Nanoquest I

LOAD LOCK

Process Methods

Ion Beam Etching

Ion Beam Sputter Deposition

Ion Beam Assisted Deposition (IBAD)

Reactive Ion Beam Etching (RIBE)TM

Chemical Assisted Ion Beam (CAIBE)

Applications

Fuel Cells

Magnetic Materials

Semiconductors

Superconductors

Wear Coatings

Corrosion Resistant Coatings

Opto-electronics

Diamond Like Carbon (DLC)

Multilayer Materials

INTLVAC nanoquest

Load Lock Ion Beam Etch/Deposition

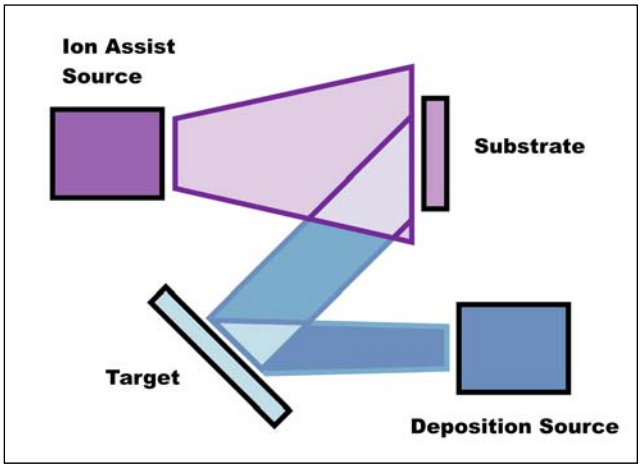
The INTLVAC Nanoquest I Load Lock Ion Beam Etch & Deposition system is the most versatile R&D ion beam development platform available. Ion beam processing is the most controllable thin film etching and deposition technique due to the independent control of ion energy, ion current density, and incidence angle. The Nanoquest I Load Lock is capable of performing processes ranging from simple inert etch to a complex multi-layer deposition.

Designed for clean room operation, the Nanoquest I Load Lock can be mounted through a clean room wall. System components, such as pumps are easily accessed in the service area. UHV design rules ensure that the etch module and load lock chamber achieve very low base pressures.

System Configuration and Layout

The vacuum chamber is constructed using only stainless steel and UHV compatible fabricating techniques with an electro-polished outer surface for a clean and attractive appearance. Continuous stainless steel cooling channels are welded in a web-like pattern on the outside of the chamber to provide an efficient heat sink.

The vacuum chamber has a differentially pumped hinged front door for easy access and multiple view-ports for complete process observation, including one view-port for the optional load lock. The Nanoquest I-LL system can achieve 1×10^{-6} Torr in less than 30 minutes and 5×10^{-8} Torr in 24 hours using a combination of dry vacuum pumps. The Nanoquest I-LL may be configured with either a Cryopump or Maglev Turbo pump.



Chamber geometry specifically designed for optimization of your process. Shown in the diagram above is the configuration for Ion Beam Deposition with Ion Assist.

ion beam etching

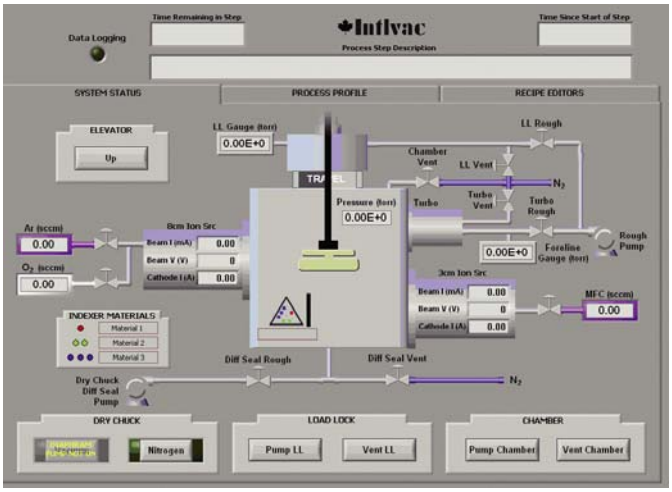
Load Lock

The Nanaoquest I-LL system uses a magnetically coupled rotary linear drive to safely transport a wafer, that has been mounted to a carrier platen, into the etch chamber.

