



AZ[®] EXP 125nXT-10A

**FT=60 μ m Lithographic Data
Suss MA 200 Aligner**



AZ[®] EXP 125nXT-10A for FT=60 μm

Process Conditions on Cu wafer

Test sample with viscosity of 5430 cSt

Target FT: 60 μm

Single coat at 2200 rpm @ 1.4 sec, then 1900 rpm @ 8 sec

SB condition: 140 °C / 8 min

Exposure tool: Suss MA-200

First Mask: Multi-transmission Mask, CH2 (g. h. i.)

Development: AZ 300 MIF; 2 puddles at 40 second

Optical Parameters of AZ[®] EXP 125nXT-10A

n & k Values

$\lambda = 365 \text{ nm:}$ $n = 1.582$ $k = 0.0013$

$\lambda = 633 \text{ nm:}$ $n = 1.539$ $k = 0.0000$

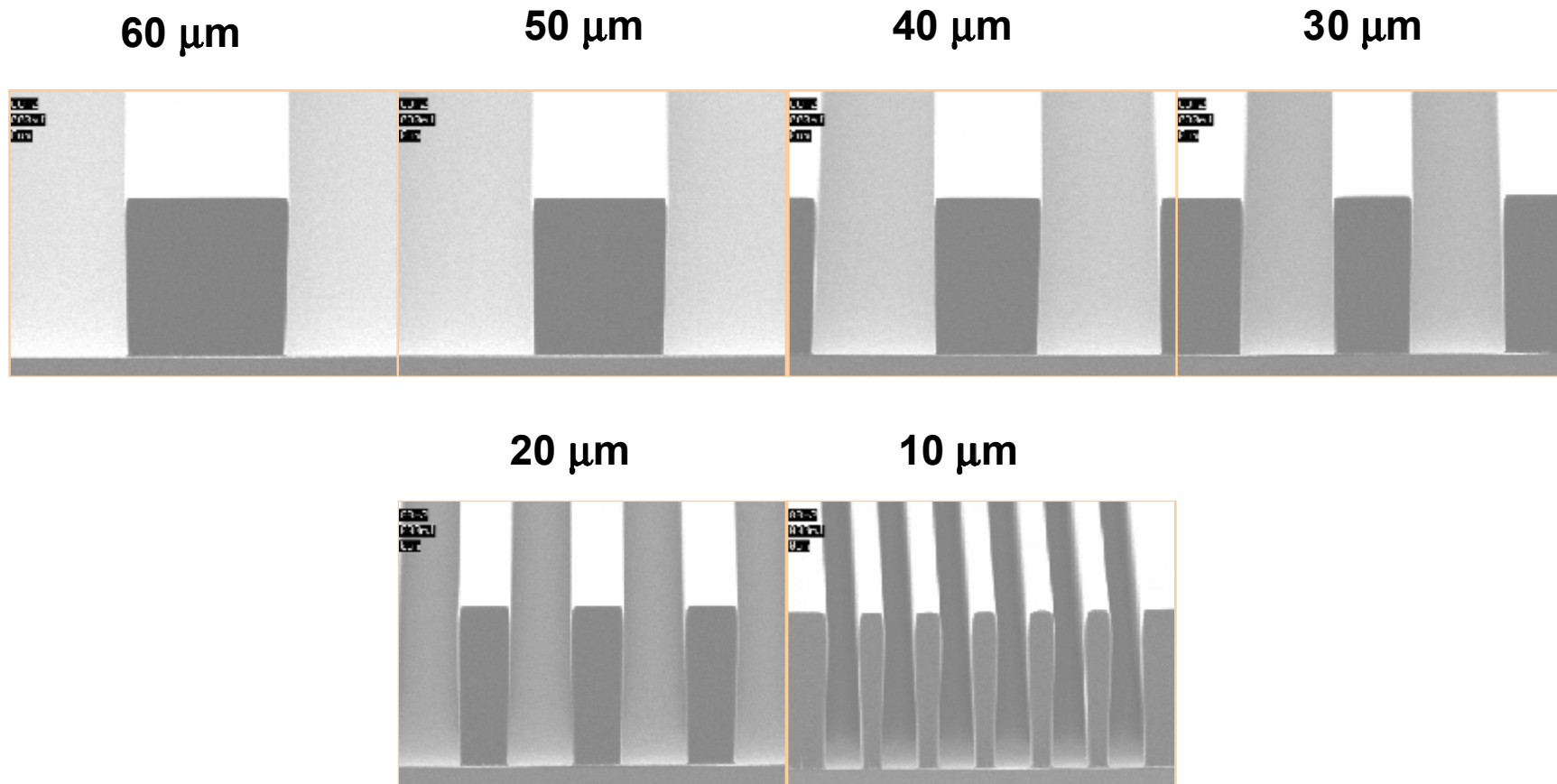
Cauchy coefficients (A, B, C) fit the following Cauchy equation: $n = A + B/\lambda^2 + C\lambda^4$

$A = 1.5206$

$B = 0.008114 \mu\text{m}^2$

$C = -0.000217 \mu\text{m}^4$

AZ[®] EXP 125nXT-10A for FT=60 μm Line/Space @ 3000 mJ/cm²



AZ[®] EXP 125nXT-10A for FT=60 μm C/H Images @ 3000 mJ/cm²

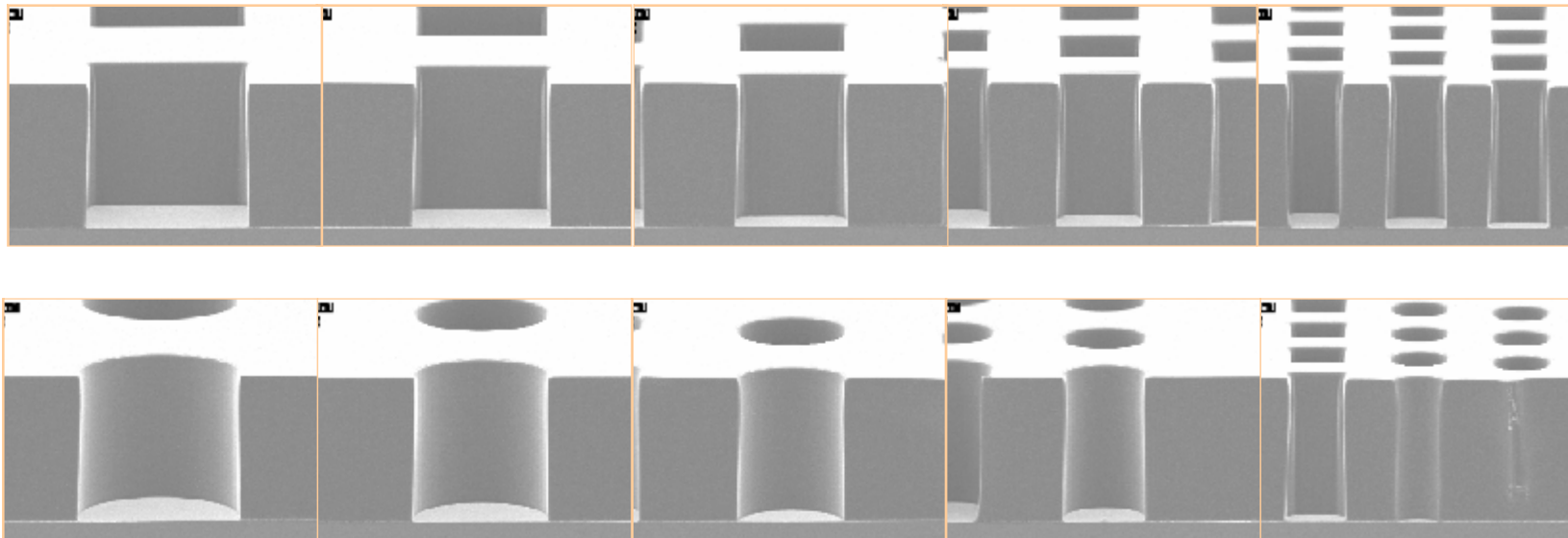
60 μm

50 μm

40 μm

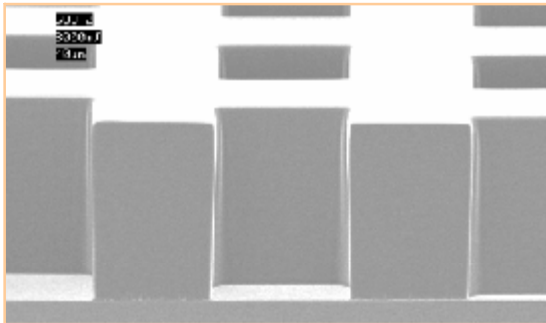
30 μm

20 μm

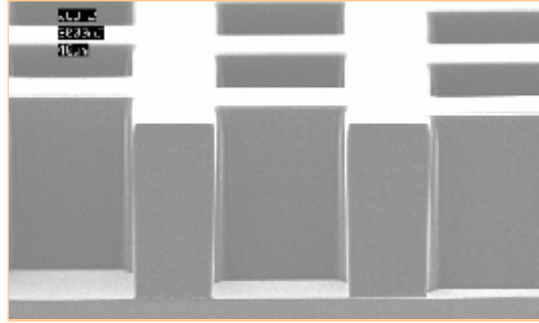


40 μm C/H Images at Different Ratios (3000 mJ/cm^2)

