PLASMA EQUIPMENT TECHNICAL SERVICES
INCORPORATED
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PETS INC

WHAT IS PECVD?

Plasma Enhanced Chemical Vapor Deposition (PECVD) is an excellent alternative for depositing a variety of thin films at lower temperatures than those utilized in CVD reactors without settling for a lesser film quality. For example, high quality silicon dioxide films can be deposited at 300 to 350 degrees centigrade while CVD requires temperatures in the range of 650 to 850 degrees centigrade to produce similar quality films.

PECVD uses electrical energy to generate a glow discharge (plasma) in which the energy is transferred into a gas mixture. This transforms the gas mixture into reactive radicals, ions, neutral atoms and molecules, and other highly excited species. These atomic and molecular fragments interact with a substrate and, depending on the nature of these interactions, either etching or deposition processes occur at the substrate. Since the formation of the reactive and energetic species in the gas phase occurs by collision in the gas phase, the substrate can be maintained at a low temperature. Hence, film formation can occur on substrates at a lower temperature than is possible in the conventional CVD process, which is a major advantage of PECVD.

Some of the desirable properties of PECVD films are good adhesion, low pinhole density, good step coverage, and uniformity.

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MARKETS FOR PECVD

Plasma Enhanced Chemical Vapor Deposition offers a wide range of cost effective material processes to manufacturers in the ELECTRONIC, INDUSTRIAL, and MEDICAL sectors.

The utility and flexibility of PECVD lies in the facts that PECVD can be utilized in nearly all of the current processes of CVD where much higher temperatures are required and that PECVD systems are almost always much smaller (footprint wise) than their CVD counterparts.

ELECTRONIC

PECVD systems have entrenched their place in the electronics sector because of their flexibility in depositing many thin films such as:

* Silicon Nitride (SiN)
* Silicon Oxide (SiO)
* Silicon Dioxide (SiO2)
- Silicon OxyNitride (SiON)
- Diamond Like Carbon (DLC)
- Amorphous Silicon (A-Si)
- Poly Silicon (poly-Si)

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These films are used for many different reasons in the manufacture of integrated circuits and provide many different step coverage's. SiN, SiO2, SiO and SiON are all dielectrics and provide different electrical insulating properties and are used most predominantly for separating one conductive layer from another. DLC is often used for a capping material which exhibits radiation-hardening characteristics and therefore, is often used in devices developed for the military. A-Si and poly-Si are conductive and depending upon their doping quantities have varying conductive properties (amorphous silicon is often used for production of solar cells).