

**Surface Reformation of Insulating Resin**  
**by Ultra Violet Treatment**

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# What is the surface reformation method by UV irradiation ?

Pretreatment for electroless plating using UV irradiation as a substitute for etching

## 【Advantages】

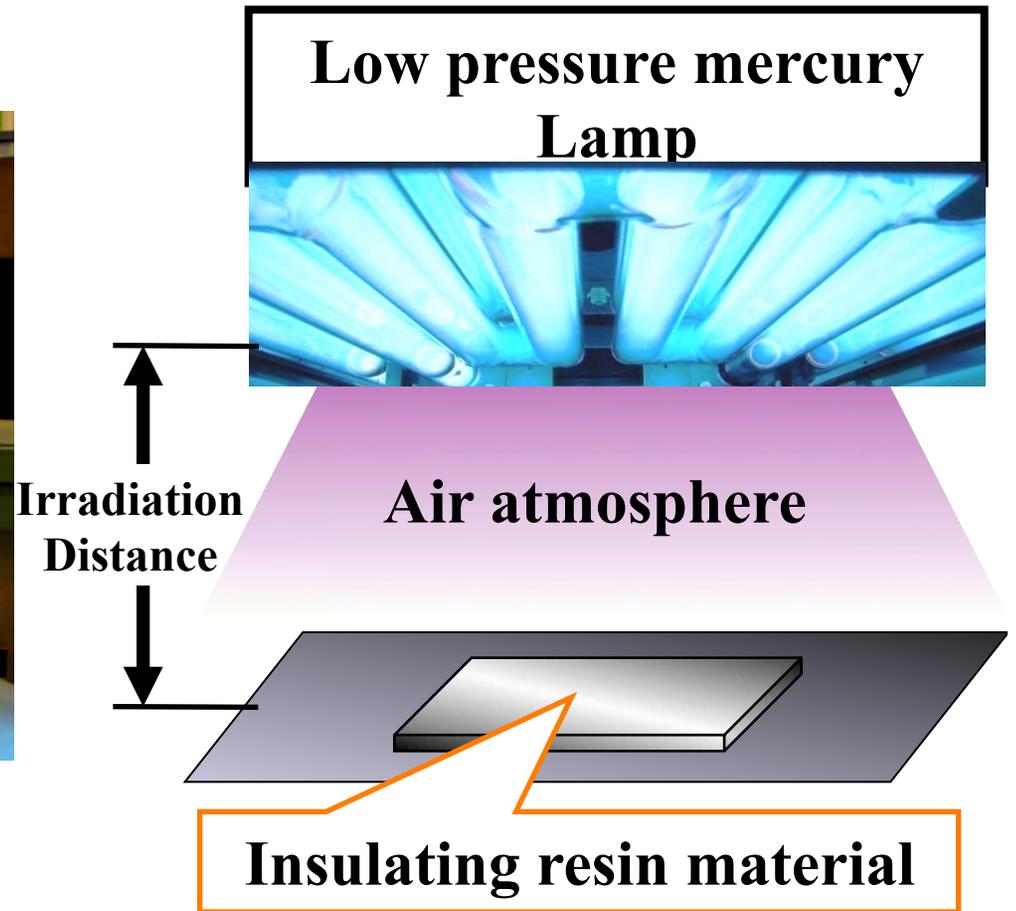
- Enables formation of a conductive layer on a smooth resin surface
- Enables formation of a conductive layer on difficult to plate materials
- Environmentally friendly plating process

