



# Nanoquest I

*A compact, low cost platform for advanced ion beam process research*

## Process Methods

**Ion Beam Etching**

**Ion Beam Sputter Deposition**

**Ion Beam Assisted Deposition (IBAD)**

**Reactive Ion Beam Etching (RIBE)™**

**Chemical Assisted Ion Beam (CAIBE)**

## Applications

**Fuel Cells**

**Magnetic Materials**

**Semiconductors**

**Superconductors**

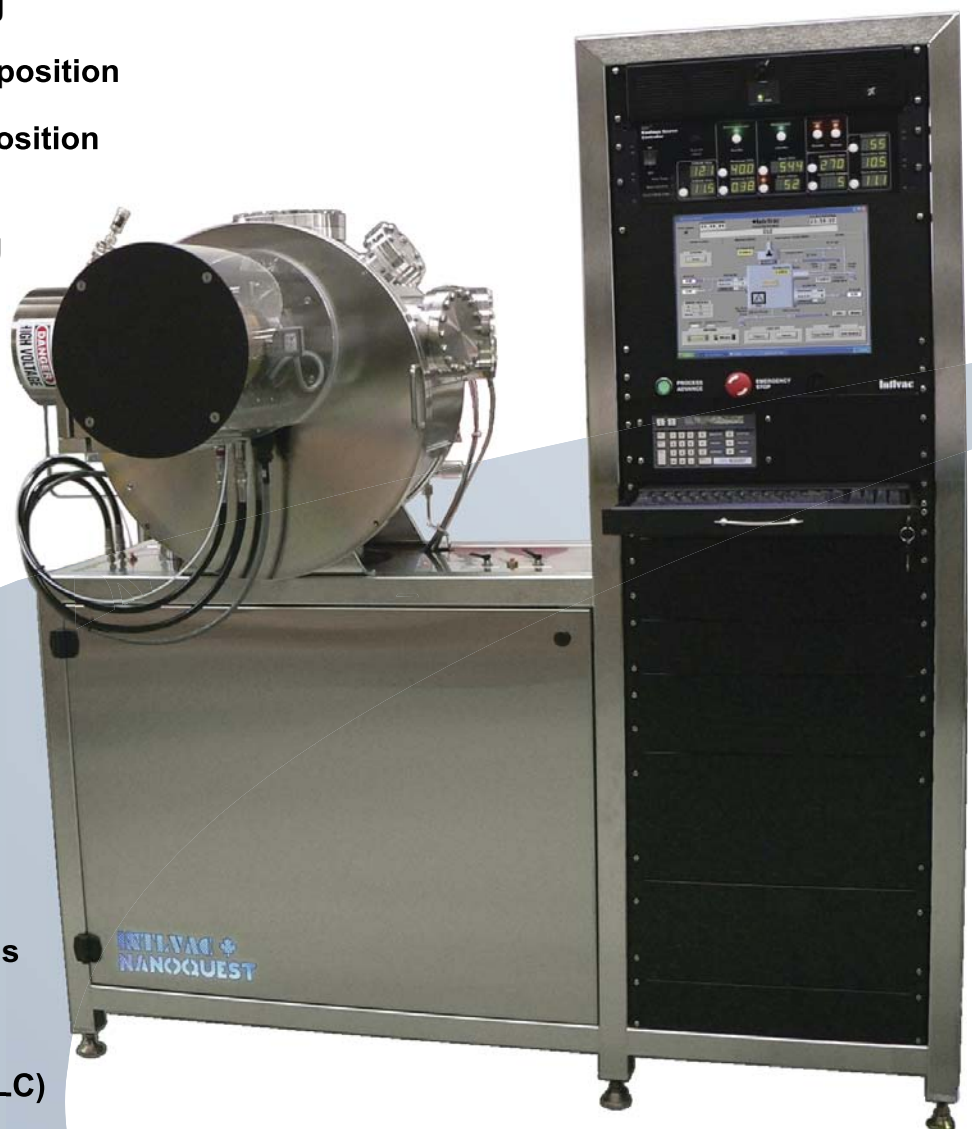
**Wear Coatings**

**Corrosion Resistant Coatings**

**Opto-electronics**

**Diamond Like Carbon (DLC)**

**Multilayer Materials**

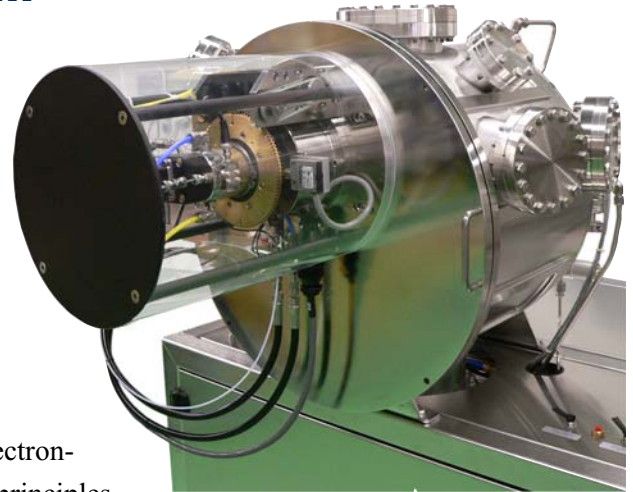




## Nanoquest Ion Beam Etch System

The INTLVAC Nanoquest System is a universal R&D platform for thin films and materials research. The system is optimized for single substrates of up to 4" in diameter. The Nanoquest platform allows; Ion Beam Etch, Ion Beam Sputtering, Ion Assisted Evaporation, and Ion Assisted Magnetron Sputtering to all be performed on the same platform. The unique design and substrate stage allows substrate cooling or heating with 360-degree tilt and rotation.

The system is housed in a compact one-piece frame with integral electronics rack to minimize lab or clean room space. High vacuum design principles ensure quick cycle times and low ultimate pressure performance. UHP Gas distribution ensures stable ion source operation.



