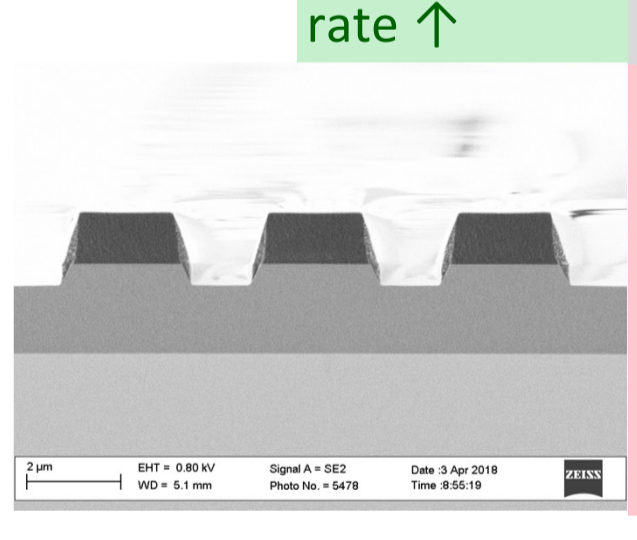
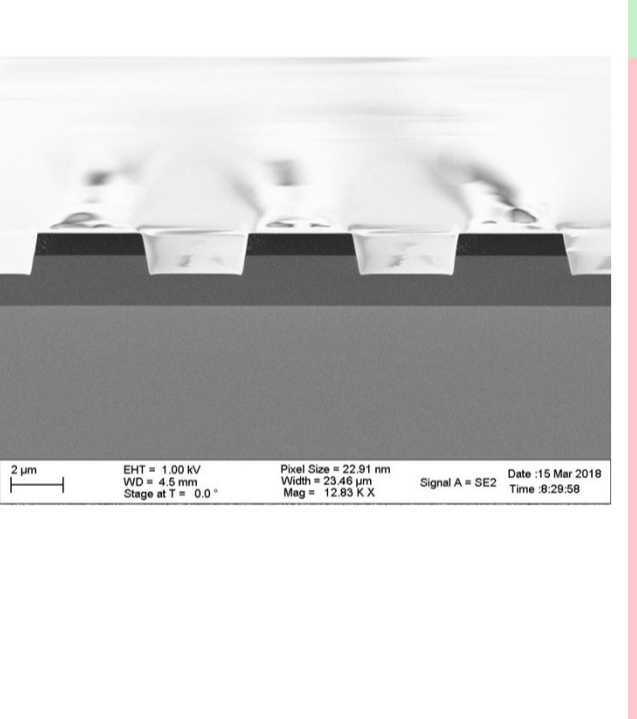


I would like the sidewall angle to be more vertical and the selectivity to be better. Increasing flow rate could maybe increase selectivity (from 24)? ->25, Increasing H/F a little could maybe increase selectivity (from 15) ->26

Resist looks good, Polymer on carrier but no polymer on the sidewalls. Sidewall angle a little high (103dg). Selectivity: 1.5