KOTO

# UV surface reformation method



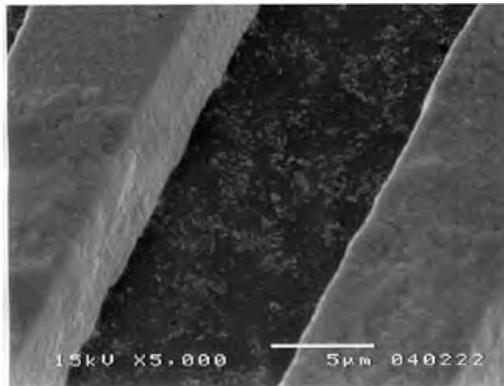
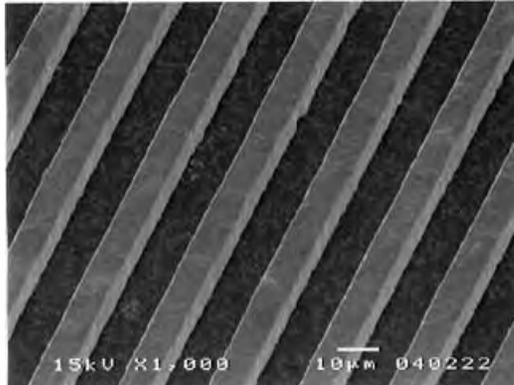
**184.9 nm: 8 mW/cm<sup>2</sup>**  
**253.7 nm: 18 mW/cm<sup>2</sup>**



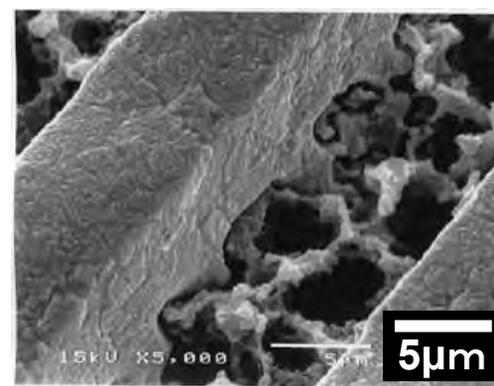
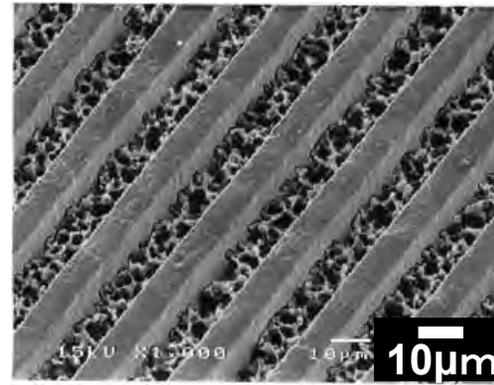
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# Wiring patterns formed on modified surface

**UV modified**



**Conventional method**

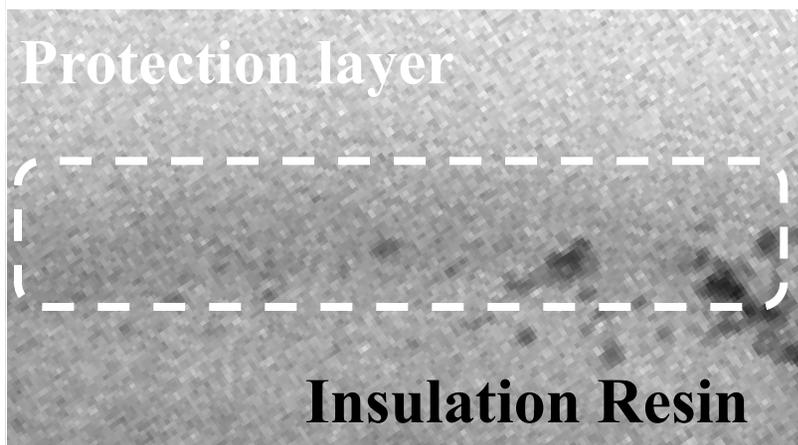


- Minimal damage to the resin surface
- Enable to form micro circuits
- Allows 10micron line and pitch space

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# Effect of modified layer on adhesion strength