### *High Vacuum Pumping*

Closed cycle pumping is accomplished with Helium Cryo-pumps or Turbo Drag pumps with a dry roughing pump for a completely oil free system.

### *Standard Layout*

The chamber is 20" diameter by 16" deep with a hinged front door and welded stainless steel cooling passages with a door mounted substrate stage. The frame is an all electro-polished stainless steel construction with an integral instrument rack. Operator control is accomplished through a rack mounted touch screen with PLC control for automated pump down, pressure control, gas flow control, and ion source operation.

## Nanoquest 1400R

### *Etch System for Reactive Gas Operation: O<sub>2</sub>, N<sub>2</sub>*

Similar to the inert gas system except that the system uses a Hollow Cathode, or Plasma Bridge neutralizer for the electron source.

## Nanoquest 1400

### *Etch System for Inert Gas Operation*

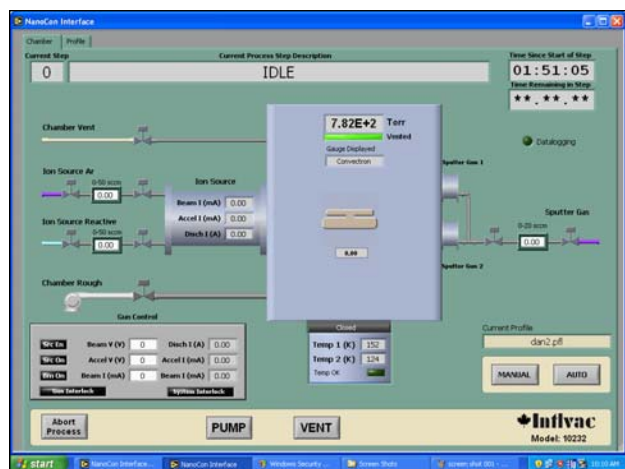
This configuration has an Ion Source port for 4, 8 or 14cm ion sources, DC or 14cm RF ion source. Standard on most systems is a high flow, direct water cooled 2704 stage with platen for Dri-Chuk mounting of wafers or quarter wafers. The stage is capable of 0-45rpm substrate rotation with computer controlled tilt and gas flow control.

