

# The Air Cleaning, antibacterial coating Technical Data Sheet



# F118 deodorant test

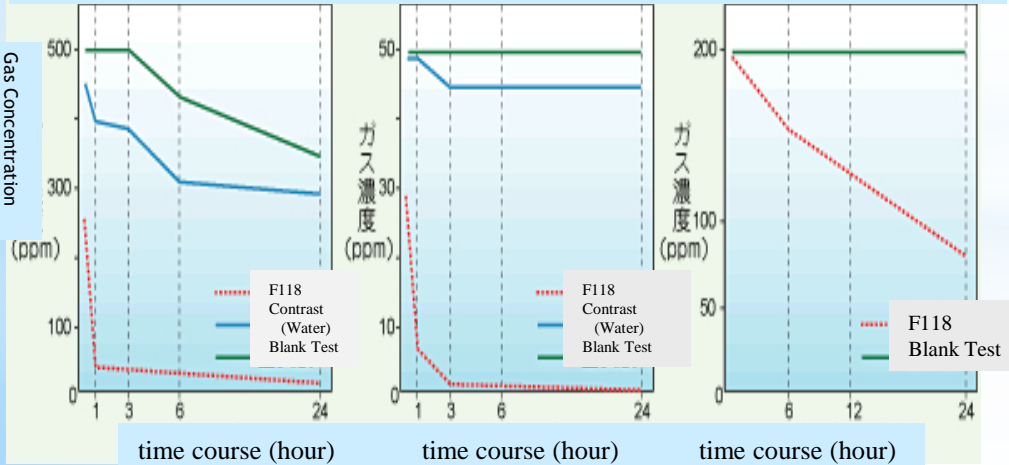
## The test by Japan Food Research Laboratories

<Test Method>  
 Impregnated gas vaporized in (5X5cm angle) absorbent cotton, then spraying the plant deodorant NTP-F118 liquid, it was confirmed whether there was a deodorant effect.

- Odor intensity 0: Odorless
- Odor intensity 1: Smell that can be sensed barely (detection threshold)
- Odor intensity 2: Weak smell to notice (detection threshold)
- Odor intensity 3: Smell that can be sensed easily
- Odor intensity 4: Strong smell
- Odor intensity 5: Intense smell

Substance name	Features of odor	Before test		After test	
		PPM	odor intensity	Quantity of Mist	odor intensity
Ammonia	Smell like human waste	40	5	0.6cc	1
Methyl mercaptan	Smell like onions rotten	1	5	1.95cc	2
Hydrogen sulfide	Smell like egg rotten	8	5	3.0cc	2
Methyl sulfide	Smell like cabbage rotten	2	5	2.85cc	2
Methyl disulfide	Smell like cabbage rotten	3	5	1.35cc	2
Trimethylamine	Smell like fish rotten	3	5	1.05cc	1
Acetaldehyde	Incentive Grassy smell	10	5	1.2cc	1
Styrene	Smell like the town gas	20	5	1.05cc	1
Propionic acid	Incentive sour smell	2	5	0.6cc	1
N-butyrate	Smell sweaty	1	5	1.2cc	2
N-valeric acid	Smell such as steamed socks	1	5	1.05cc	1
Isovaleric acid	Smell such as steamed socks	1	5	1.65cc	1
Toluene	Smell like gasoline	700	5	1.95cc	2
Xylene	Smell like gasoline	50	5	0.75cc	1
Ethyl acetate	Smell like incentive paint thinner	200	5	1.05cc	1
Methyl isobutanol ketone	Smell like incentive paint thinner	50	5	1.05cc	1
Isobutanol	Incentive fermented smell	1000	5	0.45cc	1
Propionaldehyde	Incentive bittersweet smell that burnt	10	5	1.5cc	2
N-butyraldehyde	Incentive bittersweet smell that burnt	2	5	1.5cc	2
Isobutyraldehyde	Incentive bittersweet smell that burnt	5	5	1.5cc	2
N-valeraldehyde	Bittersweet smell burnt like choked	1	5	1.5cc	2
Isovaleraldehyde	Bittersweet smell burnt like choked	1	5	1.5cc	2

Test result of Ammonia / Test result of Trimethylamine / Test result of Toluene



# F118 Anti-bacterial Test

## ■ Test organism

Escherichia coil o157 HMC5011

Staphylococcus aureus IFO12732

Legionella pneumophila HMC5014

Cladosporium cladosporioides IFO6348

## ■ Test Method

### 1) Preparation of test sample

It was used as a test sample of stock solution F118

### 2) Test organism culture in advance and bacterial liquid making.

>Escherichia coil o157 and Staphylococcus aureus to a agar medium

>Legionella pneumophila was inoculated Legionella medium created in Legionella-combi-Park (MERCK), and whole culture at 35 ° .

