PVD Products PLD-2000/3000

PLD-3000 shown with optional 2 position loadlock and A COMPex 200 Series Excimer Laser

The **PVD Products PLD-2000/3000** is capable of depositing high quality uniform films on substrates up to 2" or 3" (75-mm) in diameter, respectively. Our systems use a 304L SS box chamber with front-mounted hinged door providing quick access for easy substrate and target changes. The chamber has multiple user accessory ports for target and substrate viewing, a magnetron or ion source and spectroscopy. A blackbody style oven with a bank of IR heat lamps is used for substrate heating. Transparent substrates such as sapphire, $LaAlO_3$, and MgO can be heated to 850°C without the use of a thermal bonding agent (such as silver paste) or clamping. Silicon or other absorbing substrates may be heated to 950°C. Temperature uniformity of ±3° is readily achievable over 3" diameter substrates. The heater is surrounded by a water-cooled housing that keeps the chamber walls, targets, and gears cool during deposition. A complete enclosed optical train which rasters the laser beam over a large diameter rotating targets is included. The optical train also utilizes our Intelligent Window with in-the-chamber energy monitoring. Complete vacuum gauging along with a 500 L/sec molecular drag turbo pump is provided to achieve pressures below 5 X 10^{-7} Torr. All electropneumatic valves are controlled from a rack-mounted pump chassis. Constant pressure is obtained by using a MFC, capacitance manometer, butterfly valve, along with a closed-loop pressure control unit. This system is ideal for materials and device related research or prototype production.

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PLD-2000/3000 System Specifications:

Maximum substrate size : **PLD 2000**: Can handle One (1) 2-inch wafer or multiple smaller samples per customer requirement. **PLD-3000**: Can handle One (1) 3-inch, or one 2-inch, or multiple small substrates per customer requirement.
Maximum substrate temperature: 950°C (in oxygen) for non-transparent substrates such as Silicon, and 850°C for transparent substrates (such as $LaAlO_3$). *No thermal paste or bonding required.*
Temperature uniformity: ± 3°C across 3-inch diameter Si substrate
Operating Pressure Range: 5×10^{-4} Torr base to 300 mTorr
Target Size: The PLD-2000 includes four 3" diameter targets. The PLD-3000 includes three 4-inch diameter targets (easily adaptable to other sizes)
Film Thickness Uniformity: ± 5 % over 90% of a 3" diameter substrate for 500 nm thick film using 4" diameter target.
Target to Substrate (Throw) Distance: Variable from ~75 to 125 mm (may affect maximum temperature, temperature uniformity, and thickness)
Raster path length: ~3.8 inches
Nominal Angle of incidence of the laser beam on target: 60°
Base Pressure of the Main Chamber: $P < 5 \times 10^{-7}$ Torr guaranteed, with system at room temperature without targets in the chamber.
Base Pressure with Load Lock: $P<5 \times 10^{-8}$ Torr guaranteed, with system at room temperature without targets in the chamber. UHV Option Available
Operational Wavelength: 248 nm (KrF) or 193 nm (ArF) .

PLD 2000/3000 System Options:

Load locks for fast turnaround time and improved main chamber base pressure.
UHV Bake Out for pressure below 7×10^{-9} Torr
Additional MFC's
Custom Substrate Holders

Note: Specifications subject to change.

