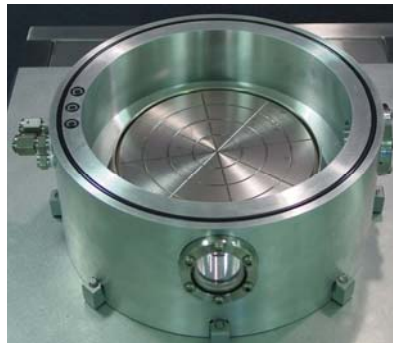


NRE-4000, NRE-3000, NRP-4000, and NDR-4000 RIE SYSTEMS



NRE-4000



NRE Chamber

Description:

The NRE-4000 is a stand-alone Reactive Ion Etching (RIE) system with shower-head gas distribution and a water cooled RF platen. It has a stainless steel cabinet and a 13" cylindrical Aluminum chamber that opens from top for wafer loading. Chamber has two ports one with a 2" window the other with a blank off for end point detection and for other diagnostic. It can accept up to 8" wafers. Chamber is extremely clean in design and reaches 10^{-6} Torr or lower base pressure depending on the pumping package. It can be operated in the pressure range of 20 mTorr to 8 Torr. Pumping package consists of a throttle valve, 300L/sec corrosive turbomolecular pump, sieve filter, and a 10cfm mechanical pump with Fomblin oil. For process pressure monitoring heated Baratron[®] is used. The RF power is provided by 600 W 13.5 MHz power supply, and 1000 W auto-tuner. The self DC bias is continuously monitored and reaches as high as -500 V which is important for anisotropic etching. The system is completely automated and is PC controlled. MFC's, valves, and the cover lift are pneumatic and controlled through PC. The real time system pressure and DC bias is displayed in graphic format while flow and power is displayed in alpha numeric format. Three levels of authorization Auto, Engineering, and Maintenance prevents unauthorized use of the system while giving maximum flexibility to user for setting up recipes in Engineering mode and running in Auto mode reproducibly.

The NRE-3000 is a table top Reactive Ion System. Chamber, gas distribution plate, RF platen are same as the stand alone version. It is again completely PC controlled, except in this table-top unit certain options can not be provided due to space constraints. For example, it does not use any throttle valve and the pressure is set with flow. Maximum number of MFC's is four, and no sieve filter is provided.

The NRP-4000 is a Dual Reactive Ion Etching and Plasma Enhanced Chemical Vapor Deposition System. It has the same footprint as NRE-4000 or NPE-4000 (stand alone PECVD system, see brochure), but combines complete deposition and etching capabilities of two separate systems by having two chambers and a common pumping and power delivery package. Chambers are isolated with pneumatically controlled gate valves. Both systems are controlled through same PC and one or the other chamber can be run at a time.

The NDR-4000 is Deep Reactive Ion Etching System with cryogenic wafer cooling and biasable platen and a 8" Inductively Coupled Plasma Source. It has 500L/sec turbo and process pressures can be as low as few mTorr.

Reactive Etching System Options:

- Plasma Etch Mode: RF Gas distribution plate for Isotropic etching (capable of switching from plasma to RIE mode during process)
- ICP Plasma Source, 2KW RF Power Supply and Tuner
- Substrate heating up to 200 C
- Cryogenic Substrate Cooling
- End Point Detection
- Langmuir Probe
- Electrostatic Chuck
- Additional MFC's
- 1KW Power RF power supply and tuner
- Lower frequency power supplies and tuners
- Load Lock

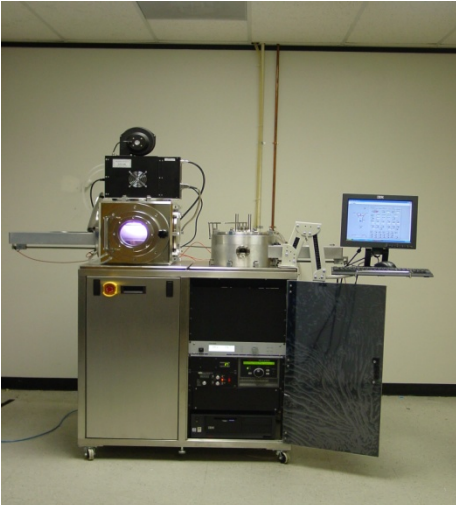


NANO-MASTER

3019 Alvin Devane Blvd. Suite 300, Austin, TX 78741;

Tel. (512) 385-4552; Fax (512) 385-4900; <http://www.nanomaster.com>; main@nanomaster.com