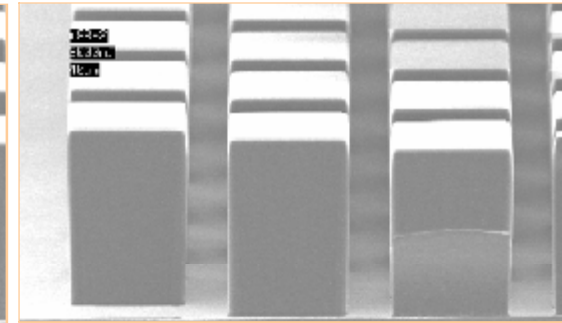
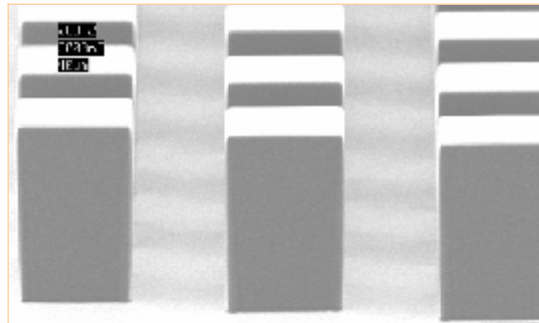
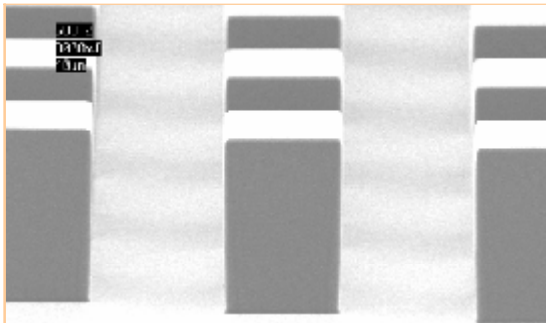
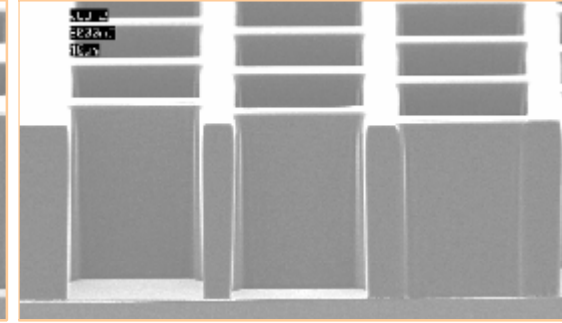
40 μm /40 μm



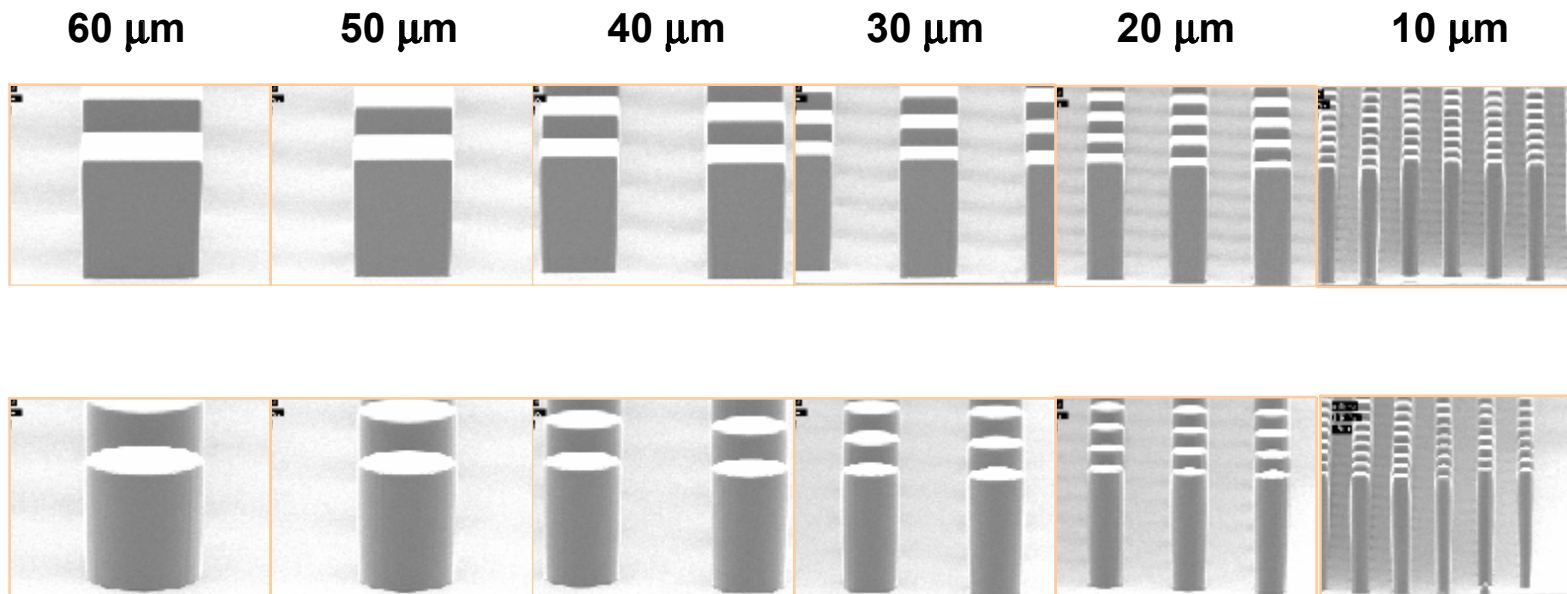
40 μm /28 μm



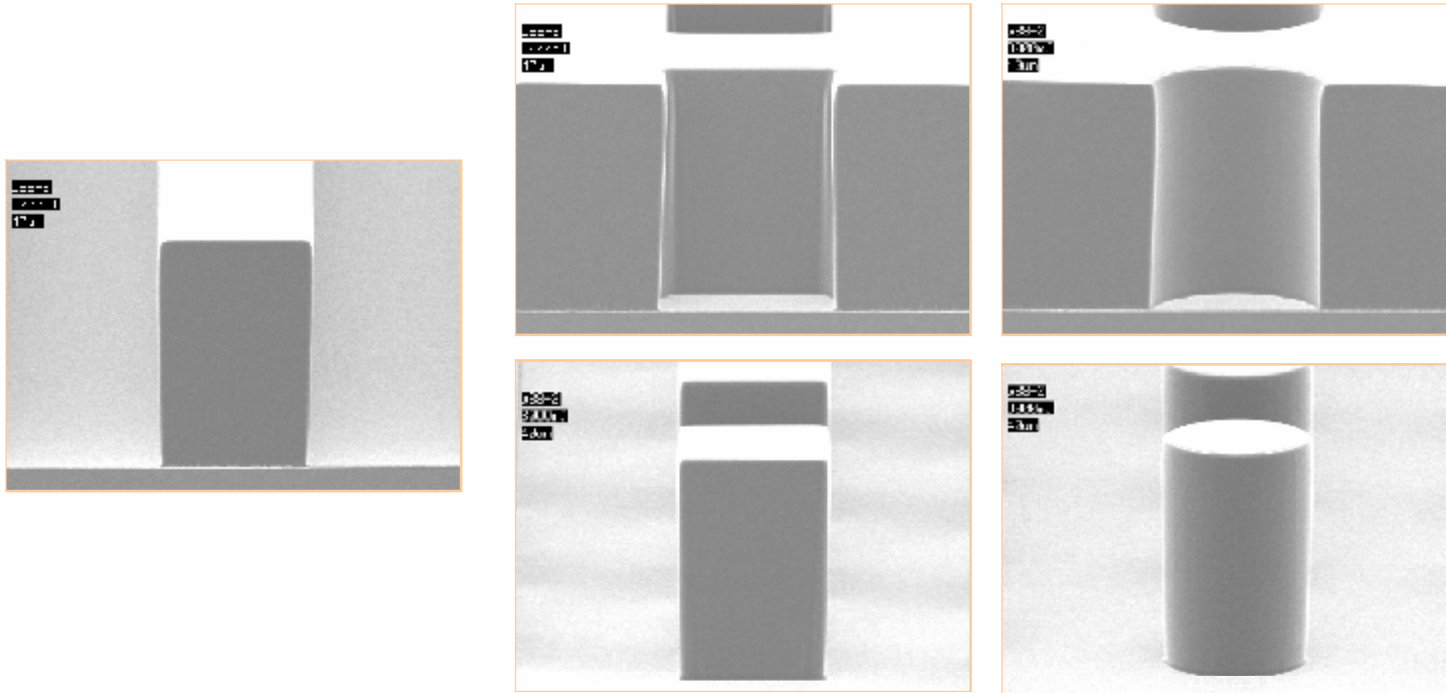
40 μm /12 μm



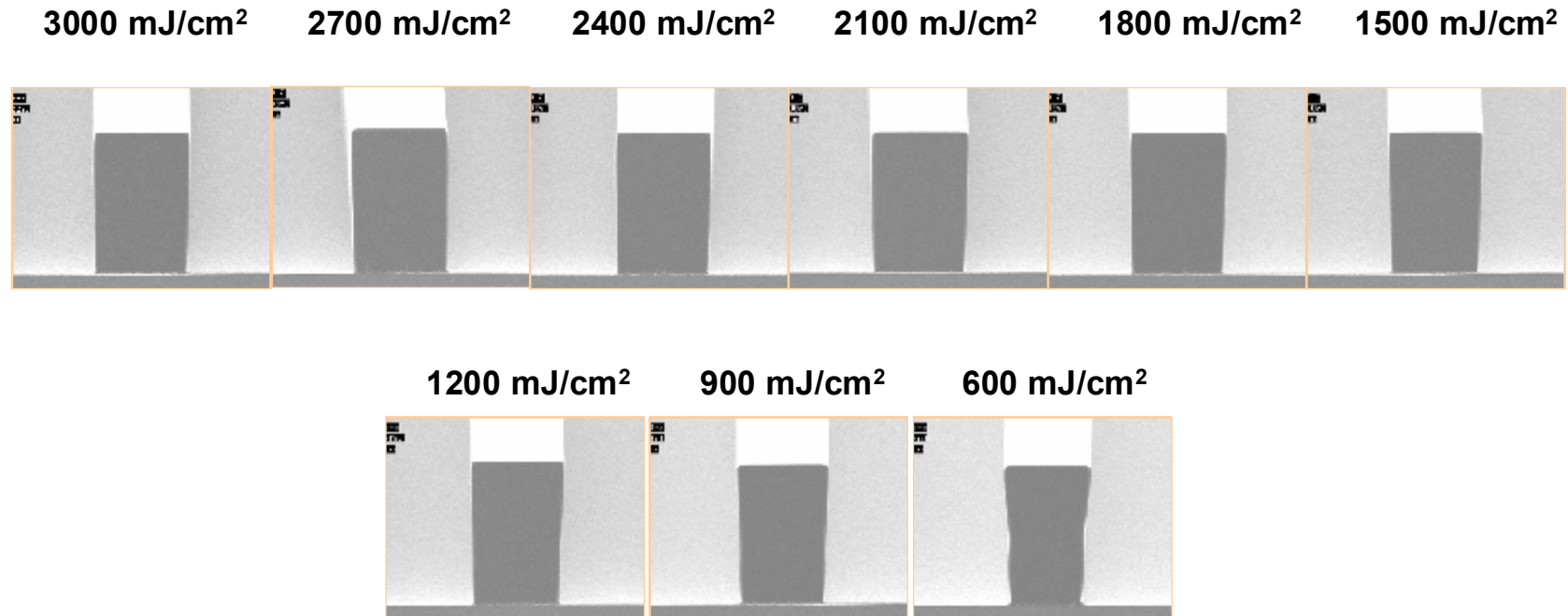
AZ[®] EXP 125nXT-10 for FT=60 μm Post Images @ 3000 mJ/cm²