The load lock enables the user to achieve faster etch turn-around times, greater run-to-run repeatability, and reduces generation of particulates. Water vapor is practically eliminated in the UHV design along with process variability caused by fluctuations in room humidity.

System Control and Monitoring

The LabVIEW based automated computer control system features total system management in an easy to use windows-based package. The LabVIEW Controller allows for automatic sequencing of electro-pneumatic actuators to pump the chamber down from atmosphere to high vacuum pumping. Venting of the system to atmosphere is achieved automatically with INTLVAC's AutoVac Controller.



The operator screen is full color and is completely customized for your system. Some important features of the operating system are prominant gauge displays, concise state descriptions showing system progress, and easy "point-and-click" access to all major system functions.

Substrate Holder/Stage Model 2704

The system utilizes substrate rotation and substrate offset to achieve superior etch/deposition uniformity. Adjustable angle of incidence further optimizes your process.

Platen: Stainless Steel & OFHC Copper Construction.
Rotation: 0-45 rpm with variable incident angle and offset, stepper motor driven angle change 0° to ±150° tilt , no rotating water seals in vacuum.
Cooling: Direct water-cooled platen with Dri-Chuk Pad interface
Assembly: Mounted on front door of chamber. Stage swings to horizontal position allowing complete access
Substrate: Can accommodate up to 4" diameter wafers
Shutter: Pneumatically operated sliding stage shutter with integral beam current probe
Incident angle: Computer control of incident angle, while under vacuum, better than ± 0.1°

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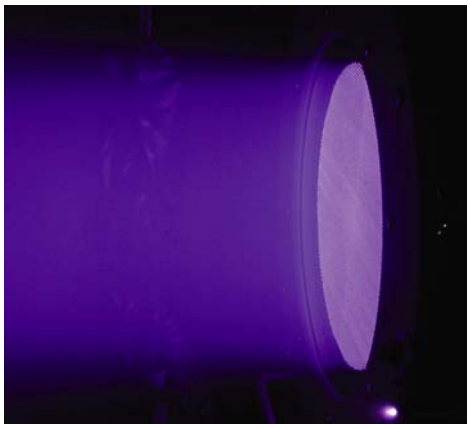
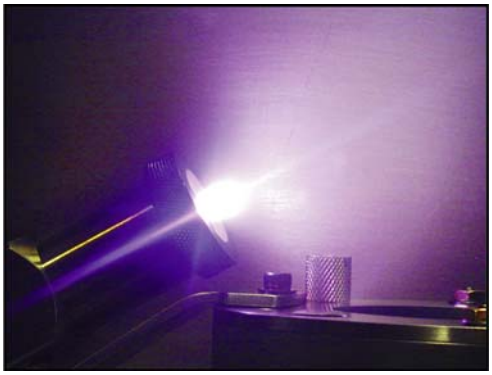
Device/Process	Materials
Microfabrication	Any Material
Thin Film Heads	NiFe, AL2O3/TiC
Superconducting Devices	YbCo, YSZ, MgO
Optical Figuring	SiO2, Glass
Laser Diodes	GaAs, AlGaAs, InP
Microwave Circuit Components	Au/Cu on Al2O2
Optical Filters	TiO2, SiO2
Optical Wave Guides	LiNbO3
Passivation Layers	SiO2
Metal Contact Etch (inert gas)	Au, Pt
Nano Structures	Si





Target	Neon	Argon	Krypton	Xenon
Carbon	-	44	50	57
Aluminum	570	730	630	520
Silicon	440	380	400	320
Titanium	-	380	340	290
Chromium	550	580	680	710
Nickel	580	660	570	510
Palladium	800	1300	1300	1200
Silver	1400	2200	2200	2200
Platinum	440	880	1100	1100
Gold	870	1700	2100	2000

Meeting customers needs worldwide

INTLVAC headquarters has state-of-the-art plant facilities in Ontario, Canada that enable assembly of vacuum systems and gas lines under cleanroom conditions.

We offer on-site installation and training for operators and maintenance personnel worldwide, insuring proper installation, process enhancements, and maximum equipment uptime.

Customer satisfaction

INTLVAC provides individual solutions for service and support issues to each customer, including Service Contracts, Preventative Maintenance, and Training in System Operation and Maintenance.

All INTLVAC systems equipped with components from selected suppliers are covered by a Comprehensive Warranty and meet International Standards. Our modular design allows for future upgrades of the systems.

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