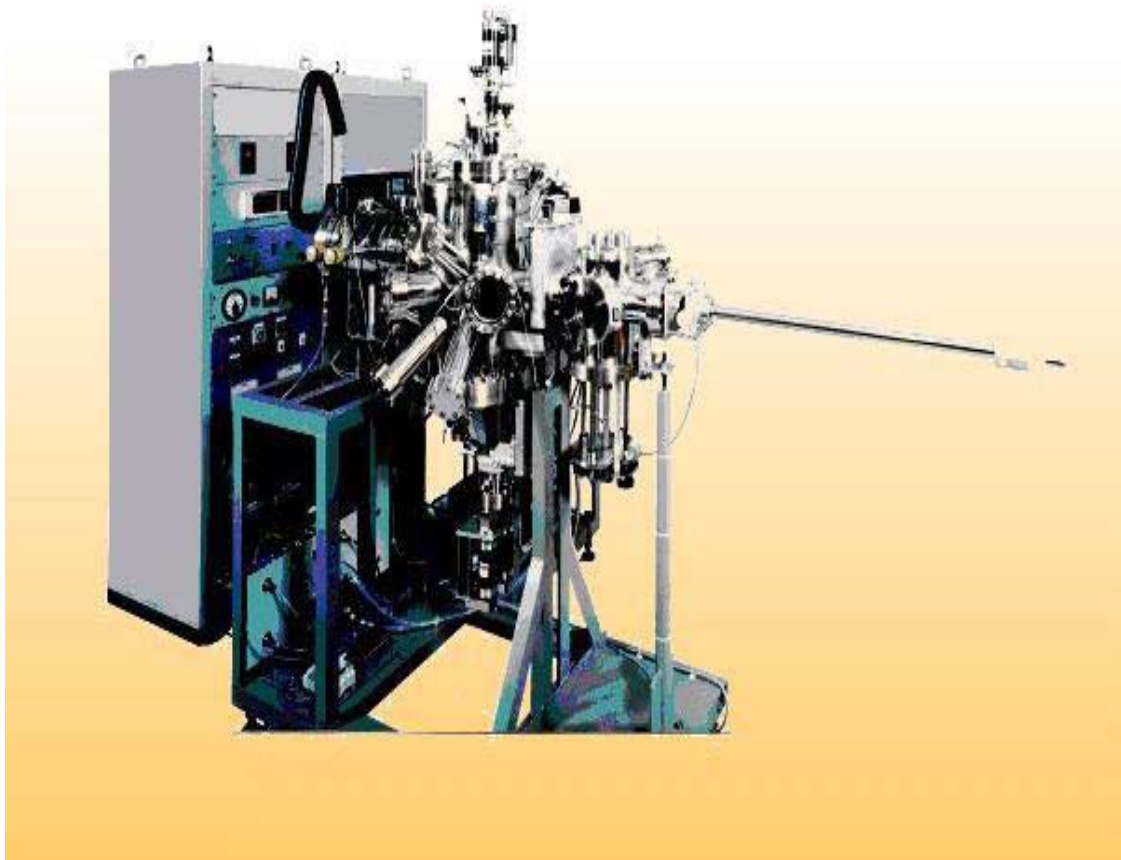


Compact Laser MBE system

Model : PA-C-PLMBE

Our design priority, easy-to-use, brings better controllability of film growth condition



<Outline>

This system is designed to deposit thin films on a substrate by the laser abrasion of target materials in an ultrahigh vacuum(UHV).

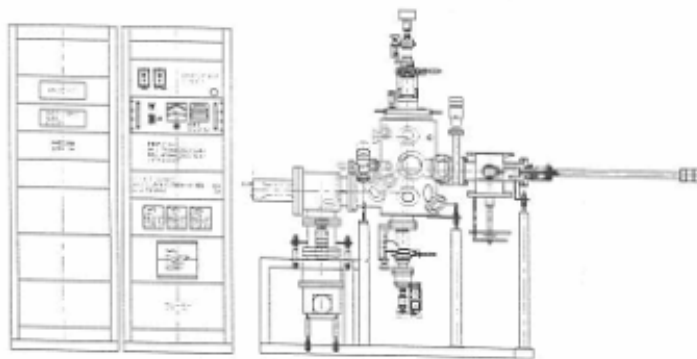
The apparatus consists of a deposition chamber, an infra-red heating lamp, a target revolution mechanism, and a RHEED chamber.

All of them are UHV compatible.

An Infra-red lamp heating that featured our apparatus can bring a substrate temperature more than 800°C and afford to deposit even in a high oxygen partial

pressure of higher than 500 mTorr.

Standard equipped load-lock transfer mechanism enable to keep deposition environment clean and bring easy-to-use.



