Titanium Dioxide Coated with Apatite

Nanobest photocatalyst can adsorb organic substances

Photocatalyst for Environmental Purification

NANOBEST®

Visible light responsive apatite-coated titanium dioxide

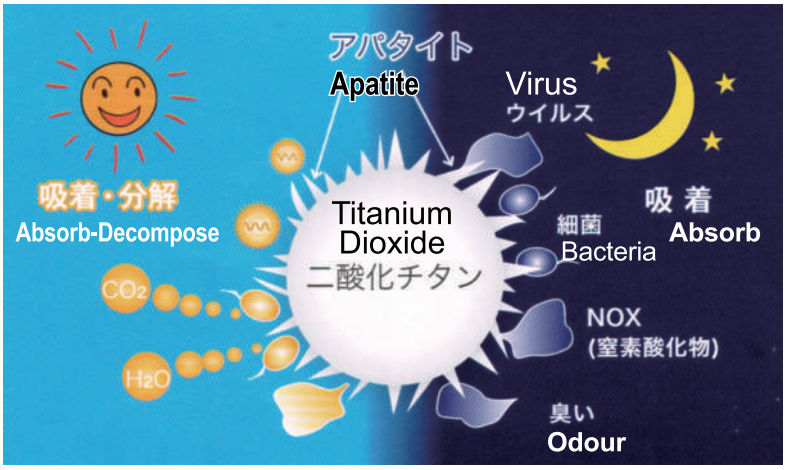
Decomposition starts when exposed to light

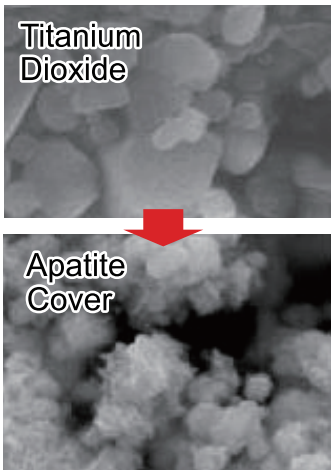
It absorbs light to generate strong oxidizing power, and decomposes dilute substances and organic chemical substances in the air and water.

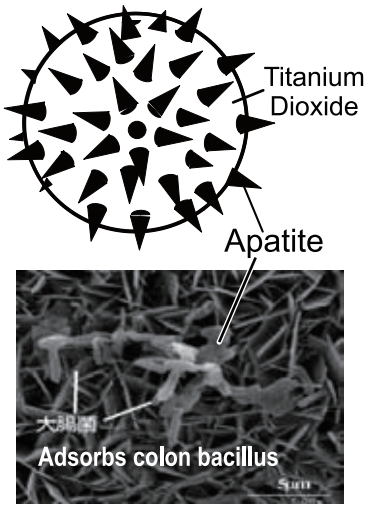
Continues to absorb and decompose

Visible light responsive apatite-coated titanium dioxide (iron-based)

The substance adsorbed by apatite is decomposed and removed by titanium dioxide when exposed to light, so the adsorption capacity of apatite is regenerated. It can adsorb a large amount of bacteria and harmful substances even without light such as at night. Therefore it can be adsorbed and removed harmful substances without light for several days in normal household.







Since titanium dioxide does not come into direct contact with the base due to apatite, the base will not be decomposed.

No binder required

Apatite adsorbs bacteria and odours at night

Reacts to fluorescent lights and faint light

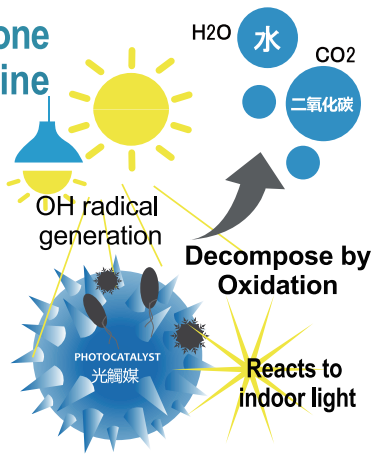
Disinfection Power ≈ 1.35 times ozone ≈ 2 times chlorine

OH radical

In response to light (catalytic reaction)

