Panasonic 2 Nanoscale ICP etching of SiO2 using ZEP (resist) mask. Recipe designed to provide vertical profiles with no trenching in nanoscale features.

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ZEP Lines as drawn and exposed in JEOL 6300FS writer:

ELECTRON DOSE (uC/cm2)	DESIGN LINE (nm)	Measurements Bottom (nm)	Top (nm)	Height (nm)
300	100	140	130	355
	180	235	215	355
350	100	170	140	355
	180	255	225	350

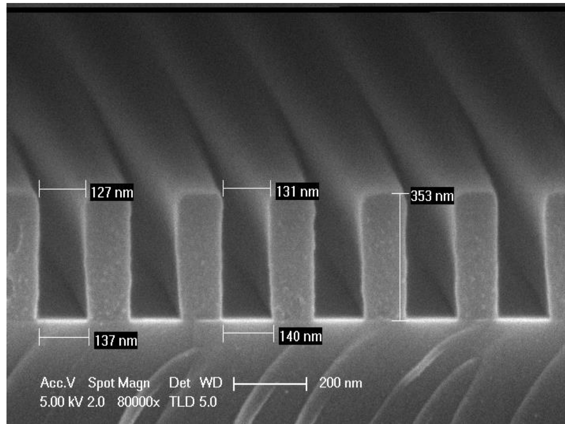
Etch Conditions and Results:

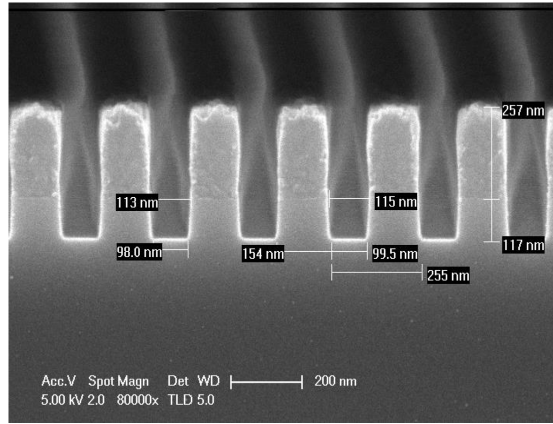
CHF3/O2 : 45/5 sccm
500W ICP / 100W Bias
Pressure 0.5Pa, Time 60s

ZEP RESIST DATA				SiOx SUBSTRATE DATA				
Dose (uC/cm2)	Design (nm)	Height (nm)	Etch Rate (nm/min)	Bottom (nm)	Top (nm)	Depth (nm)	Angle (deg)	Etch Rate (nm/min)
300	100	255	98.75	100	115	115	86.3	115
	180	275	78.75	180	185	118	88.8	118
350	100	250	103.75	110	125	116	86.3	116
	180	250	103.75	200	200	120	90.0	120
			96.25					117.25

