

MAPLE & RIR PLE SYSTEMS

Matrix Assisted Pulsed Laser Evaporation
Resonant IR Pulsed Laser Evaporation

PVD Products can provide a variety of **Matrix Assisted Pulsed Laser Evaporation (MAPLE)** and **Resonant IR Pulsed Laser Evaporation (RIR PLE)** systems. These systems are capable of depositing high-quality polymer films on substrates up to 4" (100 mm) in diameter.

The MAPLE and RIR PLE process normally includes a polymer material dissolved in an appropriate liquid solvent. The systems include the ability to inject this polymer/solvent mix into the chamber, which has been pre-pumped and then back-filled with dry nitrogen to minimize contamination due to water vapor or air. A liquid nitrogen-cooled reservoir surrounds the rotating target and will freeze the polymer/solvent mix to form a solid target.



MAPLE System
Four polymer/solvent targets

MAPLE 2000 System

Three polymer/solvent targets and a load lock that mates to a customer supplied glove box



Our systems use a 304L SS box chamber with front-mounted hinged door providing quick access for easy servicing. The chamber has multiple user accessory ports for target and substrate viewing, load lock, and spectroscopy. Heating elements are easily field-replaceable.

A complete enclosed optical train rasters the laser beam over the rotating large-diameter target and is included for enhanced film uniformity and target utilization.

This system is ideal for thin film polymer materials science and polymer device development. Coupled with our optional dual-wafer load lock, this system will provide high throughput for your polymer film needs.

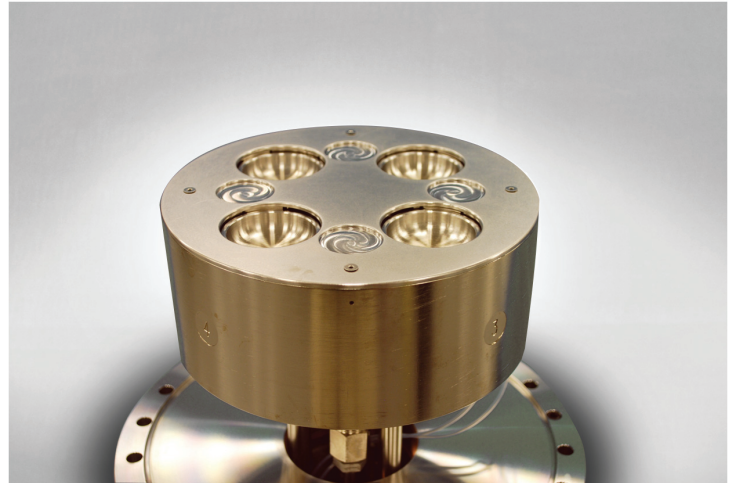
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System Features

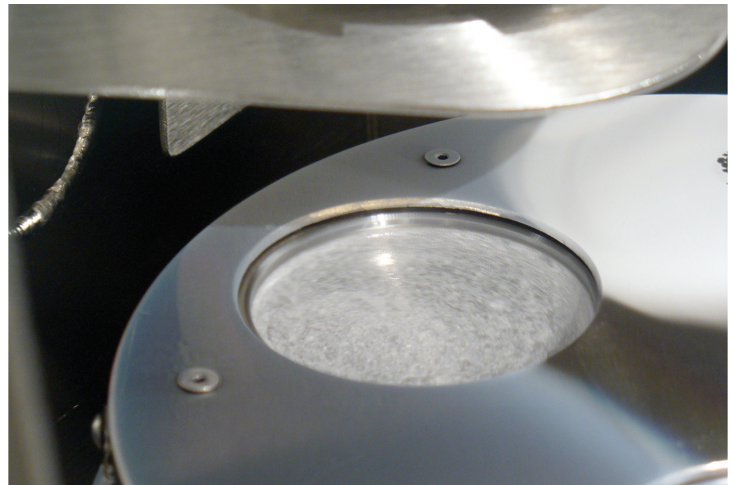
Utilizing an integrated laser, operating between 1.06 and 5 microns, a small volume of the polymer/solvent mix will be flash evaporated with each laser pulse and will throw the polymer into the vapor phase while the solvent is pumped away. Since the energy per photon is only ~ 1 eV or less, minimal dissociation of the polymer chain occurs, providing polymer films with full functionality. Systems with single or multiple targets are available. The system includes a turbo pump with a mechanical pump providing base pressures below 5×10^{-7} Torr without any polymer/solvent mix and 5×10^{-8} Torr with a load lock. One MFC for argon gas is typically provided. A current-model computer with PVD Products LabVIEW™ interface provides full system control of MFC flow rates, substrate selection, substrate and target rotation speeds, temperature, pumps, optional closed-loop pressure control, and electropneumatic valves. Data logging is also provided.

System Options

- Dual wafer load lock
- Substrate heaters
- Multiple MAPLE targets
- Automated pneumatic valves
- Closed-loop pressure control
- Additional MFCs
- Various IR lasers



Multi-Target MAPLE Assembly



Frozen Polymer/Solvent Mix