Generates strong active oxygen

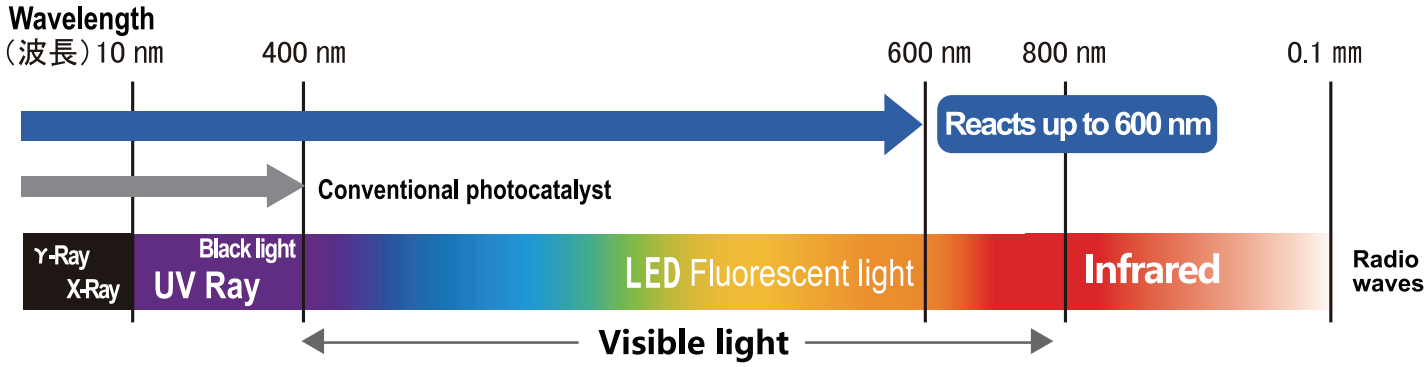
Oxidize organic substances and decompose them into water and carbon dioxide



Oxidant	Oxidation Potential (Volts)	Relative Potential (against chlorine value)
★ OH radical	2.80	2.05
Oxygen atom	2.42	1.78
Ozone	2.07	1.52
Hydrogen Peroxide	1.77	1.30
Hydrogen Peroxide Radical	1.70	1.25
Hypochlorus Acid	1.49	1.10
Chlorine	1.36	1.00

【Light in response to this photocatalyst】

Visible light responsive apatite coated titanium dioxide
Apatite coating + iron-doped titanium dioxide



Over 99% super antibacterial and antiviral!

It decomposes to carbon dioxide and water, and does not need to be washed away.

Coliform bacteria / Legionella / Staphylococcus aureus
Decomposes organic substances such as virus (COVID-19, norovirus, influenza) / hospital-acquired MRSA / mould

Safe! Safe enough to be used in spacecraft and hospital operating rooms

The main components are titanium dioxide / apatite / water

Titanium dioxide is used in foods such as white chocolate and cosmetics such as toothpaste and lipstick. (Food additive)
Apatite is a mineral mainly composed of phosphorus and calcium, and is also abundant in teeth and bones. In addition, it does not use surfactants or fragrances, so it can be used and drained with peace of mind.

Titanium dioxide

Apatite

The effect keeps on!

Antibacterial, antifouling, deodorant, antifungal!

Viruses, dirt, or organic substances that adhere to the part where the Nanobest photocatalyst is attached will be decomposed again when exposed to light. This effect will continue.

Deodorization!

Odour disappears as a result of decomposing the cause without wrapping and hiding it.

Common deodorant sprays only wrap and hide odours which reappear over time. Nanobest photocatalyst decomposes organic substances (sources of odour), resulting in deodorization.

【 Various applications of photocatalyst 】

Disinfection | Deodorant | Cleaning | Water & air purification | Dirt prevention | Keep fresh

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1L

NANOBEST

SN

Acidic

Titanium Dioxide Coated with Apatite

Effective in dark room

Continues to absorb and decompose

5L
10L
20L

NANOBEST **ST** Neutral

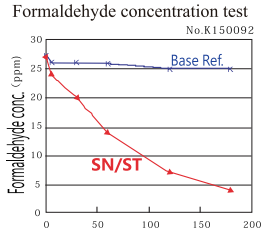
Can be used in various places

(* Excluding glass and mirror)

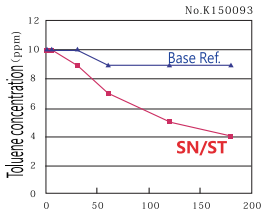
No need to wipe,lasting effect

- Apatite adsorbs bacteria and odors at night
- React even to LED and faint light
- Decompose odor from the source

Formaldehyde concentration test



Toluene concentration test



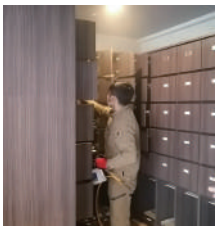
The above results are our own verification,not an official test result.