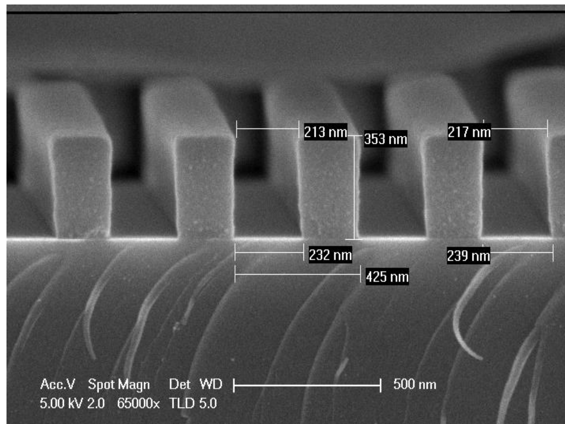
Selectivity of SiO2 to PR = 1.22:1

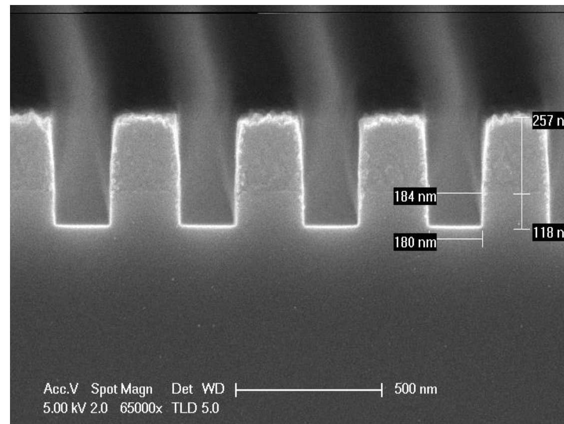
SEM Images : Before etch – After Etch



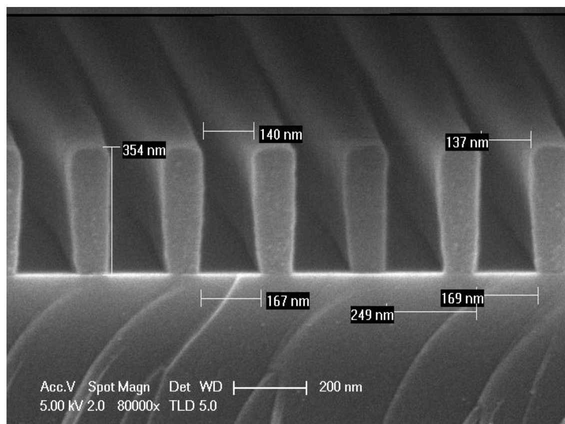


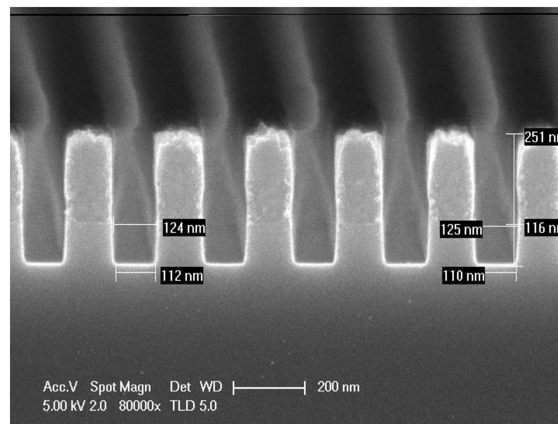
300uC, 100nm design



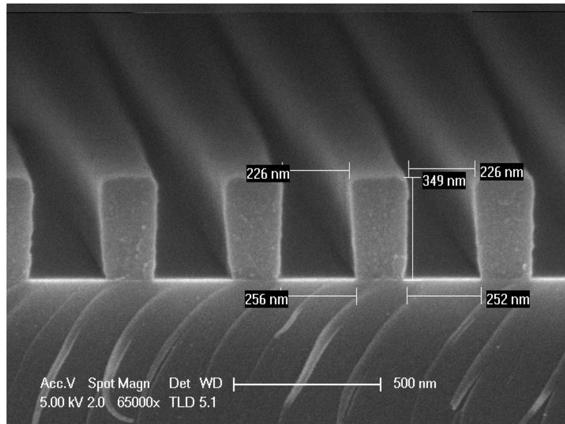


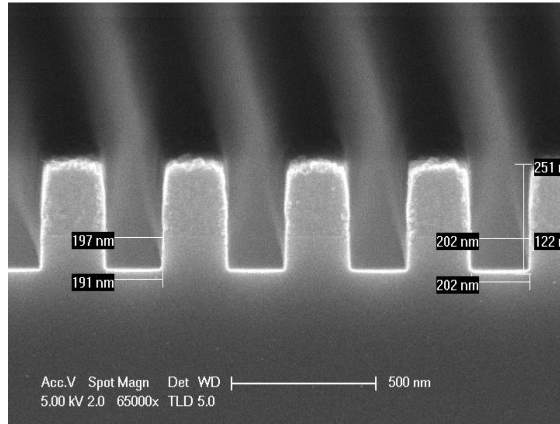
300uC, 180nm design





350uC, 100nm design





350uC, 100nm design