<Feature>

1. Compact design that brings an easy operation
 2. Infra-red lamp heating
 3. Magnetic coupled target rotation that enables the endless rotation
 4. Easy operation of substrate (or target) exchange by transfer rod
 5. Auxiliary ports for mounting various components
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<Specification>

1.Growth chamber	Arrival pressure	$\leq 6.7 \times 10^{-7} \text{Pa} (5 \times 10^{-9} \text{Torr})$
	Chamber	ca.300mm diam. × 500mm high. cylindrical(SUS304)
	Exhaust speed	$\leq 10^{-4} \text{Pa} (10^{-6} \text{Torr})$ in 20 minutes
	Substrate holder with radiation heating by infrared lamp	Heating temperature : $\geq 800^{\circ}\text{C}$ within 15-mm square of substrate holder
		Temperature uniformity : smaller than $\pm 2.5^{\circ}\text{C}$ within 15-mm square
Target holder with revolver	<p>Substrate size : MAX 50mm diam. Substrate movement : Horizontal X: $\pm 10\text{mm}$ Y: $\pm 10\text{mm}$ Vertical : Z1 : $\pm 20\text{mm}$ Sample exchange : Z2 : $\pm 0 \sim 20\text{mm}$ Rotation : AC motor driven Shutter for substrate CF1.33", pneumatic Flange CF10" Water cooling Power control : Programmable PID controlled DC power supply Thermocouple : Type R</p> <p>Target loading 20mm diam. × 4 (6 個 : optional) Target movement Horizontal X: $\pm 10\text{mm}$ Y: $\pm 10\text{mm}$ Vertical Z: $\pm 20\text{mm}$ Target spin mechanism: Motor driven via magnetic rotation feedthrough</p> <hr/> <p>Revolution mechanism: Stepping-motor driven</p>	

	Process gas flow	via variable leak valve for O ₂ via manual valve for O ₂ at around atmospheric pressure reserve port for gas inlet
	Laser irradiation	via synthesized quartz window(CF4.5") at an angle of 45° to a target <hr/> Window transparency ≥93% for ArF ≥93% for KrF
	Vacuum gauges	for UHV : nude ionization gauge for low vacuum : Capacitance manometer 1Torr
	Pumps	Main pump : magnetic-bearing TMP(800L/s)for wide-vacuum-range use <hr/> Rotary pump : 275L/m Main valve : 6" pneumatic Bypass line : pneumatic and manual operation Pressure monitor
	Bake-out heater	Sheath heater and tape heater Temperature controllable range: 100°C~200°C
	Ports	for target observation CF6" for thickness monitor or mask CF6" for cells CF4.5" × 2 for temperature measurement CF4.5" for gasintroduction CF2.75" for RHEED(gun and screen) CF4.5"for gun/CF6" for screen
2. Load-lock and substrate transfer mechanism		Load-lock chamber : ca.150mm diam. × 200mm high.(SUS304) Ultimate pressure : 6.7 × 10 ⁻⁵ Pa (5 × 10 ⁻⁷ Torr) Access door with window Sample capacity : 2 substrates and 4 targets Vent line

	<p>auxiliary port : CF2.75"</p> <p>Pumps : 70L/s TMP and Rotary pump</p> <p>Vacuum gauge</p> <p>Substrate transfer : Magnetic coupled transfer rod X-Y movable stage</p> <p>Gate valve to the growth chamber : 4" manual valve</p> <p>Bake-out heater : Tape heater 2m × 5</p>
3.system rack	JIS standard rack for controllers and power supplies × 2
4.Utilities	<p>AC100V 1 φ 50A</p> <p>AC200V 3 φ 50A</p> <p>Dry N₂ gas</p> <p>compressed air 5kg/cm² (pressure regulator supplies)</p> <p>Cooling water</p> <p>Any construction of laboratory room is not included.</p> <p>Gases for user's process are not included.</p>
5.Control system	<p>Electro-manually controlled power supply : control of vacuum valve</p> <p>Interlock : Deficient flow of cooling water for infrared lamp heating</p> <p style="padding-left: 40px;">Deficient pressure of compressed air for pneumatic valve drive</p> <p style="padding-left: 40px;">Preservation of high vacuum in each chamber after an electric power failure(Manual recovery only)</p> <p>Urgent shutdown function</p>

<Option>

Differentially pumped RHEED gun

2-stage differentially pumped RHEED gun

Scanning RHEED gun

RHEED pattern processing system

Laser diode heating component /6 targets

Target-laser synchronizer (PC and software)

Encounter mask mechanisms

Radical beam source

Ozone source(or ozonizer component)

Pyrometer

Laser for abration ; Nd:YAG(3 ω 355nm)

Laser for abration ; Excimer(KrF 248nm)

Optics components and optical box

● Specifications may subject to change for improvement without notice.

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