It reacts even to weak visible light and decomposes harmful organic substances such as formaldehyde, acetaldehyde, ammonia, and toluene, which cause sick building syndrome. It quickly decomposes cigarette tar oil and peculiar odors. Besides home, it is also useful for applying to hospitals, nursing homes, offices, cars, curtains, textiles, etc.

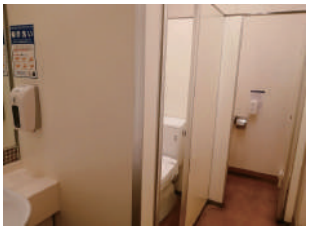
Also effective for sick building syndrome

Restaurant / bar

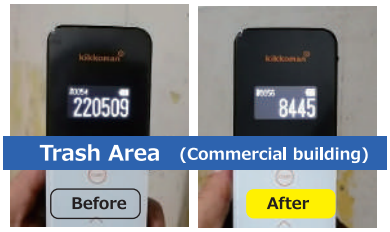
Elevator



Shoe box / locker



bathroom



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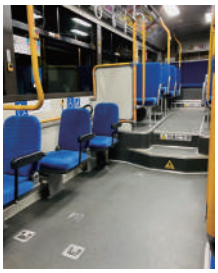
Hospital / long-term care facility



Bus / train

Inside the car

Main indoors and environmental pollutants derived from housing materials

Source	Pollutants
Plywood (closets, ceilings, walls, furniture, floors, etc.)	Adhesive (formaldehyde), insect repellent (fenitrothion, phoxim etc.), preservative (CCA chromium, copper, arsenic compound mixture)
Wallpaper; Paint	Plasticizers (phthalates, DOP, DBP, etc.), solvents (toluene, ethyl acetate, etc.), flame retardants (TCEP), adhesives (unreacted formaldehyde), etc.
Tatami, floor	Insect repellent for tatami mats (fenitrothion, fenthion, diazinon, naphthalene), vinyl chloride resin floor plasticizer (phthalate ester, DOP, DBP, etc.), adhesive for accumulation material (formaldehyde)
Carpet	Insect repellent (diazinon, fenitrothion, DEET, etc.)
Underfloor, Foundation	Termite repellents (chlorpyrifos, phoxim, basta, trichlorfon, pyridaphenion, S-421, etc.), preservatives (creosote, CCA), organic detergents
Fireproof, insulation	Asbestos, fiberglass, chlorofluorocarbon

NANOBEST

【 Photocatalyst Coating Agent 】 CLEAR

- Antibacterial
- Antifouling
- Neutral (alcoholic)

Photocatalyst generates strong oxidizing power when exposed to light, and decomposes micro substances, various organic chemical substances, odours, bacteria, mould, oil stains, etc. in the air and water.

CLEAR has a wide range of uses such as glass, outer wall, resin, aluminium and brass. It has excellent dispersibility, adhesion, and transparency because of its alcohol-based.

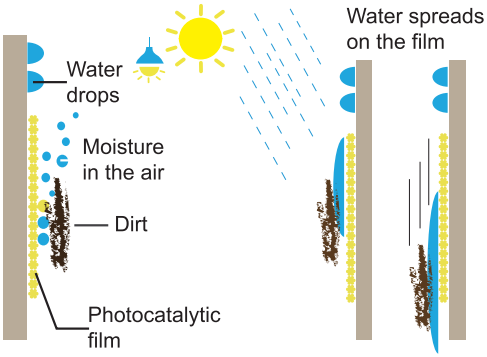
It is hydrophilic and antibacterial (by decomposing organic substances), and also adheres to children's playsets (resin, metal).

Self-Cleaning Another Feature of Photocatalyst

Super Hydrophilic

The photocatalytic coating makes it difficult for dirt to adhere to the surface of glass and wall. The natural force of rain and water will wash off dirt, thus maintain the surface clear for a long time.

Maintaining a clear surface prevents a decrease in power generation and reduces cleaning cost.



Dirt's (organic substances) adhesion is weakened after it's decomposed by the photocatalyst

When it rains where the dirt adhesion is weakened, the rainwater sneaks into the interface between the dirt and the hydrophilic photocatalyst film, and becomes a thick water film on the surface.

With enough rainwater, the water film flows down and wash away the dirt.

The gondola & quat lift at Sapporo International Ski Resort is coated with CLEAR.

