocatalyst used in coating MossOne is a titanium oxide-based complex metal oxide photocatalyst.

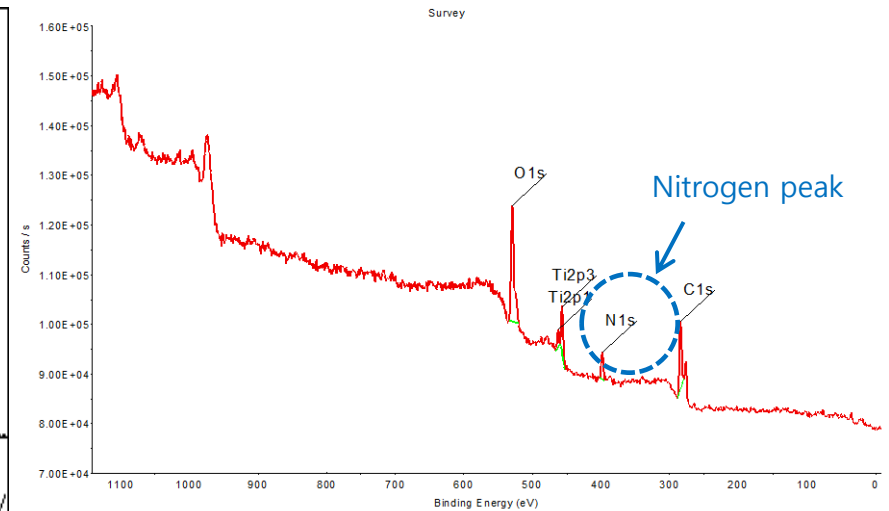
- The photocatalyst used in coating MossOne is a complex metal oxide photocatalyst that increases photosensitivity to the visible light range by doping transition metal ions and nitrogen ions with titanium dioxide.
- The photocatalyst of MossOne has been confirmed by the result of TEM measurement to have a crystal size of less than 20 nanometers (nm).



<TEM measurement result>



<EDS measurement result>



<XPS measurement result>

## Reference :

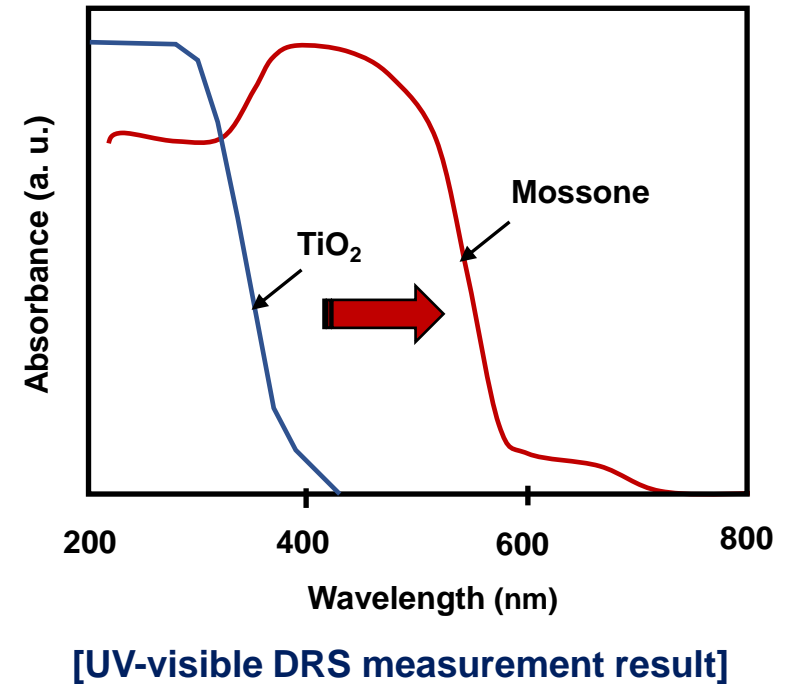
TEM (Transmission electron microscopy)