# thin film deposition

## Nanoquest 1400 SD

### *Ion Beam Sputtering System*

The Ion Beam sputtering configuration has three 4" sputtering targets and 4, 8 or 14cm DC ion sources or 14cm RF ion source. High flow, direct water-cooled 2704 stage with platen for Dry Chuck mounting of wafers, or quarter wafers, stage rotation of 0-45 rpm, and manual angle tilt. It has gas flow control of 20 sccm UHP argon gas line and pumped by a Helix CTI cryogenic pump, and Alcatel dry roughing pump for a completely oil free system. (Optional: Additional Ion Source for simultaneous assist and substrate pre-cleaning). System is also available with a Turbomolecular pump.



All Nanoquest platforms come equipped with a user friendly LabVIEW GUI. The simple interface allows the system to be run in Automatic mode with pre-programmed recipes or in Manual mode for more in depth control.

*Platen:* Stainless Steel 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:* Accommodates 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; accuracy better than ±0.1%.

## Nanoquest 1400 SDR

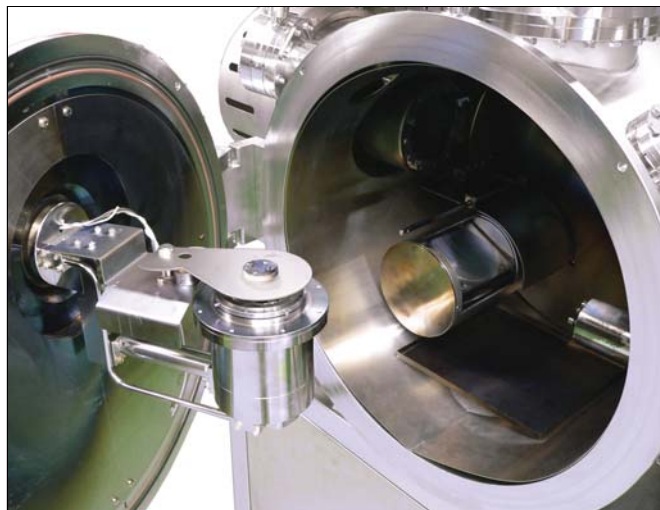
### *Ion Beam Reactive Sputtering System*

Similar to the inert gas system except that the system uses a Hollow Cathode, or Plasma Bridge neutralizer. Pumping is by a 1500 L/s Maglev Turbo pump and Diaphragm backing pump. INTLVAC recommends RF ion sources for sputtering.

## Substrate Stage Model 2704

### *High Flow Cooling Stage*

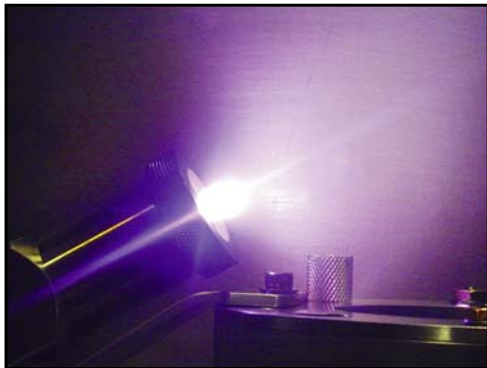
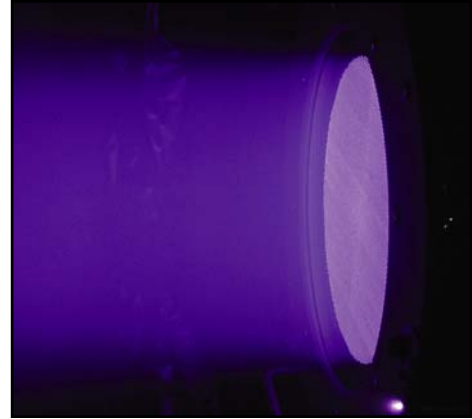
The system utilizes substrate rotation and substrate offset to achieve superior etch/deposition uniformity. Adjustable angle of incidence further optimizes your proces.





# nanorequest

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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