

Overview 機台名稱：大氣原子沉積與化學氣相反應鍍膜系統

Spatial ALD & AP-CVD for Thin Film Deposition System Procurement Project

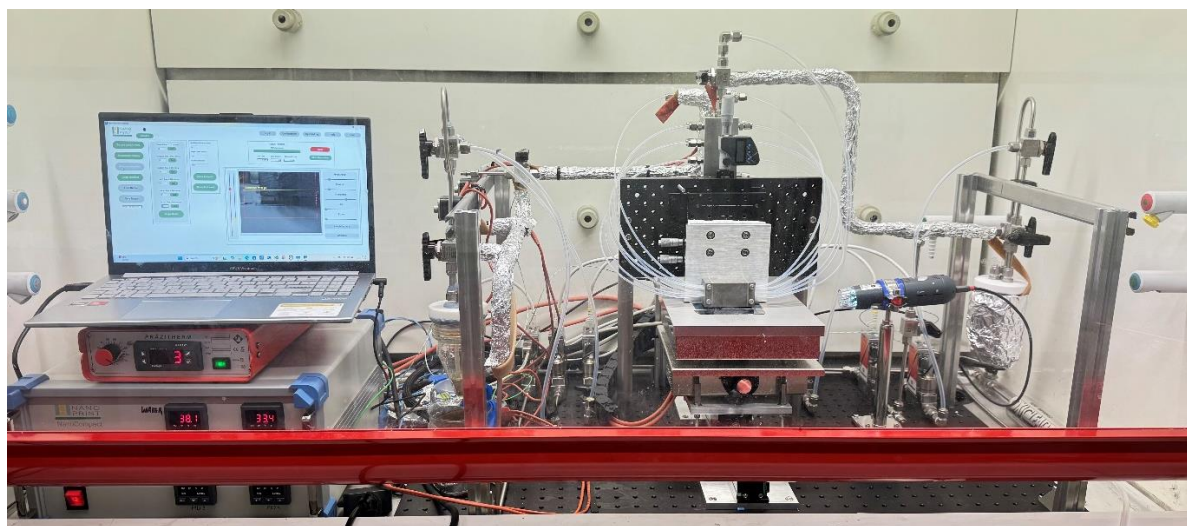
Model Name: NanoCompact-001

Key Features: 機台特色

- Operates under ambient (non-vacuum) conditions
- Deposition rates 10–100× faster than conventional ALD for the same precursors and processing temperature
- Compact design — fits easily within a standard fume hood
- Produces high-quality, uniform thin films

Description

The NanoCompact system is designed for rapid coating of oxide films on any flat substrates with ease. This model operates under non-vacuum conditions, reducing costs while ensuring high-quality coatings. With a higher deposition rate than conventional atomic layer deposition, and compact design, NanoCompact is perfect for a variety of applications, including solar cells and food packaging.



System Specifications

General Specifications

Dimensions – Main Body	900 mm × 600 mm × 700 mm (W × D × H)
Dimensions – Control Box	370 mm × 370 mm × 210 mm (W × D × H)
Dimensions – Heatplate Control Box	200 mm × 290 mm × 70 mm (W × D × H)
Operating Conditions – Temperature	Room temperature up to 350°C (film deposition)
Operating Conditions - Environment	Ambient Atmosphere
Weight – Main Body	Around 30 kg
Weight – Control Box	Around 5 kg
Weight – Heatplate Control Box	Around 1 kg

Power – Control Box	Two units of 230 VAC (UK plug; Type G)
Power – Heatplate Control Box	One unit of 220 VAC (EU plug; Type C)
PC Requirements	Windows 10/11 PC, CPU i3 or higher, RAM 8GB or higher

Moving Stage 移動載台規格

Power – Linear Actuator	220 VAC (through a controller)
Max. Speed – Linear Actuator	200 mm/s
Maximum Load – Linear Actuator	20 kg
Control – Linear Actuator	GUI Controlled
Dimensions – Heatplate	200 mm × 200 mm × 125 mm (W × D × H)
Temperature Range - Heatplate	Max 350°C
Temperature Control - Heatplate	External Controller (Automatic)
Temperature Output - Heatplate	10-100% power control available
Temperature Sensor Type - Heatplate	Built-in PT100 Sensor
Top Plate Material - Heatplate	Aluminum Alloy
Weight – Heatplate	4 kg
Power Voltage - Heatplate	230 VAC
Power Wattage - Heatplate	800 W

Manifold Stage 主體結構規格

Manifold Dimension	70 mm × 30 mm × 30 mm (W × D × H)
Manifold Body Material	Stainless Steel
Manifold Pitch/Yaw Adjustment	Micrometer controlled (Manual)
Manifold Working Height Adjustment	Micrometer controlled (Manual)
Manifold Working Height Range	0 – 10 mm
Deposition Area	50 mm × oscillation distance
Maximum Substrate Thickness	Around 5 mm
Substrate Loading	Manual loading