Coating after disinfection and deodorization

Coating with CLEAR after disinfection and deodorization with MEK.

Continue to absorb and decompose

Visible light responsive apatite film titanium dioxide

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Continue to absorb and decompose

Durable Photocatalyst Coating

Photocatalyst for Environmental Purification

NANOBEST®

Visible light responsive apatite-coated titanium dioxide

Disinfect **Deodorize**

Textile coating agent

1L

5L/10L/20L

Bacteria and odor are absorbed by apatite even with dim light,
and will be decomposed and removed immediately by titanium dioxide when exposed to light (sunlight, lamp, etc.)

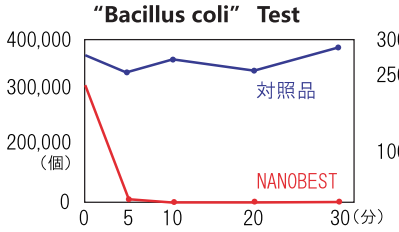
Disinfect & Deodorize Anti-Virus

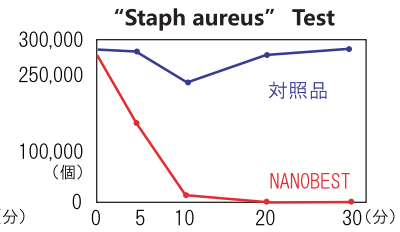
NANOBEST SE

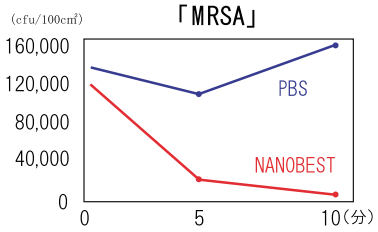
It reacts to light and continues to absorb and decompose bacteria and odors.

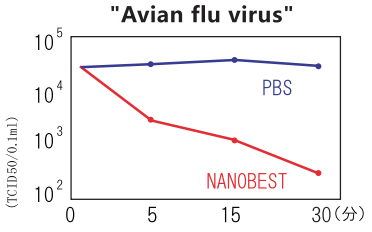
- Apatite adsorbs bacteria and odors at night
- It reacts to LED and even faint light
- Decomposes from the source of odor

Bacillus coli / legionella / staph aureus / influenza / norovirus /
MRSA (a problem of nosocomial infections) / organic substances such as mold









Japan Food Research Lab / Daiichi Kishimoto Clinical Test Center Co., Ltd.

Entrance mat / floor mat

Curtain

Sheets, mattresses, wheelchairs

Bed throws, pillows, cushion covers

For comfort and peace of mind using medical, nursing, food hygiene, tourism & rental equipment

Seats at aeroplanes, trains, buses, etc.

Towel

Protective clothing, masks Uniforms

Pet equipment

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Photocatalyst for Environmental Purification

NANOBEST®

Visible light responsive apatite-coated titanium dioxide

Continue to absorb & decompose

NANOBEST MEK

Reduce the burden of daily disinfection work

Disinfection & Deodorization
Anti-Virus

Photocatalyst Disinfectant Deodorant

NANOBEST
MEK-01s
ph6.8 Neutral

Professional deodorant of ammonia odor
Body odor, pet odor,
urine, cigarettes

Apatite adsorbs bacteria and odor sources even in places with low light.
When exposed to light (sunlight, room light), titanium dioxide will decompose and remove them.

Professional deodorant of putrid & pipe odor
Kitchen waste, oil

NANOBEST
MEK-03s
ph8.7 Weak Alkaline

Decomposes all organic substances such as coliforms, Legionella, Staphylococcus aureus, Norovirus, MRSA and mold

No need to wipe, lasting effect

Apatite adsorbs bacteria and odors at night

Reacts even to LED and faint light

Decompose odor from the source

Safe and reliable

Titanium dioxide, the main ingredient, is used in foods such as white chocolate and cosmetics such as toothpaste and lipstick.

This is an enhanced photocatalysis solution that reacts to indoor lights. It is safe for children to touch and get on food. It decomposes organic substances (bacteria, viruses, odors) in response to light.

Unlike alcohol which evaporates, if titanium dioxide is not being wiped off strongly, the effect will last for many days.