EDS (Energy dispersive X-ray spectroscopy)

XPS (X-ray photoelectron spectroscopy)

## 2. The photocatalyst used in coating is a visible light-sensitive photocatalyst that reacts to visible light.

- Titanium dioxide absorbs ultraviolet rays up to 400 nm and causes photochemical reactions. The bandgap of titanium dioxide is approximately 3.2 eV, which is unable to react to visible light energy.
- As revealed in a UV-visible diffusion reflectance spectroscopy (DRS) analysis, the complex metal oxide photocatalyst absorbs light up to the visible light range of 600 nm. The band gap, in turn, is reduced to approximately 2.2 eV, resulting in photoreactive activity in visible light.
- As a titanium dioxide-based material, the photocatalyst is chemically stable in acids and alkalis, semi-permanent and harmless to the human body. A number of researches attest to the safety of titanium dioxide. (Source: Fujishima, Photocatalysis A to Z by leading expert, 2017.)

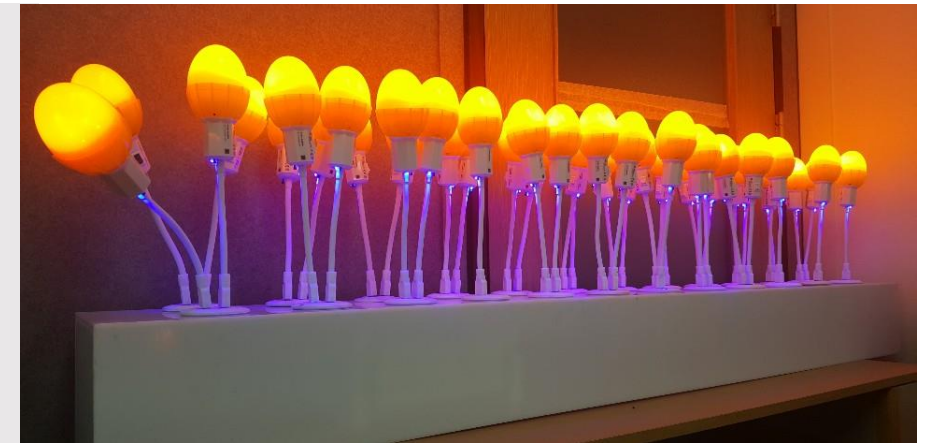
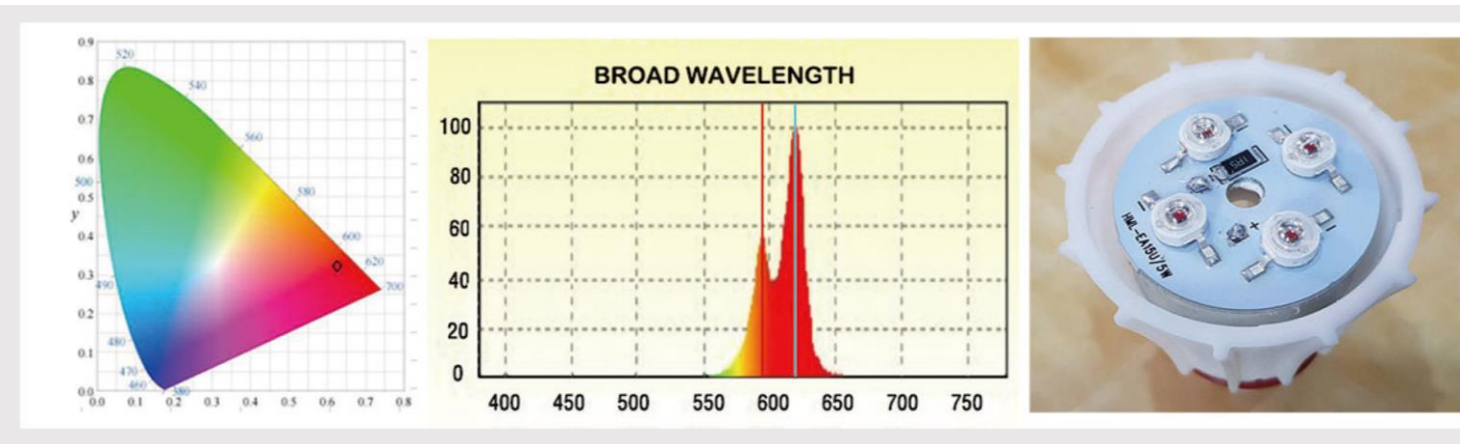