Gas and Bubblers 氣體系統規格

Gas Flow Control (Mass flow)	GUI Controlled (Automatic)
Number of MFCs	5
Gas Flow Range	5 – 3,000 ml _n /min (Min. 0 ml _n /min)
Working Gas	Ultra-pure nitrogen (N ₆), oxygen (oxidant)
Maximum Pressure	10 bar (1,000 kPa, absolute)
Gas Connections	¼ inch compression fittings
Bubbler Seal	O-ring
Bubbler Material - Cap	Teflon
Bubbler Material - Body	Glass
Metal Precursor State	Powder or liquid solution
Bubbler Heating	PID Controlled, Thermocouple-K
Bubbler Temperature Range	Room temperature - 200°C

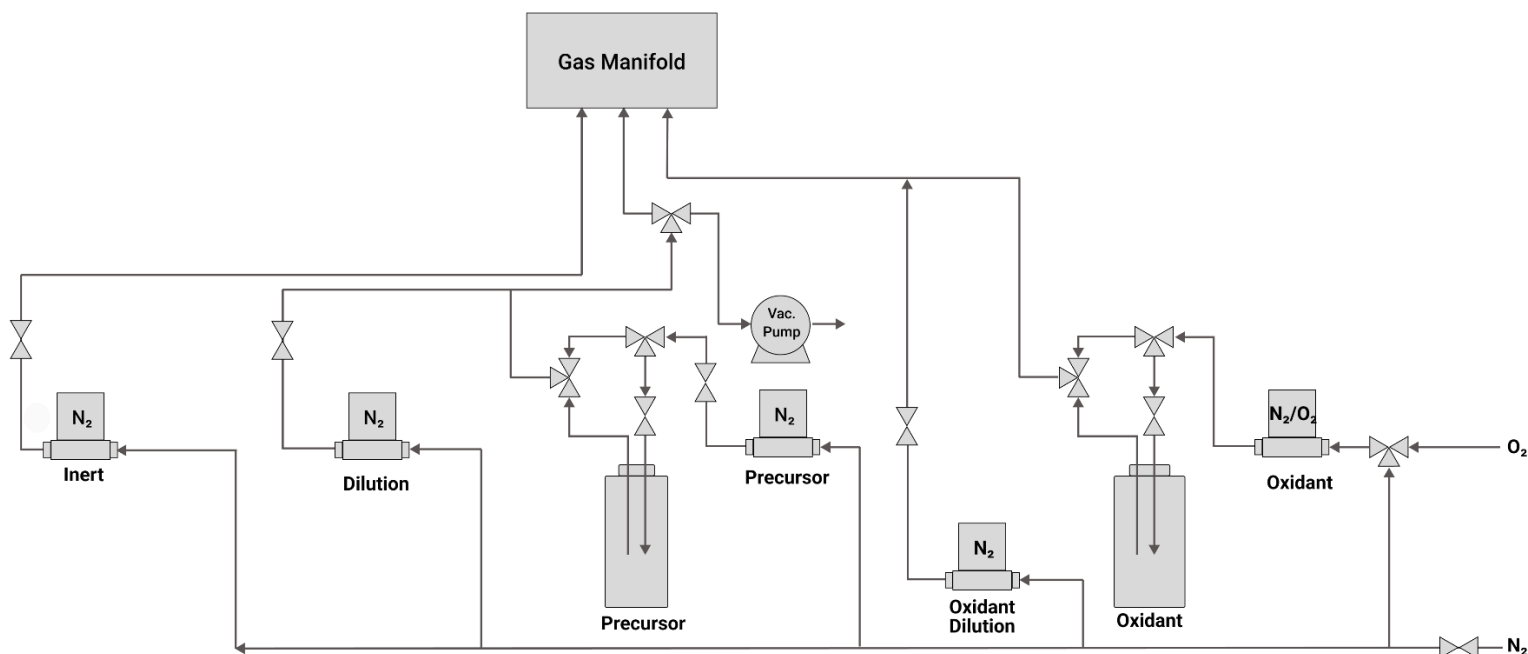


Procurement Specification Sheet

Camera 相機系統規格

Magnification	10 – 220× magnification
Body Material	Polycarbonate
Light Source	Ring Illuminator- 8 LED-Adjustable

Process Flow Diagram



The vacuum pump is only required during the initial start-up of the machine. The vacuum pump and its associated components are not included with the system.

All piping requires ¼" Compression fittings.

