

エキシマ光照射ユニット

# EXICIMER

IRRADIATION UNIT

**USHIO** www.ushio.co.jp

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※本カタログに記載の仕様・デザイン等は、改良のため予告なく変更する場合がありますので、ご了承ください。

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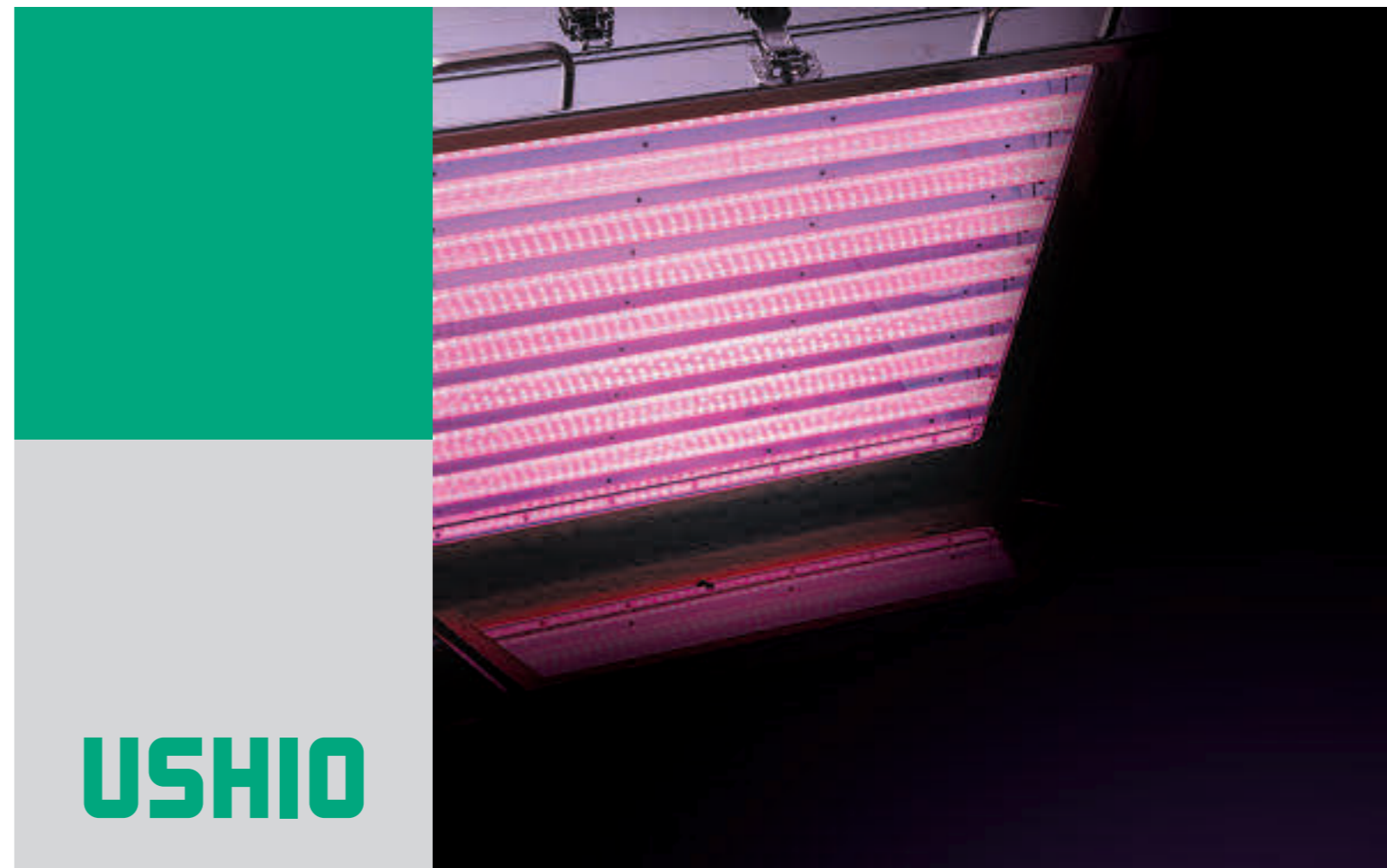
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Osaka 532-0011  
TEL.+81 6-6306-5711 FAX.+81 6-6306-5718

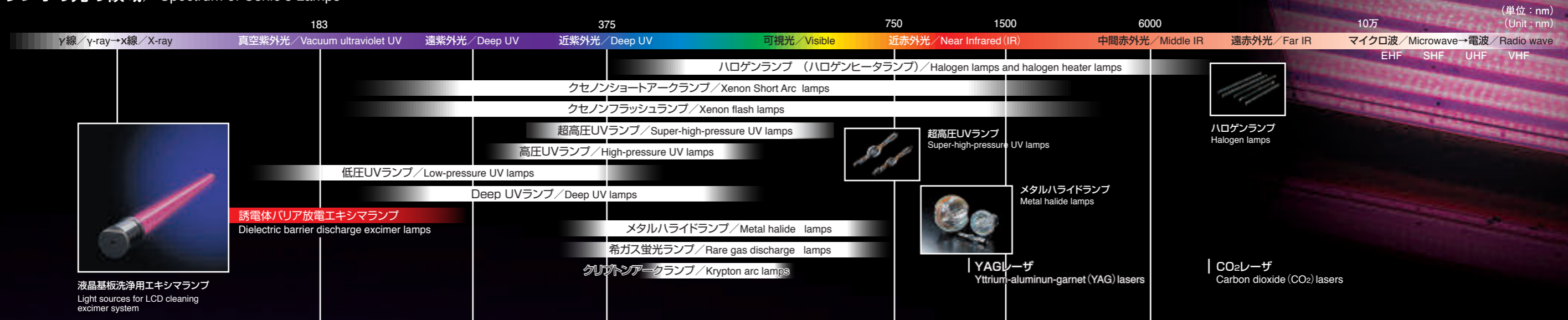
E-mail excimer@ushio.co.jp



# 太陽スペクトルとウシオの「光」

The Solar Spectrum and USHIO's Lamps

## ウシオの光の領域 / Spectrum of Ushio's Lamps



### エキシマランプの特長 Feature of excimer lamp

高光子エネルギー  
High photon energy

単一波長  
Single wave length

低温照射  
Low temperature process

瞬時点灯 / 点滅  
instant turn on/off

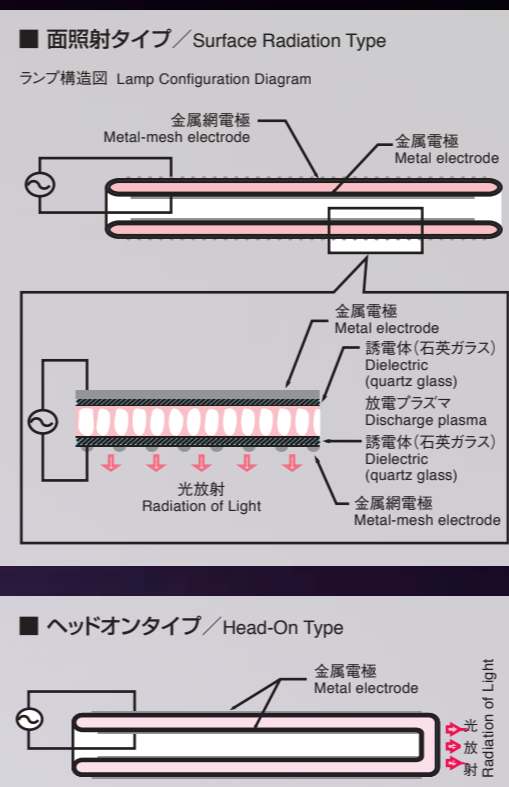
水銀を使用しない  
Mercury Free

### エキシマVUV光とは Vacuum Ultra Violet

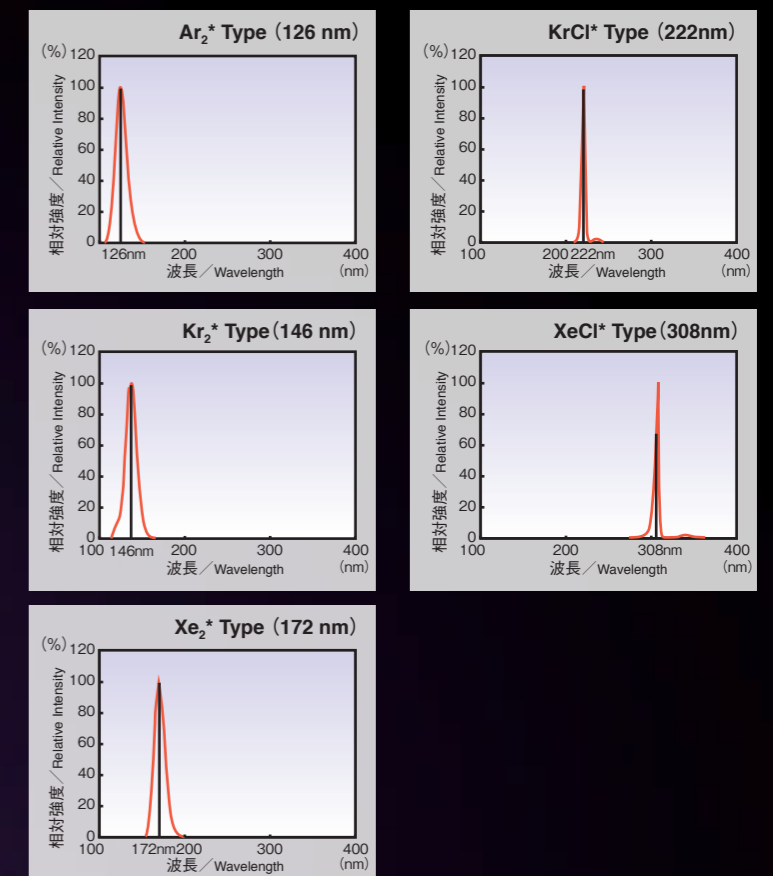
エキシマVUV光は希ガスや希ガスハライド化合物のランプから生みだされる非常にエネルギーの高い光です。希ガスや希ガスハライド化合物のガスが封じられたランプに外部から高いエネルギー電子を与えると放電プラズマ(誘電体バリア放電)が多数発生します。このプラズマは高いエネルギー電子を包含しており、かつ瞬時に消滅するという特徴を持っています。このプラズマ放電により、放電ガス(希ガス)の原子が励起され、瞬間的にエキシマ状態(Xe)となります(エネルギーの高い軌道原子に励起され、エキシマ励起分子になります)。このエキシマ状態から元の状態(基底状態)に戻るとき、そのエキシマ特有のスペクトルを発光します。この光をエキシマVUV光と呼んでいます。

Excimer Vacuum Ultra Violet (VUV) is strong light energy generated from lamps filled with noble gas or noble gas halide compound. In case the lamps filled with noble gas or noble gas halide compound is applied high energy electron from the outside, the lamps generate discharge plasma (i.e dielectric barrier discharge). This discharge plasma includes high energy electron and instantly disappears. This discharge plasma excites the gas atoms to instantaneously produce the excimer state (Xe). When the excited state of atoms returns to the original (ground) state, the spectra peculiar to the excimer state are emitted (excimer emission). This emission light is excimer vacuum ultra violet (VUV).