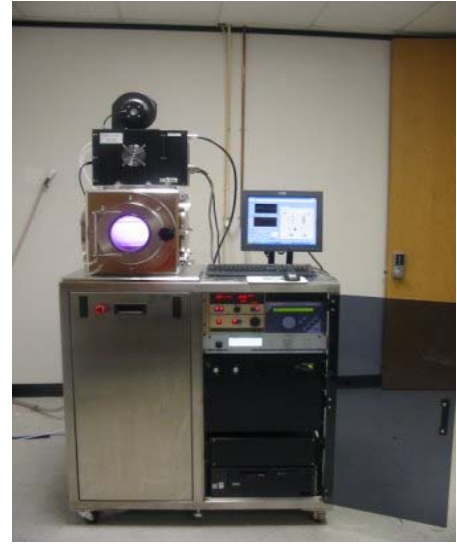
NRE-4000, NRE-3000, NRP-4000, and NDR-4000 RIE SYSTEMS



**NRP-4000 Dual PECVD/RIE System
With ICP source and Auto Load/Unload**



**Nano-Master Shower Head
RF Plasma Source**



**NDR-4000 with SS Chamber
and P-200 ICP Source**

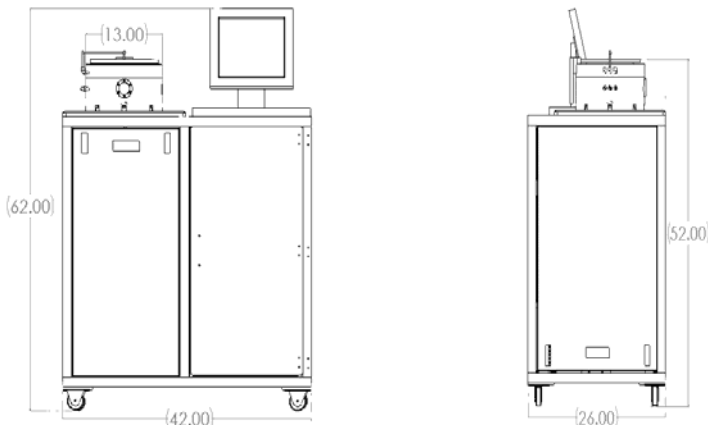
Reactive Etching System Specifications:

NRE
 Control: PC, Lab View
 Chamber: 13" Aluminum, solid block
 Substrate Holder: 13 °C, water cooled
 Gas Distribution: Shower Head, MFC's, SS lines
 Plasma Source: RF Platen, P-100 (Hollow Cathode)
 DC Bias: up to -500V Self Bias
 Base Pressure: 5×10^{-7} Torr
 Process Pressure: 0.02-8 Torr
 RF Power: 600 W, 1000W Optional
 Vacuum Pump: 200 L/sec Corrosive Turbo
 Mechanical pump: RV 12 with Fomblin Oil
 Power: 110/220V 3Phase, 40/20A

NDR
 Control: PC, Lab View
 Chamber: 13" Aluminum, solid block/SS Cubic Chamber
 Substrate Holder: -60 °C, Cryogenic/electrostatic chuck
 Gas Distribution: Gas Ring, MFC's, SS lines
 Plasma Source: Planar ICP 200 (8")
 DC Bias: up to -1000 V external bias
 Base Pressure: 5×10^{-7} Torr
 Process Pressure: 0.001 Torr and up
 RF Power: 600W, or 1KW
 Vacuum Pump: 260 L/sec Corrosive Turbo/500 L/sec optional
 Mechanical pump: RV 12 with Fomblin Oil/Dry Scroll Pump
 Power: 110/220V 3Phase, 40/20

Dimensions and Weight:

| | NRE-4000 | NRP-4000 | NRE-3000 |
|----------------|-----------------|-----------------|-----------------|
| Length: | 42" | 42" | 30" |
| Width: | 26" | 26" | 26" |
| Height: | 62" | 62" | 26" |
| Weight: | 400 lbs. | 600 lbs. | 250 lbs. |



NRE-3000



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