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Minilock GaAs etch

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Summary:
This document describes etching of GaAs using the Minilock etcher .

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1 Associated Documents & References

MSDS if chemicals or gas involved.
Minilock Standard Operating Procedure
Rules and procedures of cleanroom

2 Equipment Used

Minilock Etcher (www.triontech.com). This equipment has to be reserved through the online resource scheduler. If you need to be assisted by technicians check availability with them before reserving the equipment. Users have to go through regular training before using this equipment alone.

3 Verifications Prior to Processing

Chamber has been manually scrubbed clean every 20 hours of RF operation.
Neslab Chiller is set to 12C.

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Ensure Chamber has been pumped for at least an hour, Pressure should be in the 10^{-6} Torr range.
Pressure rise in chamber is less than 5 mTorr per minute.

4 Recipe description

Prepare sample with patterned S1818 photoresist as in the S1800 Procedure.

Endure a hard bake of 115C for at least one minute is done on the patterned photoresist.

Follow the Minilock Standard Operating Procedure to set up etcher.

Do chamber clean of 600 seconds with H at 50 mTorr.
** The carrier has to be loaded inside the chamber.

Set up the following basic recipe:

7 mTorr pressure, ICP 500 Watts, RIE 100 watts BCl3 5 sccm, argon 5 sccm
Cl2 5 sccm. Etch 150 seconds for a depth of 5 microns.
Use a "Manual" tune to get the reflected ICP and RIE poer less than 20 Watts

Retract carrier plate into load lock and vent.

Ensure carrier plate is clean and no bare aluminum is exposed.

Quickly load sample on anodized aluminum carrier plate.
Use a **very** tiny film of Santovac oil applied on the back of the sample. Do not get any close to the edge as it will creep onto the top of the sample.

Start load lock pumpdown and sample processing.

Allow a cooldown period of 10 minutes before opening the load lock to retrieve the sample.

5 Technical Data

The paper " High density inductively coupled plasma etching of GaAs/AlGaAs in BCl3/Cl2/Ar (Agarwala et al, J. Vac. Sci. Technol. B16, 511 (1998)) presents a study of how etch varies as gas flows and compositions are varied.

Etch rate, selectivity and profile depends on the size of the feature, the depth of the feature and how much open area and density the pattern occupies. The parameters in the recipe will have to be varied in order to find the optimum etch conditions for the sample.

6 Measurements & Statistical Process Control

7 Record of Revisions

Rev. 0 First Edition

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