### エキシマランプの構造例 Structural Example for Excimer Lamps



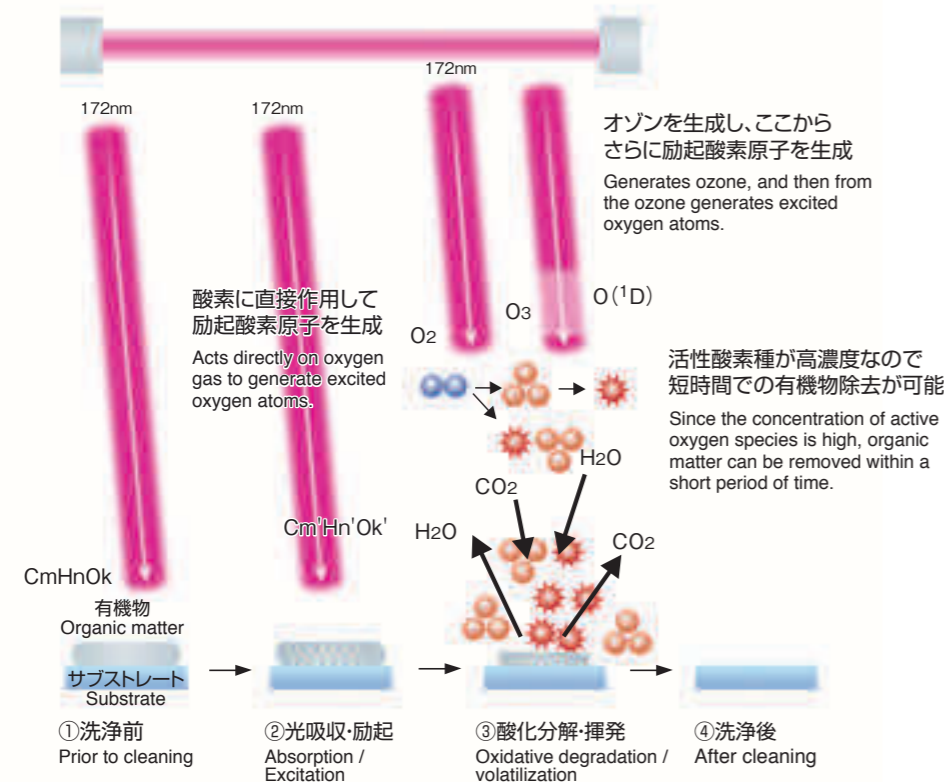
### 分光分布 Spectral Distribution



# エキシマ光のメカニズムと各種データ

Mechanism and various data of excimer light

## 誘電体バリア放電エキシマランプによるVUV/O<sub>3</sub>洗浄 VUV/O<sub>3</sub> Cleaning with Dielectric Barrier Discharge Excimer Lamp



### Point

172nmは酸素分子に対する吸収係数が185nmの約20倍。だから高濃度の活性酸素種の生成が可能。また、酸素に直接作用して酸化力の強い励起酸素原子を生成するため効率が良い。

The 172-nm excimer light has an absorption coefficient approx. 20 times greater than that of the 185-nm UV light, thus allowing generation of a high-concentration of active oxygen species. This light is also highly efficient because it acts directly on oxygen gas to generate high oxidative excited oxygen atoms.

## 有機物の結合エネルギーと光子エネルギー Bonding Energy and Photon Energy

172nmVUV光の光エネルギー  
Photon Energy of 172-nm VUV Light

166.7kcal/mol

### 各種分子結合エネルギー Bonding Energy of Various Molecular Structures

・分解には結合エネルギー以上の光エネルギーが必要です(必要条件)。  
For decomposition, light energy must be higher than the bonding energy (prerequisite).

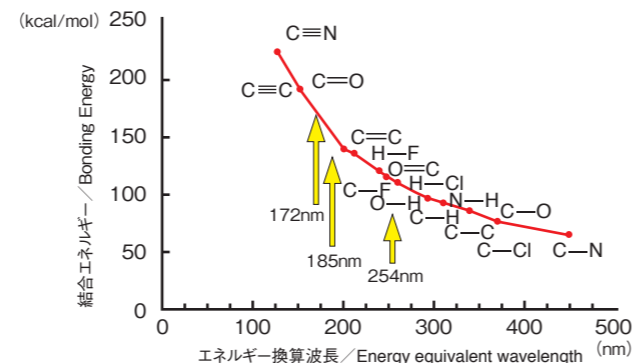
・分子が吸収する(励起する)エネルギーが大きいほど反応(分解)しやすい。  
The higher the energy absorbed by the molecules (excitation), the easier the reaction (decomposition).

・C=C、(C≡C)の結合エネルギーデータは、結合2個(3個)の合計値を示します。  
The data for C=C (C≡C) bonding energy represents the total value for 2 bonds (3 bonds).

C-C	84.3kcal/mol
C=C	140.5
C-H	97.6
C-F	115.2
C-Cl	76.9
C-N	63.6
C-O	76.4
C=O	190.0
O-O	32.9
O=O	117.5
O-H	109.3
H-F	134.9
H-Cl	101.9
N-H	91.9
Si-O	150.0

## 各種分子結合エネルギーと波長の関係※ Organic Bonding Energy and Wavelength

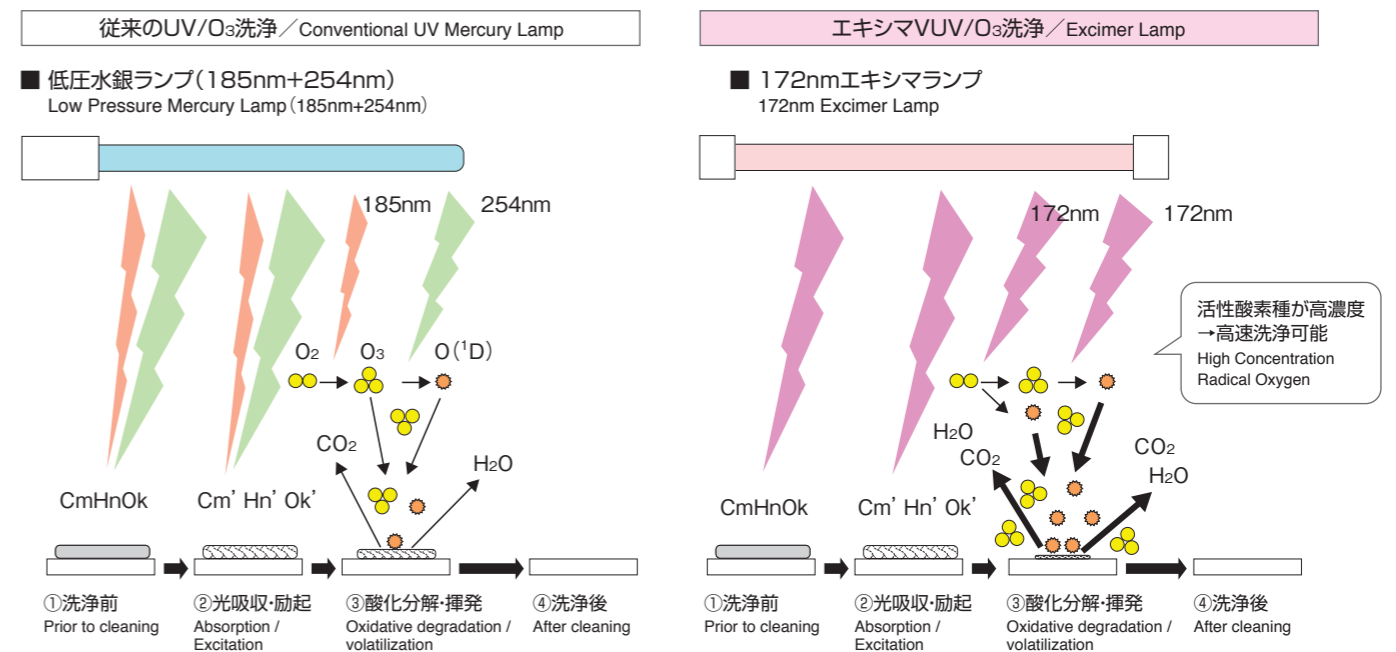
Organic Bonding Energy and Wavelength



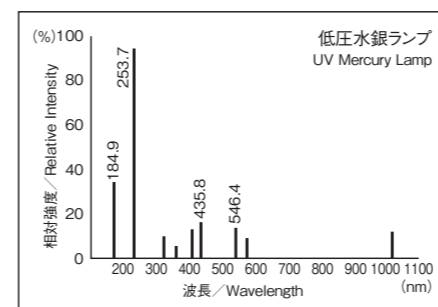
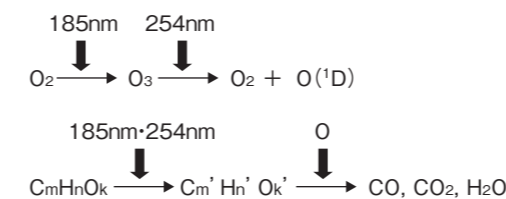
※このグラフは光エネルギーの大きさを結合エネルギーと単に比較したもので、結合エネルギー以上の光を照射すると必ず解離するわけではありません。光の吸収があること、励起ポテンシャルが解離型であることなどの条件が必要です。

## その他光源との比較 Comparison with Other Light Source

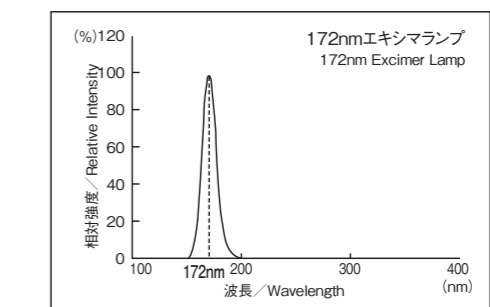
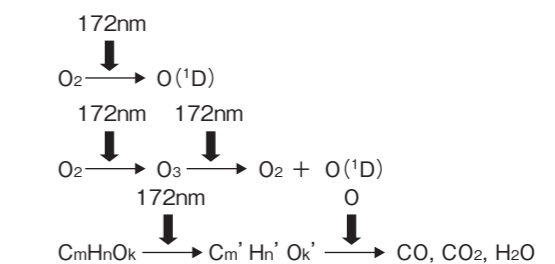
### 低圧水銀ランプとエキシマランプの概念比較図 Comparison Excimer with Low Pressure UV Mercury Lamp



### 低圧水銀ランプを用いたUV/O<sub>3</sub>洗浄 Low Pressure UV Mercury Lamp



### 172nmエキシマランプを用いたVUV/O<sub>3</sub>洗浄 172nm Excimer Lamp



# エキシマ光のメカニズムと各種データ

Mechanism and various data of excimer light

## 接触角低減

Reduction of wafer contact angle

### 水の接触角変化

Change of Water Contact Angle

照射前 / Before Radiation



照射後 / After Radiation



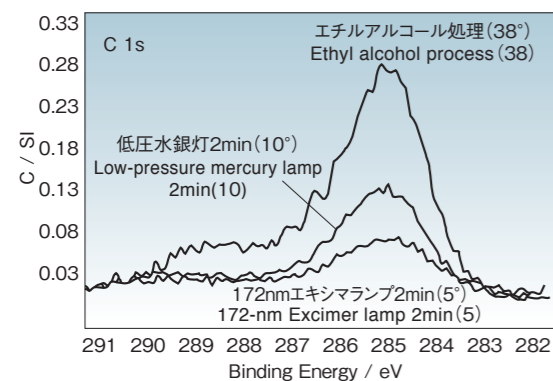
処理条件 / Process Conditions

照射時間 / Radiation time	10秒 / 10 seconds
サンプル / Sample	無アルカリガラス / Non-alkali glass
雰囲気 / Atmosphere	大気中 / In atmospheric air
照射距離 / Radiation distance	2mm / 2mm

## VUV照射によるC量の変化

Change in Amount of C Caused by VUV Radiation

XPSによる分析結果 / XPS Analysis Result



Radiation  
Mg Kalpha  
Max Count Rate  
934 CPS  
Analyser  
20 eV  
Step Size  
0.10 eV  
Dwell Time  
200 ms  
No of Channels  
131  
NO of Scans  
35  
Time for Region  
917 Sec  
Acquired  
13:07 24-Dec-93  
Plotted  
13:51 07-Jan-94

接触角が低下するに従って、表面の炭素(C 1s)が減少していくことがわかります。

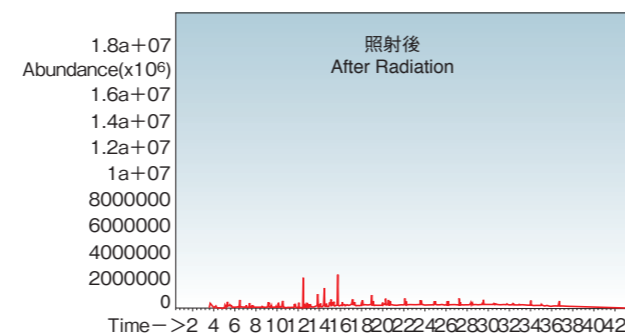
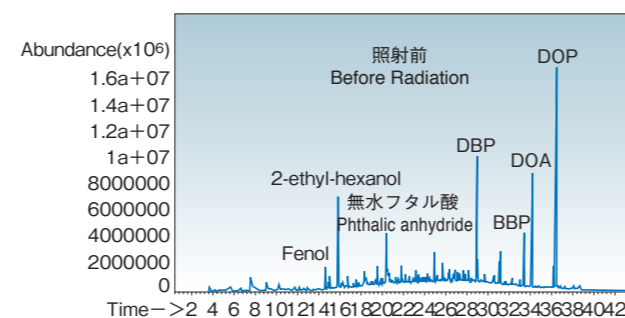
As the above graph shows, the amount of carbon on the surface decreases as the contact angle becomes smaller.

実験条件 / Experimental Conditions

光源 / Light source	エキシマ光照射装置 (UER200-172) 低圧水銀ランプ 450W (当社製) Excimer light radiation unit (UER200-172) / Low-pressure 450-W mercury lamp (manufactured by USHIO)
サンプル / Sample	石英ガラスGE-214 (GE製) エチルアルコールで超音波洗浄したもの Quartz glass GE-214 (manufactured by GE) cleaned by ultrasonic cleaner with alcohol.

