



# Xactix e1 -XeF<sub>2</sub>



## Description

### XeF<sub>2</sub> Silicon Etcher

This system uses Xenon difluoride vapor to etch silicon

This is a system designed to expose samples to xenon di-fluoride (XeF<sub>2</sub>) gas in a cyclic or pulsed mode.

XeF<sub>2</sub> can be used to isotropically etch Si, Mo, Ge, Nb, polysilicon, Ti and W.

XeF<sub>2</sub> can be used to make very long undercuts with little or no degradation of etch stop, mask or device layers.

Advantages of using this system include:

1. Selectivity during etching, XeF<sub>2</sub> shows very high selectivity vs. silicon to photoresist, SiO<sub>2</sub>, Si<sub>3</sub>N<sub>4</sub>, and aluminum.
2. Selectivity of silicon nitride is better than 100:1 and the selectivity to silicon dioxide is better than 1000:1.
3. No external energy or ion bombardment takes place, and this is the reason XeF<sub>2</sub> exhibits high selectivity to many metals, dielectrics and polymers. The etch reaction is exothermic and results in an increase in chamber temperature. A short dip in BOE is useful to break through the oxide.
4. No release stiction: XeF<sub>2</sub> etching is a dry process so no drying is needed which avoids the sticking issues that often plague wet release processes. Since XeF<sub>2</sub> etching is a dry, room temperature process, delicate structures can be released.
5. The system can etch silicon from small part to 100mm (4 inch) wafers. The etch rate is dependent on the surface area of the silicon and decreases with increasing area.

## Specifications / Capabilities

- Pieces up to 6" wafers
- Glass and Silicon Substrates allowed

## Scientific Opportunities / Applications

- Almost infinite selectivity of Silicon to photoresist, silicon dioxide, silicon nitride, and Aluminum
- Utilizes Xenon Difluoride (XeF<sub>2</sub>) in vapor phase