# LED lamp for pest control

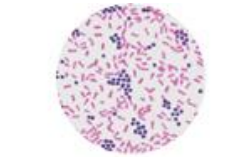
(repels 88% of mosquitoes, and 100% of moths)

The pest control lamp has air purifying, sterilization & antibacterial functions basically with the pest control function through a thin film coating of nano photo-catalyst. It powerfully shows the mosquito-repelling function only with light wavelength by strengthening the functions of fine dust removal and sterilization with the strong oxidizing power of the photo-catalyst and emitting a specific wavelength (585- 613 nm) from the specific LED chip. The effective distance is more than 5 meters in all directions where the lamp emits light.



# Sterilization and antibacterial functions (nano photo-catalytic effect)

Photo-catalyst has been implemented for sterilization and antibacterial functions by removing odors and bacteria such as bacteria, mold, acetaldehyde, ammonia, hydrogen sulfide with its strong oxidation effect.



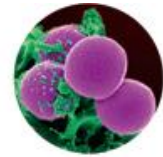
그람음성균  
(*Serratia marcescens*)  
제거율: 99.997%



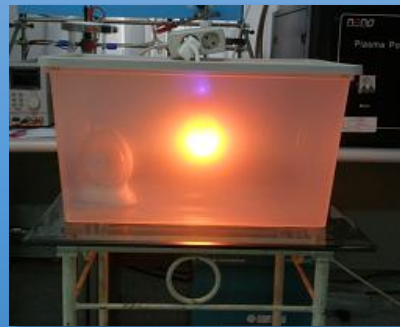
인플루엔자(독감)  
바이러스  
제거율: 99.921%



박테리아  
(*Serratia marcescens*)  
제거율: 99.999%



MRSA  
(황색포도상구균)  
제거율: 99.998%



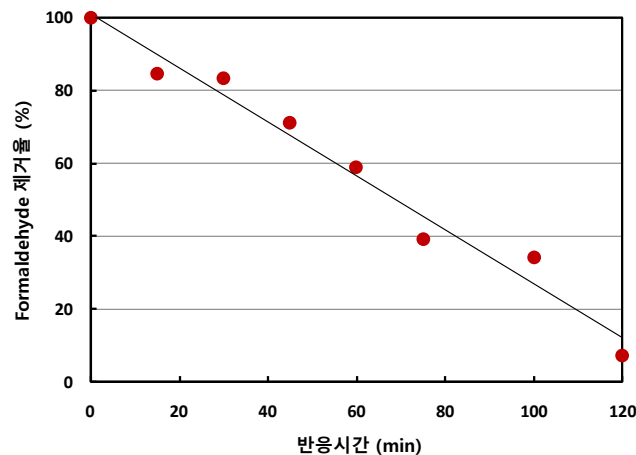
## How to measure

-Investigation of Formaldehyde Decomposition by Photocatalyst on Cap of Light Bulb

-Experiment box size: width x length x height = 35 x 50 x 30 cm (volume 52.5 L)

Formaldehyde initial concentration: 150 ppm

Formaldehyde concentration analysis: Gas chromatography (Youngin, M350D)