>Cladosporium cladosporioides was inoculated into potato dextrose agar medium, and whole culture at 25 degrees.

After the culture, It was to prepare a test bacterial liquid

so that the bacteria number of in 107ml using a 0.05% tween80 solution or saline.

### 3) Culture and inoculation of the test bacterial liquid

The inoculated test bacteria liquid in the test sample 9ml,

bacteria 35 degrees and mold 25 degrees cultured in.

### 4) Antibacterial test

After culturing, 2 days, 3 days, 5 days, to produce a 10-fold dilution series of the test solution using saline.

The inoculated medium to each of these dilutions, bacteria 35 degrees and mold 25 degrees cultured in.

Counting the colonies after culturing was formed on the medium, and converting the viable count.

### 5) Test Result

The Table 1 shows the results of examining the antibacterial performance F118-406.

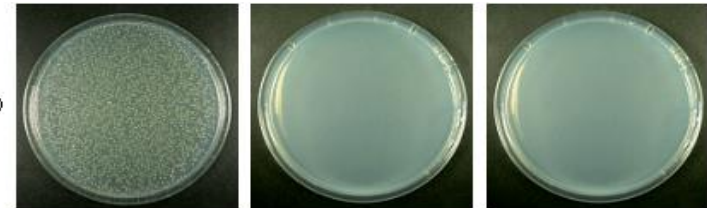
Table 1: Test result of antibacterial performance F118-406

test organism	The number of the first bacteria	viable cell count/ml		
		Culture two days later	Culture three days later	Culture five days later
Escherichia coil o157 HMC5011	$6.0 \times 10^6$	-	-	-
Stephylococcus aureus IFO12732	$8.2 \times 10^6$	-	-	-
Legionella pneumophila HMC5014	$1.3 \times 10^6$	-	-	-
Cladosporium cladosporioides IFO6348	$6.0 \times 10^6$	$8.0 \times 10^3$	$3.0 \times 10^2$	$4.7 \times 10^2$

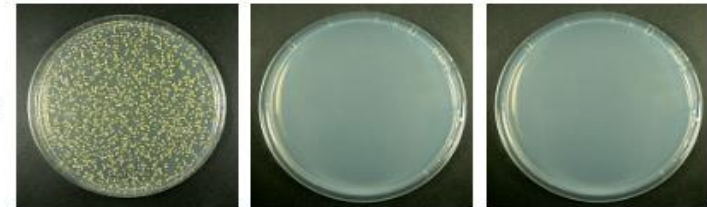
\* - : Bacteria can not be detected by the test solution 1ml culture

