

# ZEUS

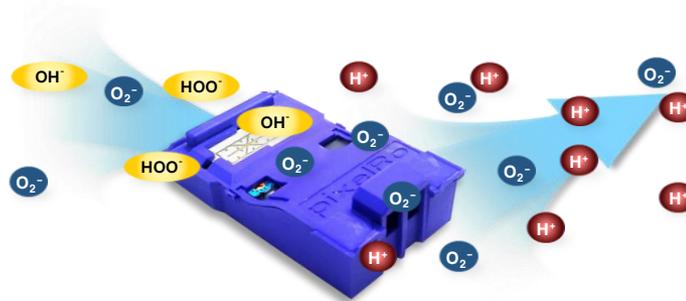
## Introduction

Zeus is Radical generator designed and produced with pixelRo's own technology.



# I . How does Zeus work?

The Radical generator uses micro plasma discharge to generate hydrogen atoms(H) and oxygen ions(O<sub>2</sub><sup>-</sup>).



## ■ Pin electrode(-electrode)

High-voltage electric discharge emits electrons and forms hydrogen atoms and negatively charged oxygen ions.



## ■ Positive electrode(+electrode)

Micro plasma discharge splits water molecules in the air and forms positively charged hydrogen atoms(H<sup>+</sup>)

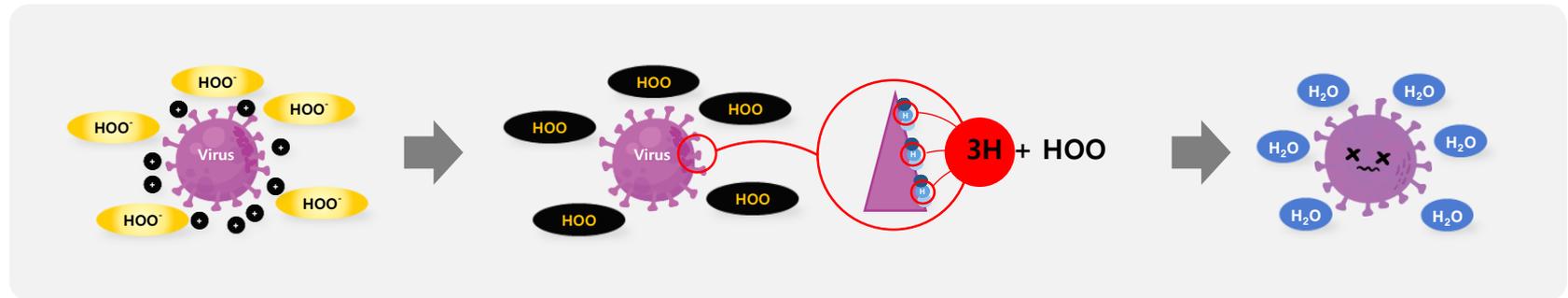


■ Hydrogen atoms(H) and oxygen ions(O<sub>2</sub><sup>-</sup>) combine to form **hydroperoxyl radicals(HOO<sup>-</sup>)**

H<sup>+</sup> : Positively charged hydrogen ion  
H : Active hydrogen

O<sub>2</sub><sup>-</sup> : Oxygen (-) ion  
HOO<sup>-</sup> : Hydroperoxyl radical

## II. Virus, Bacteria, Mold eradication Mechanism



Hydroperoxy radicals ( $\text{HOO}^-$ ) surround pollutants (viruses, bacteria, molds, etc.) floating in the air.



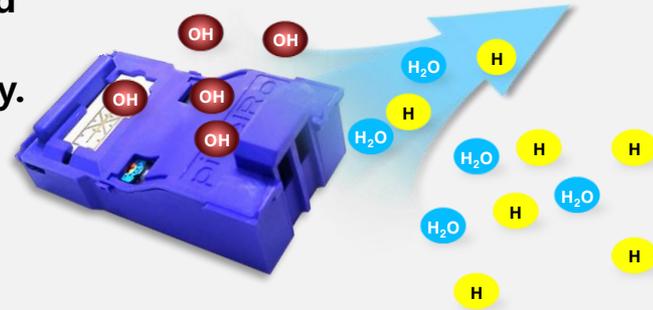
Hydrogen bonds in the protein structure on the surface of microorganisms react with hydroperoxy radicals ( $\text{HOO}^-$ ) to destroy hydrogen bonds.