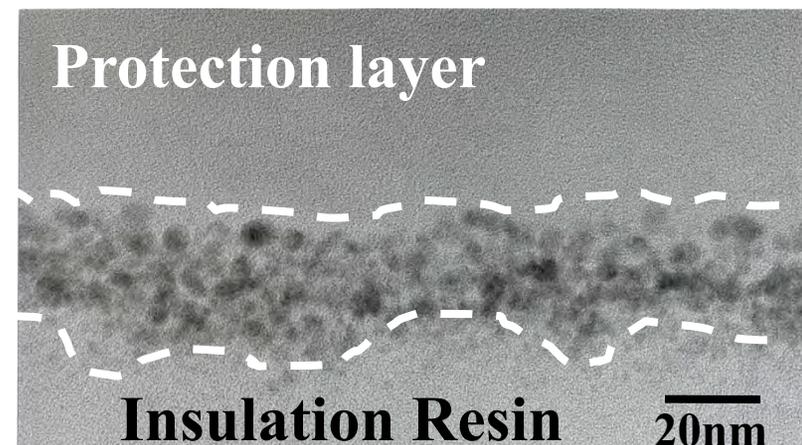
Without modification



**No modification layer**

Adequate adhesion strength is not obtained

With modification



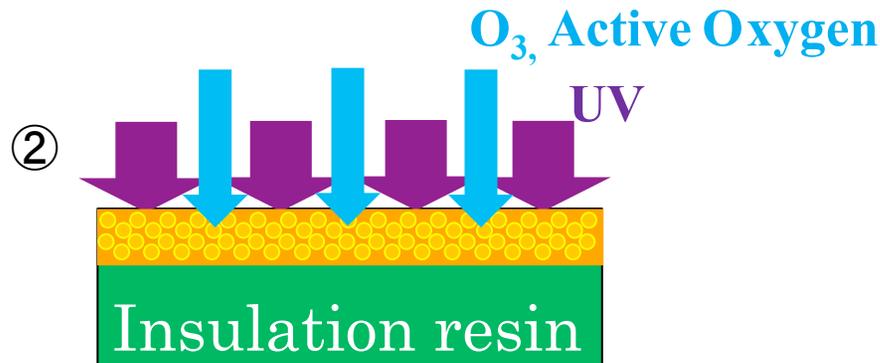
**Modified layer**

**More than 1.0 kN/m adhesion strength can be achieved**

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# Mechanism for Adhesion

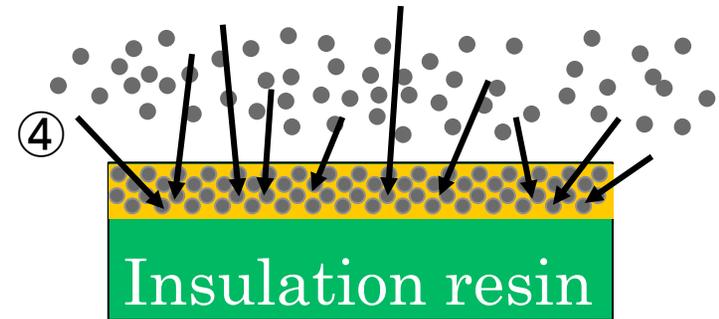
①



Ozone is generated during irradiation of resin



The surface material is Oxidatively cleaved, then eluted from resin to form nanoscale voids



Catalyst penetrates resin to form diffused catalyst layer

⑤



Nanoscale anchor layer is formed by electroless plating reaction which progressing from catalyst layer

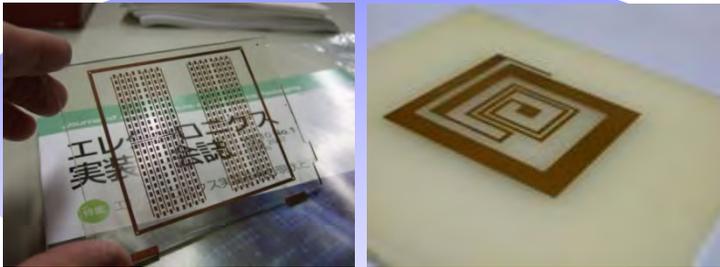
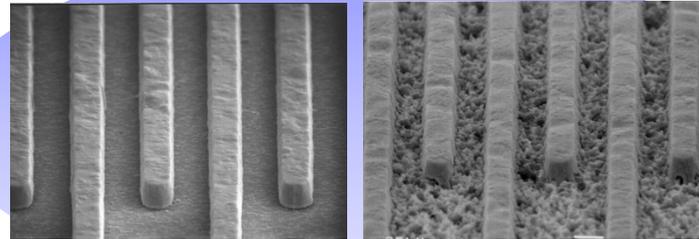
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# Applicable materials

LCP, PI, COP, PA, Urethane, ABS. Nylon etc.