## ケミカルコンタミネーション除去

Removal of Chemical Contamination



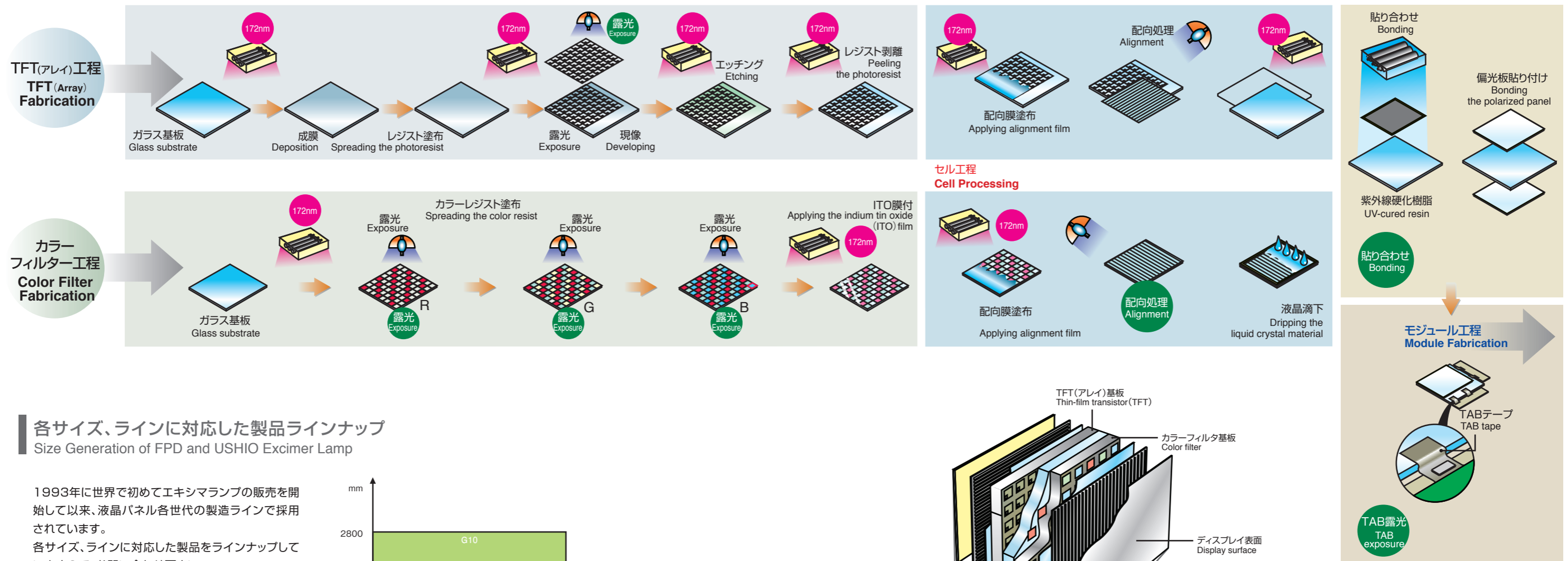
処理条件 / Process Conditions

測定方法 / Measurement method	TDS (昇温脱離ガス分析装置) / TDS
ワーク / Workpiece	φ8° Siウェーハ / φ8° Si wafer
光源 / Light source	エキシマ光照射装置 (UER200-172) Light source: Excimer light radiation unit (UER200-172)
照射距離 / Radiation distance	1mm / 1mm
雰囲気 / Atmosphere	大気中 / In atmospheric air

# エキシマVUV光の主な用途例

	洗浄 Cleaning	改質 Performing	その他 Others
半導体 Semiconductor	ウエハ洗浄 モールド洗浄 レジスタアッシング (P10)	HMDS成膜前処理 酸化膜成膜	帯電除去 (P10) 光CVD
液晶 LCD	受入ガラス洗浄 (P8) COG洗浄	PI塗布前 ITO膜仕事関数向上 エアギャップ工程前	
フォトマスク Photo Mask	石英/メタル マスクの洗浄	酸化膜の成膜 成膜前処理	
フィルム Film	フィルムの ドライ洗浄	各種ポリマーの 表面改質 (P10) 架橋重合	帯電除去 精密乾燥 (P11) 金属ペーストの焼成 架橋重合
PV	受入ガラス洗浄 ウエハ洗浄	ITO膜仕事関数向上	精密乾燥 仕事関数向上
バイオ/メディカル/ 環境 Bio / Medical / Environment	基材の洗浄 / 殺菌	成膜前処理 SAM成膜前処理	のりなし接合 (P12) 親水化の維持 汚染物質の分解 オゾンナイザー 紫外線治療 / 殺菌
その他 Others			蛍光励起

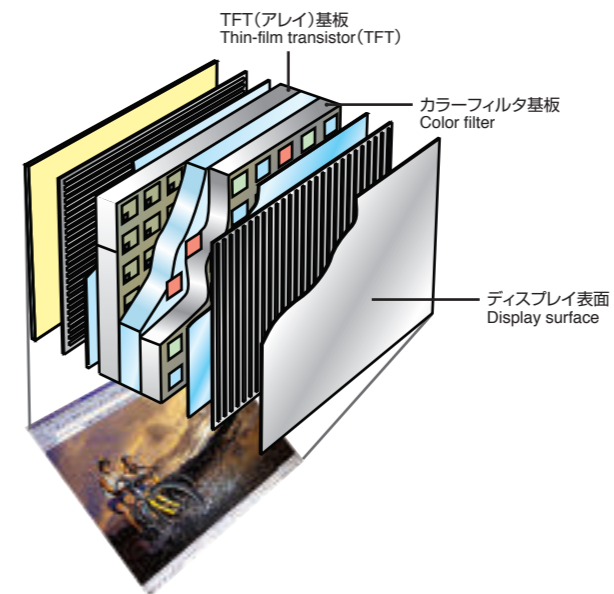
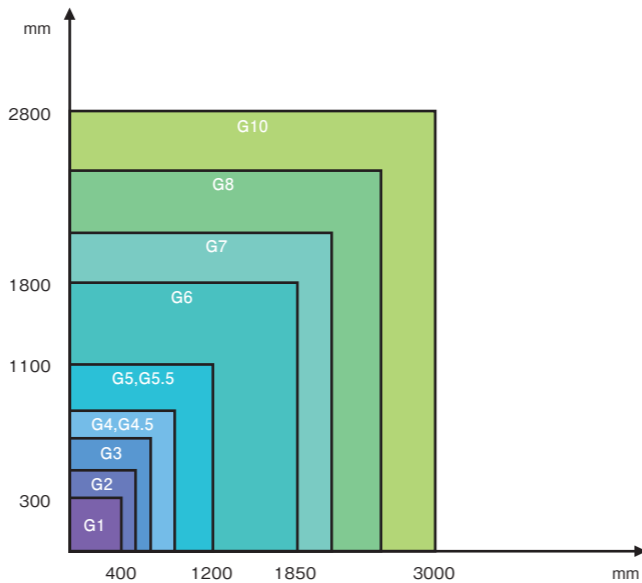
### フラットパネルディスプレイ (FPD) の製造プロセス Flat Panel Display (FPD) Production Process



### 各サイズ、ラインに対応した製品ラインナップ Size Generation of FPD and USHIO Excimer Lamp

1993年に世界で初めてエキシマランプの販売を開始して以来、液晶パネル各世代の製造ラインで採用されています。  
各サイズ、ラインに対応した製品をラインナップしていますので、お問い合わせ下さい。

Since USHIO Inc. initially started to sell USHIO excimer units, USHIO excimer units are used to each flat panel display (FPD) production line of each FPD generation.  
We would like to propose our suitable excimer units to each FPD generation.

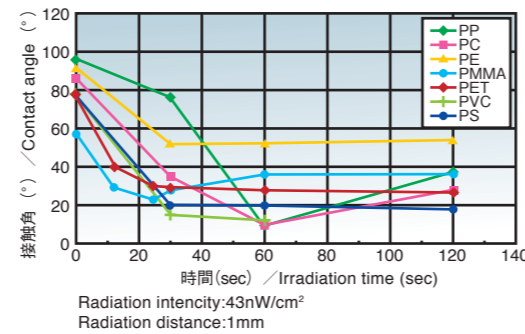
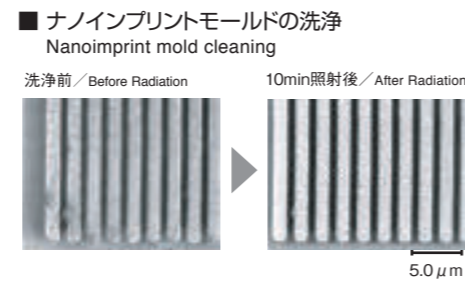
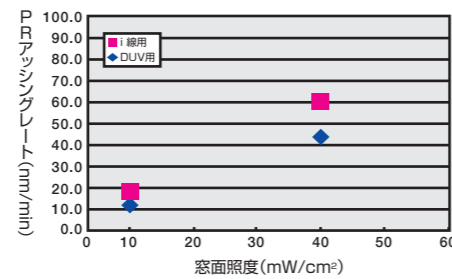


ダメージフリーUVアッシング  
Damage-free UV ashing

UV照射により、励起酸素とレジストの化学反応を促進し、基板上的レジストを灰化除去。  
Promotion of chemical reaction between excited oxygen and resist, and ashing removal of resist on substrate through UV irradiation.

用途/Applications

- ナノインプリントモールドの洗浄  
Nanoimprint mold cleaning
- レジストのアッシング・表面改質  
Ashing of resist/Surface reforming
- レジストの現像残渣除去  
Removal of resist development residue



プラスチックの表面改質  
Cleaning data with Dielectric Barrier Discharge Excimer Lamp

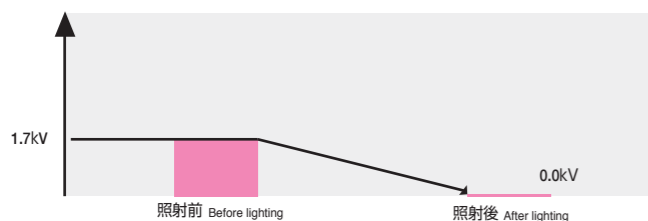
例：エキシマ光によるフィルム表面の濡れ性向上  
Ex : Excimer Light improves the Surface of Film

基板表面をドライ洗浄しながら帯電除去  
Erase static electricity while dry cleaning the substrate surface

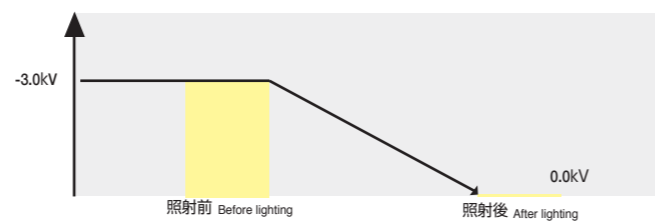
基板表面への172nmエキシマ光の照射によって、精密ドライ洗浄と同時に静電気を除去します。  
By radiating excimer light of 172nm to the substrate surface, it is available to precision dry cleaning and charge erase at sometime.

実験データ/Test data

■ “+”帯電の場合 / When charged positively



■ “-”帯電の場合 / When charged negatively



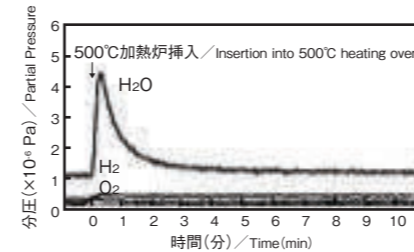
VUV(精密)乾燥  
Dehydration by VUV irradiation

有機性膜プロセスにおいて、水分子の吸着により界面異常が発生、短寿命/性能劣化の大きな要因。  
In the process of an organic material film deposition technology, interfacial abnormality due to the water molecule absorption could be a major factor of shortening/degrading a panel life time.

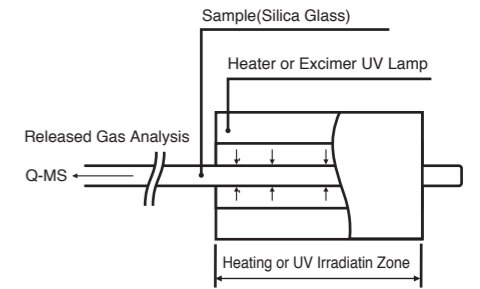
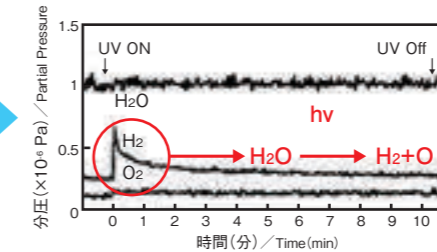
対策/Countermeasure

VUV照射により、水分子を分解、除去(乾燥)することで界面異常の発生を抑制、且つ、低温(ヒーターレス)の有機性膜プロセスを構築。  
VUV irradiation is able to decompose and remove(dry) H<sub>2</sub>O and makes it possible to restrain the interfacial abnormality with lower temperature(No heating required).