At the start of the test    Two days later culture    Five days later culture

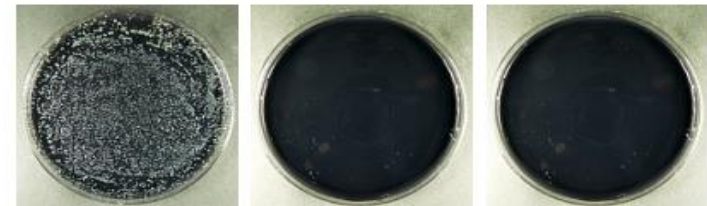
Escherichia coil o157 HMC5011



Staphylococcus aureus IFO12732



Legionella pneumophila HMC5014

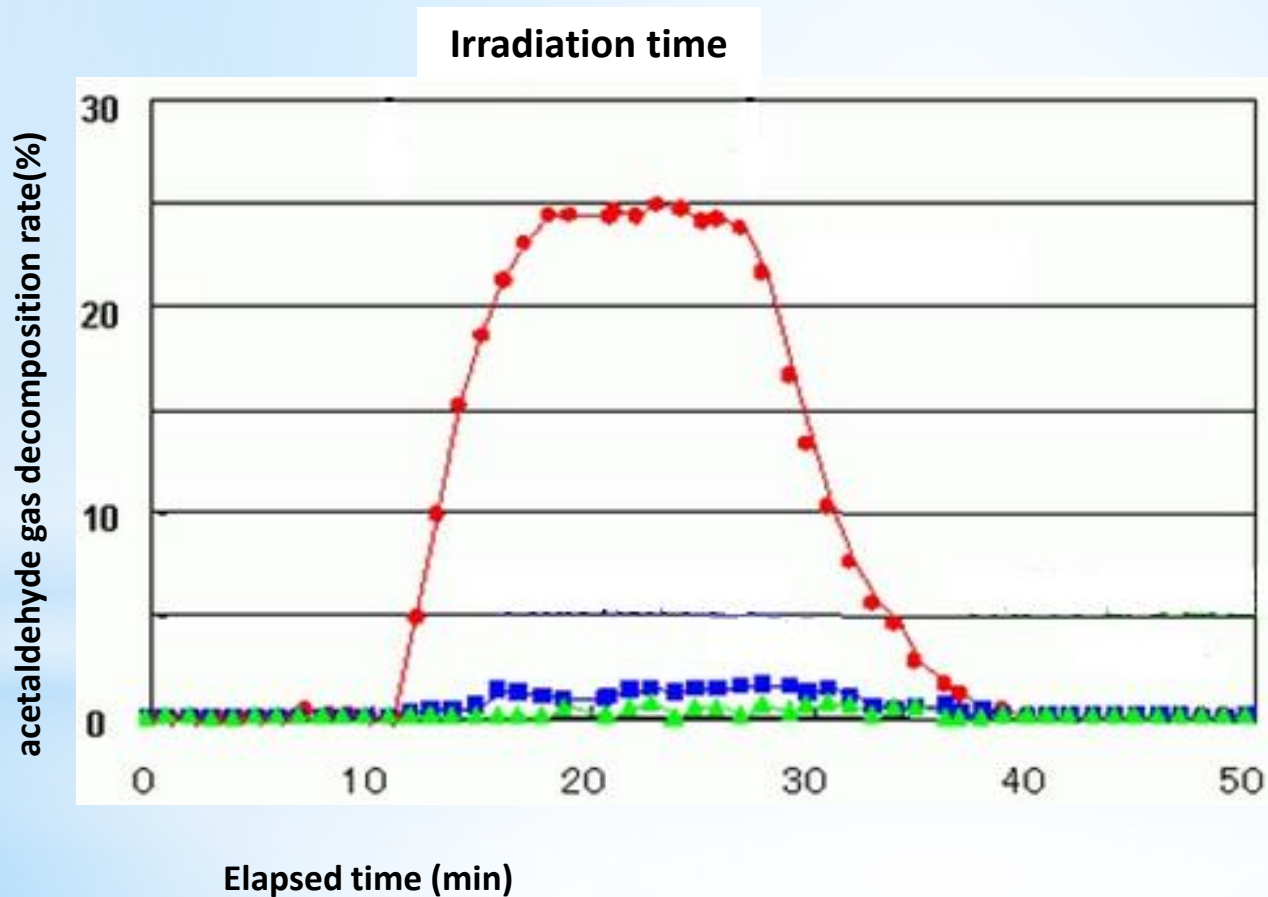


Cladosporium cladosporioides IFO6348



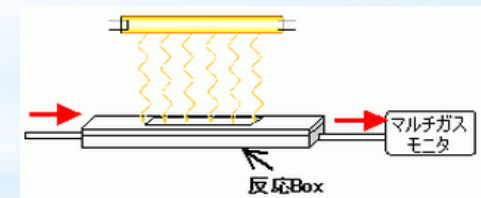
\*Test :Tanaka Institute of Nutrition and Science 研究所