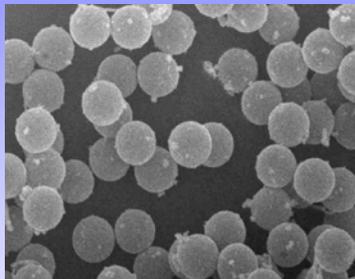
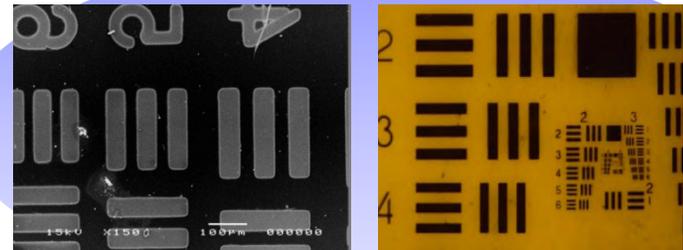
## Application examples

Micro circuit pattern on  
smooth substrate



Form conductive layer on difficult to  
plate materials

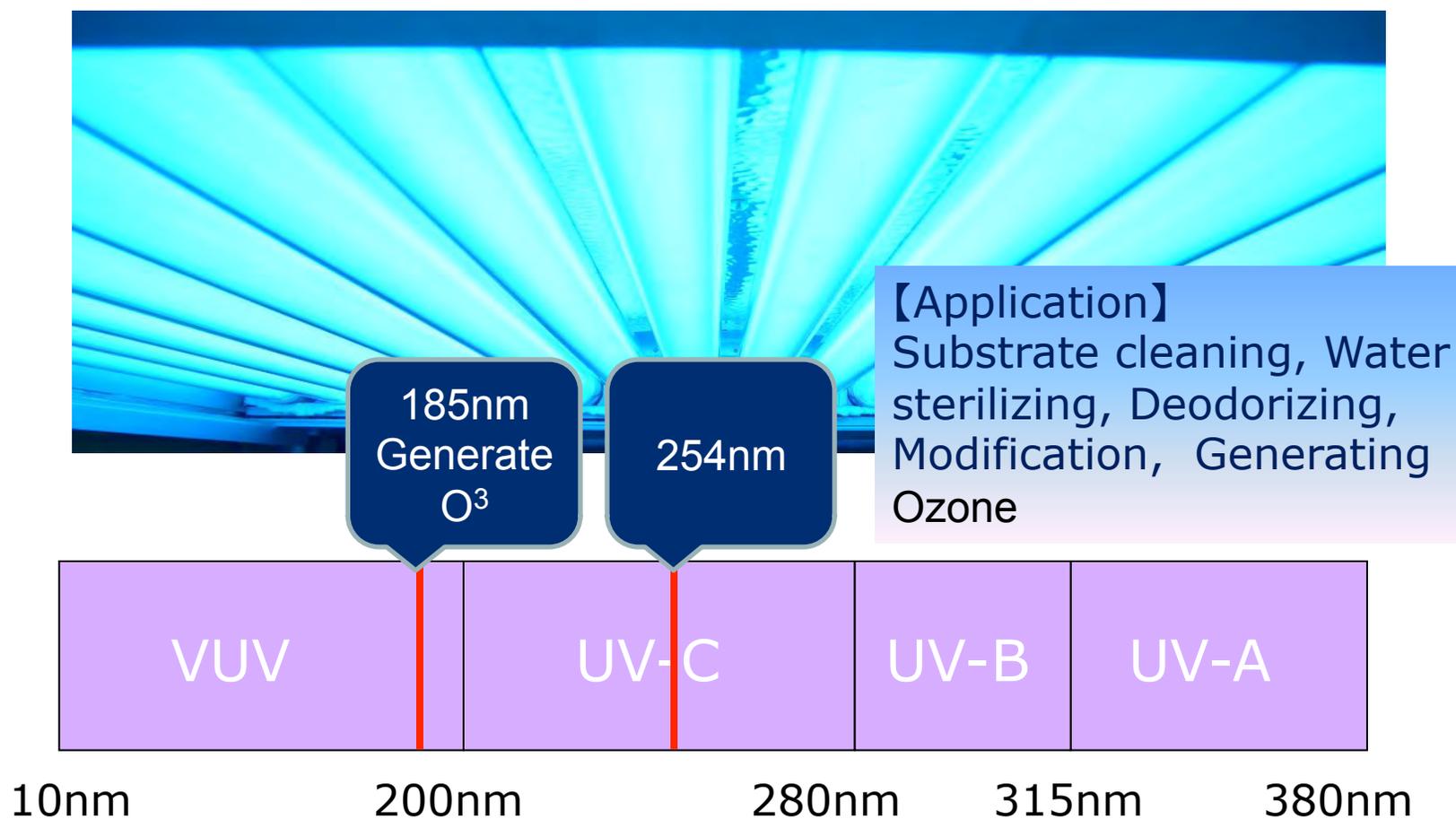
Selective plating for fine pitch pattern



