TORONTECH

LOAD-LOCK EQUIPPED COATING SYSTEM

Load-Lock Equipped Coating System ToronTS-450 with Load-Lock chambers offer faster processing and superior coating quality. Sample loading and unloading take place in the Load-Lock chamber, with a magnetic transfer arm moving the sample to the main chamber.

This enhancement is available for Thermal, Sputtering, E-Beam, and HiPIMS systems within our product range. The ToronVak Load-Lock setup enables coating in a high-vacuum environment of 10^{-7} Torr while allowing a new wafer to be loaded every 15 minutes.

APPLICATIONS

Load-Lock Equipped Coating System

- **Semiconductor & Wafer Fabrication** - High-throughput thin film deposition on wafers with minimized contamination risk, allowing continuous processing and frequent sample exchange.
- **Microelectronics & Optoelectronics** - Precise coating of conductors and insulators for sensors, MEMS devices, photodetectors, and optoelectronic components under stable vacuum conditions.
- **Energy & Photovoltaics** - Advanced coating of solar cells and energy storage devices with high-efficiency multilayer thin films using reactive sputtering and thermal sources.

- **Aerospace & Automotive Engineering** - Application of durable metallic and dielectric coatings on critical components to enhance performance, wear resistance, and thermal stability.

- **Display & Optical Coatings** - Deposition of transparent, anti-reflective, and conductive layers on glass, optics, and display substrates with recipe-controlled uniformity.

- **Surface Engineering & Industrial Coating Services** - Reliable platform for contract coating services, enabling efficient multi-sample processing with reduced downtime.

- **Research & Development** - Flexible system for universities, laboratories, and corporate R&D teams to investigate new thin film materials, coating techniques, and multilayer architectures.

FEATURES

1. **Chamber Design:** Prismatic/cylindrical vacuum chamber made of SS304 with an electro-polished, feather-touch inner surface and optional water-cooled surfaces.
2. **Port Configuration:** Standard 1", QF, CF, and ISO ports for easy upgrades to additional thermal or sputter sources.
3. **Observation & Control:** UV-blocking observation window, rotatable door shutter, and LabVIEW-programmed sample shutter for precise thickness control.
4. **Vacuum System:** Turbo-molecular, mechanical, and dry pumps with high-speed operation, achieving **10^{-8} Torr** base pressure in the main chamber.
5. **Load-Lock Performance:** Dedicated pumps reach **10^{-6} Torr** in 10 minutes, adaptable for sputtering, e-beam, and thermal sources.
6. **Valves & Isolation:** Throttle, vent, isolation, and gate valves ensure the chamber remains under vacuum when idle.

7. **Automated Control:** Fully automatic deposition via software or panel control with real-time LCD displays.
8. **Cooling System:** Automatic closed-loop water cooling with interlock protection to prevent power activation without proper vacuum conditions.
9. **Sputtering Capabilities:** 1”- 6” sputtering guns (RF & DC-driven) with flex heads, self-axis rotation, and compression sealing.
10. **Material Coating:** Coats conductors (Au, Al, Ti, Ni) and insulators (MgO, TiO_2, SiO_2, TiN) at high rates with recipe-based control.
11. **Vacuum Precision:** Adjustable vacuum control from **1000 - 10^{-9} Torr** using downstream/upstream regulation.
12. **Sample Heating & Rotation:** PID-controlled heating from **50 - 600°C** (±1°C sensitivity) and **2 - 30 rpm** adjustable rotation, with plasma cleaning (DC/RF).
13. **Loading Mechanism:** Magnetic transfer arm for easy handling of **2”, 3”, 4”, and 6”** samples.
14. **Thickness Measurement:** Dual-channel, **0.1 Å/s** precision thickness-rate measurement with two QCMs.
15. **Thermal Sources: 8V - 500A, 4000W** thermal sources for sequential and co-evaporation, with a design that minimizes cross-contamination and allows easy source replacement.
16. **Effusion Cells: 50-800±1°C** cells for organic evaporation.
17. **Gas Mixing & Sputtering:** Digital MFC-controlled gas inputs (Ar, N_2, O_2, He, CH_4, etc.) with **0.1 sccm sensitivity** for reactive sputtering.
18. **Efficiency:** 1.5-hour experiment cycle, enabling **10-15 experiments per day**.
19. **Warranty: 2-year** coverage for materials, design, and craftsmanship.

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