# WO<sub>3</sub> achieved over 20 times the gas-decomposition efficiency of current Titanium-based photocatalysts.



## ◆ Test conditions and equipment schematic view

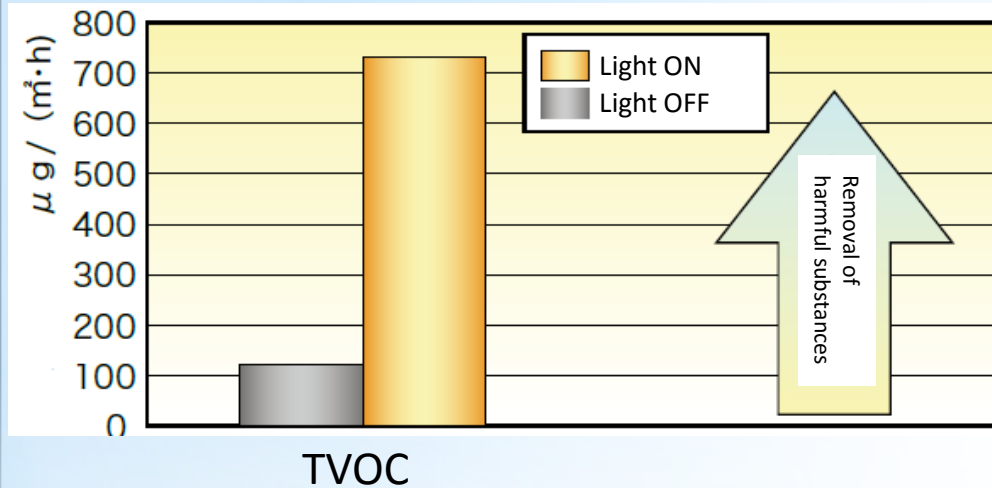
Test condition  
Compliant with NEDO standards committee JIS draft  
light source: fluorescent (UV cut, 250Lux)  
Initial acetaldehyde concentration: 5ppm  
Base: a glass plate (50 × 100mm<sup>2</sup>)  
Form: 0.2g powder coating



# VOC decomposition test

## Removal performance of TVOC

TVOC (Total volatile organic compound)  
The terms of quantification by toluene



**【TEST Condition】**

TVOC: Toluene · xylene · ethylbenzene and the others

Total VOC 14 component mixed gas target density each 0.1ppm

Evaluating method: Photocatalytic activity evaluation using a small chamber

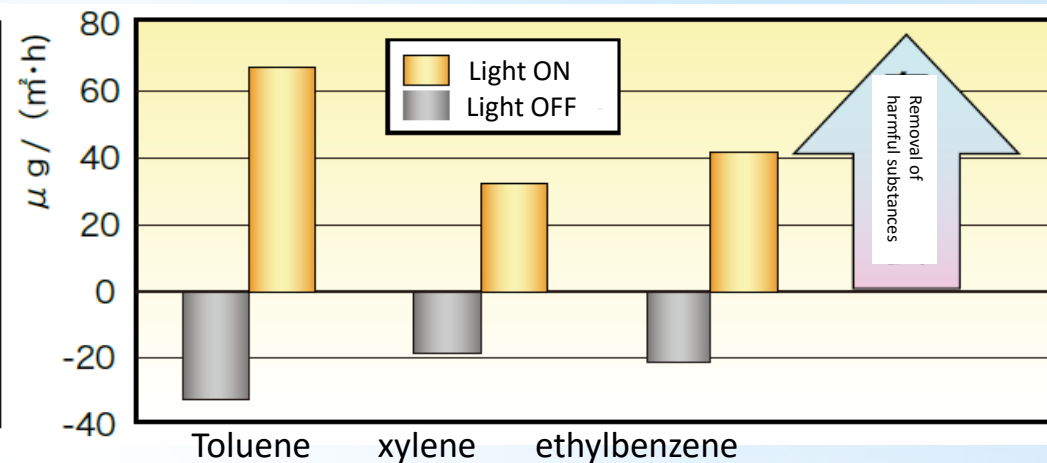
Chamber volume: 20 L, the test gas flow rate; 0.167 L / min

(0.5 times / h ventilation rate), sample load factor; 1.1 m<sup>2</sup>/m<sup>3</sup>

Illumination; fluorescent light 1000 lx sample; photocatalyst coated wallpaper

(Attached to the interior gypsum board)

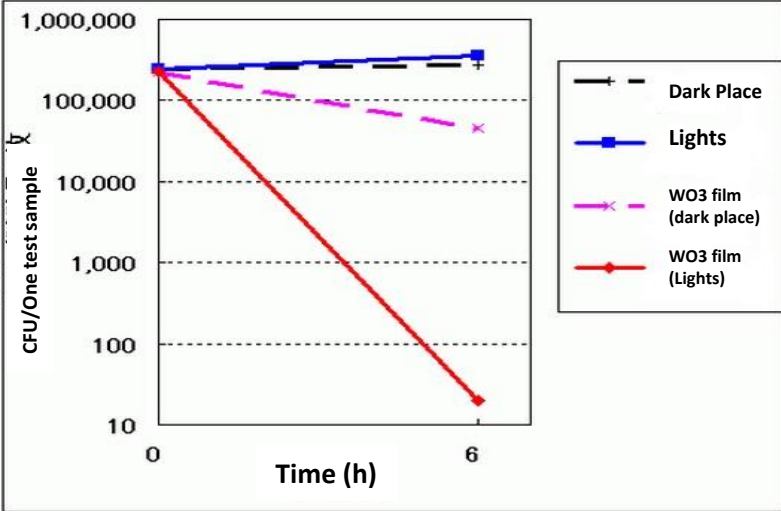
## Removal performance of the major harmful substances