## How to measure

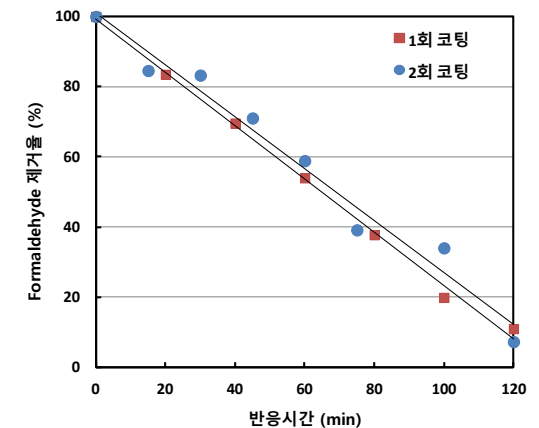
- Formaldehyde Initial Concentration: 150 ppm

- Formaldehyde removal rate

After 1 hour: approx. 45%

After 2 hours: Approx. 90%

- Over time, the height and width of the chromatogram decrease.
- In other words, formaldehyde concentration decreases with time.
- Formaldehyde removal rates with one or two coatings are almost the same.



[Formaldehyde Removal Rate by Coating Count]

# CERTIFICATE OF TESTING RESULT

**K I F A**  
KOREA FAR INFRARED ASSOCIATION  
KOREA INSTITUTE OF FAR INFRARED APPLIED ESTIMATION

4, Daekjegobon-ro 37-gil, Songpa-Gu, Seoul, Korea    <http://www.kifir.or.kr>    TEL. 82-2-2303-6037    FAX 82-2-2303-6061

**CERTIFICATE OF TESTING RESULT**

Serial No. of Issue : KFIA-176  
Name of Applicant : LEE CHANG HO [SM DOCTOR CO., LTD]  
Address of Applicant : 261 #D-909, Doyak-ro, Bucheon-si, Gyeonggi-do, Republic of Korea  
Date of Receipt : 2. 28. 2020  
Name of Test Sample : Photo-catalytic LED Mosquito Repellent Lamp(MOSS-ONE)

Test Item	Sample	Early Conc. (CFU/ml)	After 24 hours (CFU/ml)	Reduction Rate Of Bacteria(%)
Antibacterial Test For <i>Escherichia coli</i>	Blank	1.5×10 <sup>6</sup>	5.5×10 <sup>6</sup>	—
	Photo-catalytic LED Mosquito Repellent Lamp(MOSS-ONE)		< 1.0×10 <sup>6</sup>	99.9
Antibacterial Test For <i>Staphylococcus aureus</i>	Blank	3.2×10 <sup>6</sup>	1.2×10 <sup>7</sup>	—
	Photo-catalytic LED Mosquito Repellent Lamp(MOSS-ONE)		< 1.0×10 <sup>7</sup>	99.9

Note) 1) 5V USB.  
2) The blank test was measured on non-test sample.  
3) The bacteria number on the petri dish was detected by multiplication of dilution rate. End.

1) Test method : KFIA-FI-1003  
2) Bacteria to be used for the tests  
*Escherichia coli* ATCC 25922  
*Staphylococcus aureus* ATCC 6538  
3) Refer to the Enclosed (2-1, 2-2)  
4) Usage : Quality control

※ This certificate of testing result shall be used within the purpose of its defined usage.

3      12      2020  
month      day      year  
Signed Choi T. S.

The director of Korea Institute of  
Far Infrared Applied Estimation

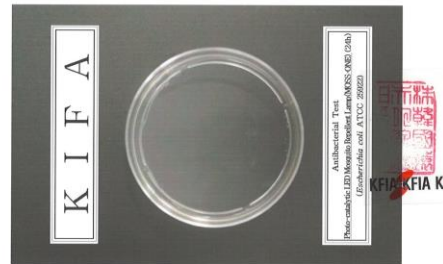
Antibacterial test for  
*Escherichia coli*  
99.9%

