

PlasmaTherm SLR-770 ECR Plasma Etch System

Operating Procedures LINK



Process Description:

The purpose of this system is to remove (etch) thin films of compound semiconductors. One common method of material removal from a wafer surface is plasma etching. Plasma activates gas species that react with the wafer surface. The production of electrons and ions for the plasma can be provided from several sources such as direct current (DC), radio frequency (RF) and microwave. The gas species and the directional velocity of the plasma ions will determine the selectivity of the material etched and the rate the material is etched.

Equipment Description:

The PlasmaTherm SLR-770 ECR is an ***Electron Cyclotron Resonance*** plasma source. This high-density plasma is produced by a 1000W microwave power supply. The microwaves are transmitted through three-axis electromagnetic fields that allow optimal tuning of the plasma. This microwave plasma is combined with a lower electrode 500W power supply at 13.56 MHz RF power. The upper and lower magnets are 185 and 125 amps, respectively. These magnets cause the electrons in the plasma to increase velocity with a spiral motion. The electron motion causes an increase in collisions in the gas and thus a large fraction of the plasma gas is ionized. The system can be used in either the ECR mode with microwaves or Reactive Ion Etching (RIE) mode with only the RF power source.

The system includes a loadlock chamber with automatic arm to move the sample into the reactive chamber. The loading platform is 6 inches x 3 inches and is capability of handling various samples from pieces to a full-sized 4-inch wafer. Gases available are:

<i>Materials Allowed</i>		<i>Materials Not Allowed</i>
AlGAs	Polysilicon	Other metals
GaAs	Silicon	Photoresists
Carbon	SiO ₂	Polymers
InP	Si ₃ N ₄	
Photoresists	SU8	
Polymers		

<i>Gases Available</i>	
Argon	Helium
Boron Trichloride	Hydrogen
Chlorine	Methane
Halocarbon 14 (CF ₄)	Sulfur Hexafluoride (SF ₆)
Halocarbon 23 (CHF ₃)	