■ 500°C Heating Only (UV Off)



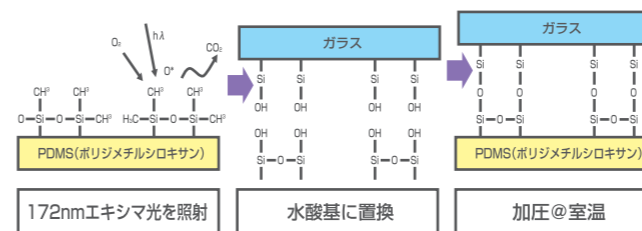
■ Only VUV On (Heating Off)



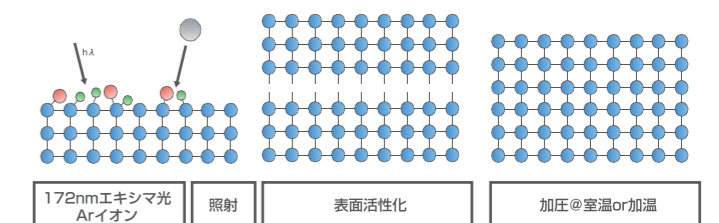
表面活性化による常温接合  
Bonding without "adhesive" through surface activation.

表面の活性化と有機物の除去により「のりなし接合」と「接合強度のアップ」を実現。  
Realization of both "adhesive-free coupling" and "greater coupling strength" through surface activation and removal of organic substances.

■ PDMS-ガラスの“のり”なし接合  
Adhesive-free coupling of PDMS and glass



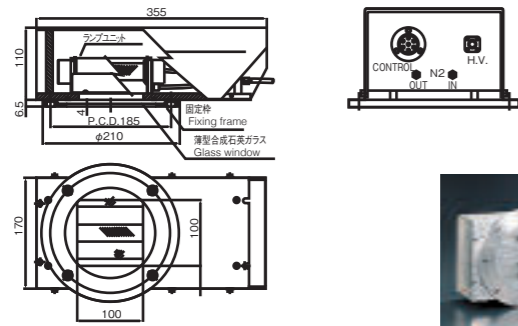
■ 各種材料の表面活性化による、のりなし接合  
Adhesive-free coupling through surface activation of all types of materials



### 光化学実験用エキシマ光照射ユニット Excimer light emission unit for photochemical experiments

標準型(172nm / 222nm / 308nm) / Standard Type (172nm / 222nm / 308nm)

#### ランプハウス / Lamp House



#### 仕様 / Specifications

形式 Model	雰囲気 Atmosphere	照射特性 Radiation characteristics			ランプ寿命 Lamp life** (h)
		中心波長 Central wavelength (nm)	半値幅 Full width at half maximum(nm)	放射照度* Irradiance* (mW/cm <sup>2</sup> )	
SUS05	大気	172	14	10	1000**
SUS06	真空	172	14	9	
SUS12	大気	222	2	5	
SUS14	真空	222	2	4.5	
SUS13	大気	308	2	4	
SUS15	真空	308	2	3.5	

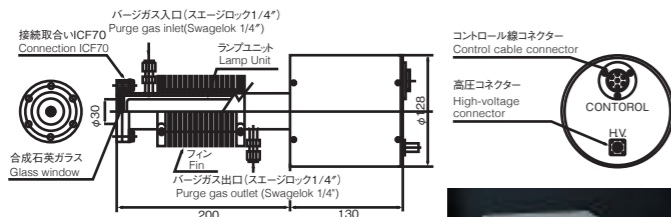
\*自社測定方法による測定値 \*\*ランプの光出力が初期の50%になった時点  
\* Value measured by USHIO's measurement method  
\*\* Time when the lamp power output becomes 50% of the initial value

#### ユーティリティ / Utilities

電源容量 Electricity	窒素 Nitrogen
AC100V±6V 100VA	4.5~5.5NI/min (純度99.99%以上) (purity of 99.99% or more)

ヘッドオン型(172nm / 222nm / 308nm) / Head-on Type (172nm / 222nm / 308nm)

#### ランプハウス / Lamp House



#### 仕様 / Specifications

形式 Model	雰囲気 Atmosphere	照射特性 Radiation characteristics			ランプ寿命 Lamp life** (h)
		中心波長 Central wavelength (nm)	半値幅 Full width at half maximum(nm)	放射照度* Irradiance* (mW/cm <sup>2</sup> )	
SUS02	大気	172	14	5	700**
SUS03	真空	172	14	4.5	
SUS09	大気	222	2	2.8	
SUS10	真空	222	2	1.9	
SUS16	大気	308	2	2.5	
SUS17	真空	308	2	1.7	

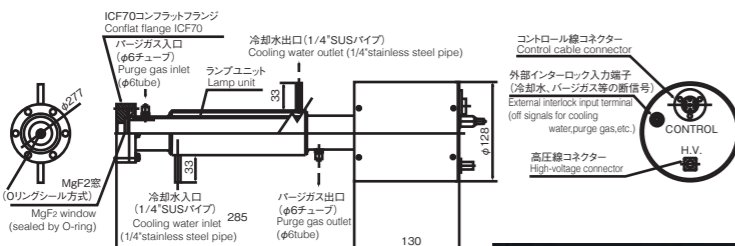
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\* Value measured by USHIO's measurement method  
\*\* Time when the lamp power output becomes 50% of the initial value

#### ユーティリティ / Utilities

電源容量 Electricity	窒素 Nitrogen
AC100V±6V 100VA	4.5~5.5NI/min (純度99.99%以上) (purity of 99.99% or more)

ヘッドオン型(126nm / 146nm) / Head-on Type (126 nm / 146nm)

#### ランプハウス / Lamp House



#### 仕様 / Specifications

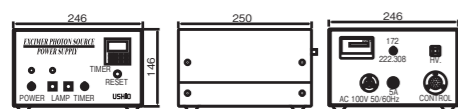
形式 Model	雰囲気 Atmosphere	照射特性 Radiation characteristics		ランプ寿命 Lamp life** (h)
		中心波長 Central wavelength (nm)	半値幅 Full width at half maximum(nm)	
SUS11	真空	126	10	500**
SUS07		146	13	700**

\*\*ランプの光出力が初期の50%になった時点  
\*\* Time when the lamp power output becomes 50% of the initial value

#### ユーティリティ / Utilities

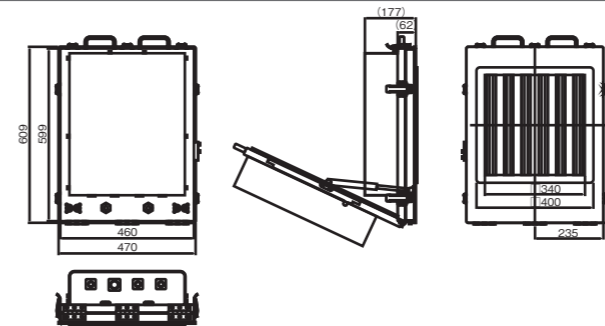
電源容量 Electricity	冷却水 Cooling water	窒素 Nitrogen
AC100V±6V 100VA	1~2l/min (市水、30℃以下) (tap water at 30℃ or lower)	4.5~5.5NI/min (純度99.99%以上) (purity of 99.99% or more)

#### 点灯電源 / Power Supply



### 半導体製造工程用エキシマ光照射ユニット Excimer light emission unit for semiconductor manufacturing process

12インチウェーハ用 / 12-inch Wafer Model



#### 参考仕様 / Specifications for reference

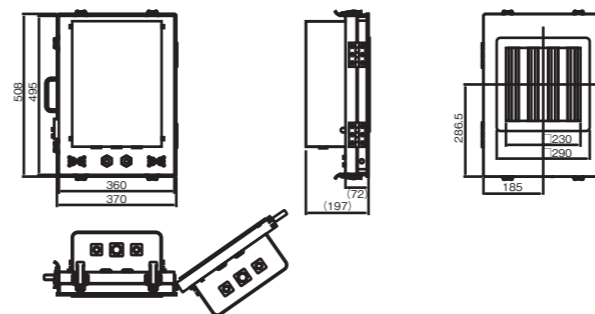
照射窓寸法 Window size	照射均一度 Radiation uniformity	放射照度(窓面実測値) Irradiance value actually measured on window surface
□340mm	±15%	10mW/cm <sup>2</sup>

\*個別設計により、照射均一度および照度は変わります。  
\*The radiation uniformity and irradiance may vary depending on individual designs.

#### ユーティリティ / Utilities

電源容量 Electricity	冷却水 Cooling water	窒素 Nitrogen
AC200V±10% 1.5kVA AC200V±10% 1.5kVA or higher	1.5~3.0l/min (市水、30℃以下) (tap water at 30℃ or lower)	30~40NI/min (純度99.99%以上) (purity of 99.99% or more)

8インチウェーハ用 / 8-inch Wafer Model



#### 参考仕様 / Specifications for reference

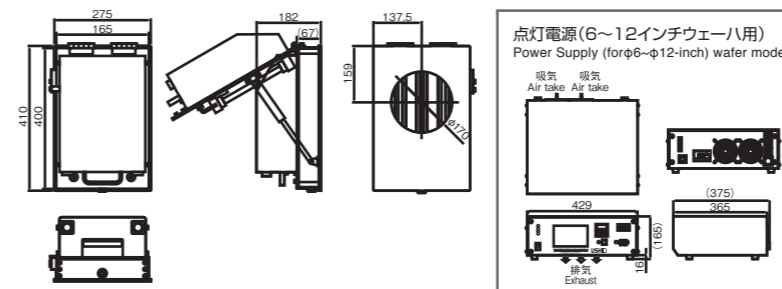
照射窓寸法 Window size	照射均一度 Radiation uniformity	放射照度(窓面実測値) Irradiance value actually measured on window surface
□230mm	±15%	10mW/cm <sup>2</sup>

\*個別設計により、照射均一度および照度は変わります。  
\*The radiation uniformity and irradiance may vary depending on individual designs.

#### ユーティリティ / Utilities

電源容量 Electricity	冷却水 Cooling water	窒素 Nitrogen
AC100V±10V 700VA AC100V±10V 700VA or higher	1.5~3.0l/min (市水、30℃以下) (tap water at 30℃ or lower)	20~30NI/min (純度99.99%以上) (purity of 99.99% or more)

6インチウェーハ用 / 6-inch Wafer Model



#### 参考仕様 / Specifications for reference

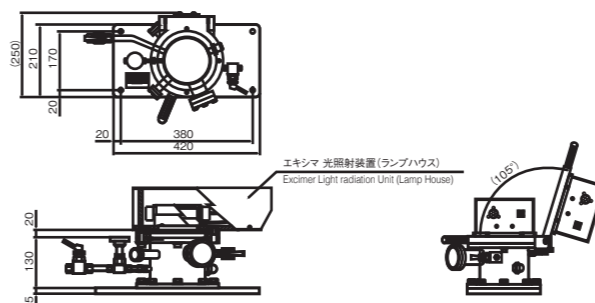
照射窓寸法 Window size	照射均一度 Radiation uniformity	放射照度(窓面実測値) Irradiance value actually measured on window surface
φ170mm	±15%	10mW/cm <sup>2</sup>

\*個別設計により、照射均一度および照度は変わります。  
\*The radiation uniformity and irradiance may vary depending on individual designs.