KIFA

Serial No. of Issue : KFIA-176  
Name of Test Sample : Photo-catalytic LED Mosquito Repellent Lamp(MOSS-ONE)



< Fig. 1 >



< Fig. 2 >  
2 - 1

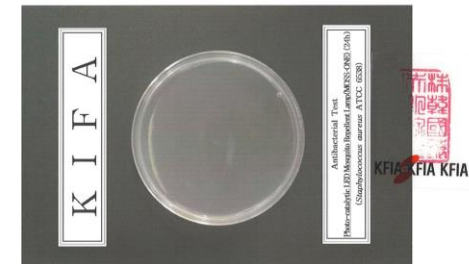
Antibacterial test for  
*Staphylococcus aureus*  
99.9%

KIFA

Serial No. of Issue : KFIA-176  
Name of Test Sample : Photo-catalytic LED Mosquito Repellent Lamp(MOSS-ONE)



< Fig. 3 >



< Fig. 4 >  
2 - 2





KIFA  
KOREA FAR INFRARED ASSOCIATION  
KOREA INSTITUTE OF FAR INFRARED APPLIED ESTIMATION

4, Baekjegeun-ro 37-gil, Songpa-Gu, Seoul, Korea <http://www.kifir.or.kr> TEL. 82-2-2303-6037 FAX. 82-2-2303-6061

CERTIFICATE OF TESTING RESULT

Serial No. of Issue : KFA-205  
Name of Applicant : LEE CHANG HO [SM DOCTOR CO., LTD]  
Address of Applicant : 261 #D-909, Doyak-ro, Bacheon-si, Gyeonggi-do, Republic of Korea  
Date of Receipt : 3. 13. 2020  
Name of Test Sample : Photo-catalytic LED Mosquito Repellent Lamp(MOSS-ONE)

TEST RESULTS

Test Item	Sample	Early Conc. (CFU/ml)	After 8 hours (CFU/ml)	Reduction Rate Of Bacteria(%)
Antibacterial Test For <i>Pseudomonas aeruginosa</i>	Blank	2.8×10 <sup>6</sup>	3.4×10 <sup>6</sup>	—
	Photo-catalytic LED Mosquito Repellent Lamp(MOSS-ONE)		< 1.0×10 <sup>4</sup>	99.9
Antibacterial Test For <i>Klebsiella pneumoniae</i>	Blank	2.4×10 <sup>6</sup>	2.1×10 <sup>6</sup>	—
	Photo-catalytic LED Mosquito Repellent Lamp(MOSS-ONE)		< 1.0×10 <sup>4</sup>	99.9

Note) 1) 5V USB.  
2) The blank test was measured on non-test sample.  
3) The bacteria number on the petri dish was detected by multiplication of dilution rate. End.

- 1) Test method : KFA-FI-1003  
2) Bacteria to be used for the tests  
*Pseudomonas aeruginosa* ATCC 15442  
*Klebsiella pneumoniae* ATCC 4352  
3) Refer to the Enclosed (2-1, 2-2)  
4) Usage : Quality control

\* This certificate of testing result shall be used within the purpose of its defined usage.

3      20      2020

month      day      year

Signed *Choi T. S.*

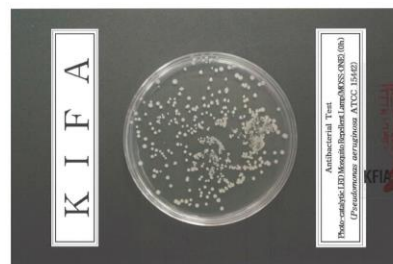
COPY

The director of Korea Institute of  
Far Infrared Applied Estimation

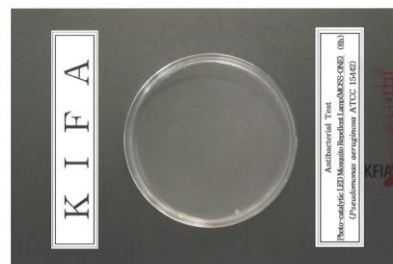
Antibacterial test for  
*Pseudomonas aeruginosa*  
99.9%

