Nano-Trenches Etch

Module recipe name: *CNS2_Nano*
Sequence recipe name: *s_CNS2_Nano*

Module Recipe

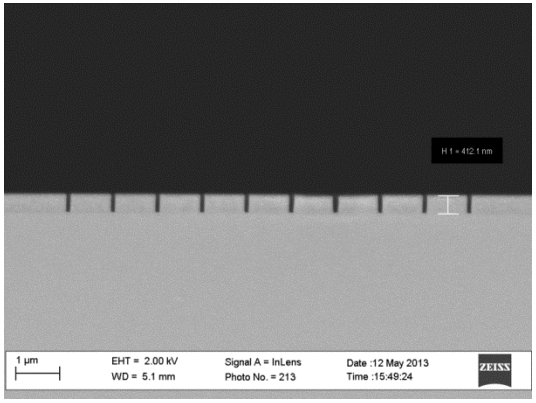
		5			6			7		
Step Name		D2			E2a			E2b		
Process Time	Secs	1.0	1.0		1.2	1.2		1.0	1.0	
Process Pressure	mTorr	40.0	40.0	± 40 %	30.0	30.0	± 30 %	30.0	30.0	± 30 %
APC Setpoint Position	%		100.0			100.0			0.0	
APC Mode			Automatic			Automatic			Automatic	
Source power	Watts	2500.0	2500.0	± 50 %	2500.0	2500.0	± 50 %	2500.0	2500.0	± 50 %
Source MU tune capacitor			3			3			3	
Source MU load capacitor			1			1			1	
Source RF Control Mode			Load			Load			Load	
Source 2 power	Watts	0.0	0.0	± 5 %	0.0	0.0	± 5 %	0.0	0.0	± 5 %
Source 2 MU tune capacitor			1			1			1	
Source 2 MU load capacitor			1			1			1	
Source 2 RF Control Mode			Load			Load			Load	
Platen HF Power	Watts	0.0	0.0	± 40 %	175.0	190.0	± 40 %	0.0	0.0	± 5 %
Platen HF Capacitor Adjust			Automatic			Automatic			Automatic	
Platen HF Tune Capacitor	%		50.0	± 5 %		50.0	± 5 %		50.0	± 5 %
Platen HF Load Capacitor	%		50.0	± 5 %		50.0	± 5 %		50.0	± 5 %
Platen HF Padding Capacitor			3			3			3	
Platen HF Control Mode			Load			Load			Load	
Platen HF Modulation Enabled			Enable			Enable			Enable	
Platen HF Modulation Frequency	Hz		150			150			150	
Platen HF Modulation Duty Cycle	%		20			20			20	
Helium pressure	Torr	15.0	15.0	± 20 %	15.0	15.0	± 20 %	15.0	15.0	± 20 %
Helium Flow Warning Level	sccm		10.0			10.0			10.0	
Helium Flow Fault Level	sccm		20.0			20.0			20.0	
Coil current	Amps		10.0	± 20 %		10.0	± 20 %		10.0	± 20 %
Loop destination			0			0			5	
Number of loops			0			0			58	
Loop Variation Parameter			1.0			1.0			1.0	
Gas Line Config			Flow			Flow			Flow	
P1 Argon 500	sccm	0.0	0.0	± 5 %	0.0	0.0	± 5 %	0.0	0.0	± 5 %
P2 Oxygen 1K	sccm	0.0	0.0	± 5 %	0.0	0.0	± 5 %	0.0	0.0	± 5 %
P3 N2 100	sccm	0.0	0.0	± 5 %	0.0	0.0	± 5 %	0.0	0.0	± 5 %
P4 C4F8 500	sccm	270.0	270.0	± 20 %	50.0	25.0	± 30 %	50.0	25.0	± 30 %
P5 SF6 720	sccm	1.0	1.0	± 0 %	300.0	300.0	± 20 %	300.0	300.0	± 20 %
S1 Oxygen 300	sccm	0.0	0.0	± 5 %	0.0	0.0	± 5 %	0.0	0.0	± 5 %
S2 C4F8 500	sccm	0.0	0.0	± 5 %	0.0	0.0	± 5 %	0.0	0.0	± 5 %
S3 SF6 720	sccm	0.0	0.0	± 5 %	0.0	0.0	± 5 %	0.0	0.0	± 5 %

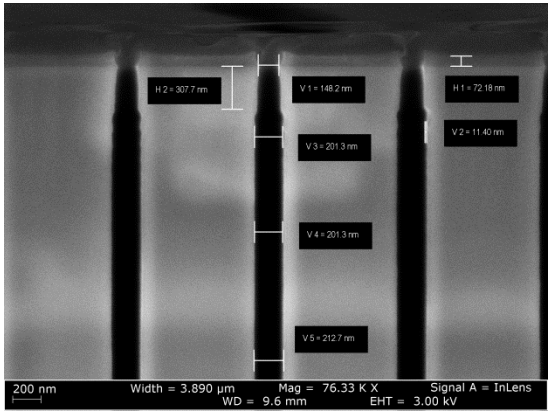
Sequence Recipe

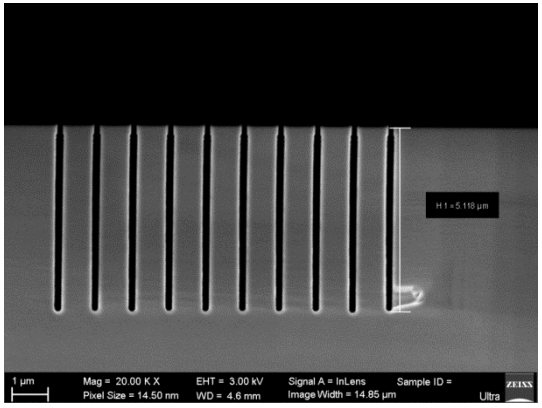
	Modules	Commands	Module Recipes	Wafer
1	RAP	READY	EQP_IDLE0	STANDARD
2	Transport	PUMP		STANDARD
3	RAP	PROCESS	IPC_PreLot_0C	STANDARD
4	Transport	LOAD		STANDARD
5	RAP	PROCESS	CNS2_Nano	STANDARD
6	Transport	UNLOAD		STANDARD
7	Transport	VENT		STANDARD
8	RAP	PROCESS	IPC_0C	STANDARD
9	RAP	IDLE	EQP_IDLE0	STANDARD

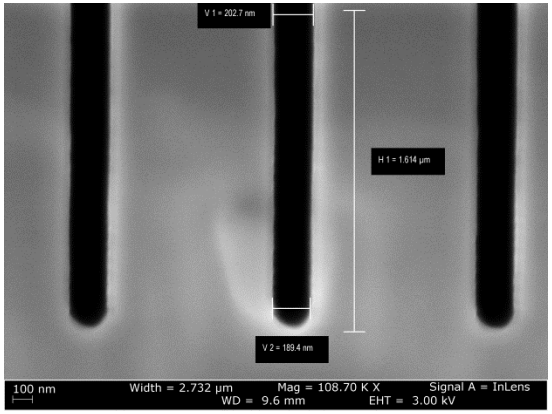
Nano-Trenches Etch Results

400nm Zep520A Resist
100nm in width, etched 5 μm in depth









Characteristic	Achieved
Etch Profile	89.85
Scallop Depth	< 6 nm
CD Loss (nm)	6 nm
Mask Undercut (nm)	0
Selectivity to e-beam resist	9:1
Etch Rate	1.1 um/min
Uniformity	4.3%
Etch Depth (μm)	5.1