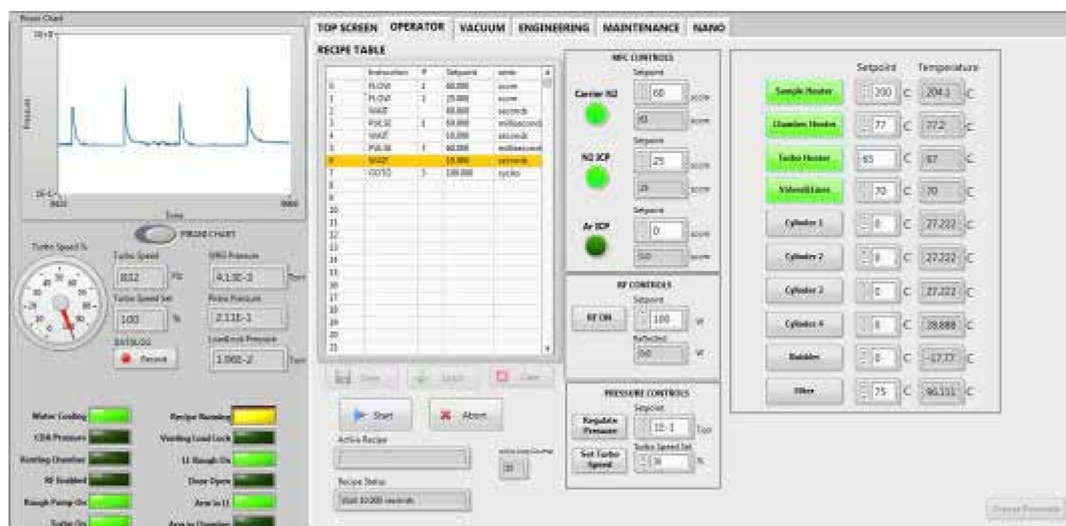
NANO-MASTER Atomic Layer Deposition Systems

Atomic Layer Deposition is an important technique for depositing thin films for a variety of applications. ALD is able to meet the needs for precise thickness control and conformal deposition in high aspect ratio structures to a level that far exceeds other deposition techniques. The nature of the sequential, self-limiting surface reactions in ALD produces a non statistical deposition because the randomness of the precursor flux is not a factor. As a result, ALD films remain extremely smooth, continuous, and pin-hole free allowing for excellent film properties. ALD processing can also be scaled to very large substrates.

The NLD-4000 is a stand alone, PC controlled ALD system with LabVIEW software featuring four levels password-controlled user authorization. The system is fully automated and safety-interlocked and offers flexibility to deposit multiple films (ex. Al_2O_3, AlN, TiN, ZrO_2, LaO_2, HfO_2) for Semiconductor, Photovoltaic and MEMS applications. It has a 12" aluminum reaction chamber with heated walls and a pneumatically lifted top for easy chamber access and cleaning. The system features an onboard gas pod containing up to seven heated 50ml cylinders for precursors and reactants with fast-pulse heated delivery valves using N_2 or Ar as a carrier gas.

Unreacted precursor can be managed with a heated filter on the chamber exhaust port. All heater set points are PID controlled. Automatic PC control of recipes, temperatures, flows, pumpdown/vent cycles, and delivery line flushing. Options include automatic load-unload (without changing system footprint), planar ICP source with remote plasma for Plasma Enhanced ALD (Planar ICP geometry maintains a small reaction chamber volume, speeding up cycle times), Turbomolecular pump for faster cycles and a lower base pressure, etc.



NLD-4000 Software in Automatic Recipe Mode

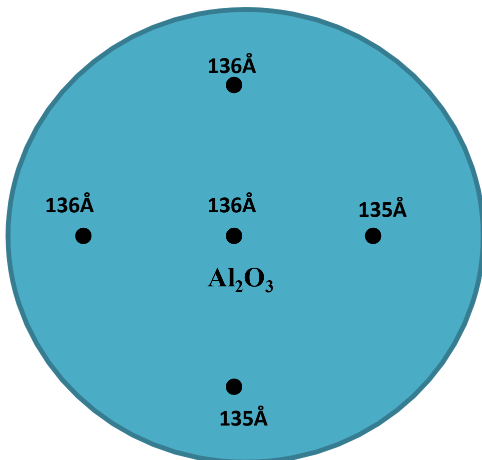
NANO-MASTER Atomic Layer Depositon Systems

ALD GENERAL SPECIFICATIONS	
Maximum Substrate Size:	8”
Substrate Temperature Range:	Up to 400°C
Gas Lines:	Heated and Electropolished
Precursors:	Up tp 7 Precursor/Reactant Cylinders
MFC’s:	2 Standard, Extras Optional
Plasma Enhanced ALD:	Downstream ICP (Optional)
System Control:	PC Controlled with LabVIEW and Touchscreen User Interface
Loading and Unloding:	Automatic (Optional, Only for 6” Substrates)

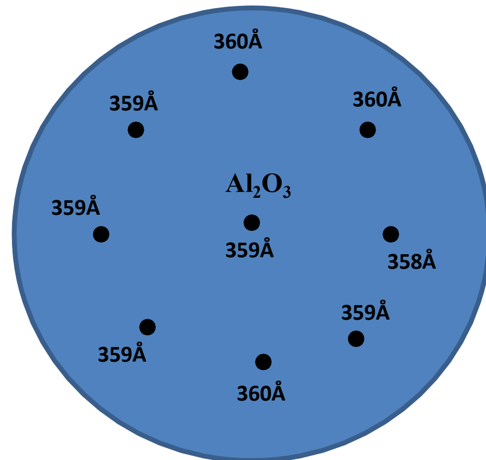
FACILITY REQUIREMENT	
Power Input:	208V, 50/60Hz, 20A/phase
Chilled Water:	(2X) 3/8” Swagelok, H2O Supply & H2O Return
Compressed Air:	1/4” Swagelok, 80-90 PSI
Processed Gas:	1/4” Swagelok, 20 PSIG
Nitrogen:	1/4“ Swagelok, 10 PSIG
Exhaust (System):	NW25

DIMENSIONS	Width	Depth	Height
NLD-4000	28”	44”	44”

NLD-4000 Uniformity Data on 6” Wafer



Cycle: 100 cycles (TMA + H_2O)
Uniformity: 0.36%
Temperature: 200°C
Refractive Index: 1.68



Cycle: 300 cycles (TMA + H_2O)
Uniformity: 0.27%
Temperature: 200°C
Refractive Index: 1.67

NANO-MASTER, Inc.

3019 Alvin Devane Blvd., Suite 300,
Austin, Texas 78741
Ph. 512-385-4552; Fax 512-385-4900
main@nanomaster.com; www.nanomaster.com