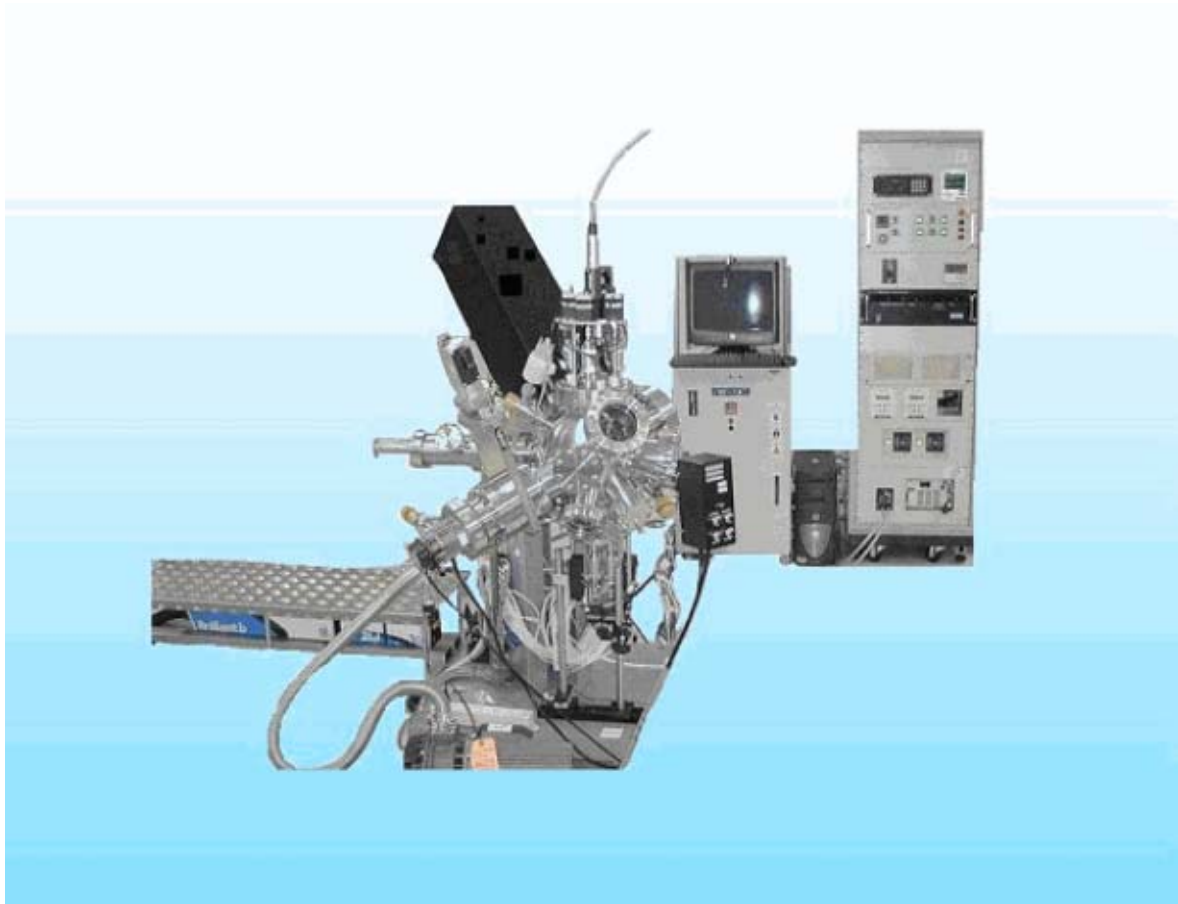


Mobile Combi-Laser MBE system

Model : MC-LMBE

Combinatorial research and development by a compact, high performance, and fully PC and controlled system



<Outline>

The main body of the system is a UHV laser MBE apparatus to deposit thin films on a substrate by the laser ablation of targets. An excimer or other pulsed laser is irradiated from outside of the UHV chamber via synthesized quartz window. Using two combinatorial masks and a scanning RHEED device, the system enables to prepare many samples at one time, each of them is controlled atomically and has a different growth condition, using a combinatorial mask and targets irradiated by a laser in a high vacuum.