#### ユーティリティ / Utilities

電源容量 Electricity	冷却水 Cooling water	窒素 Nitrogen
AC100V±10V 600VA AC100V±10V 600VA or higher	1.5~3.0l/min (市水、30℃以下) (tap water at 30℃ or lower)	20~30NI/min (純度99.99%以上) (purity of 99.99% or more)

5インチ チャンバ / 5-inch Chamber



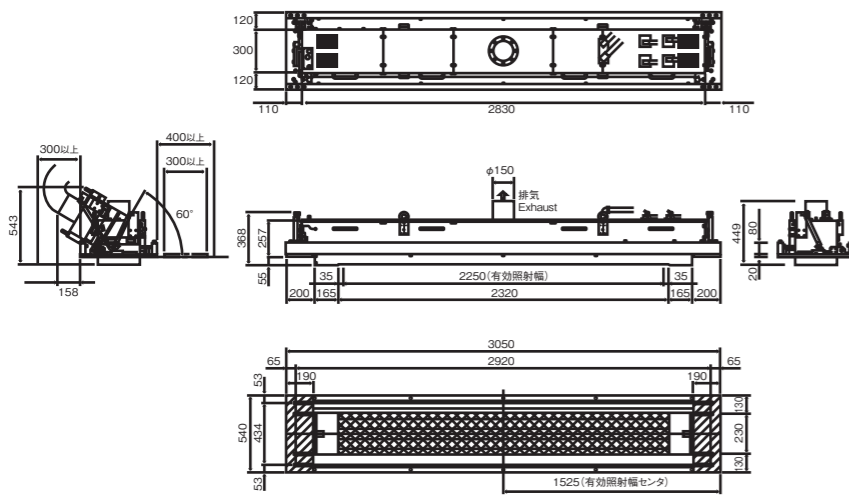
#### 仕様 / Specifications

形式 Model	照射エリア Irradiation area
P0032	φ133.8mm

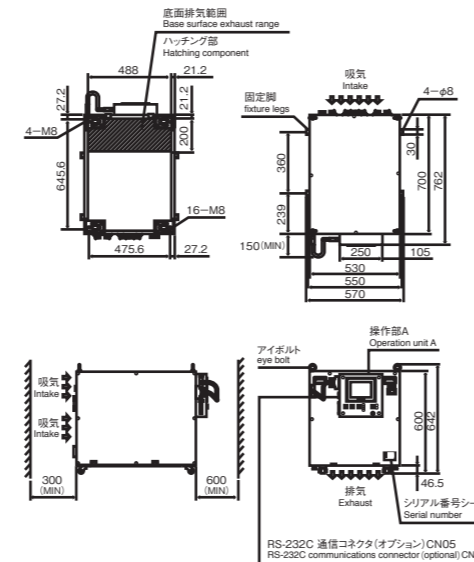


### FPD製造工程用エキシマ光照射ユニット Excimer Light Emission Unit for FPD manufacturing process

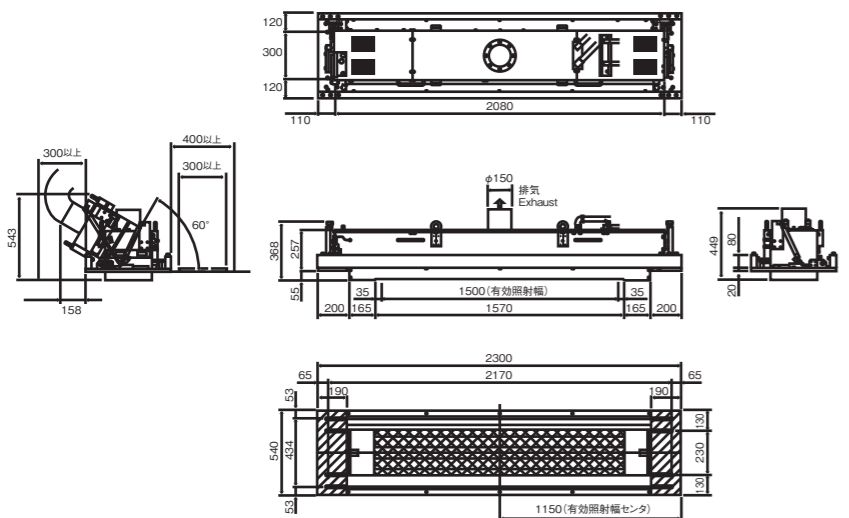
〈スキャンタイプ〉2200mm幅対応高照射タイプ / 〈Scan type〉High irradiance type for width of 2200 mm



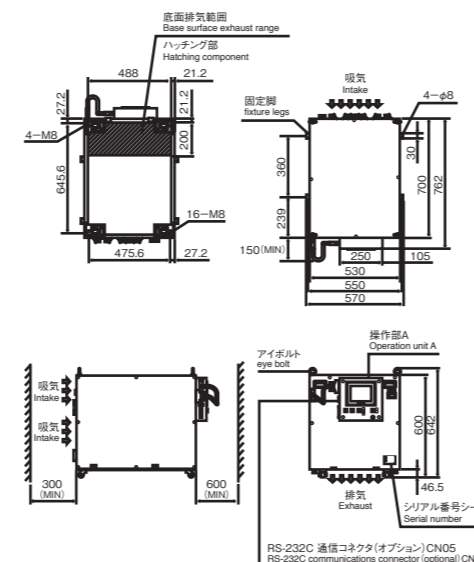
■ 点灯電源 (B0271-04) / Power supply (B0271-04)



1500mm幅対応高照射タイプ / High irradiance type for width of 1500 mm



■ 点灯電源 (B0271-04) / Power supply (B0271-04)



### システムの構成例 Example of system configuration

当社のエキシマ光照射ユニットは、お客様のご要望に合わせてフレキシブルなシステム構築が可能です。  
USHIO's Excimer Light Emission System enables the flexible design of a system configuration to satisfy customer requirements.

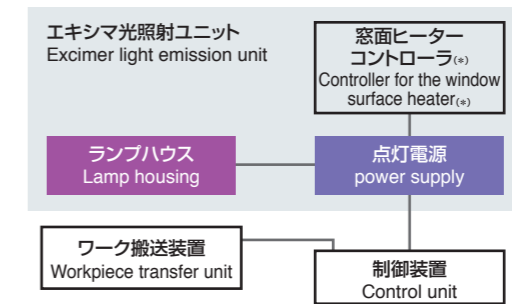
#### ■ 基本構成 / Basic configuration

エキシマ光照射ユニットの基本構成は、ランプハウス、点灯電源から構成されます。

※窓面ヒーターコントロールユニットはオプションです。

The basic configuration of Excimer Light Emission System consists of a lamp house and a power supply.

※The control unit for the window surface heater is optional.



### 照度モニタ Irradiance monitor



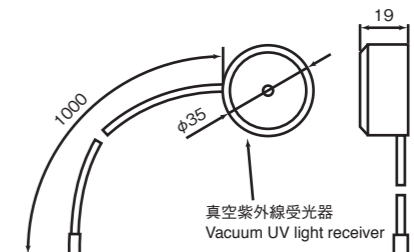
VUV-S172/UIT-250

- 172nmエキシマ光の照度、ピーク照度、積算光量の測定。  
Measures the irradiance, peak irradiance, and integrated light quantity of 172-nm excimer light.
- メモリ搭載で最大4分間の照度測定。  
Measures irradiance for up to four minutes with mounted memory.
- 延長ケーブル(本体～受光部:標準オプション2m)対応。  
Can be connected between the main unit and light receiver by a 2-meter extension cable (option).
- オートパワーのON/OFF切り替え  
Switches between ON and OFF of auto power.
- PCとのシリアル通信機能(対応OS:Windows XP/2000)  
Features a serial communication function with a PC (supporting Windows XP/2000 OS).

#### ■ 受光部 VUV-S172 / Light receiving unit VUV-S172

形式 / Model	VUV-S172(受光部) / VUV-S172(light receiving unit)
感度波長域 Sensitivity wavelength range	150nm~400nm
校正波長 Calibration wavelength	中心波長:172nm 半値全幅14nmのエキシマ光 Center wavelength: 172-nm full width at half maximum: 14-nm excimer light
受光径 Light receiving diameter	φ4mm
測定温度範囲 Measurable temperature range	0~50°C
放射照度測定範囲 (mW/cm²) Emission irradiance measuring range (mW/cm²)	HLレンジ H range 0~999.9 MLレンジ M range 0.0~99.99 LLレンジ L range 0.00~9.999
寸法 / Dimensions	外形図参照 / See External View.
質量 / Weight	約57g / About 57 g

#### ■ 外形図 / External View



ご注意 / 本モニタを使用する場合、真空紫外線受光器と感度調整アダプタの型式及びシリアル番号が一致していることを確認してください。真空紫外線受光器と感度調整アダプタの型式及びシリアル番号が一致していない場合、UIT-250本体には表示をしますが、実際の表示値とは異なります。

When using this monitor, confirm that the models and serial numbers of the vacuum UV light receiver and sensitivity adjusting adapter match. If these models and serial numbers do not match, the values displayed on the UIT-250 main unit do not reflect the actual display values.

形式 / Model	UIT-250(本体) / UIT-250 (main unit)
表示 Display	液晶デジタル表示、照度4桁、積算光量5桁 Liquid crystal display (4-digit irradiation, 5-digit integrated light quantity)
機能 Function	リアルタイム照度、ピーク照度、積算光量、3段階レンジ切替え、オートパワーオフ(5分) Real-time irradiance, peak irradiance, integrated light quantity, 3-step range switching, auto power OFF (in 5 minutes)
照度分布出力 Irradiance distribution output	アナログ0-1V出力、記録時間最大2分または4分(記録計接続) Analog 0 to 1V output, maximum recording time of 2 or 4 minutes (with recorder connected)
サンプルレート Sample rate	16または32サンプル / 秒 16 or 32 samples per second
通信仕様 Communication specifications	通信仕様:半二重、同期方式:調歩同期(非同期)、ボーレート:4800bps(固定)、伝送コード:ASCⅡ、データ長:8bit(固定)、ストップビット:1、パリティ:なし、デリミタ:CR Communication specifications: Half-duplex; Synchronization system: Start-stop synchronization (asynchronous); Baud rate: 4800 bps (fixed); Transmission code: ASCII; Date length: 8 bits (fixed); Stop bit: 1; Parity: None; Delimiter: CR
寸法 (mm) / Dimensions	75(W)×160(D)×15(H)
重量 (g) / Weight	250g以下、本体のみ(電池含まず) / 250 g or less, main unit only (without batteries)
電源 / Power supply	×単4電池3本 / LR04 battery x 3



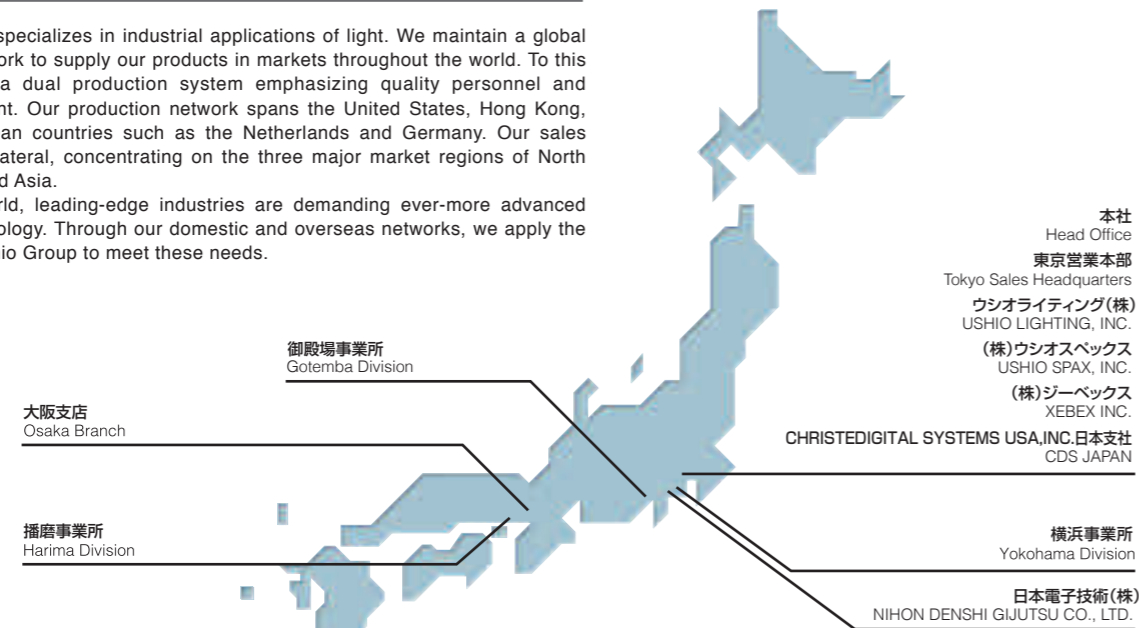
光の専門企業として産業用途の「光」に特化し、世界の光市場をカバーするウシオグループ。

求められる地で「光」をつくる“消費地生産”と、質の高い労働力や材料調達に適した地で「光」をつくる“適地生産”の2つの生産体制主義に徹し、すでにアメリカ、ヨーロッパ(オランダ、ドイツ)、香港、台湾、フィリピンに生産拠点を設立。また販売ネットワークもアメリカ、ヨーロッパ、アジアの三大拠点を中核に展開しています。

世界のさまざまな産業の先端分野で求める高レベルの「光」を、ウシオは海外・国内を合わせ、グループの総力を結集して提供しています。

The USHIO Group specializes in industrial applications of light. We maintain a global manufacturing network to supply our products in markets throughout the world. To this end, we maintain a dual production system emphasizing quality personnel and material procurement. Our production network spans the United States, Hong Kong, Taiwan and European countries such as the Netherlands and Germany. Our sales structure is also trilateral, concentrating on the three major market regions of North America, Europe and Asia.