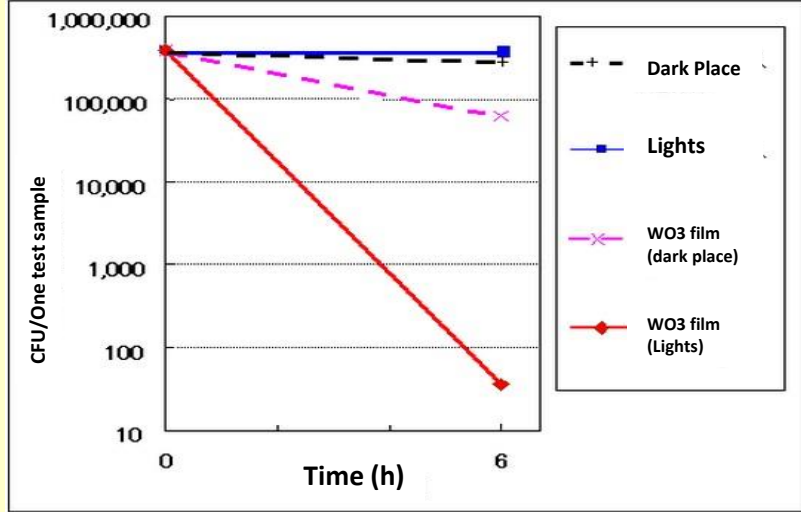
**※ Note** It will include the adsorption and increase by the test substrate.

# Antibacterial test/Tungsten Oxide

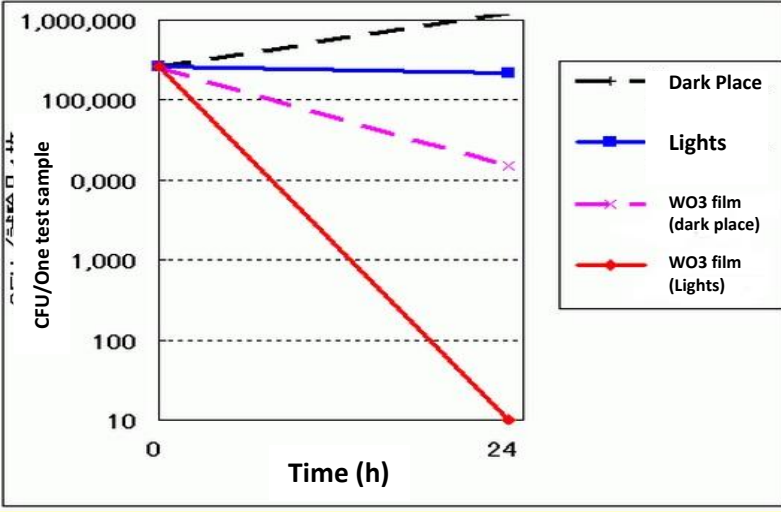
## ◆ Antibacterial test of Staphylococcus aureus



