
The new approach to
etching and deposition:
The PlanarEtch IIA
Plasma System
from Technics.
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Cost-effective in a range of applications.

The PlanarEtch IIA/B offers you a new approach to your etching and deposition requirements. For the first time, you can bring all these valuable features to an application of virtually any scale:

- Compact size: fits on a standard laminar flow bench
- Simple to use: one-button operation for non-technical personnel
- Low power consumption: operates on 110 volts
- Low cost: about ¼ the price of comparable systems
- Standard 30 KHz power supply

PlanarEtch IIB
Standard with 13.56 MHz power supply
All other specs remain the same

These advantages make the PlanarEtch IIA/B ideal for R&D and production. You can use multiple PlanarEtch IIA/B units to process large numbers of wafers. With multiple units, you avoid the production halts associated with single large machines. And the PlanarEtch IIA/B is more compact, economical, and easier to operate than any other comparable system.

ThePlanarEtch IIA/B is based on the popular PlanarEtch II—a system with 4 years of proven, well-documented performance. The new, improved system has many features found in systems costing much more:

Capability. Easy processing of any wafer size.
Fully automatic operation. Non-technical personnel can operate the system at the touch of a button.
Tabletop size. Installs easily in a standard laminar hood.
Digital readout. Power, pressure, and time readings are displayed for convenient viewing on the front panel.
Process-end alarm. Signals the operator the moment the process is finished. No time is wasted between loads.
Front panel safety. Attractively designed lucite panel securely protects all displays. The 15-volt controls operate safely in accordance with the strictest requirements.

Fully opening, assisted-lift lid. Eases loading and unloading of substrates. Facilitates cleaning and maintenance.
Frontal quartz viewport. Provides a clear view of the etch process, and may be used to monitor the plasma emission spectra.
Aluminum process chamber, with optional LN_2 trap. Provides the greatest compatibility with process gases.
Direct-drive mechanical pump. Guarantees quiet, clean, vibration-free operation. Low backstreaming rate prevents contamination.
Standard two-gas capacity. Permits most etching applications. (Additional gas-blending capabilities available).
Capacitance manometer. Accurately monitors various etch gas pressures.
Crystal-controlled timer. Processes cannot run overtime and ruin the wafers. Frees the operator from constant monitoring.
Solid-state logic. Guarantees instant start-up, high reliability, and uniform results.


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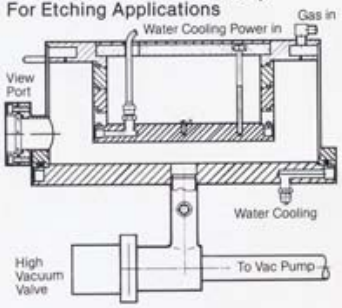
Anisotropic, reproducible etching.

PlanarEtch IIA Chamber Setup For Etching Applications



Etchable Materials

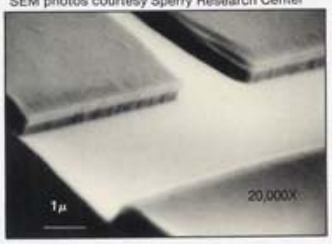
- Silicon nitride
- Single-crystal and polycrystalline silicon
- Thermally grown and deposited silicon dioxide
- Phosphorous and boron-doped silicon dioxide
- Titanium, tungsten, and titanium tungsten
- Tantalum and tantalum nitride
- Molybdenum
- Metal Silicides
- Aluminum

You can depend on the PlanarEtch IIA/B to deliver consistent, uniform reproducible, "straight-wall" etching of semiconductor films and other devices. Wafers of different material densities and doping concentrations are easily handled, because the PlanarEtch IIA/B allows you to perfectly balance the key process parameters — time, power, temperature, pressure, and gas composition. In an independent test of PlanarEtch IIA/B the unit could routinely etch 1μ geometries in 5,000-Å Polysilicon films.

Typical Etching Applications

- Etching of lines and spaces of submicron dimensions in semiconductor films
- Smooth, anisotropic etching of doped and undoped polycrystalline silicon
- High-rate etching of films used in semiconductor fabrication
- Etching silicon before contact-point metallization for improved adhesion and reduced ohmic contact resistance.
- Precise etching of dielectrics down to aluminum metallization layers
- Etching of most thermally sensitive devices
- Etching and surface treatment of hybrid circuits
- Etching of Aluminum films

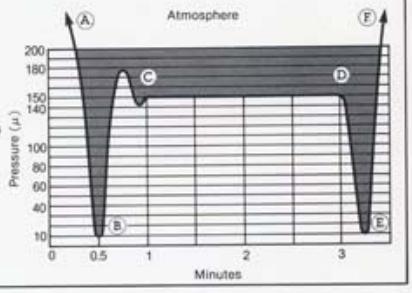
SEM photos courtesy Sperry Research Center



3,000-Å silicon nitride over gallium arsenide, etched in CF_4 and oxygen.