Environmentally-friendly  
Anisotropic conductive fine particles

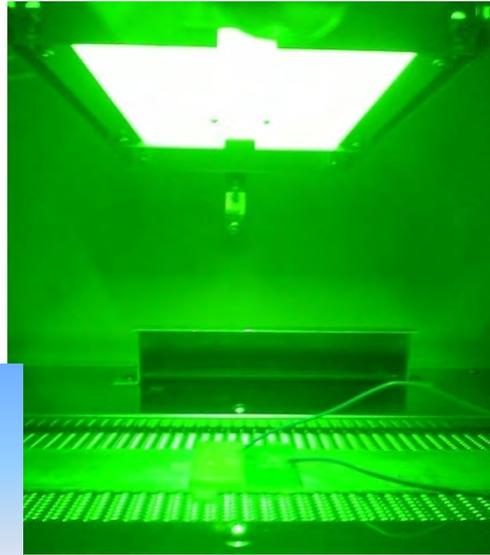
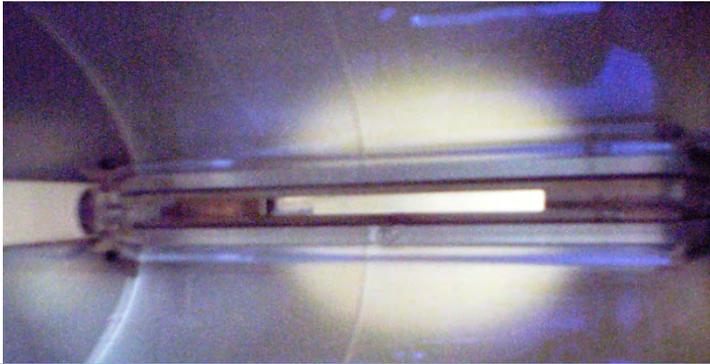
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# Low Pressure UV Lamp



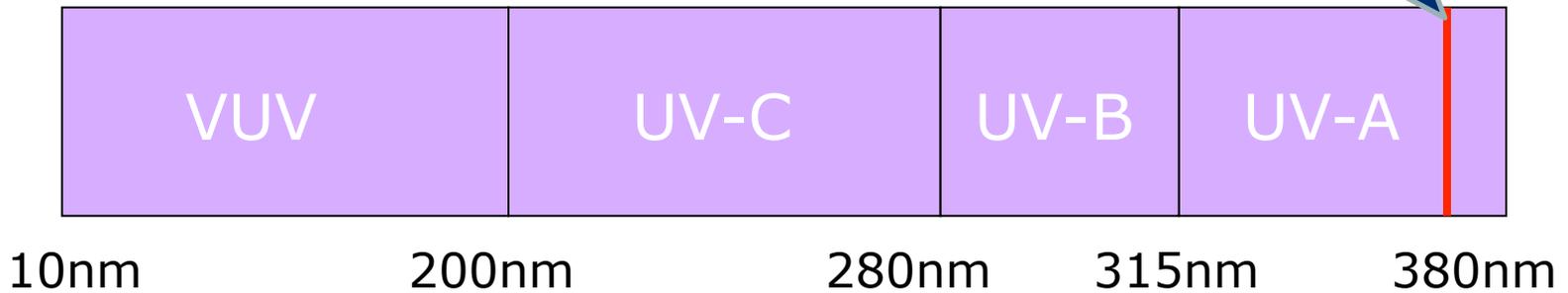
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# High pressure UV Lamp