The operation of the machine should only be carried out after thoroughly reviewing the user manual or receiving appropriate operator training.

Consumables and Precursors

The following items are classified as consumables and are not covered under warranty:

- Stainless steel gas manifold
- Plastic inlet tubing on the gas manifold
- Plastic tubing inside the glass bubblers
- Glass components of the bubblers (in the event of breakage)

The filling, refilling, and cleaning of bubblers due to the use of metal precursors are not included as part of the product and are not covered under maintenance services. These procedures must only be performed after thoroughly reviewing the user manual or receiving appropriate operator training.

Required Parts and Consumables Prior to System Installation

The following items are not included with the product and must be sourced separately, in addition to the system, prior to installation:

- A suitable vacuum pump and associated components capable of connecting to a 1/4" compression female connector.
- Working gases: high-purity nitrogen (N6 grade or equivalent) and industrial-grade oxygen gas cylinders, along with appropriate gas regulators featuring either a 1/4" compression outlet or a compatible connection.
- A suitable ALD-grade metal precursor, sourced from a reliable supplier and compatible with the intended deposition process
- A laptop with an available USB-C port supporting USB4, along with necessary accessories (e.g. monitor, mouse, keyboard) to operate the system software.
- A safety-tested and well-ventilated space or enclosure, such as a fume hood, suitable for safe operation of the equipment and proper exhaust handling during deposition processes.
- An oxygen trap filter—such as Oxiclear—with suitable 1/4" inlet/outlet connections is highly recommended to prevent degradation of sensitive or unstable metal precursors.

Contract Fulfilment Period

- **140 calendar days** from the day after the contract is established.

Acceptance Criteria

- **Mass Flow Controllers and Leak Integrity:**
 - Mass flow controllers (MFCs) can be powered on/off and controlled via PC to regulate flow rates from 0 up to maximum limit.
 - MFCs support switching between 'fully-open' purge mode and standard 'RS232 communication' mode.
 - System demonstrates no observable leakage, with all valves closed and the system pressurized at 2 bar, showing <5 mL/min flow on MFC readouts.
- **Heating components:**
 - The heated plate is capable of operating from room temperature up to 300°C, using an external dedicated temperature control box.
 - All PID controllers support temperature regulation from room temperature up to 150°C.
- **Moving and Manifold stages:**
 - The motor stage is aligned with the bottom breadboard surface to within 0.5° of tilt in X and Y directions.
 - The motorized stage supports oscillation speeds between 10 mm/s and 100 mm/s, adjustable via the graphical user interface (GUI).
 - The gas manifold stage allows adjustable gap heights from 0 to 2,000 microns relative to the heat plate surface.
 - The gas manifold can be aligned to standard glass substrates using precision side micrometer screws.
- **Camera**
 - The user can access and monitor the live camera feed directly through the GUI interface.
- **GUI**
 - The system's GUI provides full operational control, enabling users to run complete deposition processes through the interface.
- **User Manual and Training**
 - A comprehensive user manual covering system operation, bubbler related procedures, and routine maintenance will be provided to the customer.
 - A one-day on-site training session will be conducted by a qualified technician as part of the installation service.
- **Deposition**
 - The user is able to deposit a film of the chosen metal precursor, provided that the same precursor from the same supplier has been used successfully with a similar ALD setup for 25 nm and 50 nm film thicknesses.
 - Film thickness variation <10% of the maximum measured thickness, assuming the deposition is carried out by a trained operator under valid operating conditions. This specification applies to a maximum 50 mm × 50 mm area at the center of the substrate.
 - Acceptable results may require multiple runs, as system performance typically stabilizes after the first one or two runs.
- **Liability**
 - The supplier will not be held liable for acceptance criteria that cannot be tested or are not met due to improper use of the equipment, inadequate preparation of the required parts and consumables listed in the previous section.

Payment Terms

- **Upfront payment:** 45% of the total amount payable by wire transfer upon order confirmation.
- **Upon shipment:** 45% of the total amount payable by wire transfer prior to international shipment.
 - Documentary evidence confirming that the goods have been shipped from the United Kingdom—such as a courier receipt or airway bill—will be provided to the Buyer, upon which the Buyer shall proceed with the corresponding payment.
- **After installation:** 10% of the total amount payable by wire transfer within 30 days after the completion of installation service.

Warranty

- A warranty period of **one year** is provided, starting from the date of acceptance. The warranty excludes consumable parts and damage resulting from misuse or unauthorized modifications.
- Please refer to the “**Consumables and Precursors**” section for a detailed list of **items not covered under warranty**.
- Warranty is **void** if the system is operated:
 - Without proper training
 - Without adherence to operational instructions outlined in the user manual
 - Or if operated using untrained personnel or without completing the recommended start-up training