Resists looks good, polymer on carrier and the sidewalls, selectivity 2.1

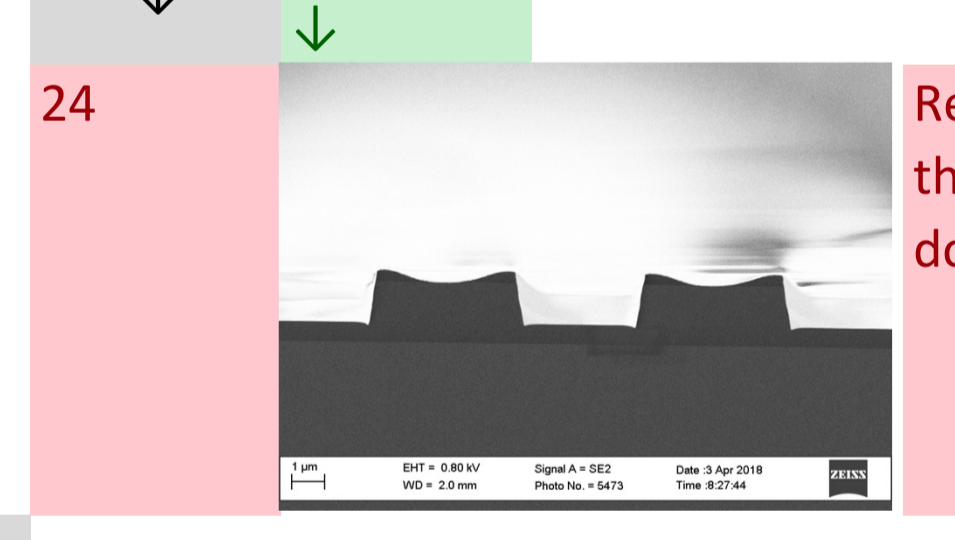
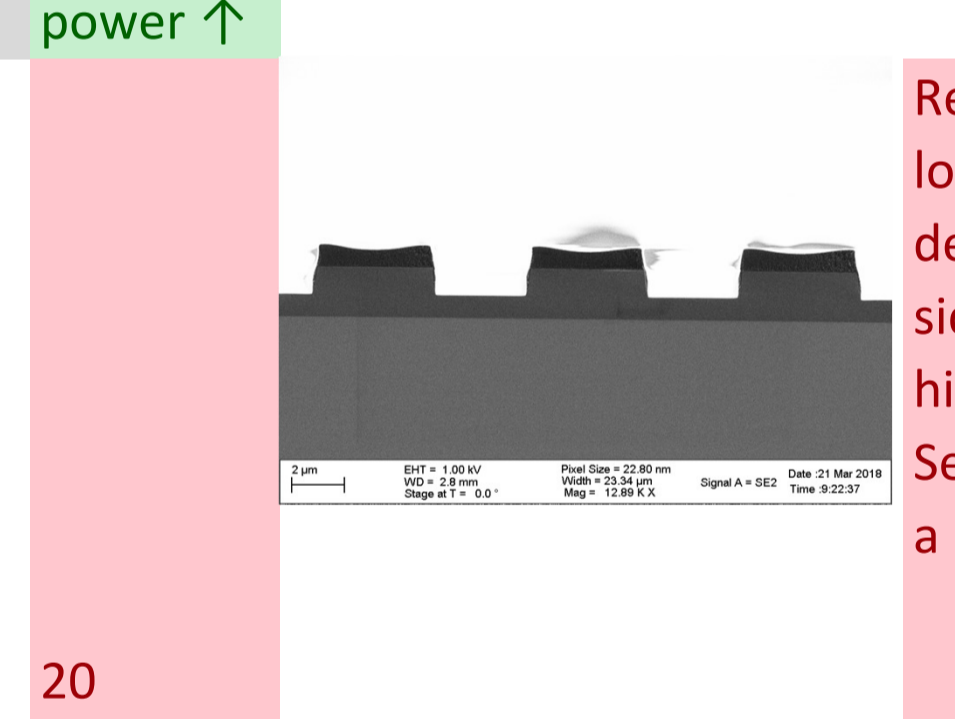