Throughout the world, leading-edge industries are demanding ever-more advanced levels of light technology. Through our domestic and overseas networks, we apply the strengths of the Ushio Group to meet these needs.



国内 / Domestic

ウシオ電機株式会社	USHIO INC.
本社	Head Office
東京営業本部	Tokyo Sales Headquarters
大阪支店	Osaka Branch
播磨事業所	Harima Division
横浜事業所	Yokohama Division
御殿場事業所	Gotemba Division



主なグループ企業 / Major Group Companies

ウシオライティング	USHIO LIGHTING, INC.
ウシオスペースックス	USHIO SPAX, INC.
ジーベックス	XEBEX INC.
日本電子技術	NIHON DENSHI GIJUTSU CO., LTD.



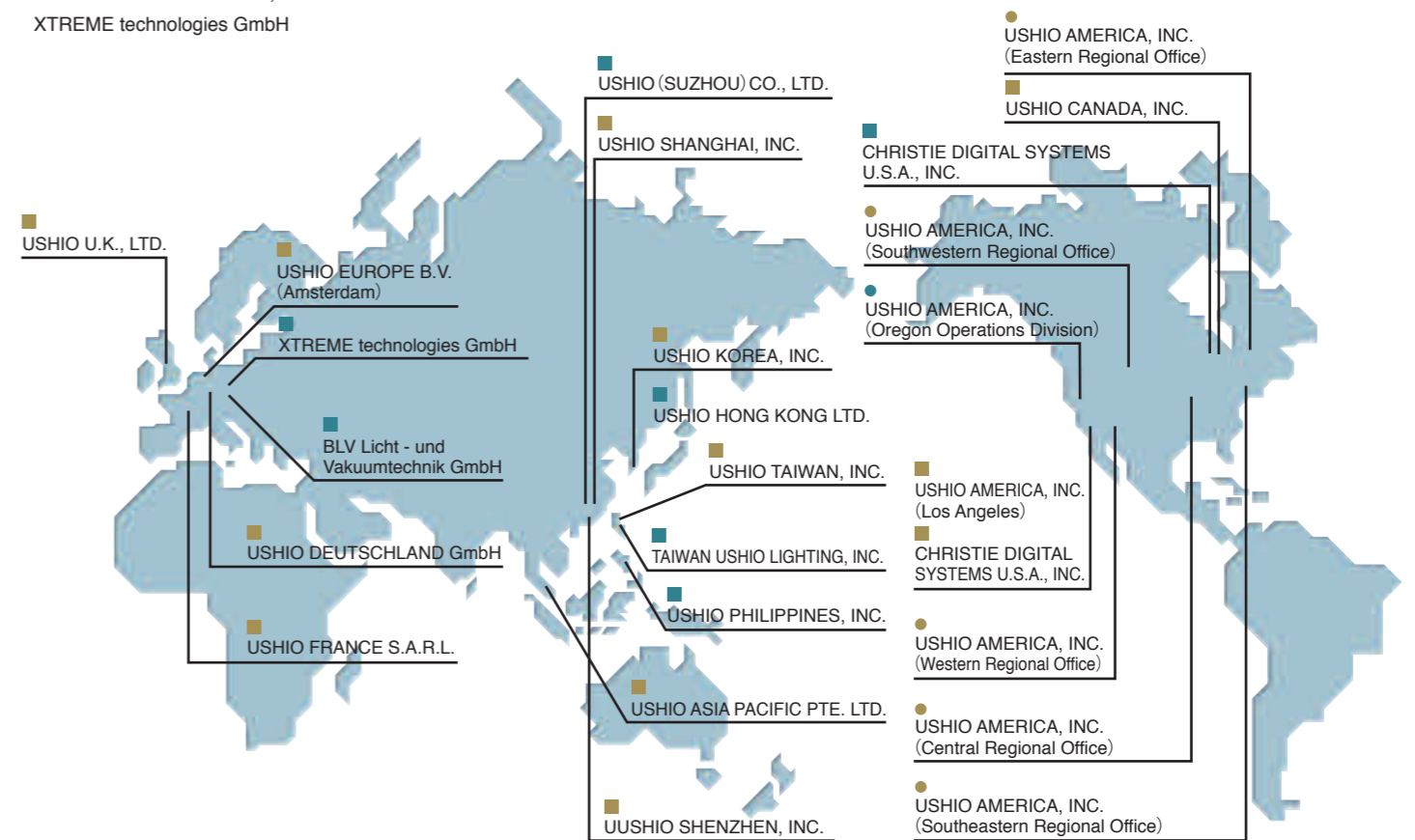
海外 / Overseas Operations

■販売拠点 / Sales

- USHIO AMERICA, INC.
- USHIO CANADA, INC.
- CHRISTIE DIGITAL SYSTEMS U.S.A., INC.
- USHIO ASIA PACIFIC PTE. LTD.
- USHIO EUROPE B.V.
- USHIO DEUTSCHLAND GmbH
- USHIO FRANCE S.A.R.L.
- USHIO HONG KONG LTD.
- USHIO TAIWAN, INC.
- USHIO U.K., LTD.
- USHIO KOREA, INC.
- USHIO SHANGHAI, INC.
- USHIO SHENZHEN, INC.

■研究開発・生産拠点 / Manufacturing

- CHRISTIE DIGITAL SYSTEMS CANADA INC.
- BLV Licht - und Vakuumtechnik GmbH
- USHIO PHILIPPINES, INC.
- USHIO (SUZHOU) CO., LTD.
- TAIWAN USHIO LIGHTING, INC.
- XTREME technologies GmbH





## Excimer VUV Light Emission Unit (126 / 146nm)

(1) Power Supply	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installation and removal. Otherwise it could cause electrical shock.</li> <li>Do not modify or overhaul power supply. Otherwise it could cause electrical shock, fire and smoke.</li> <li>Earth (ground) must be connected utilizing three poles electrical outlet. Otherwise it could cause electrical shock and noise.</li> </ul>
<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning lamp unit and lamp house. Otherwise it could cause electrical shock, overheating and breakage.</li> <li>Use Ushio's specified lamp house. Otherwise it could cause electrical shock, fire and smoke.</li> <li>Do not turn on lamp operation switch when lamp unit is not installed. Otherwise it could cause electrical shock.</li> <li>When connecting cables, fix them firmly with screws to avoid looseness or separation. If connection is insufficient, it could cause malfunctions. Otherwise it could cause problems such as overheating due to poor connection.</li> <li>Cables should be installed loosely and should not be coiled or stretched. Otherwise it could cause overheating by poor connection and wire disconnection.</li> <li>Do not drop, hit against anything or apply excessive force. Otherwise it could cause electrical shock, fire and overheating.</li> <li>Do not operate power supply in a close proximity of combustible material such as paper or cloth, nor cover it with such materials. Otherwise it could cause fire.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Power supply must be installed after having confirmed a supply voltage at installation site. Input to power supply must be kept at 100V±6V.</li> <li>Surrounding temperature for operation should be kept within 10-35°C. If power supply is operated inside a case, there should be sufficient space and ventilation to keep surrounding temperature for operation maintained within 10-35°C.</li> <li>Surrounding humidity should be kept within 20-80 % RH. Power supply should be operated in a water or condensation proof environment.</li> <li>Light output varies if system is used in an area where supply voltage varies. In such a case, use a special power supply that regulates voltage.</li> <li>An inrush current of more than 7 to 8 times of its normal current when lamp operation is stabilized is generated immediately after ignition. Breaker capacity set up should be carefully examined by taking this fact into consideration before use.</li> <li>If lamp unit does not turn on, switch off power supply and investigate the problem by referring to Section "Trouble Shooting" in the manual. Please contact your nearest office mentioned in the backside of operation manual or the following office, if the problem cannot be resolved.</li> <li>Tokyo Sales Office TEL. 03-3242-5058 FAX. 03-3242-2700</li> </ul>	

(2) Lamp House	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installation and removal. Otherwise it could cause electrical shock.</li> <li>Do not look directly or indirectly at the light from lamp house during operation. Otherwise it could cause sore eyes or eyesight problems.</li> <li>Do not directly or indirectly expose your skin to the lamp radiation. Otherwise it could cause skin burn.</li> <li>Thoroughly ventilate the area when operating lamp house in an oxygen atmosphere (such as in open air). It could generate a harmful ozone. If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not modify or overhaul lamp house. Otherwise it could cause electrical shock, fire and smoke.</li> <li>Do not operate lamp unit with lamp house cover left open. During operation, hazardous high-voltages with high frequencies of several kilo Volts is generated by transformer. Otherwise it could cause electrical shock.</li> </ul>
<ul style="list-style-type: none"> <li>Pipes for nitrogen should be properly connected. Otherwise it could cause electrical shock if cooling water is accidentally supplied.</li> <li>Use USHIO's specified power supply and lamp unit. Otherwise it could cause electrical shock, overheating and breakage.</li> <li>Firmly fix the lamp connector to lamp house. Otherwise it could cause electrical shock, fire, smoke and overheating.</li> <li>When connecting cables, fix them firmly with screws to avoid looseness or separation. If connection is insufficient, it could cause malfunctions. Otherwise it could cause overheating due to poor connection, etc.</li> <li>Do not drop, hit against anything, or scratch the lamp house as it contains glass materials. Otherwise it could cause injury if breakage occurs.</li> <li>Do not touch light irradiation window during or immediately after operation as it is hot. Otherwise it could cause a burn.</li> <li>Do not operate lamp house in a close proximity to combustible material such as paper or cloth, nor cover it with such materials. Otherwise it could cause fire.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Water must be circulated for water cooling type lamp house. Operation without water cooling circulation could cause lamp breakage.</li> <li>Lamp house must be purged with nitrogen gas as per specified procedures before lamp ignition. Unless operated in a nitrogen gas atmosphere, Vacuum Ultra-violet rays will not be emitted properly, lamp house mirror and lamp electrodes can be oxidized, and light output could be reduced.</li> <li>Lamp house must be purged with nitrogen. Do not use other gases such as argon, neon etc.</li> <li>Make sure to dispose or ventilate Nitrogen gas.</li> <li>Surrounding temperature for operation should be kept within 10-35°C. If lamp house is operated inside a case, there should be sufficient space and ventilation to keep surrounding temperature for operation maintained within 10-35°C.</li> <li>Surrounding humidity should be kept within 20-80 % RH. Lamp house should be operated in a water or condensation proof environment.</li> <li>Radiation window glass must be kept clean. Use a soft piece of cloth soaked with cleansing liquid for optical lenses (ethyl alcohol) to clean glass surface of irradiation window. Decompositions of dust or organic materials on radiation window glass will reduce light output.</li> <li>Avoid any excessive vibrations or shock during operation as the system contains glass parts.</li> <li>Do not create a vacuum on the inside of lamp house.</li> </ul>	

(3) Lamp Unit	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning system. Otherwise, it could cause electrical shock.</li> <li>Do not look directly or indirectly at the light from lamp unit during operation. Otherwise it could cause sore eyes or eyesight problems.</li> <li>Do not directly or indirectly expose your skin to the lamp radiation. Otherwise it could cause skin burn.</li> <li>Thoroughly ventilate the area when operating lamp unit in an oxygen atmosphere (such as in open air). It could generate a harmful ozone. If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not overhaul lamp unit. Otherwise it could cause electrical shock, fire, smoke and abnormal arc discharge.</li> </ul>
<ul style="list-style-type: none"> <li>Use Ushio's specified lamp house and power supply. Otherwise it could cause electrical shock, fire, smoke, overheating and breakage.</li> <li>Do not carry lamp unit by its lead wires nor pull lead wires. Otherwise it could cause breakage. If they are accidentally detached, contact your nearest office or the following office.</li> <li>Do not pull lamp bases. Otherwise it could cause breakage. If they are accidentally detached, contact your nearest office or the following office.</li> <li>Tokyo Sales Office TEL. 03-3242-5058 FAX. 03-3242-2700</li> <li>Firmly fix the lamp connector to lamp house. Otherwise it could cause electrical shock, fire, smoke and overheating.</li> <li>Do not attempt to operate a broken lamp unit. Otherwise it could cause electrical shock.</li> <li>Do not touch during or immediately after operation, as it is hot. Otherwise it could cause a burn.</li> <li>Do not operate in inflammable atmosphere such as volatile thinner etc. Otherwise it could cause explosion and fire. Otherwise it could cause injury when broken.</li> <li>Do not operate lamp unit in close proximity of combustible material such as paper or cloth, nor cover it with such materials. Otherwise it could cause fire.</li> <li>Used lamps should be disposed without breaking them. Otherwise, it could cause injury.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Do not touch lamp unit with bare hands. Organic materials and their decompositions on lamp outer surface will reduce light output.</li> <li>Avoid any excessive vibrations or shock during operation as it contains glass parts.</li> </ul>	