KIFA

Serial No. of Issue : KFA-205  
Name of Test Sample : Photo catalytic LED Mosquito Repellent Lamp(MOSS-ONE)



<Fig. 1>



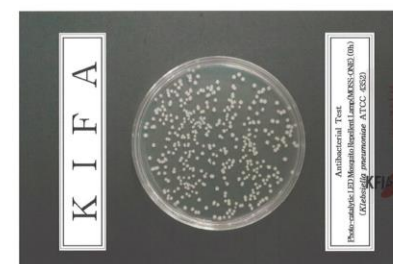
<Fig. 2>

2 - 1

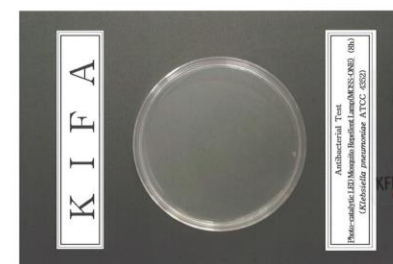
Antibacterial test for  
*Klebsiella pneumoniae*  
99.9%

KIFA

Serial No. of Issue : KFA-205  
Name of Test Sample : Photo catalytic LED Mosquito Repellent Lamp(MOSS-ONE)



<Fig. 3>



<Fig. 4>

2 - 2

G4B([www.g4b.go.kr](http://www.g4b.go.kr))진위확인코드 : pIMp8uOVia0=

G4B([www.g4b.go.kr](http://www.g4b.go.kr))진위확인코드 : pIMp8uOVia0=

G4B([www.g4b.go.kr](http://www.g4b.go.kr))진위확인코드 : pIMp8uOVia0=

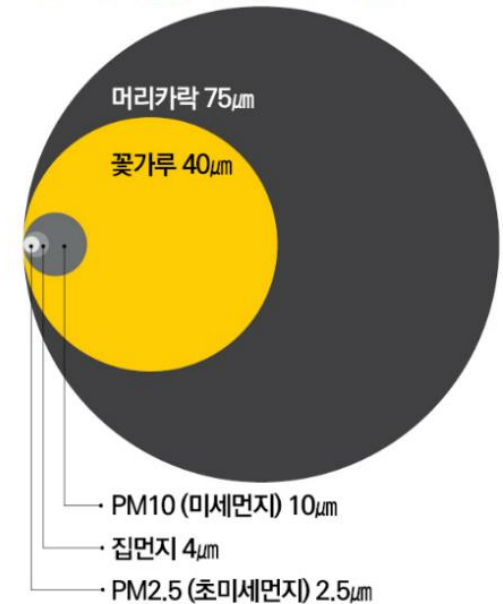


# Fine dust removal and air purification (anion)

MOSS ONE purifies the air, introduces pleasant air into the room, and prevents the inflow of polluted air from outside. MOSS ONE removes invisible toxic gases and harmful substances such as CO<sub>2</sub> and radon. It removes all airborne odors, volatile organic compounds, allergy/atopic agents, and pathogenic microorganisms, from cigarette smoke and even 0.0001 mm ultra-fine particles.

Depending on the size of the dust particles, dust is divided into ultra-fine with a diameter of 2.5  $\mu\text{m}$  or less (PM<sub>2.5</sub>), and fine dust (PM<sub>10</sub>) with a diameter of 10  $\mu\text{m}$  or less, which can penetrate deep into human lungs and cause various diseases.

## ■ 미세먼지 크기 비교



<2020.02. Measurement of Ultrafine and Fine Dust in General Indoor Environments>



<2020.02. Experiment with Mos One in the experimental box / Measuring fine dust and ultra fine dust>

# Air purification

(17.64 million anions, ozone-free 0.01um)

Anion has the functions of air cleaning and air purification and when you use it in a vehicle, you can enjoy the effects of preventing various bacteria and deodorizing the vehicle.