* The above results are our own verification, not an official test result

NANOBEST MEK

Effective even in the dark
Disinfection, Deodoration

MEK Series

Safe, secure and reliable disinfectant deodorant

Visible light responsive apatite coated titanium dioxide

01/03 Prepare for your application needs

1L

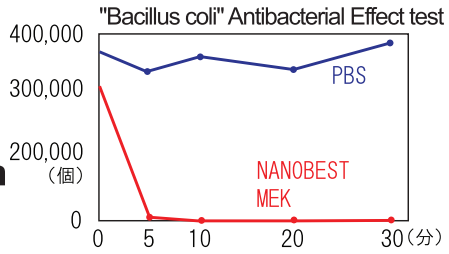
5L
10L
20L

Reduces the burden of daily disinfection work

USB charging

Cordless electric spray gun

The photocatalyst can be sprayed after the store is closed. There's no need to wipe.

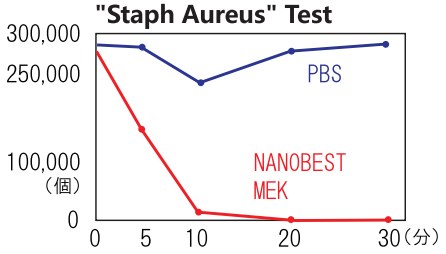


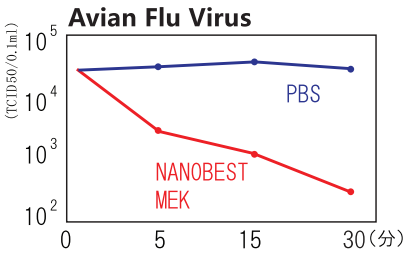
Kitchen | **Kitchen ware** | **Pet** | **Room Toilet** | **Tobacco Garbage** | **Bacterial Virus**

MEK reduces risks at factories, hospitals, facilities, restaurants, pig farms, poultry farms and agriculture.

UV light accelerates the reaction of the photocatalyst

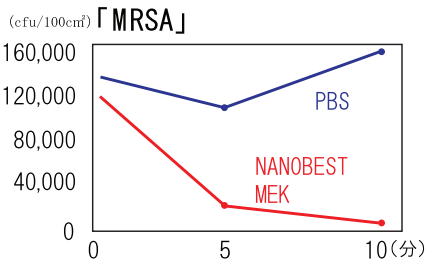
Disinfectant for boots





Sterilization of protective clothing

Large atomizer



"Eye irritation" test of rabbits

Instill 0.1 ml of MEK-01 spray on one eye of 3 rabbits. It can be classified as non-irritants and safe as shown in the table below according to the Draize method.

0～50	61～150	151～300	301～600	601～800	801～1100
No irritant	Mild irritant	Irritant	Medium irritant	Medium-Strong irritant	Strong irritant

Component analysis test

MEK ingredient spec	Arsenic	Heavy metal	Methanol	pH Value	Coloring
Result ※1	PASS ※2	PASS ※2	PASS	PASS (pH7 7) ※2	Pass (not detected)

※1 No. 5A of Food & Additives Standards. Ingredient standards for cleaning agents
※2 Category: Conforms to non-fat detergents. (Test results by Japan Food Research Lab)

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環境浄化の光触媒

NANOBEST®

可視光応答型アパタイト被覆二酸化チタン

分解

Clean Disinfect Deodrize

Can be done at tha same time

photocatalyst Cleaner

No need to rinse with plenty of water

ECO-C/5 is made of titanium doxide apatite,carbonate,citric acid,and natural oils. It releases active oxygen which smoothly decomposes dirt and oil and becomes carbon dioxide,water,and oxygen. It is a safe,harmless and eco-friendly and inorganic ions are left. Besides,wastewater is naturally decomposed in 2-3 weeks.It is free from colourings, fragrances,preservatives or surfactants.

ECO-C

Carpet,Bathroom,
Air conditioner(A/C),etc.

Cleaning & disinfection of A/C, carpets etc.

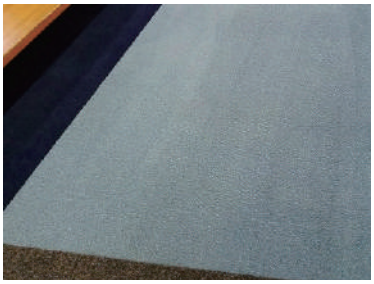
Weak alkaline / pH9

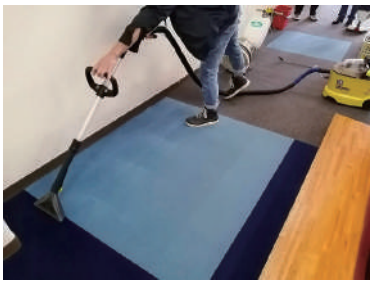
1L

5L/10L/20L

Cleaning the inside of the A/C

Car seat





No need to rinse with water

1.Put it a carpet polisher and wash it. **2.Absorb it with a vacuum cleaner.**

ECO-5

Kitchen,ventilation fan,
air conditioner,floor,
outdoor stairs,bathroom, etc.

