Nanoquest I

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

Process Methods

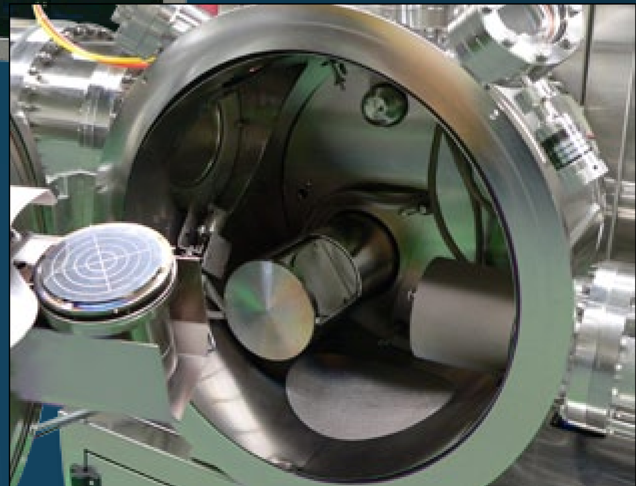
Ion Beam Etching

Ion Beam Sputter Deposition

Ion Beam Assisted Deposition (IBAD)

Reactive Ion Beam Deposition (RIBE)

Chemically Assisted Ion Beam Etching (CAIBE)



Applications

Magnetic Materials

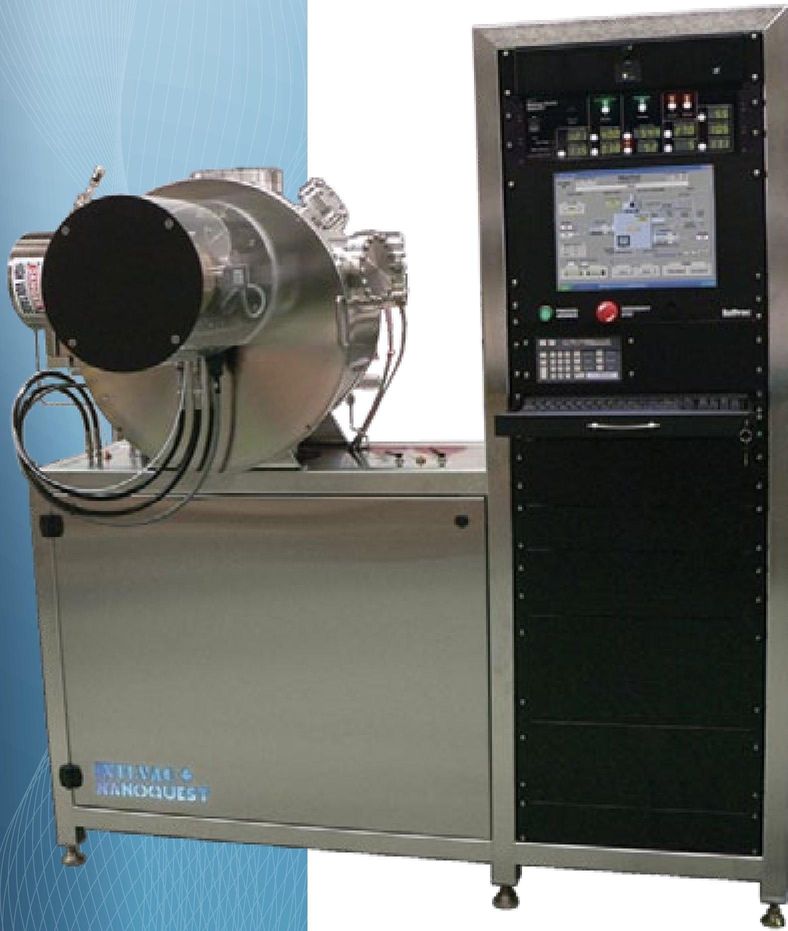
Semiconductors

Optoelectronics

Multi-layer Materials

IntlVAC
THIN FILM

nanoquest ion

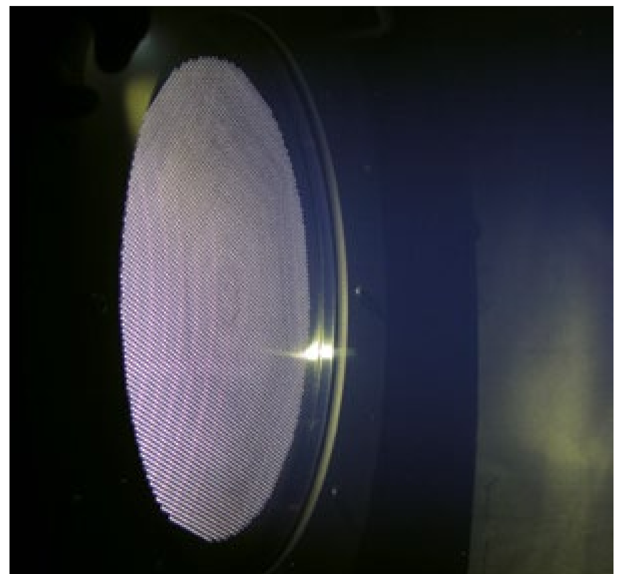


ION BEAM ETCHING SYSTEM

The INTLVAC THIN FILM Nanoquest I 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 is capable of performing processes ranging from simple inert etching to a complex multi-layer deposition.