PlanarEtch IIA Automatic Etching Cycle

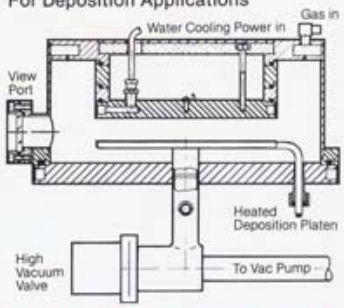
A. Operator loads substrates, closes chamber, and presses start/stop button.
B. After pump down to pre-set pressure, etch gases are introduced.
C. After timed gas stabilization, RF power is initiated.
D. After programmed etch time, etch gas and power are turned off, and the alarm sounds.
E. Operator presses start/stop button, the alarm stops, and the chamber vents.
F. Operator unloads etched substrates.



Uniform nitride and oxide deposition.

Use the PlanarEtch IIA/B for deposition by adding a compact deposition module. This tabletop accessory converts the PlanarEtch IIA/B's function from etching to plasma deposition of silicon nitride and silicon dioxide. An independent test of PlanarEtch IIA/B verified ±5% uniformities in silicon nitride deposition (at low temperature and with a wide range of refractive index values).

PlanarEtch IIA Chamber Setup For Deposition Applications



Deposition Features Three-gas ratio flow control.
Controls total gas flow and ratio of gases independent of pumping speed and chamber pressure—essential to critical applications such as precise blending of silane and nitrogen or ammonia. Three independent channels can set and read flow (cc/min) or flow ratio (%) of up to three gases.

Heated deposition platen.
Heating and temperature control from ambient to 350°C.

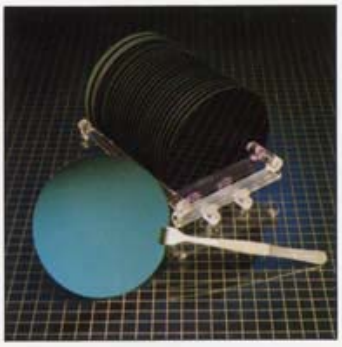
Digitized temperature readout.
Temperature clearly displayed digitally from 0° to 350°C. through front panel. Closed-loop temperature control ensures consistent results.

Parallel plate design.
Ensures uniformity—thickness varies less than ± 5% across substrates and from substrate to substrate.

Lower Gas Ring.
Chamber set-up for Deposition Applications the process gases enter the chamber via a gas ring located underneath the heated deposition platen allowing for increased process uniformity, repeatability, and system versatility.

Typical Deposition Applications:

- Plasma-deposited silicon nitride
- Plasma-deposited silicon dioxide: Dielectric for multilayer metallization integrated circuits or tri-level resist applications.
- Final passivation layer for discretes, integrated circuits, and thin-film hybrid circuits.
- Antireflective and protective coatings on photomasks, optics, and solar cells.



The PlanarEtch IIA with deposition module.

Etching chamber:
15 inches in diameter, aluminum construction with quartz viewport and UV filter.

Capacity:
Four 4-inch (100-mm), or One 5-inch or larger;
8-inch maximum.

Etch electrode:
11 inches in diameter, water-cooled, with radial gas introduction and axial exhaust.

Power supply PEIIA:
A 500-watt, 35 KHz solid state, fully regulated design. No tuning required.

Power supply PEIIB:
13.56 MHz — 300-watts, solid state, fully regulated design with manual matching network.

Process control:
A central process control panel displays pressure, power, time, and system status/mode.

Vacuum pump:
400-LPM two-stage, direct-drive corrosive series mechanical pump.
Option: Fomblin charged.

Deposition Module (optional)

Cabinet:
Three mass flow controls, related plumbing, and temperature controller. All digital displays.

Gas Flow System:
Gas lines are all stainless steel with VCO fittings.

Deposition platen:
11-inch diameter. Provides uniform heating and substrate temperature control with readout from 0 to 350 °C.

Utilities:
Power, system:
110V, 60/50 Hz, 10 A, 1 PH.
Power, pump:
115/230V, 60 Hz, 15/7.5 A, 1 PH.
Power, module:
110V, 60/50 Hz, 15A, 1 PH.
Compressed air:
75-125 psi.
Water:
½ GPM ambient.
Fittings (gases, air, water and vent):
¼-inch tubing.
Pump exhaust:
KF-25 flange.

Size:
System:
17¼ (w) x 21 (d) x 21 (h) inches (31 inches open).

Module:
10 (w) x 21 (d) x 15 (h) inches.

Weight:
System: 120 lbs.
Module: 30 lbs.
Pump: 100 lbs.

TECHNICS

Technics, Inc. World Headquarters
2305 Paragon Drive
San Jose, CA 95131
(408) 946-8700
TELEX: 357 482

Technics GmbH Europa
Dieselstrasse 22
D-8011 Kirchheim Bei Munchen
West Germany
(089) 903 8021-24

Okura & Co., Ltd.
6-12 Ginza Nichome
Tokyo 104 Japan
03-566-6307
TELEX: 781 J22306

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