한국원적외선 협회  
음이온발생량(시험성적서)  
발급번호 : KFIM-510  
시험조건 : 측정거리 4cm  
시험결과 : 음이온 발생량 17644000(ION/cc)

한국기계전기전자시험연구원 KTC  
음이온 브러시&모듈에 의한 발생 성능 측정  
(시험성적서)  
성적서번호 : T2019-000  
시험결과 : 0.001 μmol/mol

한국건설생활환경시험연구원  
유해가스제거율(암모니아, 포말데하이드)  
성적서번호 : CT19-044044  
시험결과  
- 암모니아 26% - 포말데하이드 10%

	Photo catalyst	Air Cleaner	HEPA Filter	Dust collection filter
Fungus	Excellent	General	Good	General
Germ	Excellent	General	Excellent	General
Virus	Excellent	General	General	General
House dust mites	Excellent	General	Excellent	Good
Toxic substance	Excellent	General	General	General
Smell	Excellent	Good	General	General
Acting	Good	Excellent	Good	Good
Volatile Organic Compounds	Excellent	General	General	General
Allergy	Excellent	Excellent	Good	Good

# How to use



1. Put it higher than the human body.  
When it is closer to the human body, you can enjoy better effects because nothing hides the light but if you are sensitive to light, put it in a high place facing downwards.
2. Don't use it with any other light.
3. Use anions to purify the air in your room.
4. Put it on the head of your bed facing your feet.
5. Use it to deodorize your car. In addition, MOSS ONE can be used as a warning light for emergencies at night and repel moths (by 100%) and mosquitoes safely when fishing while camping and eating at night.



# Application

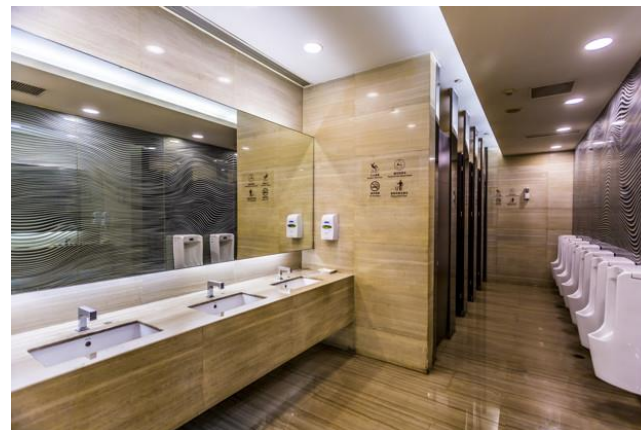
You can use it indoors, in a car, fishing, hiking, camping, or traveling abroad.