AZ[®] EXP 125nXT-10A for FT=60 μm 40 μm Line, C/H, and Post @ 3000 mJ/cm²



AZ[®] EXP 125nXT-10A for FT=60 μm 40 μm Line Images



AZ[®] EXP 125nXT-10A for FT=60 μm 40 μm C/H Images

3000 mJ/cm²

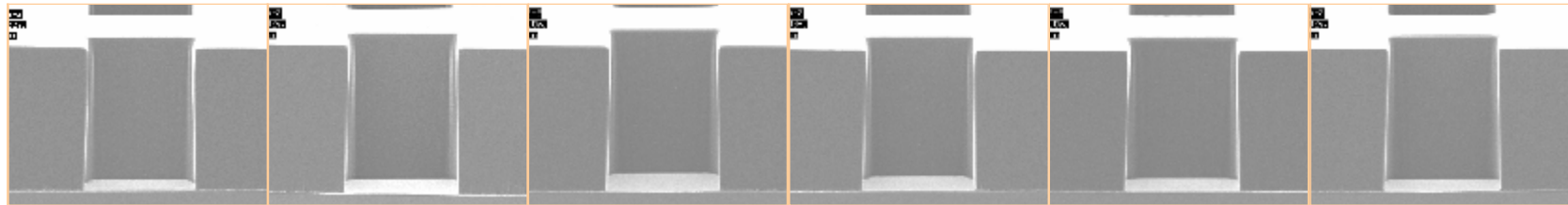
2700 mJ/cm²

2400 mJ/cm²

2100 mJ/cm²

1800 mJ/cm²

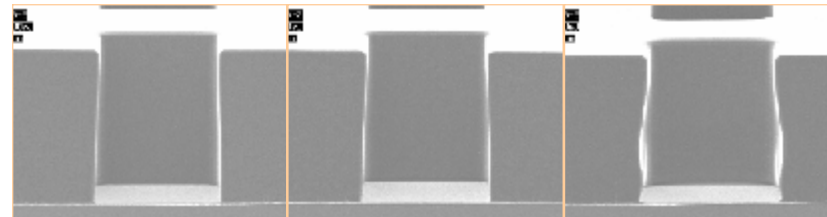
1500 mJ/cm²



1200 mJ/cm²

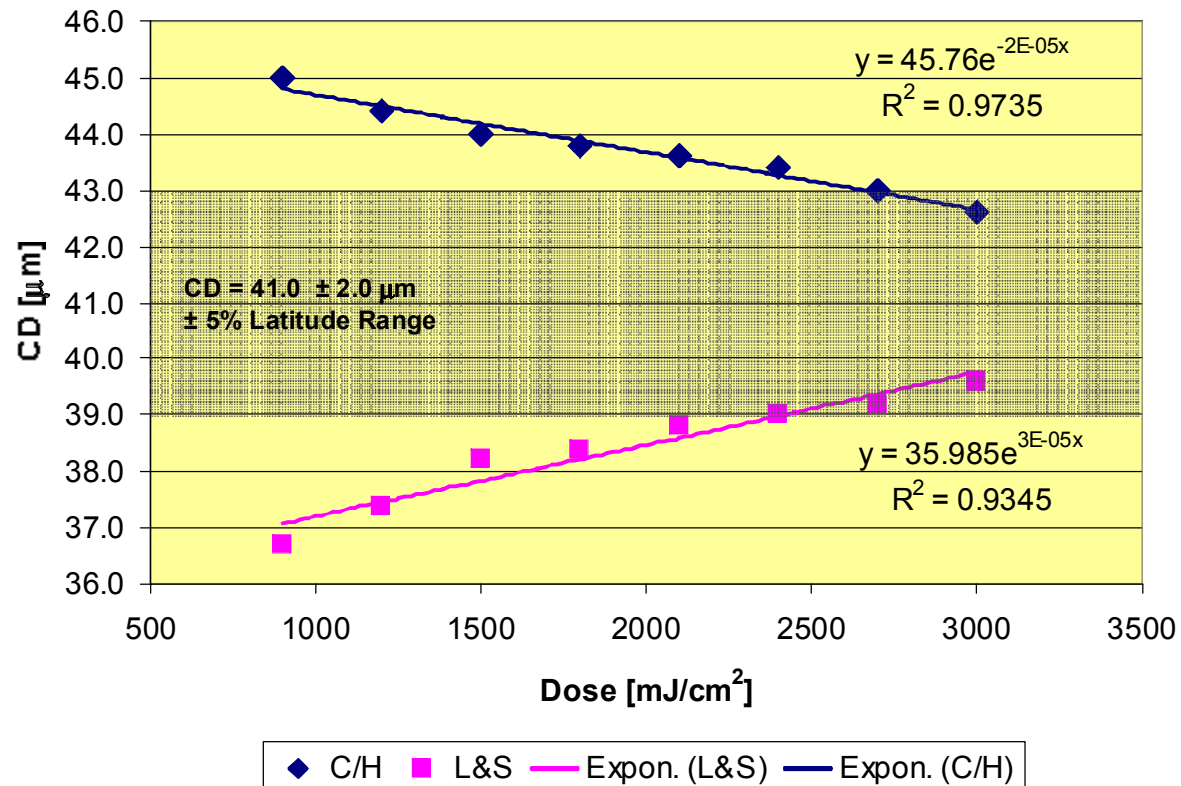
900 mJ/cm²

600 mJ/cm²



Exposure Latitude of AZ[®] EXP 125nXT-10A

Exposure Latitude AZ[®] 125 nXT-10A
40 μm C/H and L&S @ 60 μm FT



Conclusions

- ✓ Film thickness of 60 μm by single coat was achieved @ 1900 rpm.
- ✓ Good performance above 1200 mJ/cm^2
- ✓ Recommended soft back conditions:
Temp: 140 °C
Time: 8 min.
- ✓ Recommended dose and development time on Cu:
Dose: 1500 - 3000 mJ/cm^2
Development: 2 puddles @ 40 sec.



AZ[®] EXP 125nXT-10A

**FT=70 μ m Lithographic Data
Ultratech AP 300 Stepper**



AZ Electronic Materials

Process Conditions of AZ[®] Exp 125nXT-10A

Test sample: viscosity @ 5038 cSt

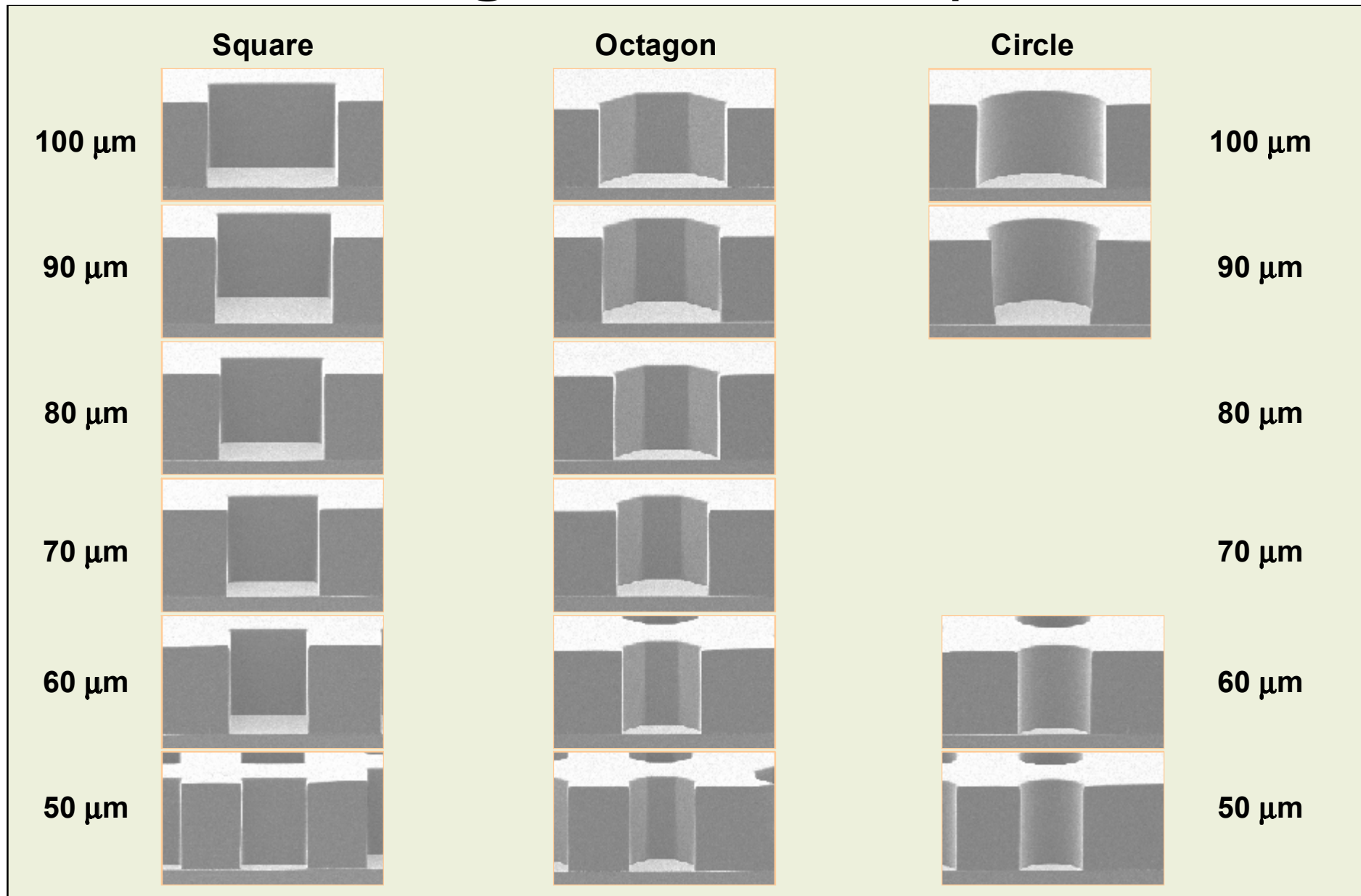
Target FT: 70 μm by single coat on Suss ACS200
1200 rpm @ 1.0 sec, then 1000 rpm @ 12 sec

