

GaAs Cl₂_N₂ recipe transfer:

Recipe Parameters:

- Ignite and stabilize the gas and temperature for 2min within the recipe (example below).
- 3.75 mTorr;
- Substrate power = 50 W and ICP Power = **600 Watt at UCSB**
- N₂/Cl₂=20/40 sccm,
- 180sec or 3 min;
- Post etch rinse with DI water and blow dry with N₂
- **Temperature = 30°C with oil backing**

Parameters	Set point
Etch Pressure	3.75mTorr
Substrate PWR	50 W
ICP PWR	600 W
Temperature	30C with Oil backing
N ₂	20 sccm
Cl ₂	40 sccm
Etch Rate	1018 nm/min
SiO ₂ Etch Rate	~26.5 nm/min
Selectivity_GaAs/SiO ₃	~38

Recipe screen shot:

FF_GaAs_C12_N2_30C_USC Private Edit Duplicate Export Delete

Steps

	Alarm Level	Gauge Zero Check (Stabilize Phase) Min: 1.00s Max: 10.00s	Pump (Stabilize Phase) Min: 30.00s Max: 30m 0.00s	Stabilisation (Stabilize Phase) Min: 2m 0.00s Max: 3m 0.00s	Ignition 10.00s	Etch 3m 0.00s	Pump 1m 0.00s	New phase 10.00s
Table Heater	± 5 °C	Unchanged	30.0 °C	Unchanged	Unchanged	Unchanged	Unchanged	Unchanged
Changeover Unit		Unchanged	LN2	Air	Unchanged	Unchanged	Unchanged	Unchanged
APC	± 0.3 mTorr	Pressure 1.00e-3 mTorr	Open	Pressure 3.750 mTorr	Unchanged	Unchanged	Open	Unchanged
N2	± 2.5 sccm	Unchanged	Unchanged	20.0 sccm	Unchanged	Unchanged	Off	Unchanged
C12	± 0.5 sccm	Off	Unchanged	40.0 sccm	Unchanged	Unchanged	Off	Unchanged
Table RF	± 5 W	Unchanged	Off	Unchanged	Power Demand 50.0 W Max Reflected Power 50.0 W Tot Time 10.00 s Min DC Bias 0.000 V (Load Power)	Power Demand 50.0 W Max Reflected Power 10.0 W Tot Time 10.00 s Min DC Bias 15.00 V (Load Power)	Off	Unchanged
ICP RF	± 5 W	Unchanged	Off	Unchanged	Power Demand 600 W Max Reflected Power 60.0 W Tot Time 20.00 s Min DC Bias 15.00 V (Load Power)	Power Demand 600 W Max Reflected Power 20.0 W Tot Time 20.00 s Min DC Bias 15.00 V (Load Power)	Off	Unchanged
ICP AMU	± 0.05	Unchanged	Unchanged	Auto Park C1 56.7 % C2 57.0 %	Unchanged	Unchanged	Unchanged	Unchanged
He Flow Controller	± 5 Torr	Unchanged	Pressure 5.000 Torr	Unchanged	Unchanged	Unchanged	Off	Unchanged

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Steps

ICP AMU	± 0.05	Unchanged	Unchanged	56.7 % C2 57.0 %	Unchanged	Unchanged	Unchanged	Unchanged
He Flow Controller	± 5 Torr	Unchanged	Pressure 5.000 Torr Max Flow 0 sccm	Unchanged	Unchanged	Unchanged	Off	Unchanged
Table AMU	± 0.05	Unchanged	Unchanged	Auto Park C1 64.1 % C2 38.6 %	Unchanged	Unchanged	Unchanged	Unchanged
Optical Endpoint		Off	Off	Off	Off		Off	Off

Monitoring

Endpoint using	Signal
Threshold	
Smoothing time	1 s
Closed time	15 s
Normalisation time	5 s
Normalisation level	20 %
Overrun time	30 s
Overrun level	30 %
Threshold value	20 %
Capture time	60 s
Derivative smooth time	0 s
Derivative gain	0.1
Wavelength 1	655.8 nm
Wavelength 2	451.13 nm
Wavelength 3	837.6 nm
Integration time	500 ms
Samples to average	4
Boxcar width	2 pixels
Spectra Logging	Yes