Decomposes oil stains,cleans and disinfects outer walls,floors,etc.

Strong alkaline / pH13

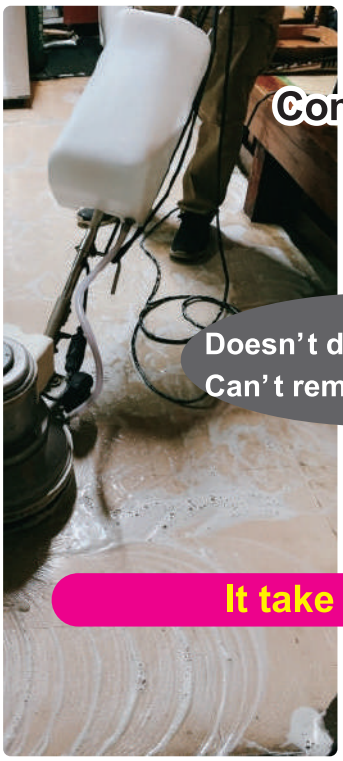
1L

5L/10L/20L

Microwave oven,
ventilation fan

About Carpet Cleaning

ECO-C / ECO-5



Common Carpet Cleaner

Main ingredients: Surfacant

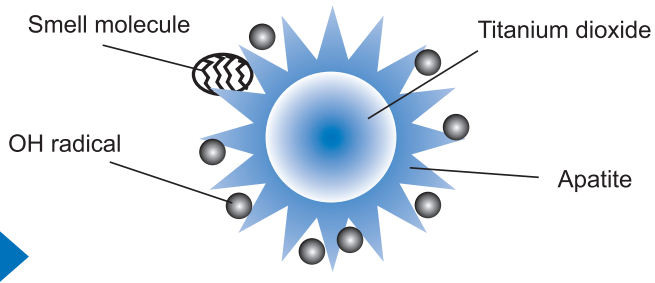
Doesn't decompose dirt
Can't remove stais

It wil take time to ventilate and deodorize if the cleaning agent has a strong odour

It take time to dry

Requires plenty of water to remove the surfactant

Photocatalyst Cleaner



Apatite adsorbs bacteria and odours,and decomposes with active oxygen.

decomposes

Decomposes the source of dirt

Removes stains and odours

Cleanliness continues,and regular cleaning becomes easier!

	Traditional carpet cleaning	ECO-C / ECO-5
Suspension Period	Drying; 1-2 days Deodorization; 1-2 days	Drying; 1-2 hours Deodorization; None(odorless)
Stains removal	△ It may not be removed because it does not discompose.	○ Decomposes organic compounds
Deodorization, disinfection	× Not deodorization effect	○ Decomposes organic compounds with deodorization and disinection effects
Sustainability	Not clear	○ Hard to get dirty
Re-contamination	Dirt may remain or spread due to waste liquid treatment	○ No wastewater treatment required, no recontamination
Hazard	Surfactant (synthetic is harmful) detergent	○ Neutral,harmless, additive-free

No need for a lot of water

Dries quickly!

Since no surfactant or detergent is used,there's no need to rinse with water,thus takes less time to dry.

No need for waste treatment

No recontamination!

It's clean and comfortable,and regular cleaning becomes easy!

decomposes

About deodorization

There are 3 main deodorizing methods.

COUPLING (Deodorant spray)

odour molecules

Wrap odour molecules and drop them down

- Will smell again
- Breken molecules may adhere and stain

ABSORB (Activated Carbon)

odour molecules

Adsorbs odour molecules

If it gets wet,it may become a harmful substance and flow out.

MASKING

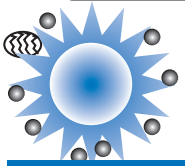
odour molecules

Adhere another odour

(Fragrances,aroma oils,etc.)

When the molecular effect disappears,the odour will appear again.

In these cases,the source of the odour remains,so the smell will reappear.



Photocatalyst Cleaner

Decompose from the source of the odour

After decomposition,it becomes water and carbon dioxide,which is harmless to humans and the environment.

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