SB condition: 140 °C
5.1 mm@30 sec; 1.3mm@30 sec;
0.1 mm @ 120 sec; contact@ 600 sec.

Exposure tool: Ultratech AP 300 stepper
Dose: 1500 to 3500 mJ/cm²
Focus: -22.5 to -7.5 μm

Development: AZ 300 MIF
3 puddles at 40 sec for Cu wafer

**AZ[®] Exp 125nXT-10A for FT=70 μm
C/Hs @ 3000 mJ/cm², F=-15 μm**



Square

Octagon

Circle

DOF

Best Focus $F = -15 \mu\text{m}$

50 μm C/D

3000mJ/cm²

-7.5 μm

-10 μm

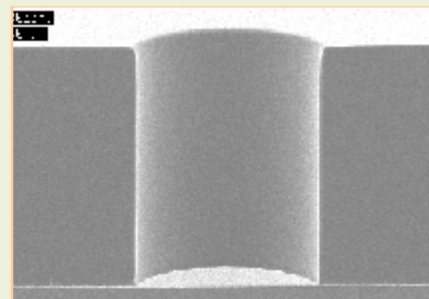
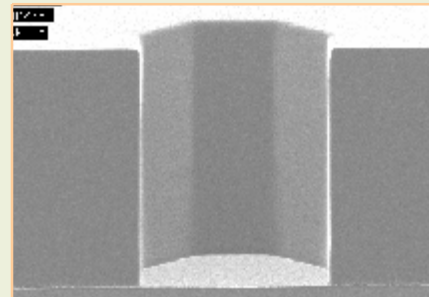
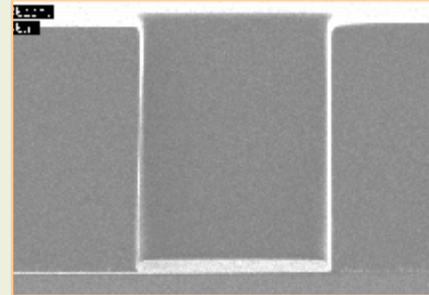
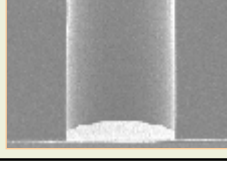
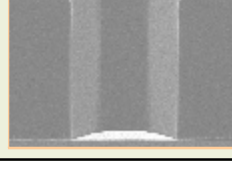
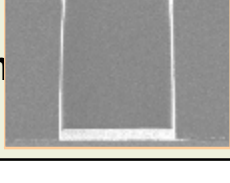
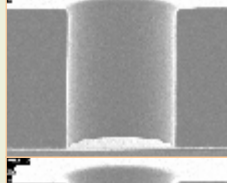
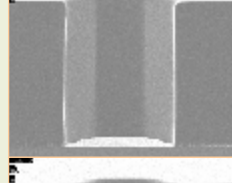
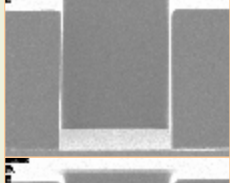
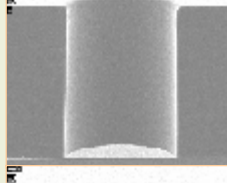
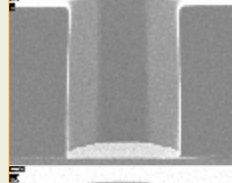
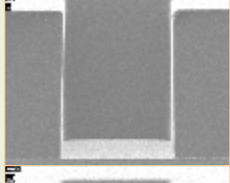
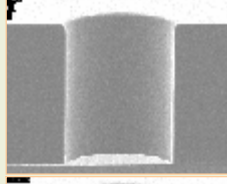
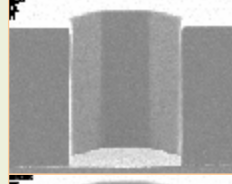
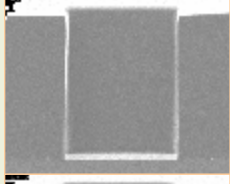
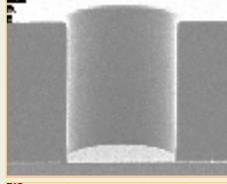
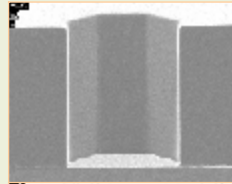
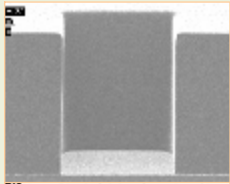
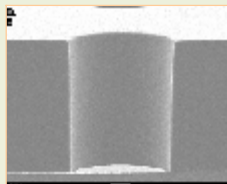
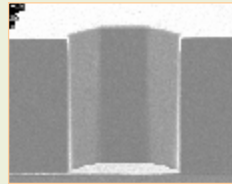
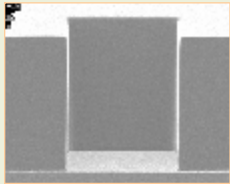
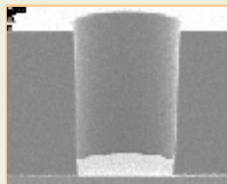
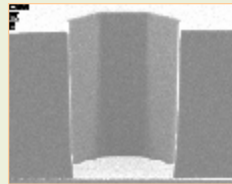
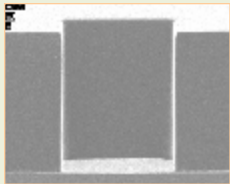
-12.5 μm

-15 μm

-17.5 μm

-20 μm

-22.5 μm



Square

Octagon

Circle

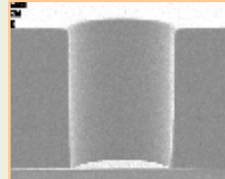
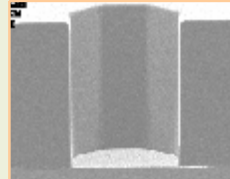
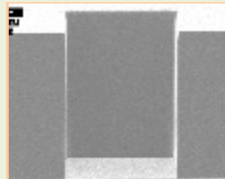
DOF

F=-15 μm

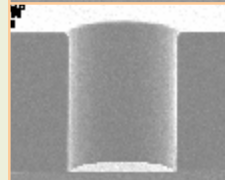
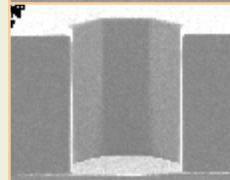
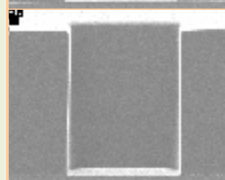
50 μm C/D

3000mJ/cm²

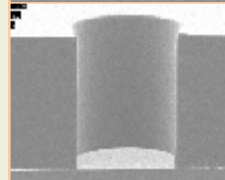
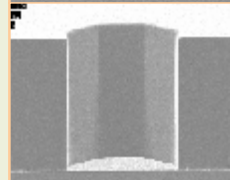
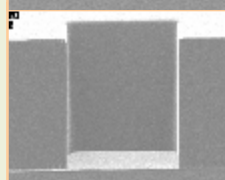
3500 mJ/cm²



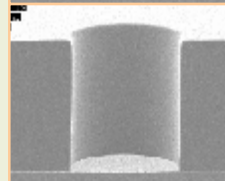
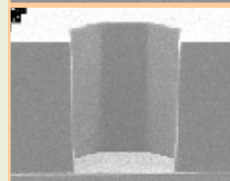
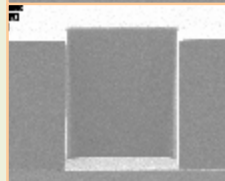
3000 mJ/cm²



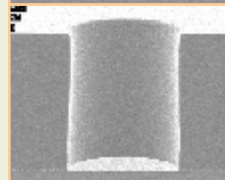
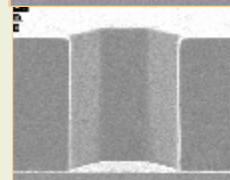
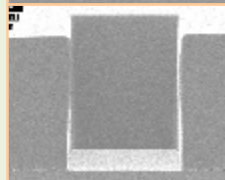
2750 mJ/cm²



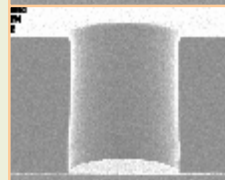
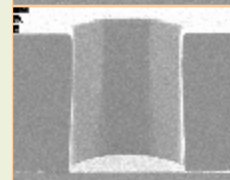
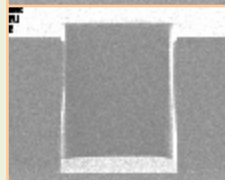
2500 mJ/cm²