## Standard Type Excimer UV Light Emission Unit (172 / 222 / 308nm) Head-on Type Excimer UV Light Emission Unit (172 / 222 / 308nm)

(1) Power Supply	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installation and removal. Otherwise it could cause electrical shock.</li> <li>Do not modify or overhaul power supply. Otherwise it could cause electrical shock, fire and smoke.</li> <li>Earth (ground) must be connected utilizing three poles electrical outlet. Otherwise it could cause electrical shock and noise.</li> </ul>
<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning lamp unit and lamp house. Otherwise it could cause electrical shock, overheating and breakage.</li> <li>Use Ushio's specified lamp house. Otherwise it could cause electrical shock, fire and smoke.</li> <li>Do not turn on lamp operation switch when lamp unit is not installed. Otherwise it could cause electrical shock.</li> <li>When connecting cables, fix them firmly with screws to avoid looseness or separation. If connection is insufficient, it could cause malfunctions. Otherwise it could cause problems such as overheating due to poor connection.</li> <li>Cables should be installed loosely and should not be coiled or stretched. Otherwise it could cause overheating by poor connection and wire disconnection.</li> <li>Do not drop, hit against anything or apply excessive force. Otherwise it could cause electrical shock, fire and overheating.</li> <li>Do not operate power supply in a close proximity of combustible material such as paper or cloth, nor cover it with such materials. Otherwise it could cause fire.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Power supply must be installed after having confirmed a supply voltage at installation site. Input to power supply must be kept at 100V±6V.</li> <li>Surrounding temperature for operation should be kept within 10-35°C. If power supply is operated inside a case, there should be sufficient space and ventilation to keep surrounding temperature for operation maintained within 10-35°C.</li> <li>Surrounding humidity should be kept within 20-80 % RH. Power supply should be operated in a water or condensation proof environment.</li> <li>Light output varies if system is used in an area where supply voltage varies. In such a case, use a special power supply that regulates voltage.</li> <li>An inrush current of more than 7 to 8 times of its normal current when lamp operation is stabilized is generated immediately after ignition. Breaker capacity set up should be carefully examined by taking this fact into consideration before use.</li> <li>If lamp unit does not turn on, switch off power supply and investigate the problem by referring to Section "Trouble Shooting" in the manual. Please contact your nearest office mentioned in the backside of operation manual or the following office, if the problem cannot be resolved.</li> <li>Tokyo Sales Office TEL. 03-3242-5058 FAX. 03-3242-2700</li> </ul>	

(2) Lamp House	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installation and removal. Otherwise it could cause electrical shock.</li> <li>Do not look directly or indirectly at the light from lamp house during operation. Otherwise it could cause sore eyes or eyesight problems.</li> <li>Do not directly or indirectly expose your skin to the lamp radiation. Otherwise it could cause skin burn.</li> <li>Thoroughly ventilate the area when operating lamp house in an oxygen atmosphere (such as in open air). It could generate a harmful ozone. (172nm lamp house only) If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not modify or overhaul lamp house. Otherwise it could cause electrical shock, fire and smoke.</li> <li>Do not operate lamp unit with lamp house cover left open. During operation, hazardous high-voltages with high frequencies of several kilo Volts is generated by transformer. Otherwise it could cause electrical shock.</li> </ul>
<ul style="list-style-type: none"> <li>Pipes for nitrogen should be properly connected. Otherwise it could cause electrical shock if cooling water is accidentally supplied.</li> <li>Use USHIO's specified power supply and lamp unit. Otherwise it could cause electrical shock, overheating and breakage.</li> <li>Firmly fix the lamp connector to lamp house. Otherwise it could cause electrical shock, fire, smoke, and overheating.</li> <li>When connecting cables, fix them firmly with screws to avoid looseness or separation. If connection is insufficient, it could cause malfunctions. Otherwise it could cause overheating due to poor connection, etc.</li> <li>Do not drop, hit against anything, or scratch the lamp house as it contains glass materials. Otherwise it could cause injury if breakage occurs.</li> <li>Do not touch light irradiation window during or immediately after operation as it is hot. Otherwise it could cause a burn.</li> <li>Do not operate lamp house in a close proximity to combustible material such as paper or cloth, nor cover it with such materials. Otherwise it could cause fire.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Lamp house must be purged with nitrogen gas as per specified procedures before lamp ignition. Unless operated in a nitrogen gas atmosphere, Vacuum Ultra-violet rays will not be emitted properly, lamp house mirror and lamp electrodes can be oxidized, and light output could be reduced.</li> <li>Lamp house must be purged with nitrogen. Do not use other gases such as argon, neon etc.</li> <li>Make sure to dispose or ventilate Nitrogen gas.</li> <li>Surrounding temperature for operation should be kept within 10-35°C. If lamp house is operated inside a case, there should be sufficient space and ventilation to keep surrounding temperature for operation maintained within 10-35°C.</li> <li>Surrounding humidity should be kept within 20-80 % RH. Lamp house should be operated in a water or condensation proof environment.</li> <li>Radiation window glass must be kept clean. Use a soft piece of cloth soaked with cleansing liquid for optical lenses (ethyl alcohol) to clean glass surface of irradiation window. Decompositions of dust or organic materials on radiation window glass will reduce light output.</li> <li>Avoid any excessive vibrations or shock during operation as the system contains glass parts.</li> <li>Do not create a vacuum on the inside of lamp house.</li> </ul>	

(3) Lamp Unit	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning system. Otherwise, it could cause electrical shock.</li> <li>Do not look directly or indirectly at the light from lamp unit during operation. Otherwise it could cause sore eyes or eyesight problems.</li> <li>Do not directly or indirectly expose your skin to the lamp radiation. Otherwise it could cause skin burn.</li> <li>Thoroughly ventilate the area when operating lamp unit in an oxygen atmosphere (such as in open air). It could generate a harmful ozone. (172nm unit only) If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not overhaul lamp unit. Otherwise it could cause electrical shock, fire, smoke and abnormal arc discharge.</li> </ul>
<ul style="list-style-type: none"> <li>Use Ushio's specified lamp house and power supply. Otherwise it could cause electrical shock, fire, smoke, overheating and breakage.</li> <li>Do not carry lamp unit by its lead wires nor pull lead wires. Otherwise it could cause breakage. If they are accidentally detached, contact your nearest office or the following office.</li> <li>Do not pull lamp bases. Otherwise it could cause breakage. If they are accidentally detached, contact your nearest office or the following office.</li> <li>Tokyo Sales Office TEL. 03-3242-5058 FAX. 03-3242-2700</li> <li>Firmly fix the lamp connector to lamp house. Otherwise it could cause electrical shock, fire, smoke and overheating.</li> <li>Do not attempt to operate a broken lamp unit. Otherwise it could cause electrical shock.</li> <li>Do not touch during or immediately after operation, as it is hot. Otherwise it could cause a burn.</li> <li>Do not operate in inflammable atmosphere such as volatile thinner etc. Otherwise it could cause explosion and fire. Otherwise it could cause injury when broken.</li> <li>Do not operate lamp unit in close proximity of combustible material such as paper or cloth, nor cover it with such materials. Otherwise it could cause fire.</li> <li>Used lamps should be disposed without breaking them. Otherwise, it could cause injury.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Do not touch lamp unit with bare hands. Organic materials and their decompositions on lamp outer surface will reduce light output.</li> <li>Avoid any excessive vibrations or shock during operation as it contains glass parts.</li> </ul>	

## Excimer VUV/O3 Cleaning System for Semiconductor Production Excimer VUV/O3 Cleaning System for LCD Production

(1) Power Supply	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installation and removal. Otherwise it could cause electrical shock.</li> <li>Do not modify or overhaul power supply. Otherwise it could cause electrical shock, fire and smoke.</li> <li>Earth (ground) must be connected. Otherwise it could cause electrical shock and noise.</li> </ul>
<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning lamp house. Otherwise it could cause electrical shock, overheating and breakage.</li> <li>Use Ushio's specified lamp house. Otherwise it could cause electrical shock, fire and smoke.</li> <li>Do not turn on lamp operation switch when lamp(s) is not installed. Otherwise it could cause electrical shock.</li> <li>When connecting cables, fix them firmly with screws to avoid looseness or separation. If connection is insufficient, it could cause malfunctions. Otherwise it could cause problems such as overheating due to poor connection.</li> <li>Cables should be installed loosely and should not be coiled or stretched. Otherwise it could cause overheating by poor connection and wire disconnection.</li> <li>Do not drop, hit against anything or apply excessive force. Otherwise it could cause electrical shock, fire and overheating.</li> <li>Do not operate power supply in a close proximity of combustible material such as paper or cloth, nor cover it with such materials. Otherwise it could cause fire.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Power supply must be installed after having confirmed a supply voltage at installation site. Input to power supply must be kept at single phase 210 V±20V. (100V ± 10V for 6 Inches and 8 Inches types)</li> <li>Surrounding temperature for operation should be kept within 10-35°C. If power supply is operated inside a case, there should be sufficient space and ventilation to keep surrounding temperature for operation maintained within 10-35°C.</li> <li>Surrounding humidity should be kept within 20-80 % RH. Power supply should be operated in a water or condensation proof environment.</li> <li>An inrush current of more than 10 times of its normal current when lamp operation is stabilized is generated immediately after ignition. Breaker capacity set up should be carefully examined by taking this fact into consideration before use.</li> <li>If lamp(s) does not turn on, switch off power supply and investigate the problem by referring to Section "Trouble Shooting" in the manual. Please contact your nearest office mentioned in the backside of operation manual or the following office, if the problem cannot be resolved.</li> <li>Tokyo Sales Office TEL. 03-3242-5058 FAX. 03-3242-2700</li> </ul>	

(2) Lamp House	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installation and removal. Otherwise it could cause electrical shock.</li> <li>Do not look directly or indirectly at the light from lamp house during operation. Otherwise it could cause sore eyes or eyesight problems.</li> <li>Do not directly or indirectly expose your skin to the lamp radiation. Otherwise it could cause skin burn.</li> <li>Thoroughly ventilate the area when operating lamp house in an oxygen atmosphere (such as in open air). It could generate a harmful ozone. (172nm lamp house only) If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not modify or overhaul lamp house. Otherwise it could cause electrical shock, fire and smoke.</li> <li>Do not operate lamp unit with lamp house cover left open. During operation, hazardous high-voltages with high frequencies of 20-30 kilo Volts is generated by transformer. Otherwise it could cause electrical shock.</li> </ul>
<ul style="list-style-type: none"> <li>Pipes for nitrogen and cooling water should be properly connected. Otherwise it could cause electrical shock if the connections are mixed up.</li> <li>Use USHIO's specified power supply and lamp(s). Otherwise it could cause electrical shock, overheating and breakage.</li> <li>Firmly fix the lamp connector to lamp house. Otherwise it could cause electrical shock, fire, smoke and overheating.</li> <li>When connecting cables, fix them firmly with screws to avoid looseness or separation. If connection is insufficient, it could cause malfunctions. Otherwise it could cause overheating due to poor connection, etc.</li> <li>Do not drop, hit against anything, or scratch the lamp house as it contains glass materials. Otherwise it could cause injury if breakage occurs.</li> <li>Do not operate lamp house in a close proximity to combustible material such as paper or cloth, nor cover it with such materials. Otherwise it could cause fire.</li> <li>Do not touch light irradiation window during or immediately after operation, as it is hot. Otherwise it could cause a burn.</li> <li>When lifting up and opening lamp house, make sure it is fully open until it stops; do not let it stop and leave it open half way through. Make sure that opening and closing function is not damaged. Otherwise it could cause injuries, such as catching fingers when lamp house accidentally goes down.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Lamp house must be purged with nitrogen gas as per specified procedures before lamp ignition. Unless operated in a nitrogen gas atmosphere, Vacuum Ultra-violet rays will not be emitted properly, lamp house mirror and lamp electrodes can be oxidized, and light output could be reduced.</li> <li>Lamp house must be purged with nitrogen. Do not use other gases such as argon, neon etc.</li> <li>Make sure to dispose or ventilate Nitrogen gas.</li> <li>Surrounding temperature for operation should be kept within 10-35°C. If lamp house is operated inside a case, there should be sufficient space and ventilation to keep surrounding temperature for operation maintained within 10-35°C.</li> <li>Surrounding humidity should be kept within 20-80% RH. Lamp house should be operated in a water or condensation proof environment.</li> <li>Radiation window glass must be kept clean. Use a soft piece of cloth soaked with cleansing liquid for optical lenses (ethyl alcohol) to clean glass surface of irradiation window. Decompositions of dust or organic materials on radiation window glass will reduce light output.</li> <li>Avoid any excessive vibrations or shock during operation as the system contains glass parts.</li> <li>Do not create a vacuum on the inside of lamp house.</li> </ul>	