Hydroperoxy radicals ( $\text{HOO}^-$ ), which react with hydrogen in the protein component on the surface of the virus, are pollinated and returned to the air, and the virus is sterilized by surface cracks.

### III. OH-radial Neutralization Mechanism

The activated active hydrogen (H) is combined with active oxygen (OH-radical) with strong toxicity and oxidation power in the air to neutralize and deodorize so as to be harmless to the human body.



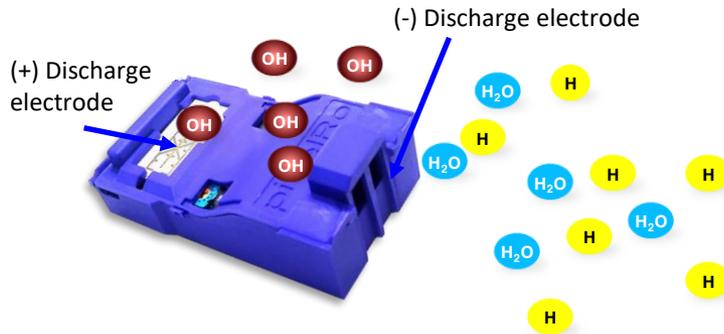
- Active hydrogen (H) generated in Zeus reacts with active oxygen (OH-radical) to be bonded to a moisture state, thereby reducing active oxygen in the air.

#### 👁 OH-radical ?

It is the strongest oxidative substance among active oxygen, causing skin aging and skin diseases, and is a compound produced by reacting with harmful substances in volatile organic compounds (VOCs) in the air.

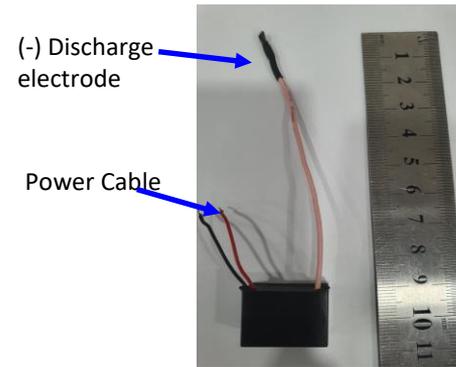
# IV. Differentiating point1

1. By simultaneously performing (+) discharge and (-) discharge, ions necessary for eradication and antibacterial are generated.



< Zeus >

- ✓ Hydrogen (H<sup>+</sup>) is generated by (+) discharge.
- ✓ (-) Discharge generates oxygen ions (O<sub>2</sub><sup>-</sup>).
- ✓ Hydroperoxy radicals (HOO<sup>-</sup>), which are eradication ions, are produced by (+)(-) ionic bonds.

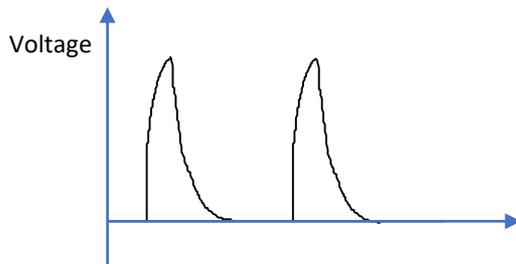


< Low-cost ion modules >

- ✓ It generates only oxygen ions (O<sub>2</sub><sup>-</sup>) by discharging (-).
- ✓ It doesn't work as a sterilized.

## 2. Technology to minimize ozone

With a stable discharge circuit configuration by the pulse driving method, it is possible to minimize the amount of ozone by maintaining a constant discharge voltage.



< Pulse driving waveform >

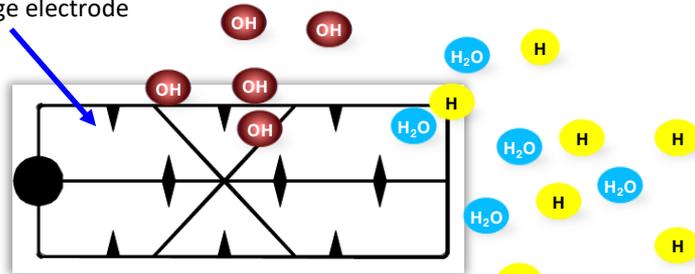
- ✓ Voltage, frequency, and duty management

Cf> Other companies can't maintain a constant voltage through DC driving, so it's hard to control the Ozone.