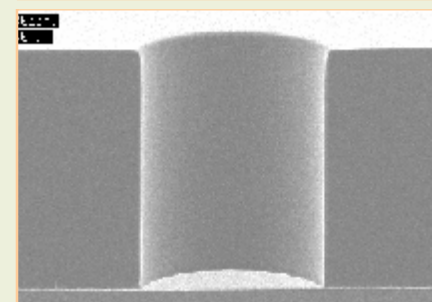
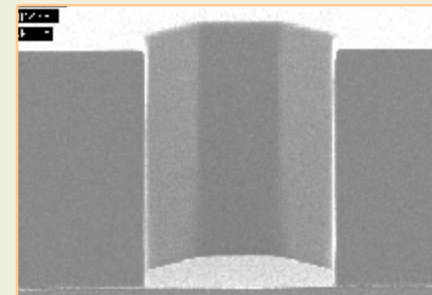
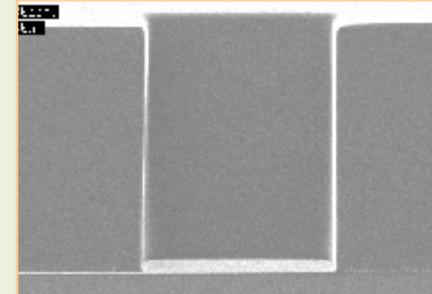
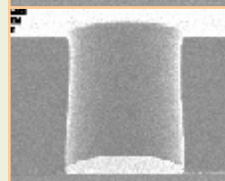
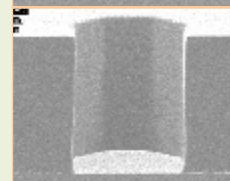
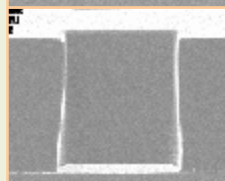
2250 mJ/cm²



2000 mJ/cm²



1500 mJ/cm²





AZ[®] EXP 125nXT-10A
FT=75 μ m Cu Plating Test



AZ[®] Exp 125nXT-10A Cu Plating Test

Exposure tool: Suss Aligner MA-200

Dose: 2200 mJ/cm²

Developer: AZ 300 MIF, 3x35

Descum: 10 min / 300W, Plasma Start AXIC Equipment

Cu solution: Intervia 8540

Tool: Semitool CFD 2 Reactor

Process conditions: 30 °C, flow rate (5 GPM);
wafer rotation (60 rpm)

Deposition rate: between 0.4 - 0.8µm/min

Stripper: AZ[®] 400T at 75 °C for 20 min

Resist and Cu Plate Images (FT=75 μm)

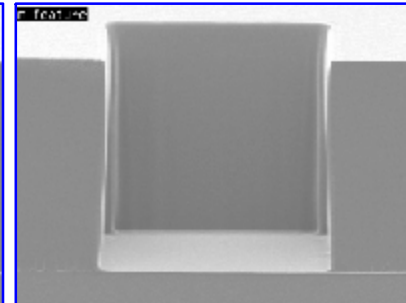
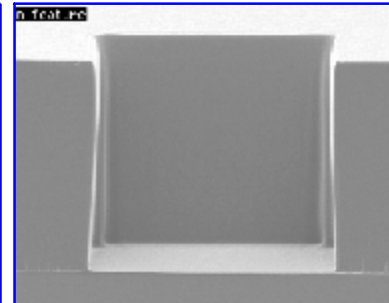
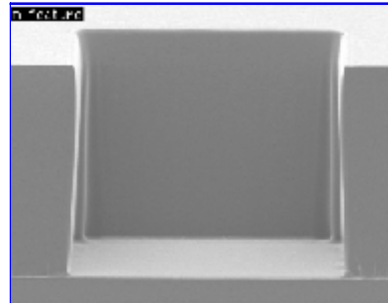
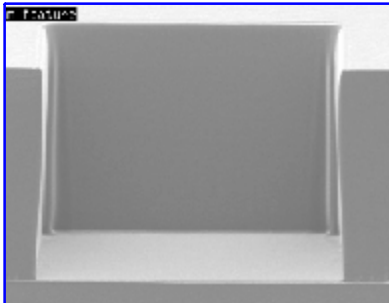
100 μm

90 μm

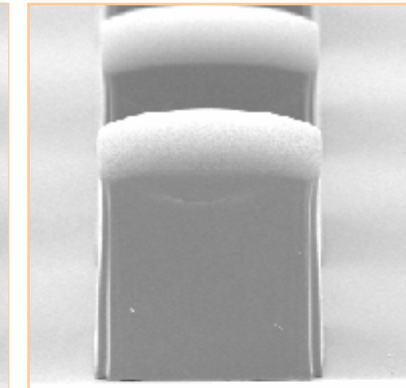
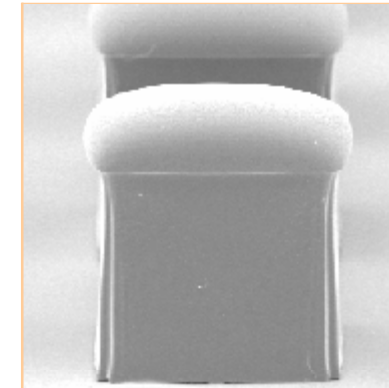
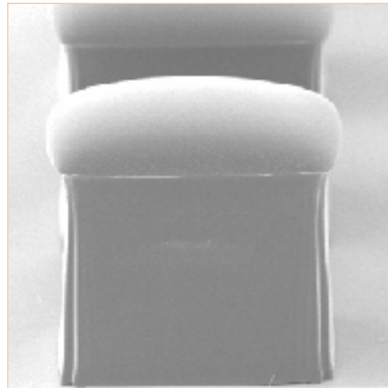
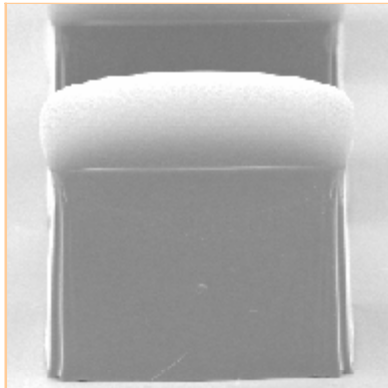
80 μm

75 μm

**Resist
Pattern**

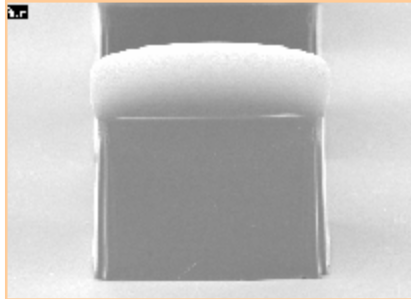


**Cu
Plate**

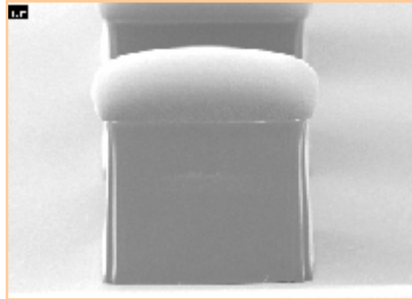


Cu Plate Images (Cubic, FT=75 μm)

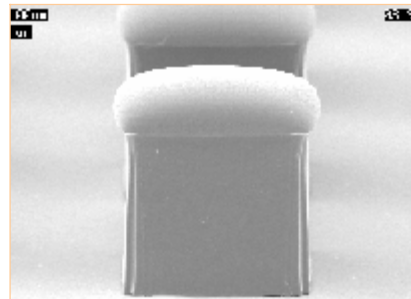
100 μm



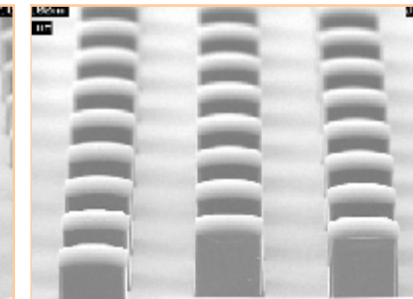
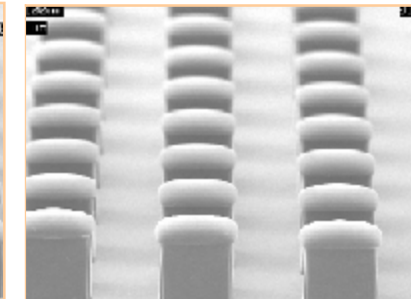
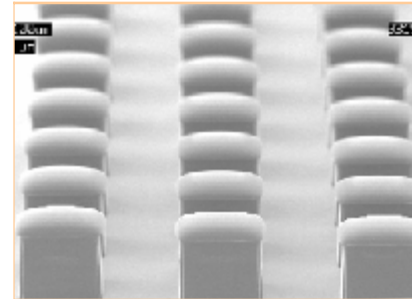
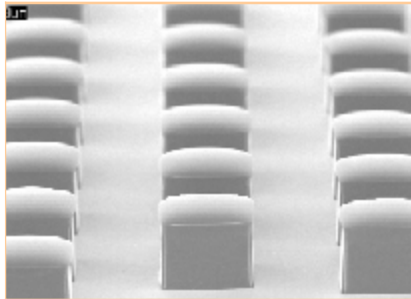
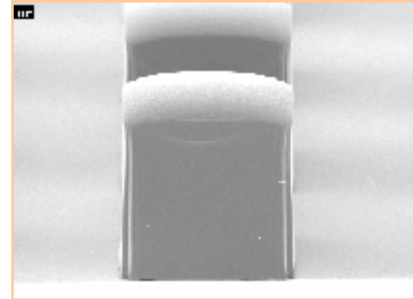
90 μm