## ◆ MRSA antibacterial test

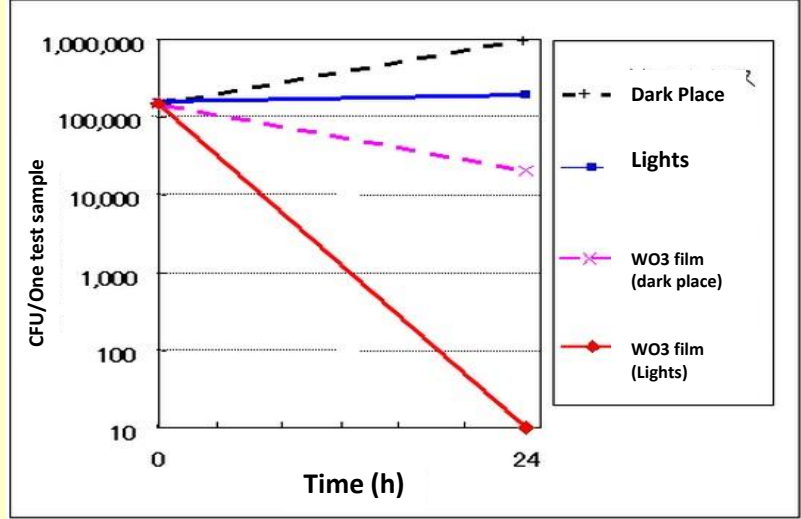


## ◆ Antibacterial test of Escherichia coli



JIS R1702

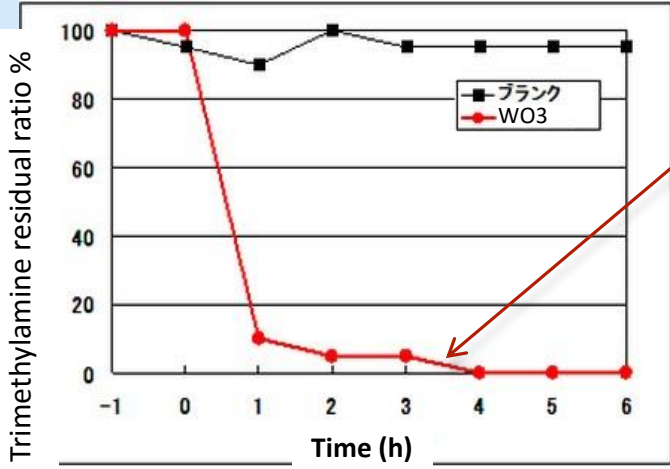
## ◆ O-157 Antibacterial test



JIS R1702

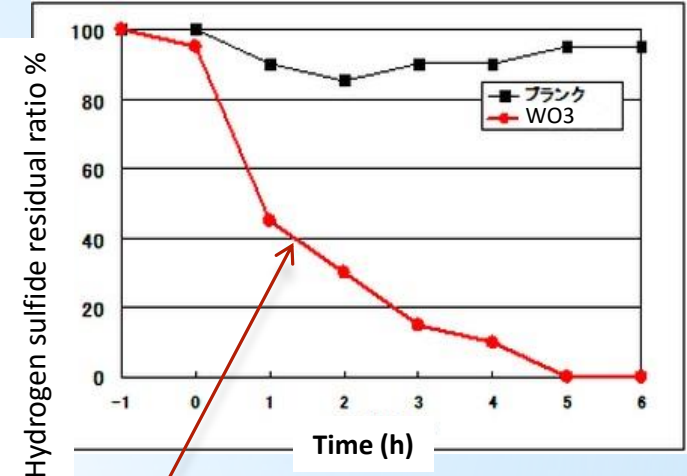
# Deodorant test/Tungsten oxide

## ◆ Trimethylamine residual ratio test



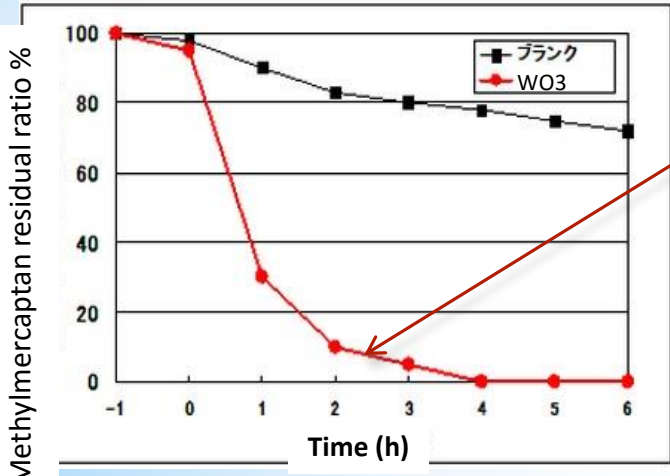
The decomposition in 4 hours trimethylamine concentration of 4000-fold concentration (4ppm) of trimethylamine a human feel the smell (0.001ppm)

## ◆ Hydrogen sulfide residual ratio test



5 hours a hydrogen sulfide concentration of about 200 times the concentration of hydrogen sulfide that humans feel the smell of (0.006ppm) of (1ppm)  
Decomposition degree

## ◆ Methylmercaptan residual ratio test



The decomposition in 4 hours methyl mercaptan concentration of about 1500-fold concentration of methyl mercaptan that humans feel the smell of (0.0007ppm) of (1ppm)