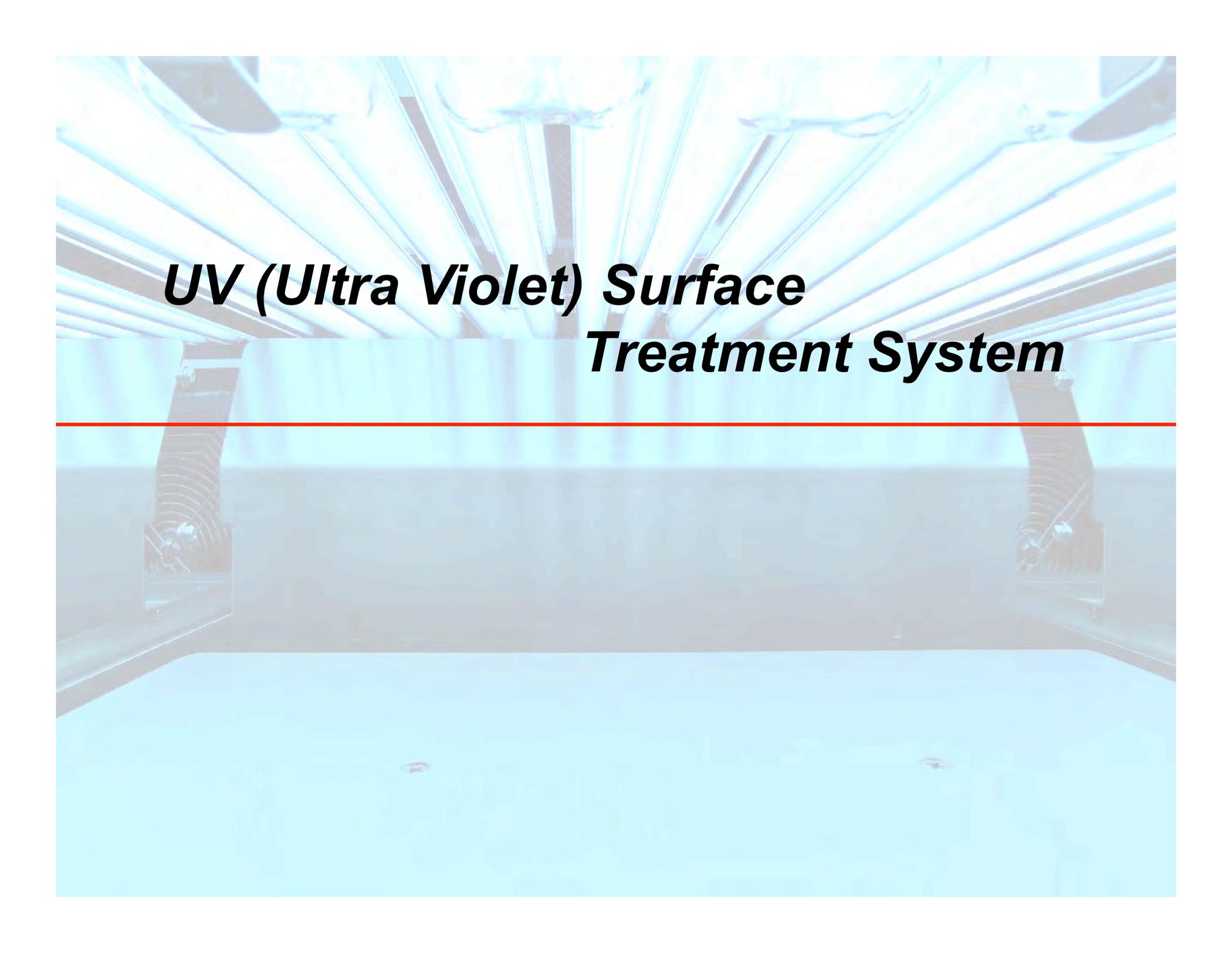


**【Application】**  
Curing and drying for Inks,  
Paints, Adhesive materials,  
Resin coating etc.

365nm



**KOTO**



***UV (Ultra Violet) Surface  
Treatment System***

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# UV Surface Treatment System for 3 dimensional objects (KOL4-1200V)