80 μm



75 μm

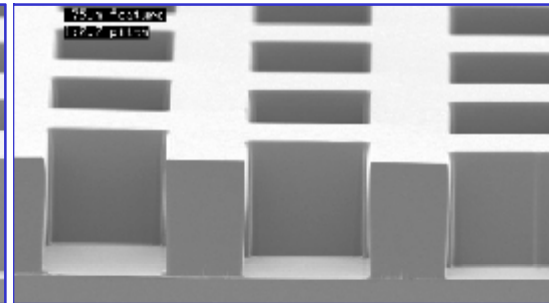
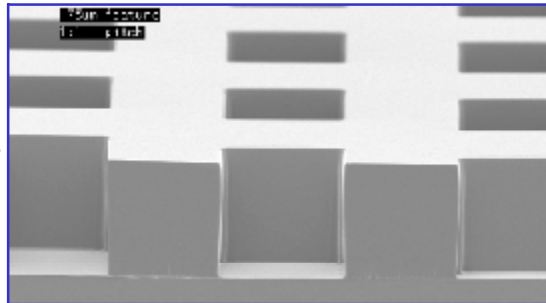


75 μ m C/H and Cu Plate Images at Different Ratios

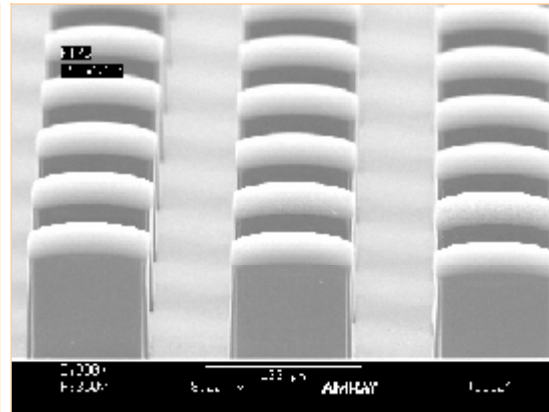
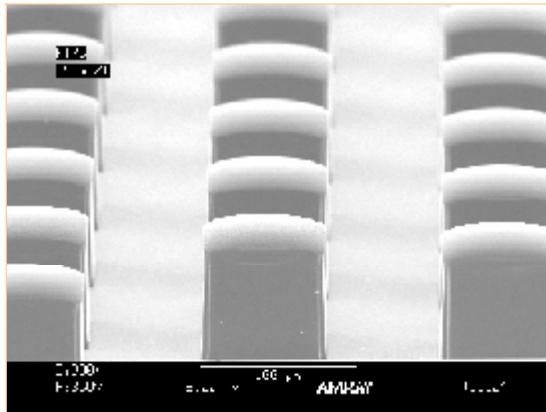
75/75 μ m

75/53 μ m

Resist
C/H

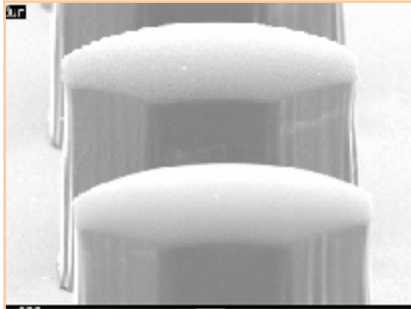


Cu
Plate

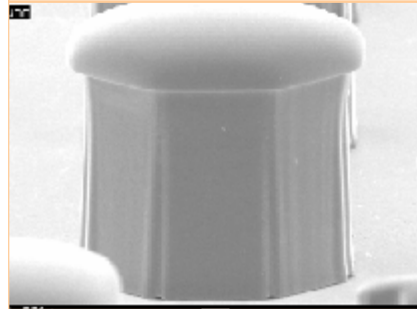


Cu Plate Images (Octagon, FT=75 μm)

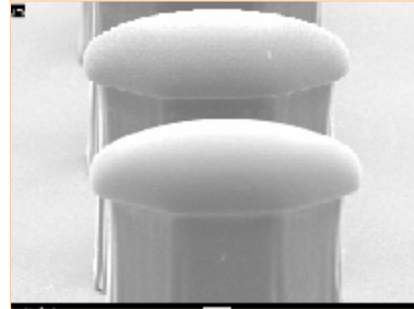
100 μm



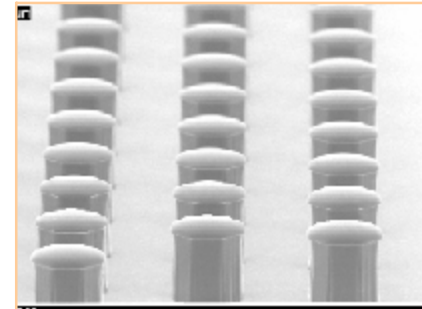
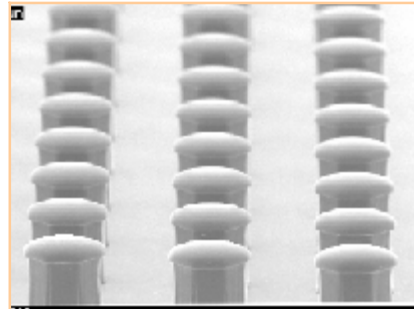
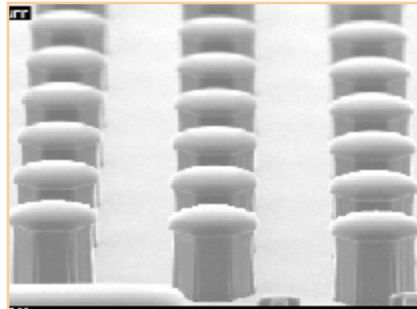
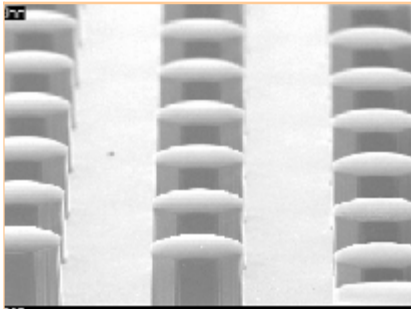
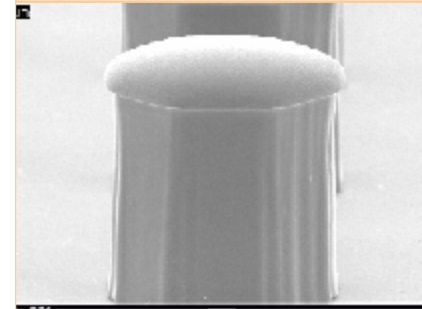
90 μm



80 μm



75 μm





AZ[®] EXP 125nXT-10A

**FT=120 μ m by Single Coating
Lithographic Data**



AZ[®] EXP 125nXT-10A @ FT=120 μm

Summary of Process Conditions on Cu Wafer

Test sample 2513-76 with viscosity of 5430 cSt

Target FT: 120 μm

Single coat at 1100 rpm @ 1.2 sec, then 620 rpm @ 12 sec

SB condition: 135 °C / 25 min

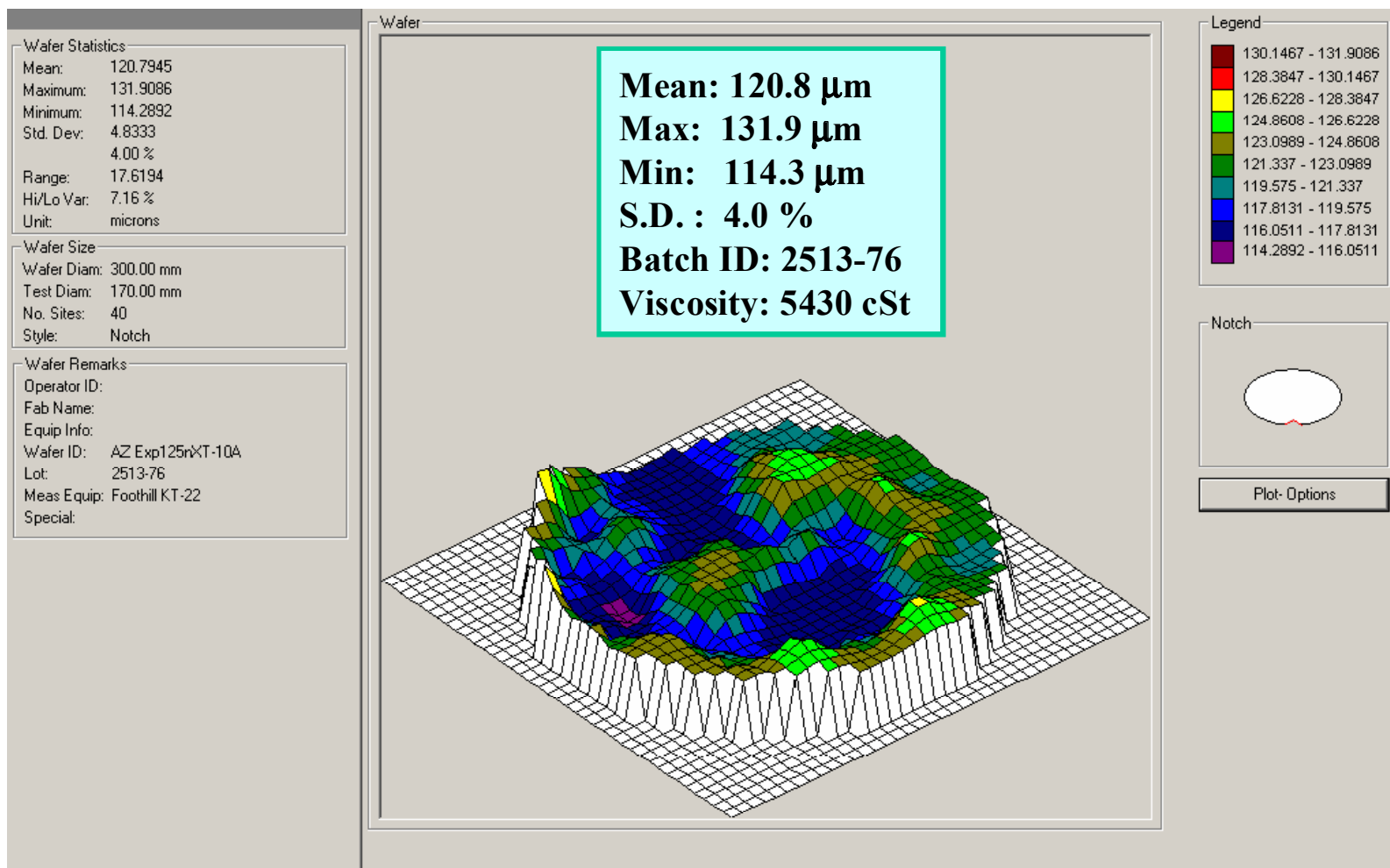
Exposure tool: Suss MA-200

Proximity mode Exposure @ CH2 (g. h. i.)