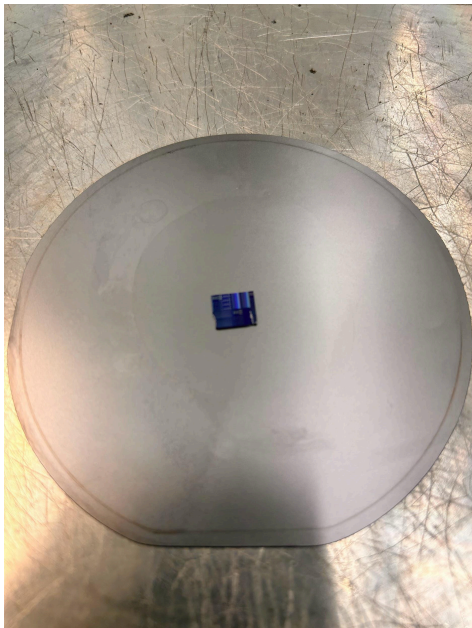
Process sequence GaAs:

The sequence is clean & etch each time, no need for "coat":

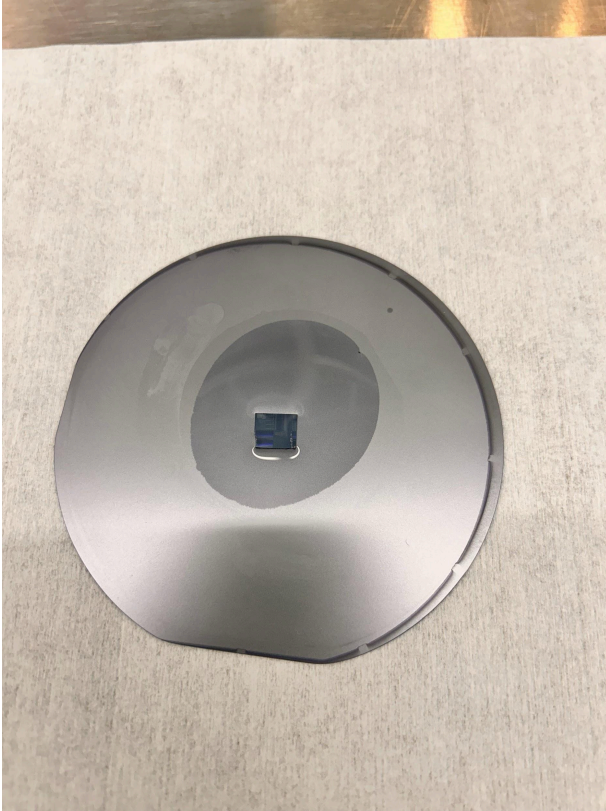
1. Mount a GaAs coupon on 4" Silicon prime wafer with oil (from UCSB). With the back of a q-tip stick, dab a small drop (<2 mm diameter drop is enough). Heat to 80°C 30 seconds for the oil to spread evenly.



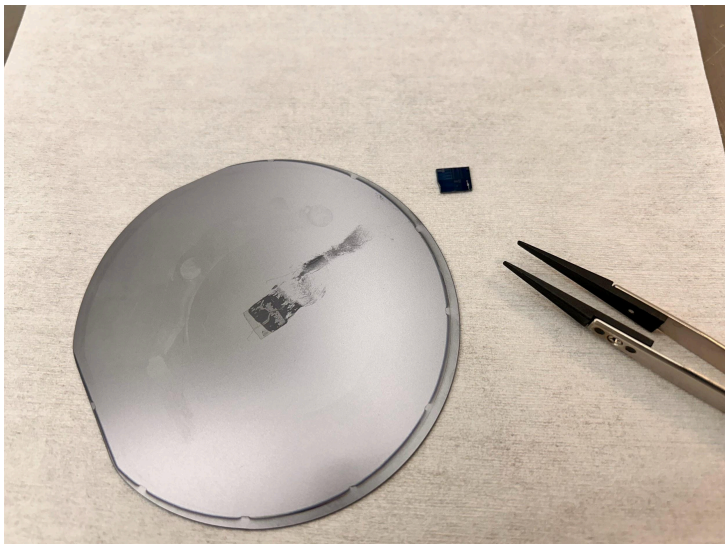
2. This is a small drop on 6" diameter silicon.



3. This is a coupon on top of the oil drop on silicon.
4. OXFORD: Run SF6+O2 Clean recipe for 15 min to warm up and bring the chamber to a clean state. Cool the substrate to **30°C**.
5. Run the coupon without any dummy wafers.
6. After etch, spray water on the sample a couple of times to rinse off the residue chlorine. And blow dry with an N2 gun.



7. Remove the coupon from the silicon wafer by pushing the coupon sideways until it slides out of the silicon.



8. Spray Acetone on coupon on a paper towel, front and back, to remove all oil. Immediately rinse with IPA and blow dry with N2 gun. The silicon wafer can be clean with Acetone and IPA with a paper towel, and blow dry with an N2 gun.

