Nitride

STANDARD OPERATING PROCEDURE

CORAL Name: *nitride*

Model Number: --

Location: ICL

What it does: wet station

Introduction: The ICL machine named "nitride" is a wet etch bench used to remove silicon nitride from 4" or 6" Si or SiGe whole wafers. Partial wafers, wafers that have seen gold or metal processes are not allowed. Also, due to the high boiling temperature of the etchant, photoresist is not effective and is not allowed. Patterning of silicon nitride should be done in a plasma etcher.

The user transfers wafers to teflon cassettes and immerses them in the liquid etchant for a predetermined time. Then they are rinsed with DI water and dried.

Safety: This processes uses boiling phosphoric acid at 165°C. Be very alert.

DO NOT ASSUME AN UNKNOWN WET SUBSTANCE IS WATER.

The Personal Protective Equipment (PPE) required to work at any wet etch sink includes:

- Rubber Gloves: the orange gloves labeled Puretek, not the yellow solvent gloves (Nytek). There are different sizes, use the best fit. Rubber gloves are worn over the vinyl, general use gloves.
- Arm shields: Worn over the rubber gloves.
- Green Apron: Acid resistant. The front label should be worn out not against the clean suit. One size fits all. Tie back straps tightly.
- Safety glasses: To be worn at all times throughout the lab. These are not an alternative to the faceshield.
- Faceshield: To be worn, pulled down, while at the wet sink. Not a substitute for safety eyeglasses, both must be worn.

The PPE is kept in the wet etch bay and is meant to be shared. However, do not use any equipment which is wet or ripped or stained or questionable or does not fit well.

New PPE is available in the glove room or by asking a staff member. Face- shields should be changed whenever they become stained.

Other Safety notes:
Before working at any wet etch sink familiarize yourself with the location of the safety shower/eyewash station as well as the eyewash hose and DI water hose at the sink.

Loss of cleanroom air movement or power failure may mean loss of fume exhaust. Therefore all users should leave the lab if this occurs. Unusual quiet or air whistling is a sign of loss of air handling capability.

Procedure: Note: We suggest that users perform a quick BOE etch in the oxide wet bench prior to nitride strip. A thin oxide or oxynitride layer will act as a barrier to the phosphoric etchant.

1. Check Equipment Reservations in CORAL to insure that you reserved the correct machine in the correct facility for the correct date.
2. Operate machine for the equipment that you are Using. Insure that the correct facility is set (ICL or TRL) and that your lot name is entered correctly. Enter the quantity of wafers in the comments field.
3. When the wet bench is idle the controller is off. Press POWER and then press RESET. This will heat the bath. It may take as much as 30 minutes.
4. Determine the etch time to use (based on etch rate and film thickness.) This process etches

stoichiometric silicon nitride at a rate of ~ 65A/m.

5. Put on all personal protective equipment listed above.
6. Transfer your wafers to the process cassette (marked green/blue) and fasten the handle to it. Open the lid and immerse the cassette carefully. Orientation of the boat does not matter in this system. Note: There will be a release of steam from the bath that will be vented into the hood exhaust. It is only steam from water that is injected into the system for temperature control.
7. When etch time is completed, lift the lid and let the steam dissipate. Carefully remove the cassette and place it into the dump rinser. Press dump rinser start button. Replace etch bath lid. Press POWER to shut off sink controller
8. Remove cassette with handle. Affix dryer cassette handle. Load wafers into spin dryer. Press start.
9. Remove personal protective equipment. Transfer wafers back to your box.

Sink Information

The nitride etch vessel is a quartz bath enclosed by an insulated heating element. The Modutek controller applies power to the heater which drives up the bath temperature. DI water is injected at the process temperature setpoint to stop the rise in temperature and maintain it at setpoint.

This system is equipped with a second temperature feedback loop to monitor steam temperature. This is a safety feature. Loss of proper steam temperature might mean the cool DI water has formed a layer over the (higher temp.) etchant. This is a danger because placing a cassette in the bath in this state will cause the cool water to be enveloped by the etchant and burst into steam and splash the area. Therefore variation from the steam setpoint will interlock the DI water inject.

Process program:

C1 = 40:00	C2 = 10:00	Pb = 5.0
PA = 00:10	PS = 165.0	re = 0.5
Hi = 175.0	Lo = 160.0	ra = 0.5
BS = 75.0	DR = 0.0	ca = 2.5
AC1= xxx	CR = 10	

Spin dryer program

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