The concept of the combinatorial film deposition is a systematic change of growth condition resulted by dividing a substrate by masking into many small regions having different growth parameters each other. This contributes to outstandingly rapid screening of growth conditions.

A load-lock transfer componet that is a standard equipment of our MC-PLD makes exchange of targets and substrates very easy.



<Feature>

1. A compact UHV body highly contributes to user's easy operation
2. An ultimate vacuum pressure of $2.7 \times 10^{-7} \text{Pa}$ ($2 \times 10^{-9} \text{Torr}$)
3. MC-PLD can accommodate 2 motor-driven combinatorial masks.
4. Up to 4 targets are usable
5. Standard equipped 2-stage differentially pumped RHEED component
6. Fully computer control

<Specification>

1. Growth chamber	Arrival pressure	$2.7 \times 10^{-7} \text{Pa}$ ($2 \times 10^{-9} \text{Torr}$ 以下)
	Chamber	ca. 260mm diam. Spherical (SUS304)
	Laser Irradiation	through a synthesized quartz window(CF4.5")
	Vacuum gauges	a nude ionization gauge and a capacitance

		manometer
	Exhaust system	Main pump : 300L/s TMP Fore pump : 250L/m scroll pump Valve : CF6" gate valve Fore-line monitor : T/C gauge
	Process gas flow	Variable-leak valve Air vant valve 1/4-inch diam.nozzle facing a substrate(SUS)
	Target holder/revolver	Target loading : 20mm diam. × 4 Target spin mechanism : AC motor driven with speed control Revolution mechanism : Stepping motor driven Revolution control : via Lab View™
	Substrate holder /heate	Substrate heating : a laser diode heating (808nm,140W)with chiller Temperature gradient : $\geq 200^{\circ}\text{C}$ attainable Temperature maeasurement : $180^{\circ}\text{C}-1400^{\circ}\text{C}$ (measurable smaller than 2-mm diam.spot size on a substrate by a pyrometer) Substrate rotation : Stepping-motor driven (sensor equipped) Substrate size: 10-mm square
	Combinatorial masks	Number of masks : Moving mask × 1,Contact mask × 1 Moving mask control : Lab View™ controlled motor driven
	Scanning RHEED device	differentially pumped RHEED gun (CF2.75") 30kv of acceleration voltage CF6" screen for RHEED pattern observation Focusing / Scanning coils for area scan of whole substrate surgace

		Pattern processing : CCD camera, dark box and processing software(LabView™)
2. Load-locks chamber		<p>Chamber : 100-mm diam. Cylindrical(SUS304)</p> <p>Sample capacity : substrate × 2, Target × 2</p> <p>Rotation/Elevation stage</p> <p>Isolation valve : 4.5" gate valve</p> <p>Substrate/target handling : Access door</p> <p>Vacuum Monitor : nude ionization gauge(CF2.75")</p> <p>pumping : 70L/s TMP</p> <p>Sample transfer : Magnetic coupled transfer rod with tilt mechanism</p>
3. Controlled function		<p>Systematic and fully control of combinatorial sample fabrication with PC via LabView™</p> <p>a) Mask motion</p> <p>b) Target revolution and arm-angle</p> <p>c) Substrate rotation control</p> <p>d) RHEED oscillation monitor</p> <p>e) Laser trigger</p> <p>f) Substrate temperature</p>
4. Utilities		<p>Electricity : AC200V , 3 φ 40A, *AC100V , 1 φ 40A</p> <p>N₂ gas , O₂ gas</p> <p>Compressed air 5kg/cm²(pressure regulator supplied)</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>

<Options>

Radical beam source

Ozone source(or ozonizer component)

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

Laser for ablation ; Excimer (KrF 248nm)

Optics component and optical box

● Specifications may be subject to change for improvement without notice

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