Conclusion

Response

Action

5

 \downarrow

6

 \downarrow

7

 \downarrow

8

 \checkmark

Coil power \downarrow +

Time ↑

No image

Coil power \downarrow

200 nm EHT = 1.00 kV Signal A = SE2 Date :28 Feb 2018 Hitel Size = 2,159 nm WD = 4.7 mm Photo No. = 52114 Time :12:57:25

Coil power \downarrow +

 \leftarrow

 \leftarrow

Sample no. 5 was a starting point for deveolping a SiO2 etch that can be used for samples on a carrier. No. 5 was a 100 mm wafers that was clamped and He cooled with fairly good results. The testing regime was using both the coil power and the platen power with C4F8 chemistry. The challage was to keep a good selectivity to the resist mask and get a vertical sidewall, without getting a lot of redeposition on the sidewalls.



EHT = 1.50 kV Pixel Size = 14.25 nm WD = 4.8 mm Wildth = 14.60 µm Signal A = SE2 Time :8:57:29 Stage at T = 0.0 ° Mag = 20.62 k X The resist is

The resist is	nLof resist + time \downarrow
affected but	
much less then	
no. 6	



EHT = 1.00 kV Pixel Size = 24.63 nm WD = 3.7 mm Width = 25.23 µm Signal A = SE2 Time :13:11:09 Stage at T = 0.0 ° Mag = 11.93 K X 1 µm

> The resist looks nLof resist good, polymer





Resist very rough and with many holes though

Resist still very rough

Resist still rough, has

been lifted at the edge

Conclusion

The overall conclusion is that if the sample cannot be clamped and cooled it is difficult to get a vertical sidewall and have good selectivity to the resist. It can be advised to use nLof as the resist mask as it can withstand some more heat from the plasma and a larger bombardment before getting bad. But the nLof has a negative profile angle and this might turn into a none vertical profile, see number 9. If you need to use a postive resist then recipe no. 26 is probably the best choice.



Resist looks good, polymer on carrier, deposition on SiO2	Too much polymerization
Resist looks good, r polymer on carrier, little trenching, selectivity to resist	 Repeat with a longer time, due to low etch rate and cleavage was bad on the samle, so I need to inspect the profile on a new sample 1.3
Resist looks good, r polymer on carrier, little trenching, selectivity to resist	no , a 1.1
Resist looks good, polymer on carrier, trenching, selectivi to resist 2.5. Etch r low (14.8 nm/min). Deposition on sidewalls	Too much polymer, etch rate too low. Can I reduce polymer and increase etch rate by increasing the platen power a little? -> 20, Can I reduce the polymer by increasing the coil power a little? -> 18, Can I reduce the polymer by decreasing the H/F ratio a little? -> 17

Necipe settings.	sample no.	Cterr	Cterr						THILE	5102		
All temperature at 20 dg. C	5	1975 nm	1382 nm (mir) 800 W	15 W	2.5 mTorr	13 sccm	26 sccm	15 min	63 nm/min	27 nm/min	2.3
	6	1975 nm	1382 nm (mir) 800 W	15 W	2.5 mTorr	13 sccm	26 sccm	15 min	79 nm/min	>92 nm/min	<0.8
	7	1975 nm	1382 nm (mir) 400 W	15 W	2.5 mTorr	13 sccm	26 sccm	25 min	27 nm/min		
	8	1975 nm	1382 nm (mir) 300 W	15 W	2.5 mTorr	13 sccm	26 sccm	15 min	27 nm/min		
	9	1975 nm	1437 nm nLof	300 W	15 W	2.5 mTorr	13 sccm	26 sccm	15 min	37 nm/min	16 nm/min	2.3
	10	1975 nm	1437 nm nLof	800 W	15 W	2.5 mTorr	13 sccm	26 sccm	10 min	78 nm/min	74 nm/min	1.1
	11	1975 nm	1382 nm (mir) 150 W	25 W	2.5 mTorr	13 sccm	26 sccm	20 min	0 nm/min		
	13	1975 nm	1382 nm (mir) 150 W	25 W	2.5 mTorr	49 sccm	0 sccm	20 min	27.7 nm/min	20.3 nm/min	1.3
	14	1975 nm	1382 nm (mir) 150 W	25 W	2.5 mTorr	49 sccm	0 sccm	30 min	29.9 nm/min	26.6 nm/min	1.1
	15	1975 nm	1382 nm (mir) 150 W	25 W	2.5 mTorr	29 sccm	20 sccm	30 min	14.8 nm/min	6.0 nm/min	2.5
	17	1975 nm	1382 nm (mir) 150 W	25 W	2.5 mTorr	39 sccm	10 sccm	30 min	26.0 nm/min	16.7 nm/min	1.5
	18	1975 nm	1382 nm (mir) 200 W	25 W	2.5 mTorr	29 sccm	20 sccm	30 min	27.6 nm/min	14.7 nm/min	1.9
	20	1975 nm	1382 nm (mir) 150 W	50 W	2.5 mTorr	29 sccm	20 sccm	30 min	36.7 nm/min	21.0 nm/min	1.7
	24	1975 nm	1382 nm (mir) 150 W	50 W	2.5 mTorr	15 sccm	10 sccm	30 min	43.5 nm/min	~~46 nm/min	~0.9
	25	1975 nm	1382 nm (mir) 150 W	25 W	2.5 mTorr	78 sccm	20 sccm	30 min	14.7 nm/min	7.1 nm/min	2.1
	26	1975 nm	1382 nm (mir) 150 W	25 W	2.5 mTorr	36 sccm	13 sccm	30 min	22.1 nm/min	12.5 nm/min	1.8