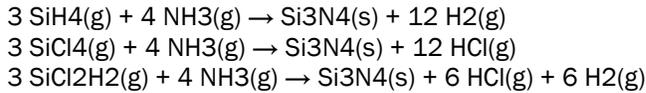




CSI GAS DELIVERY SYSTEMS SUPPORT

Silicon Nitride Etch Process

Electronic-grade silicon nitride films are formed using chemical vapor deposition (CVD), or one of its variants, such as plasma-enhanced chemical vapor deposition (PECVD):



For deposition of silicon nitride layers on semiconductor (usually silicon) substrates, two methods are used:

1. Low pressure chemical vapor deposition (LPCVD) technology, which works at rather high temperature and is done either in a vertical or in a horizontal tube furnace, or
2. Plasma-enhanced chemical vapor deposition (PECVD) technology, which works at rather low temperature and vacuum conditions.

In a research application, to facilitate a Nitride tool you will need gas cabinets to safely house and deliver the process gases, and an abatement unit to destroy the waste gases after leaving the tool.

Typical Flow Rates: < 1 SLPM SiH₄; <1 SLPM NH₃; 20 – 30 SLPM N₂

Research / Production Tools:

Plasmatherm Versaline
Oxford PlasmaPro
Novellus Concept One

Facilitation Information:

Silane (SiH₄)

Classification: Pyrophoric in concentrations higher than 1.37%
Gas Cabinet with ESO Capability - Required, Must Comply with CGA Code G-13
Pressurized Gas
DISS 632 Connection Recommended
Coax Tubing is Recommended but not required by Code
Purge Gas of Helium/Nitrogen blend is recommended
Hazardous Gas Monitor for Gas Supply Shutdown - Required

Ammonia (NH₃)

Classification: Flammable, Toxic
Gas Cabinet with ESO Capability - Required
Liquefied Gas
DISS 720 Connection Recommended
Single Containment Tubing is Permitted by Code
Purge Gas of Helium/Nitrogen blend is recommended
Purge Gas Purifier Strongly Recommended

Gas Scrubber:

Required
Type Suggested: Resin Bed Scrubber – Novapure EGS237- A 37 gallon dry resin single canister point of use scrubber capable of abating SiH₄ and NH₃ gases in the flow rates shown.
Duty Cycle – 100%
Canister – Disposable/Replaceable, hazardous gas is converted to non-volatile solids
Monitoring – Outlet of scrubber should be sent to facility scrubber or monitored for shutdown and exhausted in a safe area

Note: CSI always recommends enlisting a professional engineer to determine the Codes your facility will be required to meet for your installation. CSI's information above is for informational purposes only and not intended to serve as a statement of what is legally required to meet local and national compliance.