When a child sleeps indoors



Deodorization and air purification in the kitchen



Deodorant effect in the bathroom



Air purification effect in living room



When falling asleep with family



Children's room

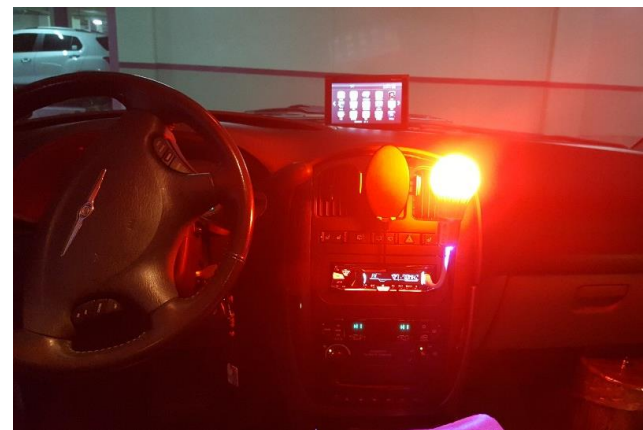




Travel



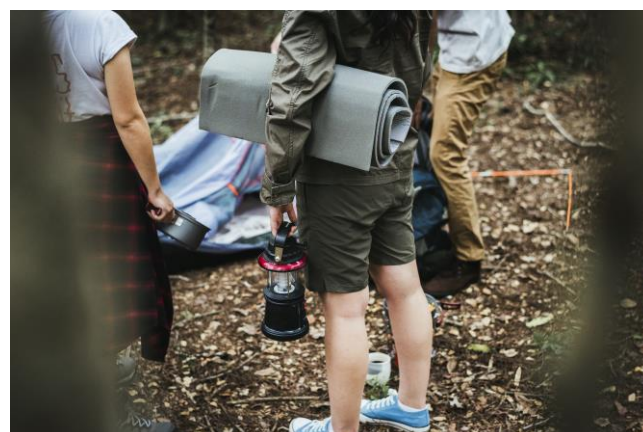
Use in car



Use in car



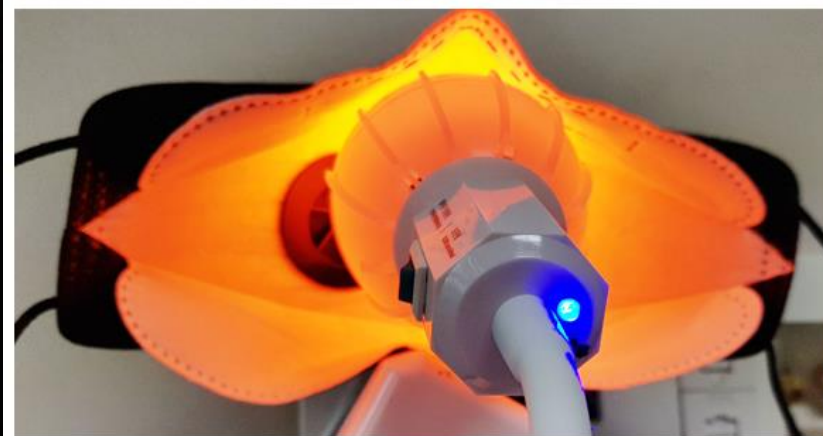
Outdoor / Picnic



Mountain climbing



Camping





# SPEC



- . Product Name: MOSSONE
- . Model Name: SMD-012
- . Electromagnetic wave certification number: R-R-SmD-012
- . Composition: insect repellent LED lamp
- . Type: USB type
- . Operating environment temperature: -20 ~ 50 ° C
- . Rated voltage: DC 5V
- . Power consumption: 3.5W / 6W
- . Manufacturer: SM Doctor
- . Country of origin: Korea
- . A / S: 82-32-670-8333
- . E-MAIL: LCH19480404@GMAIL.COM



# FAQs

## **1. How much area does one MOSS ONE product cover?**

Each MOSSONE covers a distance of more than 5 meters in all directions.

## **2. Is it really harmless to the human body?**

MOSSONE uses LED chips for visible light.

The light from the LED lamp is harmless to the human body.

## **3. How many hours can it last when using an external battery pack?**

MOSS ONE is a product with 5V power supply that can last for 8-9 hours based on 10,000 mAh.

## **4. Does it really work abroad?**

Since it uses the wavelength of light on its LED chips that can be allowed anywhere in the world, light suitable for each country emits to make you enjoy the effects of repelling mosquitoes and even air purification (with anions).

## **5. What is the life span of the lamp? Where can I get the after-sales service?**

The life of the lamp is semi-permanent.

The LED chips used at MOSSONE are a special tailored chips, which are different from general LED chips.

The after-sales service is provided at our head office (070-8064-3591).

## **6. Let me know its components and how to use it.**

The component is only the lamp. You can use it anywhere from any power source including an external battery pack, mobile phone charger with a USB port, mobile phone adapter cable converter, etc.



# Certification