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 Cryopump or Maglev Turbo pump.



LOAD LOCK

The Nanoquest 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

SYSTEM CONTROL AND MONITORING

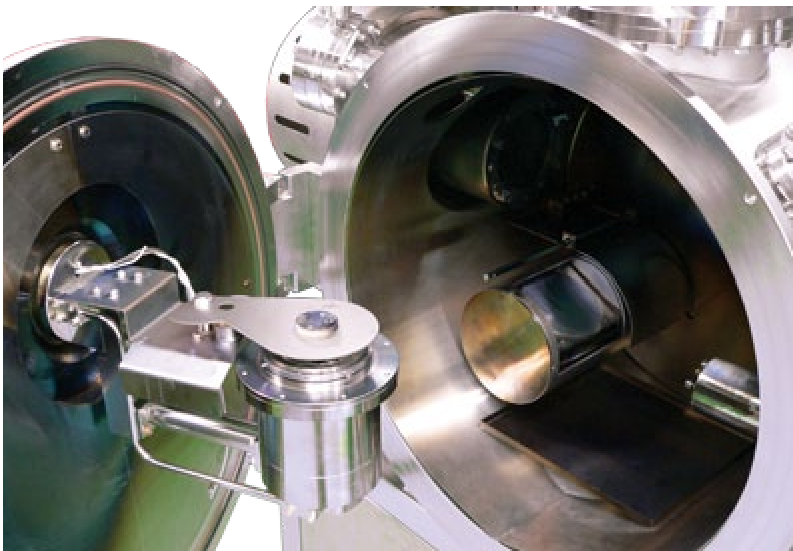
The LabVIEW based automated computer control system features total system management in an easy to use Windows-based package. The LabVIEW Controller allows for automatic sequencing of electro-pneumatic actuators to pump the chamber down from atmosphere to high vacuum pressure. Venting of the system to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

SUBSTRATE STAGE

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

PLATEN: Stainless Steel Contruction

ROTATION: 0-45rpm with variable incident angle, offset, stepper motor driven angle change 0° to 270° tilt, no rotating o-ring seals in vacuum.



COOLING: Direct water-cooled platen.

ASSEMBLY: Monted on front door of chamber. Stage swings to allow complete access.

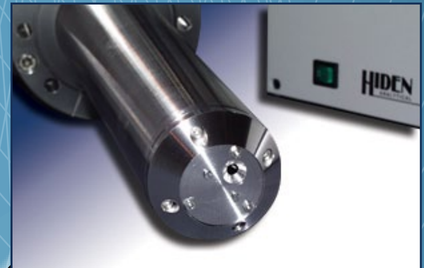
SUBSTRATE: Can accomodate up to 6" diameter wafer.

SHUTTER: Pneumatically operated sliding stage shutter with optional beam current probe.

INCIDENT ANGLE: Computer control of incident angle, while under vacuum better then ±0.1°

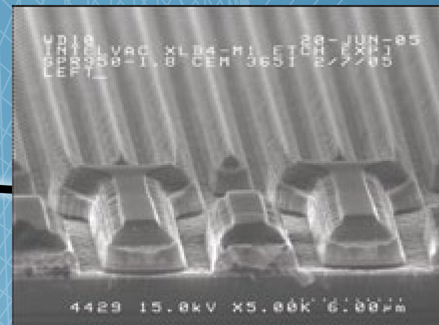
Load-lock can fit 4” to 6” substrates

Retractable SIMS End-point Detector



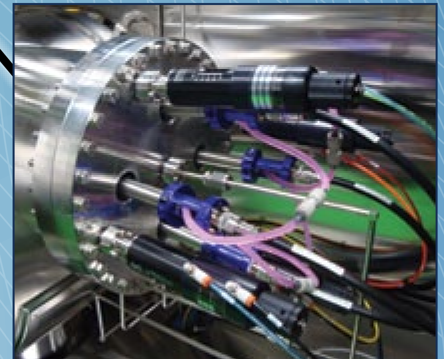
Up to 22cm D.C. or R.F. Ion Source

SiO_2 passivation by R.F. Sputtering



Direct water-cooled Stage with integral beam probe

D.C., A.C., or R.F. Magnetron Sputtering



4cm R.F. Ion Source for IBS with Target Indexer

Intlvac THIN FILM

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