## ■Features

- Easily set irradiation speed. Just press Start button to clean and modify the surface of material
- Simple UV output and treatment temperature settings
- Enables UV irradiation while a material is rotating
- Supports material size up to 200×200×700(mm)



## ■Specification

- 【Effective irradiated area】 200×200×700(mm)
- 【Irradiation distance】 15~100(mm)
- 【Lamp】 High output low-pressure mercury lamp
- 【Footprint】 W1000×D1000×H2350(mm)
- 【Utility】 AC200V(50/60Hz) Exhaust duct

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## Small UV Surface Treatment System (KOL1-300)

### ■ Spec

【Effective irradiated area】150 × 150(mm)

【Irradiation distance】5 ~ 100(mm)

【Lamp】High output low pressure mercury  
lamp

【Footprint】W360 × D550 × H530(mm)

【Utility】AC200V (50/60Hz)

### ■ Accessories

- 300W low pressure mercury  
lamp(KOGLQ-300GS) 1pc
- Power source for the low pressure  
mercury lamp(KSG-302MHKT) 1pc
- Connection cables



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# Roll-to-Roll UV Surface Treatment System (KOL2-1200V/R)

## ■Features

- Easily set irradiation speed and press Start button to clean and modify the surface of material
- Simple UV output and treatment temperature setting
- Enable UV treatment of various films by simply adjusting the tension of the rollers
- Support different material sizes (500mm wide or less, outer diameter  $\Phi$ 300 or less)

## ■Specification

- 【Effective irradiation with】 500mm
- 【Irradiation distance】 10~30(mm)
- 【Lamp】 High output low temperature
- 【Footprint】 W2300×D1400×H1750(mm)
- 【Utility】 AC200V(50/60Hz) Exhaust dust



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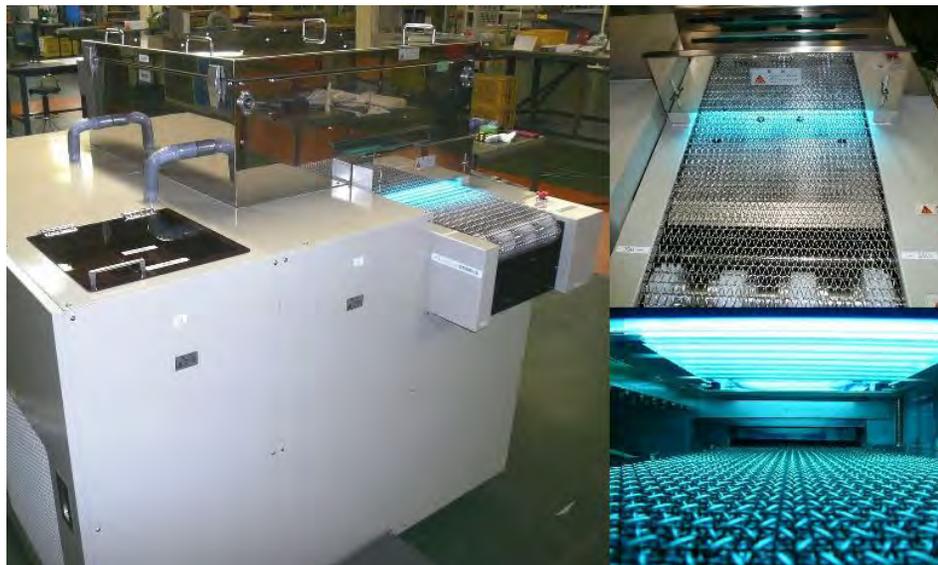
# UV Surface Treatment System (KOL4-600H/L)

## ■Features

- Conveyor operation modes can be switched between continuous and intermittent for cleaning and property modification.
- Support up to 250 mm wide materials of sheets, films and exterior components.
- Applicable to heat sensitive materials by using cooling net.
- Real-time monitoring of the temperature inside the equipment is possible.

## ■Specification

- 【Effective irradiated area】 250×500(mm)
- 【Irradateion distance】 15~100(mm)
- 【Lamp】 High output low-pressure mercury lamp
- 【Footprint】 W1800×D1620×H1360(mm)
- 【Utility】 AC200V(50/60Hz) Exhaust duct



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*Thank you*

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