17

25

20

24

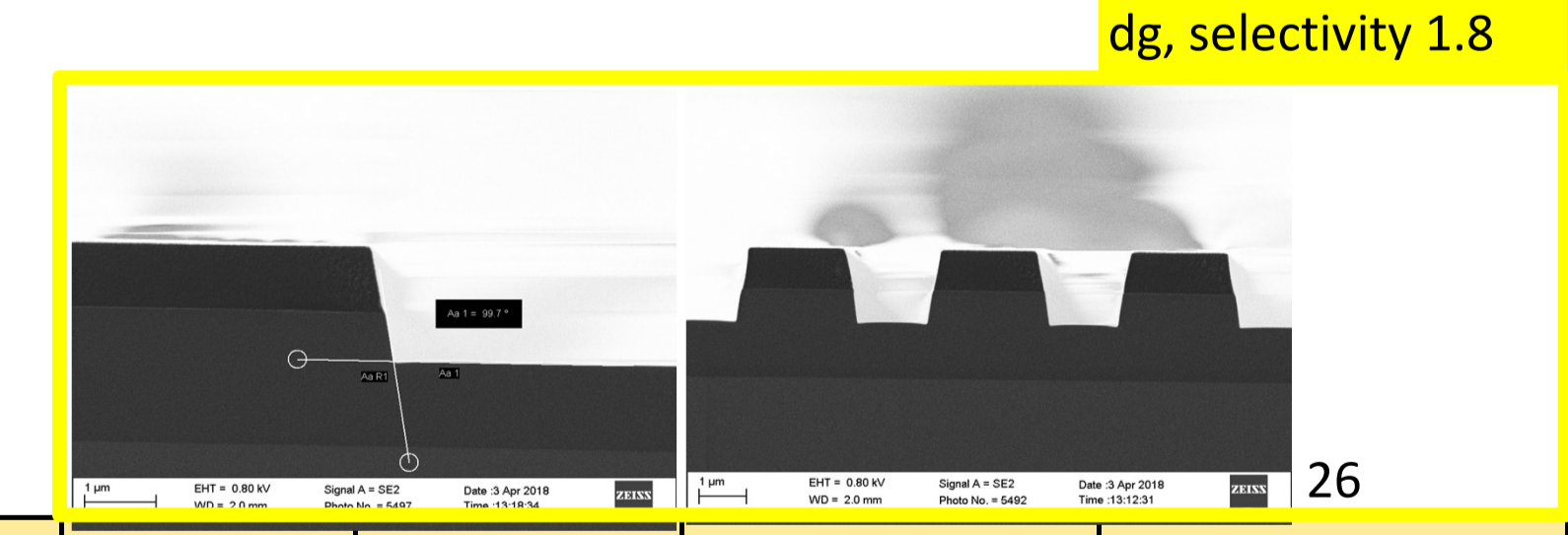


Resists now starts to look bad. Much less deposition on sidewalls. Etch rate higher (36.7 nm/min). Selectivity went down a bit (1.7)

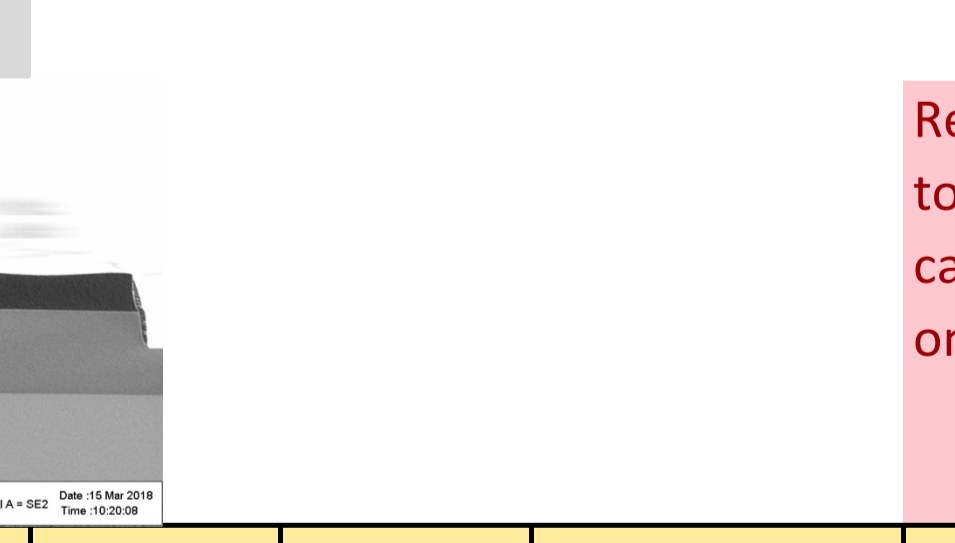
Resist looks worse and the selectivity went down 0.9

In another test I saw indications that increasing flow rate made the resist "burn", so let me see if it helps on the resist if I decrease the total flowrate keeping the ratio between the gasses.

Not good, best to keep the platen power down at 25W.



18



Resist has just started to scrump, polymer on carrier and polymer on sidewalls.

Stick to the coil power 150W

Recipe settings:	sample no.	SiO2 before etch	Resist before etch	Coil power	Platen power	Pressure	C4F8 flow	H2 flow	Process Time	Etch rate in SiO2	Etch rate in resist	Selectivity to resist (SiO2:Resist)
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	

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 very rough and with many holes though

Resist still very rough  
Resist still rough, has been lifted at the edge

Resist looks good, polymer on carrier, deposition on SiO2

Resist looks good, no polymer on carrier, a little trenching, selectivity to resist 1.3

Resist looks good, no polymer on carrier, a little trenching, selectivity to resist 1.1

Resist looks good, polymer on carrier, no trenching, selectivity to resist 2.5. Etch rate low (14.8 nm/min). Deposition on sidewalls

Too much polymerization

Repeat with a longer time, due to low etch rate and cleavage was bad on the sample, so I need to inspect the profile on a new sample

Selectivity low, I tried adding H2 to improve selectivity

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

In another test I saw indications that increasing flow rate made the resist "burn", so let me see if it helps on the resist if I decrease the total flowrate keeping the ratio between the gasses.

Not good, best to keep the platen power down at 25W.

Stick to the coil power 150W