LAM 9400

Tool Overview

The LAM 9400 is a high density plasma etch tool manufactured by LAM Research Corporation. It uses LAM's TCP, which is a special patented form of ICP source, to create plasma density. It has a second bias source for controlling ion bombardment energy. In order to dissipate the high heat loads generated in a high density system, this tool uses electrostatic clamping to hold the wafer tightly to the chuck and then pressurizes the back side with helium to 8 Torr to provide thermal transport to the temperature controlled chuck.

This tool was originally designed for production polysilicon etching. Endpoint detection and highly selective etch processes allow stopping on very thin underlying oxide layers. The tool has been reconfigured with a wide array of gases and has proven effective for etching a comprehensive list of materials. This extensive gas list also allows for significant tailoring of etch properties for an individual material. The tool also allows for customizing and automating clean and condition processes for each recipe to reduce the likelihood of process cross contamination. Currently users may etch Silicon based materials, III-Vs, metals, and organic materials. Etches of submicron features to depths of 1 or 2 microns are routinely achieved. 50nm features or depths of 3 microns (not at the same time) have been performed with some materials.

Tool Capabilities

- Configured for 6" wafers, smaller samples may be mounted to a 6" carrier wafer
- TCP inductive RF plasma source - 1000 watts
- Separate bias RF power source – 1000 watts
- All dry pumping system
- Electrostatic clamping of wafer
- Temperature controlled chuck –40C to 80C
- Process pressure range: 5mT to 300mT
- Wafer cooling via backside helium pressure and chilled chuck
- Heated chamber
- Entry and exit load lock chambers
- Cassette to cassette
- Gases: HBr, Cl2, O2, SF6, C2F6, He, Ar, CH4, H2
- Materials: Si, Si3N4, SiO2, glass, III-Vs, metals, organics