PLD-2000 four position target carousel assembly

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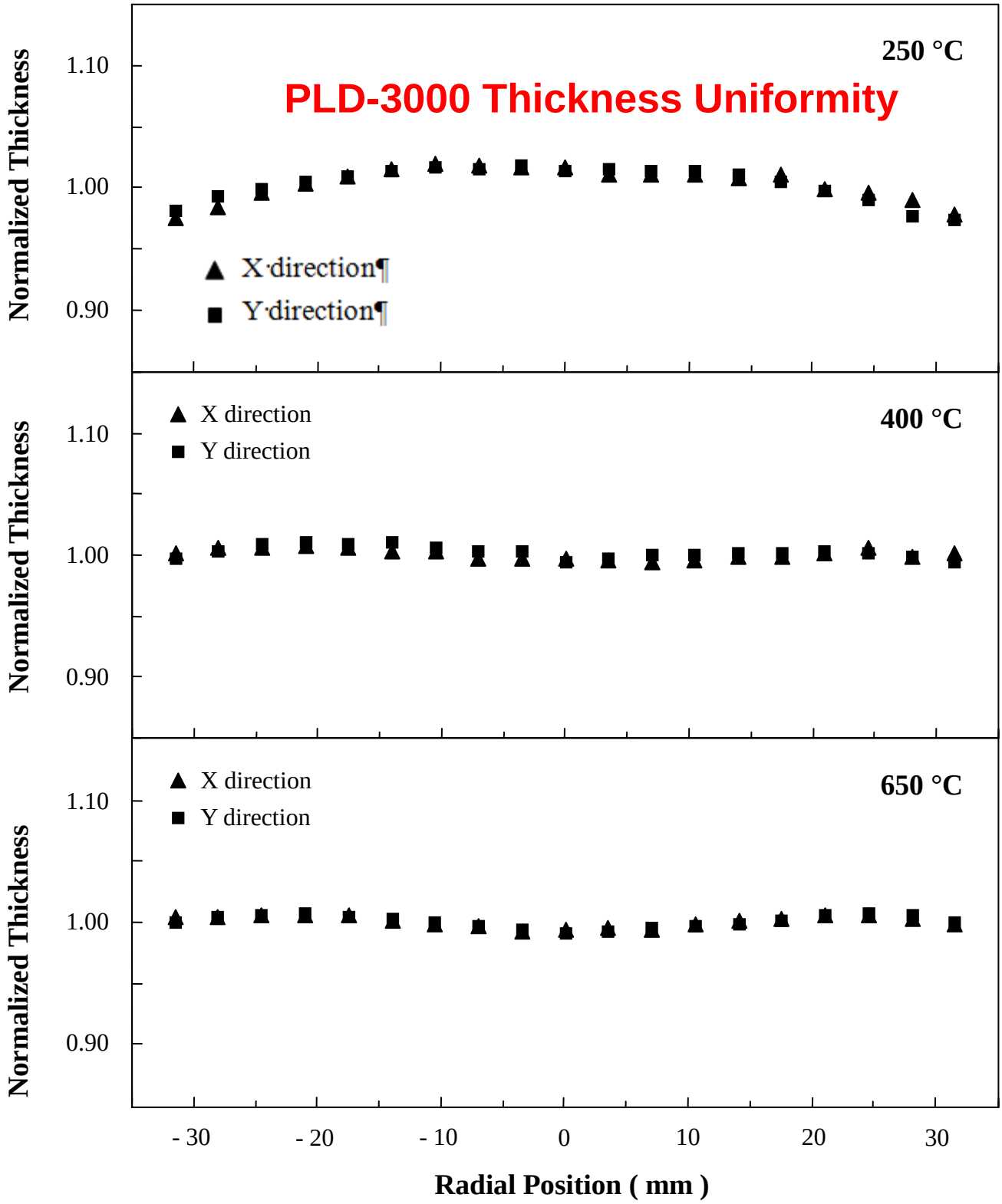

Normalized film thickness from three Ta_2O_5 films deposited onto a 3-inch silicon substrates at a) 250°C, b) 400°C, and c) 650°C, respectively.
Reference: Boughaba et. al. Mater. Res. Soc Proc., Vol: 567, 527