(3) Lamp	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning system. Otherwise, it could cause electrical shock.</li> <li>Do not look directly or indirectly at the light from lamp during operation. Otherwise it could cause sore eyes or eyesight problems.</li> <li>Do not directly or indirectly expose your skin to the lamp radiation. Otherwise it could cause skin burn.</li> <li>Thoroughly ventilate the area when operating lamp in an oxygen atmosphere (such as in open air). It could generate a harmful ozone. If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not overhaul lamp. Otherwise it could cause electrical shock, fire, smoke and abnormal arc discharge.</li> </ul>
<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning system. Otherwise, it could cause electrical shock.</li> <li>Do not attempt to operate a broken lamp unit. Otherwise it could cause electrical shock.</li> <li>Do not touch during or immediately after operation, as it is hot. Otherwise it could cause a burn.</li> <li>Do not operate in inflammable atmosphere such as volatile thinner etc. Otherwise it could cause explosion and fire. Otherwise it could cause injury when broken.</li> <li>Do not operate lamp unit in close proximity of combustible material such as paper or cloth, nor cover it with such materials. Otherwise it could cause fire.</li> <li>Used lamps should be disposed without breaking them. Otherwise, it could cause injury.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Do not touch reflector(s) with bare hands. Organic material or its decompositions on outer surface of reflector(s) will reduce light output.</li> <li>Used reflector can be disposed of as metal waste without any special care.</li> </ul>	

## (4) Gaskets

Important Safety Notes	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning system. Otherwise, it could cause electrical shock.</li> <li>Make sure to attach gaskets. If the system is operated without gaskets, ozone could be leaked. Otherwise it could cause leakage of ozone. If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not scratch gaskets. Otherwise it could cause leakage of ozone.</li> <li>When replacing gaskets by lifting up and opening lamp house, make sure that opening and closing function is not damaged. Otherwise it could cause injury. If it is damaged and if it does not stay open, contact your nearest office and do not continue the work.</li> </ul>
<ul style="list-style-type: none"> <li>Use Ushio's specified gaskets. Otherwise it could cause leakage of ozone.</li> <li>Gaskets must be attached properly in specified positions. Otherwise it could cause leakage of ozone.</li> <li>If the system is operated without gaskets, ozone could be leaked. Otherwise it could cause leakage of ozone. If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not operate the system with scratched gaskets. Otherwise it could cause leakage of ozone.</li> <li>Do not touch during or immediately after operation, as it is hot. Otherwise it could cause a burn.</li> <li>Do not drop, hit against anything or scratch. Pay appropriate attention especially when cleaning the system. Otherwise it could cause leakage of ozone when scratched.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Used gaskets can be disposed of without any special care.</li> <li>Do not touch gaskets with bare hands. Organic materials or their decompositions, or dust on outer surface will reduce its sealing performance.</li> </ul>	

(5) Window Glass	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning system. Otherwise, it could cause electrical shock.</li> <li>Make sure to attach irradiation window glass. If the system is operated without window glass, ozone could be generated. Otherwise it could cause leakage of ozone. If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not scratch window glass. Otherwise it could cause leakage of ozone.</li> <li>When replacing window glass by lifting up and opening lamp house, make sure that opening and closing function is not damaged. Otherwise it could cause injury. If it is damaged and if it does not stay open, contact your nearest office and do not continue the work.</li> </ul>
<ul style="list-style-type: none"> <li>Use Ushio's specified window glass. Otherwise it could cause injury when broken.</li> <li>When attaching window glass to the system, use attached gaskets. Otherwise it could cause leakage of ozone. If ozone is inhaled, it could cause headaches, nausea, dizziness etc.</li> <li>Do not operate the system with broken window glass. Otherwise it could cause leakage of ozone.</li> <li>Do not touch during or immediately after operation, as it is hot. Otherwise it could cause a burn.</li> <li>Do not drop, hit against anything or scratch, as it is a glass product. Pay appropriate attention especially when cleaning the system. Otherwise it could cause injury when broken.</li> <li>Used window glass should be disposed without breaking it. Otherwise it could cause injury.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Do not touch window glass with bare hands. Organic materials or their decompositions on outer surface of window glass will reduce light output.</li> <li>Avoid any excessive vibrations or shock during operation, as it is a glass product.</li> </ul>	

(6) Reflector	
<b>Important Safety Notes</b>	
	<ul style="list-style-type: none"> <li>Turn off main power supply switch before installing, removing or cleaning system. Otherwise, it could cause electrical shock.</li> <li>When replacing reflector by lifting up and opening lamp house, make sure that opening and closing function is not damaged. Otherwise it could cause injury. If it is damaged and if it does not stay open, contact your nearest office and do not continue the work.</li> <li>Do not modify reflector. Otherwise it could cause electrical shock, fire, smoke, overheating and injury.</li> </ul>
<ul style="list-style-type: none"> <li>Use Ushio's specified reflector. Otherwise it could cause electrical shock, fire, smoke, overheating and breakage.</li> <li>Make sure to fix reflector to lamp house by using screws. Otherwise it could cause electrical shock, fire, smoke, overheating and breakage.</li> <li>Do not touch during or immediately after operation, as it is hot. Otherwise it could cause a burn.</li> <li>Do not operate the system in corrosive atmosphere or in areas with a lot of dusts. Otherwise it could cause short circuit problem and overheating.</li> <li>Do not drop, hit against anything or scratch, as it is a glass product. Pay appropriate attention especially when cleaning the system. Otherwise it could cause injury when broken.</li> </ul>	
<b>Important Operation Notes</b>	
<ul style="list-style-type: none"> <li>Do not touch reflector(s) with bare hands. Organic material or its decompositions on outer surface of reflector(s) will reduce light output.</li> <li>Used reflector can be disposed of as metal waste without any special care.</li> </ul>	

### エキシマ光照射ユニット実験施設

Laboratory Facilities of Excimer Unit

ご購入を検討中のお客様向けに、無償にてご利用いただける貸し出し用デモ機、および共同実験スペース「USHIO Techno-Lab」をご用意しており、立会い実験、または、サンプルをお預かりしての実験が可能です。実験後は、分析、評価(XPS、FT-IR、FE/SEMなど)の上、実験レポートをお送りします。

ご希望のお客様は、当社ホームページよりお申し込みいただくか、営業までご連絡ください。

※実験、分析の内容によっては、ご希望に添えない場合がございますので、詳細内容については、事前にお問い合わせください。

#### 立会い実験の場合

実験内容を事前にご連絡の上、ワークを事前送付いただくか、持参ください。ご来社後、すぐに実験可能です。

#### サンプル預かり実験の場合

実験内容を事前にご連絡いただき、ワークを送付ください。

For customers who are considering the purchase of our products, demonstration units may be loaned out free of charge, with a Application Laboratory Facilities available.

Witnessed experiments or experiments using an customer provided sample can be conducted. Upon completing an experiment, we conduct analysis and assessment (XPS,FT-IR,FE/SEM etc), and then send an experiment report to each customer.

Any customer interested in the above should submit an application from our Homepage or contact the Business Division.

\* Note that it may be difficult for us to satisfy certain customer requests depending on the contents of an experiment or analysis. For details, please contact us for further information in advance.

#### For a witnessed experiment:

Inform us of the contents of the desired experiment or send/deliver a workpiece to us in advance. We will be able to start an experiment soon after you visit us.

#### For an experiment with an customer provided sample:

Inform us of the contents of the desired experiment in advance and send us a workpiece.



播磨事業所 / Harima Division



当社播磨事業所内 / In our Harima Division

### 光の共同実験室「USHIO Techno-Lab」

Consult us at USHIO for all your needs regarding light.

お客様のボトルネックを解決したい—— そのための共同実験室をウシオはご用意しました。皆様の新技術開発に、「光」の最新設備を集結した「USHIO Techno-Lab」をぜひお役にしてください。

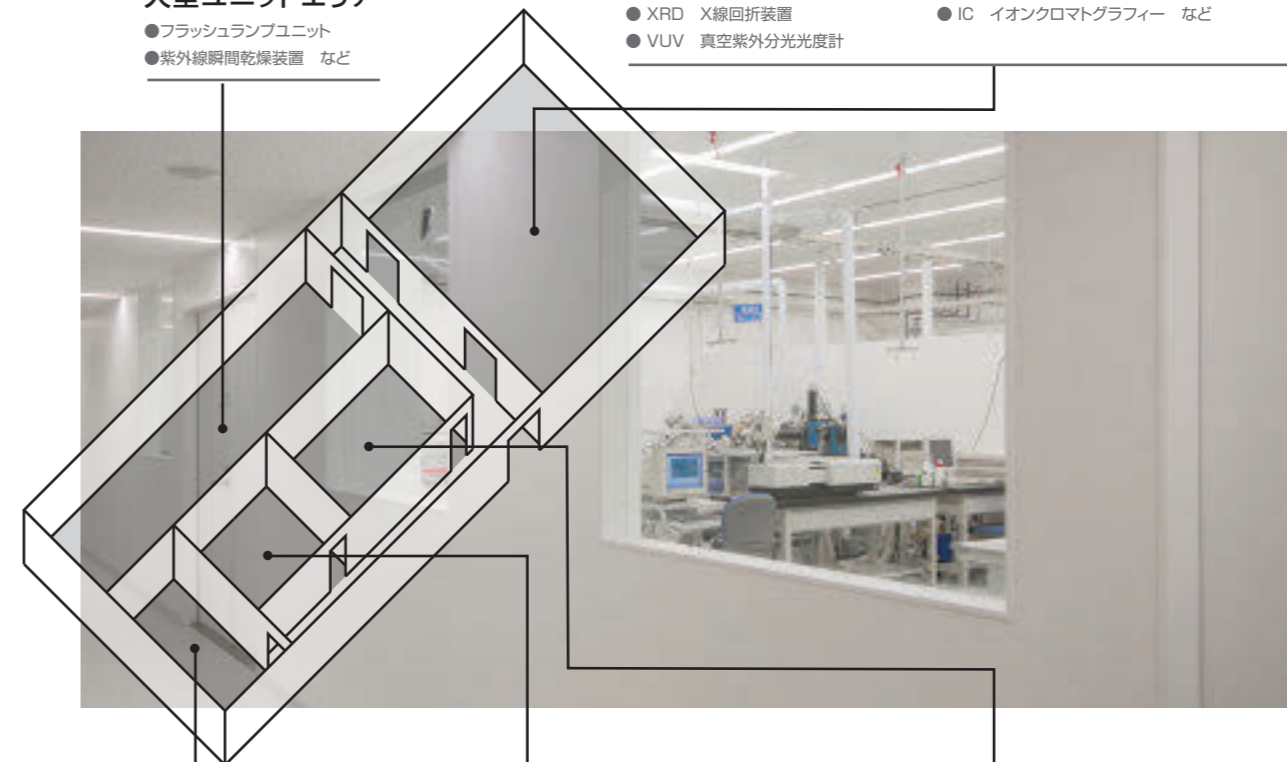
Dividing, connecting, heating, drying, investigating, lighting, melting, cultivating...  
USHIO regards light not only as lighting but also as energy, and has developed various forms of light in collaboration with numerous prominent partner companies.

#### 分析・測定エリア

- XPS X線光電子分光分析装置
- SEM 走査電子顕微鏡
- FE-SEM 電界放射型走査電子顕微鏡
- EDX エネルギー分散型X線分析装置
- XRF 蛍光X線分析装置
- XRD X線回折装置
- VUV 真空紫外分光光度計
- UV-VIS 紫外可視分光光度計
- FT-IR フーリエ変換赤外分光光度計
- Mass Spectrometer 質量分析計
- ICP-AES 誘導結合プラズマ発光分光分析装置
- AAS 原子吸光分析装置
- IC イオンクロマトグラフィー など

#### 大型ユニットエリア

- フラッシュランプユニット
- 紫外線瞬間乾燥装置 など



#### 赤外線実験エリア

- 光加熱用各種ハロゲンヒータユニット

#### ミーティングルーム

#### 可視光～紫外線実験エリア

- 低圧UVランプ照射ユニット
- 超高压UVランプ照射ユニット
- クセノンショートアークランプ照射ユニット
- Deep UVランプ照射ユニット
- エキシマ光照射ユニット
- スポットUV照射装置 など