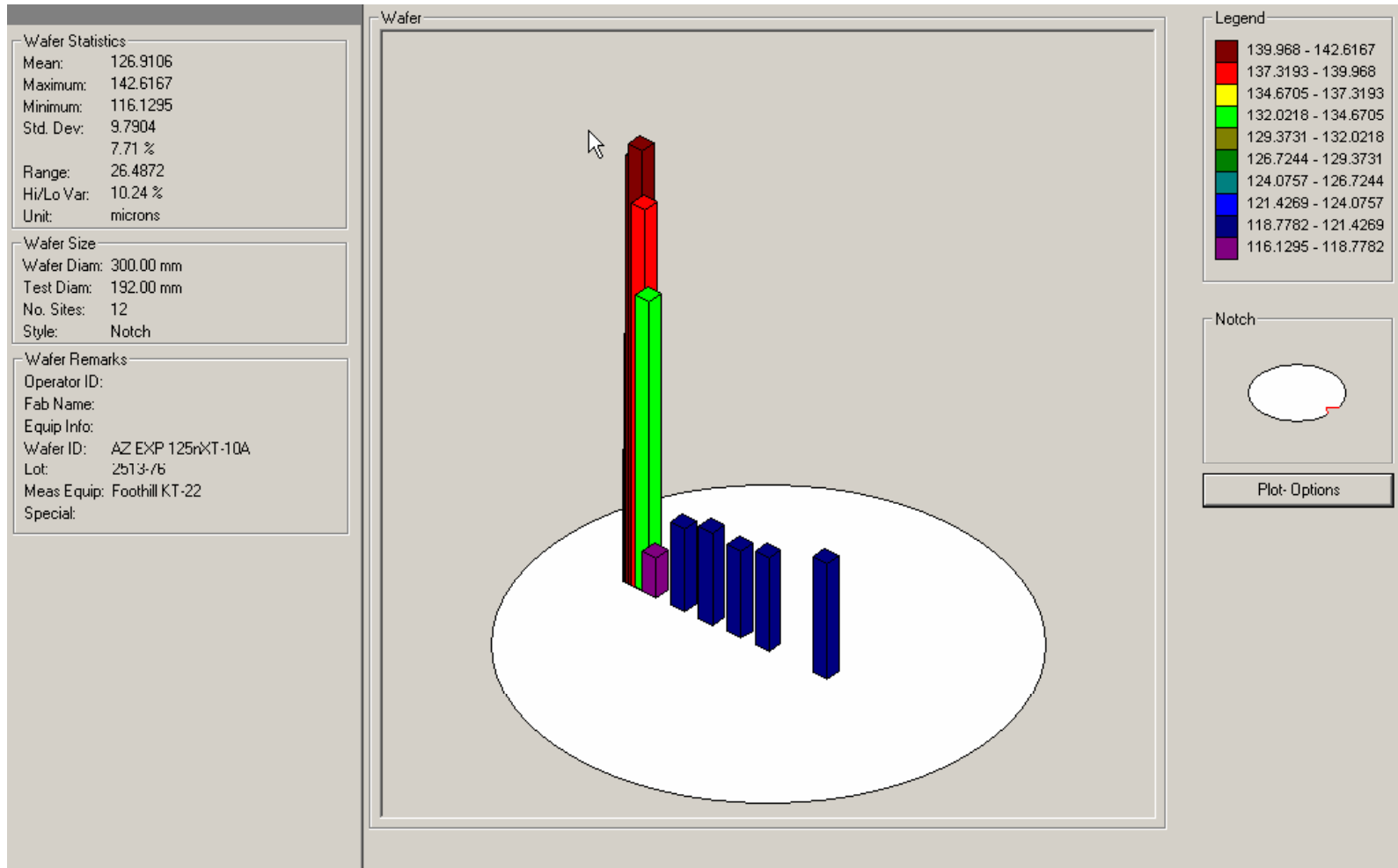
Development: AZ 300 MIF; 3 puddles at 60 second