# Differentiating point2

## 3. Micro plasma discharge method

(+) Discharge electrode



< (+) Discharge electrode >



< Other company's normal needle electrode >

- ✓ The use of special electrodes by precision pattern design.
- ✓ Hydrogen (H+) is generated by (+) discharge.
- ✓ Heating and structural design for micro-plasma discharge [Pixel specialized technology]
- ✓ Cf> Other companies can only Corona discharge by using needle electrodes.

## 4. Built-in module protection circuit.

When an abnormal phenomenon occurs in a circuit due to other factors in the product, the module is automatically turned off to limit ion emission.

Cf> Without a protection circuit, a large amount of ozone may be released when an abnormal phenomenon occurs.

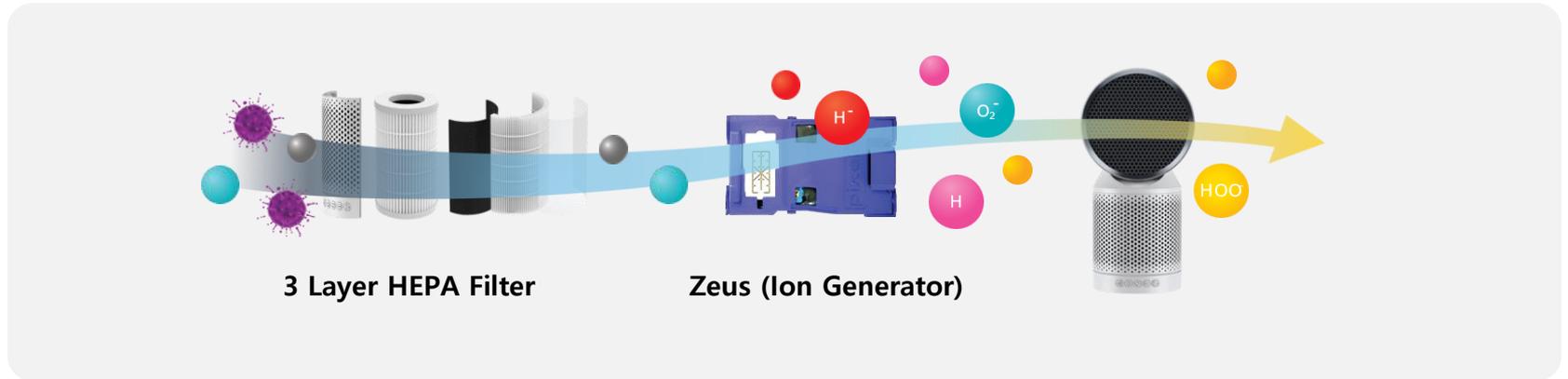
# Differentiating point3

## 5. Tight quality control and high reliability test.

- ✓ Reliability test of 17 items.
- ✓ High-quality product through tight process management.

No.	Item	No.	Item	Remarks
1	Endurance voltage test	11	Low temperature test	
2	Insulation resistance test	12	Temperature Cycle Test	
3	Residual charge high voltage test	13	The 2nd SHORT test	
4	Overvoltage test	14	High temperature, high humidity test	
5	Temperature raising test	15	Thermal shock test	
6	Discontinuous durability test	16	Vibration test	
7	Continuous durability test	17	Drop test	
8	Discontinuous discharge durability test			
9	Continuous discharge durability test			
10	High temperature and high humidity test(Working)			