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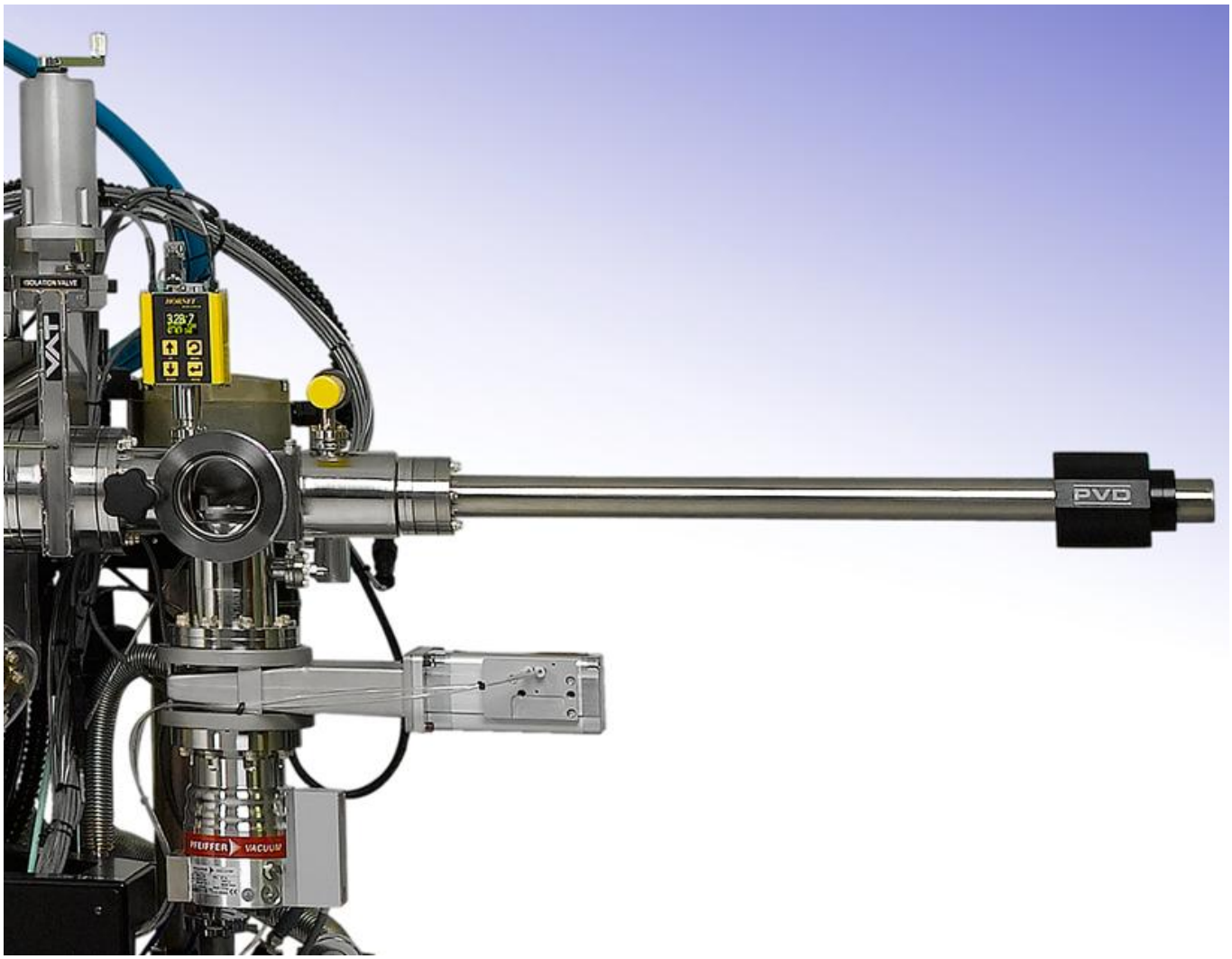

PLD-2000 Dual Wafer Loadlock Assembly. This loadlock allows the removal and insertion of a sample into the chamber in one pump down cycle basically doubling the speed with which wafers can be transferred.

Examples of various types of substrate holders available with the PLD-2000/3000 system

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