AZ[®] EXP 125nXT-10A Coating Uniformity

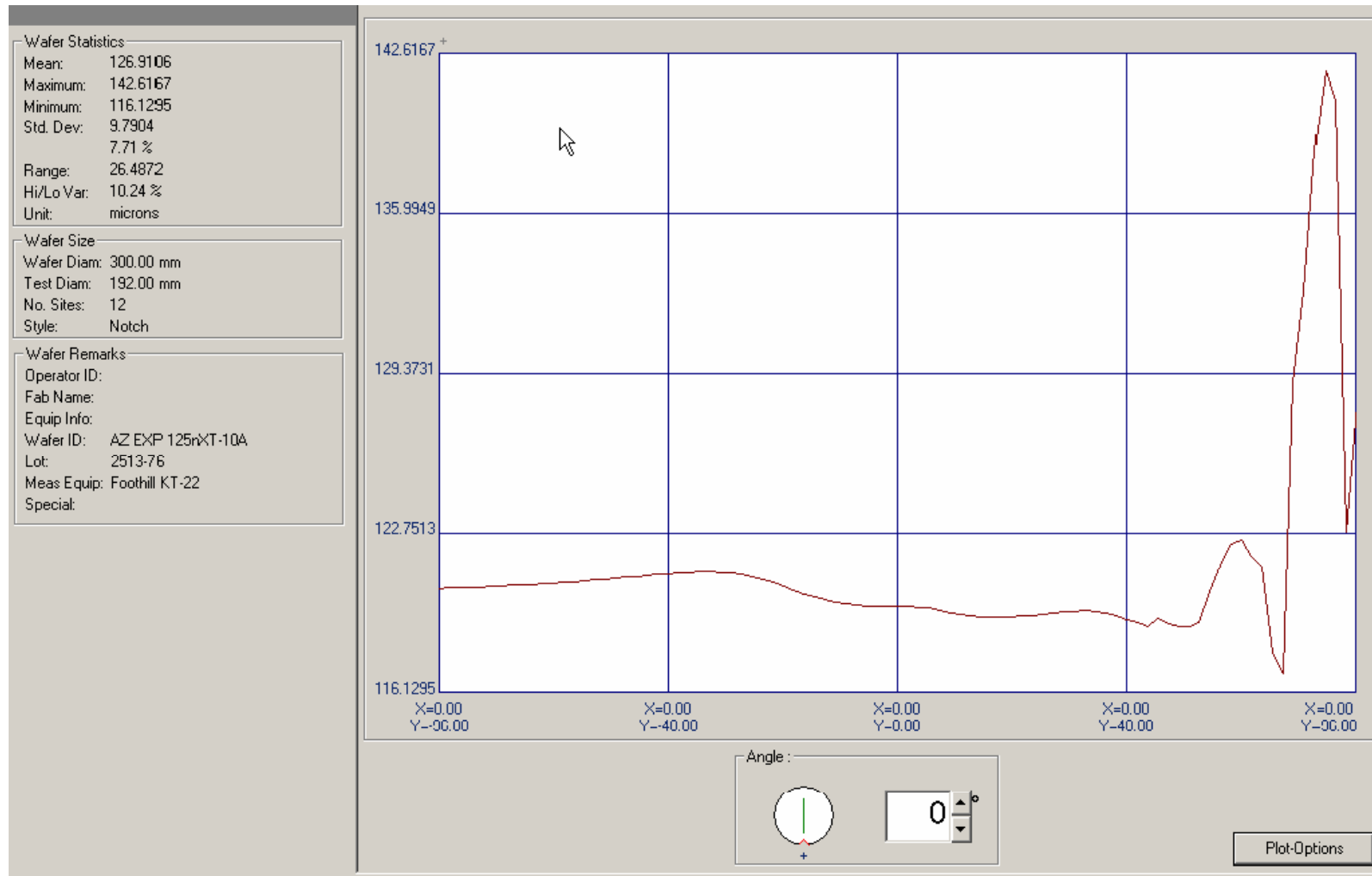
FT=120 μm @ 620 rpm



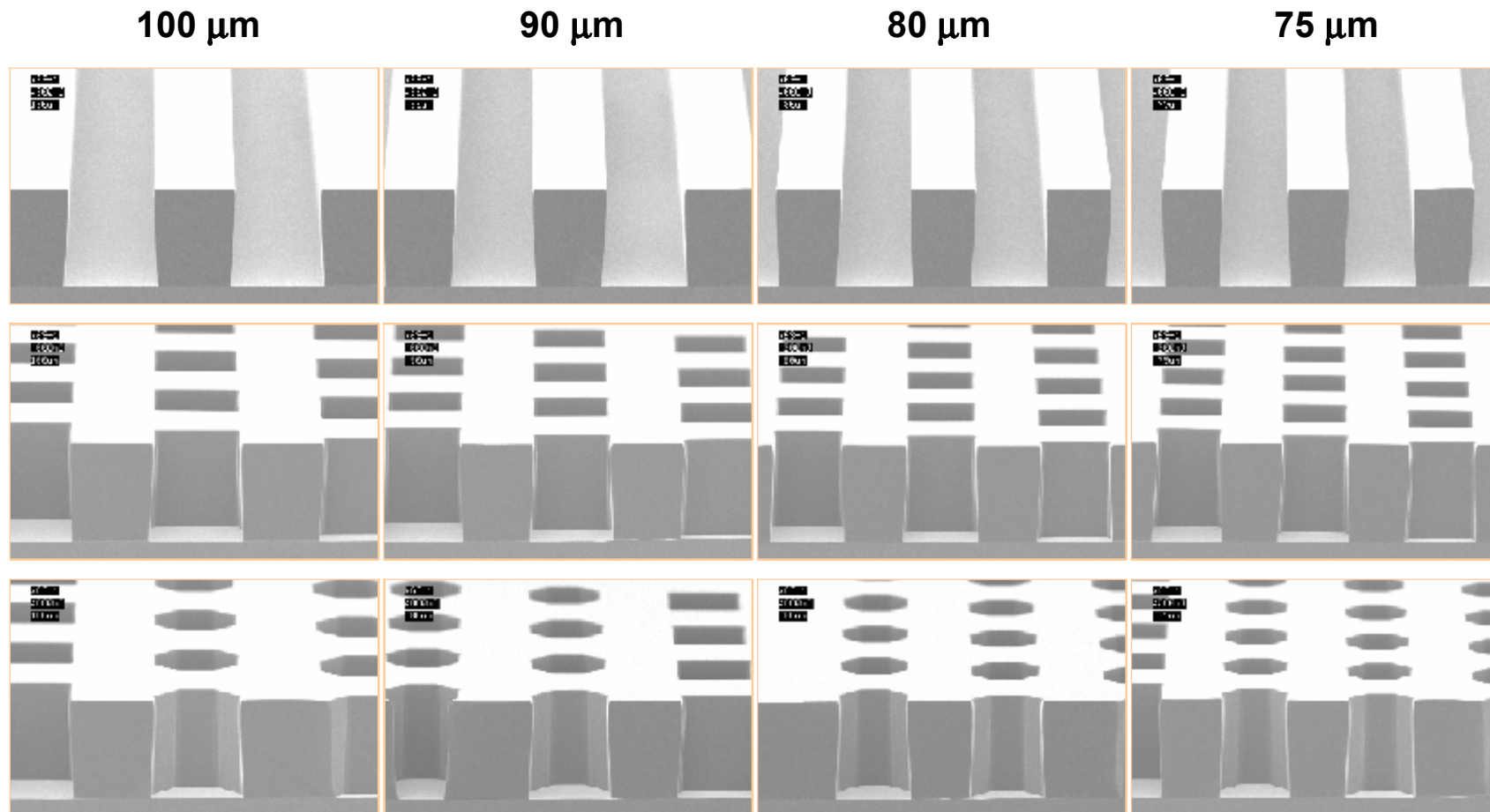
AZ[®] EXP 125nXT-10A, Edge Scan FT=120 μm @ 620 rpm



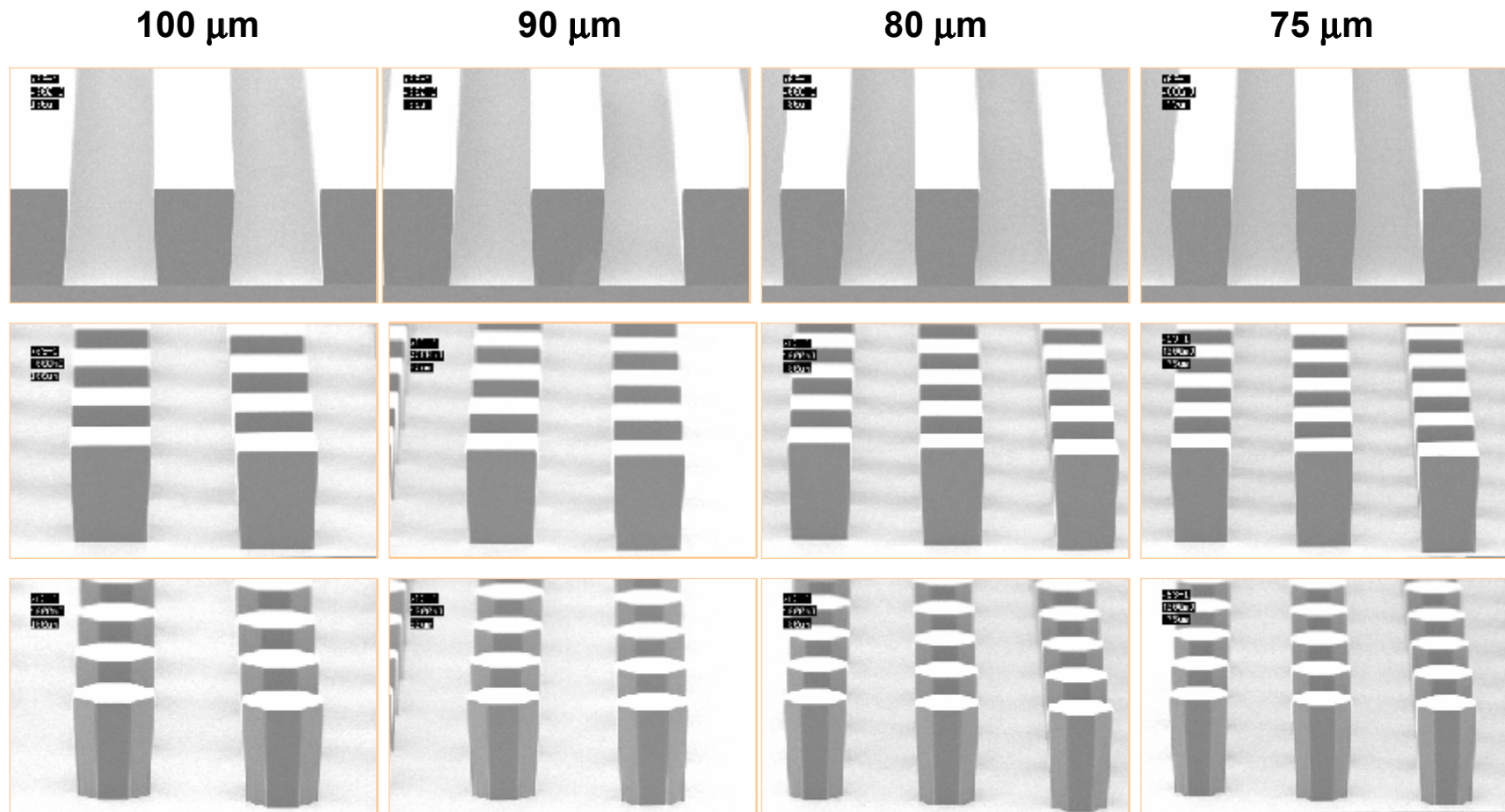
AZ[®] EXP 125nXT-10A, Edge Scan FT=120 μm @ 620 rpm



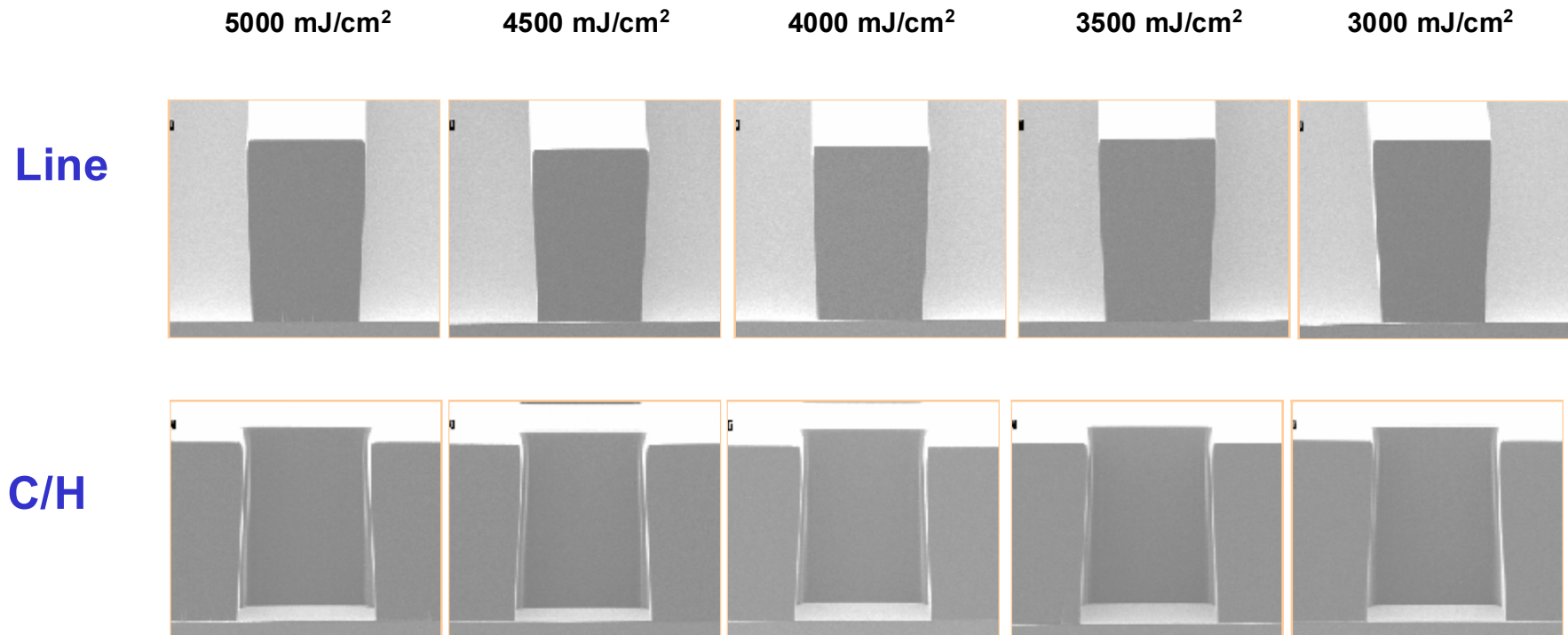
AZ[®] EXP 125nXT-10A @ FT=120 μm Resolution Comparison (4000 mJ/cm²)



AZ[®] EXP 125nXT-10A @ FT=120 μm Resolution Comparison (4000 mJ/cm²)



AZ[®] EXP 125nXT-10A @ FT=120 μm 80 μm Line and C/H Images



Thank You !