# V. Example of deodorizing and cleaning eradication process



## Application

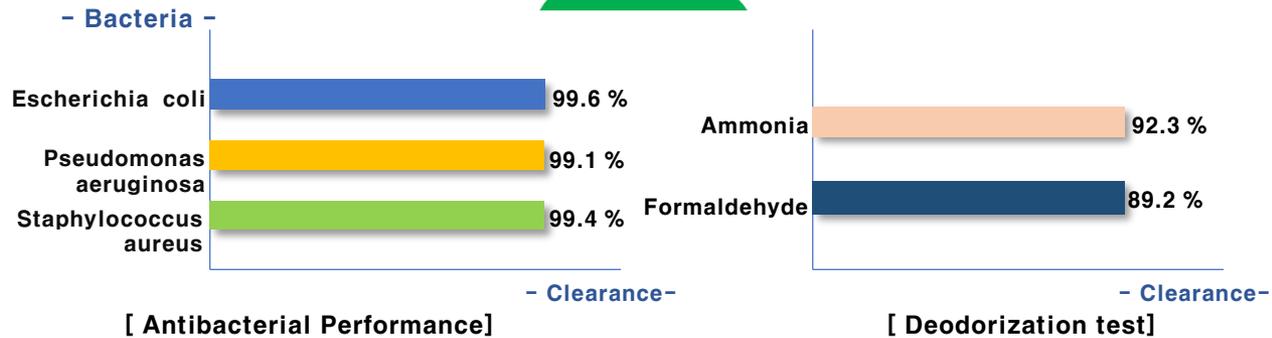
**It changes the smelly space into clean and purified air for your better life.**

- A baby room
- Kitchen
- Bathroom
- Office/School/Church
- Public Places
- Smoking Area



# VI. Deodorizer Antibacterial Performance.

The 5 major harmful gases test is over.



## VII. Excellence

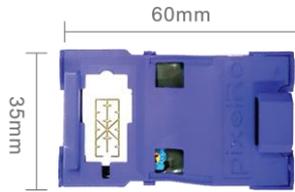
---

Excellent deodorization and eradication technology to remove harmful substances from the air by generating **hydroperoxyl radicals** for the first time in Korea.

<b>Eliminates allergens</b>	<b>The negative ions released and the positive allergens bond as they bear opposite charges. After bonding these particles become too heavy to remain air borne, consequently these harmful airborne particles settle down on the grounded plates that can be cleaned easily</b>
<b>Safe in humans</b>	<b>Unlike other ionizers using high voltage produced type, it generates less Ozone quantity by using Dielectric barrier discharge(DBD) type.( lower than 20ppb)</b>
<b>Deodorization</b>	<b>Electronic air deodorizing systems by generation of plasma discharge effect, Small microorganisms and VOCs are filtered from air by using electrons and reactive species produced by dielectric barrier discharge</b>
<b>Air Purification</b>	<b>There are 3 stage filtration system, Pre-Filter, HEPA Filter, Activated Carbon Filter. It filters air pollution of PM2.5.</b>

# VIII. Specification

## Dimension



TOP



FRONT



SIDE

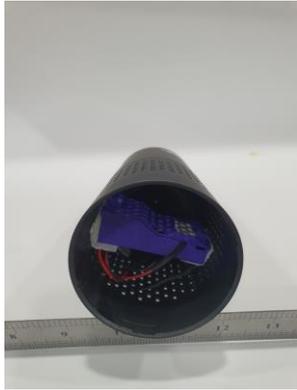
## Specification

<b>Input Voltage</b>	<b>11.5 ± 0.5 [V]</b>
<b>Current</b>	<b>80 mA ± 5 mA</b>
<b>Output Voltage</b>	<b>(+) Output : 3.0 [kV] ± 10% , (-) Output : - 3.0 [kV] ± 8%</b>
<b>Ion Generation</b>	<b>Ion &gt; 2 million/cc</b>
<b>Ozone</b>	<b>Ozone quantity ≤ 20 [ppb]</b>
<b>Dimension</b>	<b>35(W) X 60[D] X 23[H] mm</b>
<b>Weight</b>	<b>&lt; 40 [g]</b>

\* It is more effective at over 40% humidity.

# IX Application

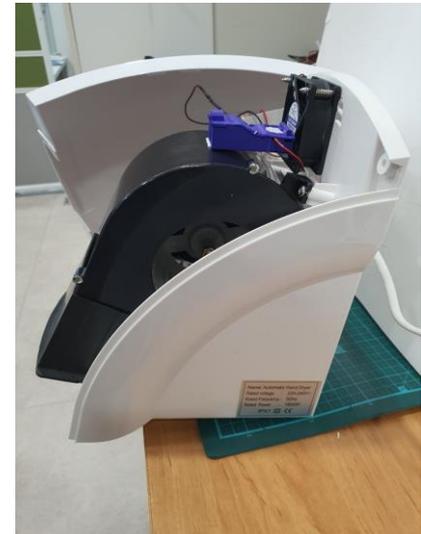
## Car Airpurifier



## For Air-Conditioner



## Hand-Dryer



Thank You !!