AZ Electronic Materials

AZ® nLOF® 2000 Series

Negative Tone i-Line Photoresist for Metal Lift-Off Applications

AZ nLOF 2000 Series Summary

Process capability: 0.7µm CD @ 2.0 µm FT

0.9µm CD @ 3.5 µm FT

AZ nLOF 2020: For 2.0 µm FT, DTP = 66 mJ/cm²

AZ nLOF 2035: For 3.5 µm FT, DTP = 80 mJ/cm²

AZ nLOF 2070: For 7.0 µm FT, DTP = 180 mJ/cm²

AZ Electronic Materials

AZ nLOF 2000 Photoresists

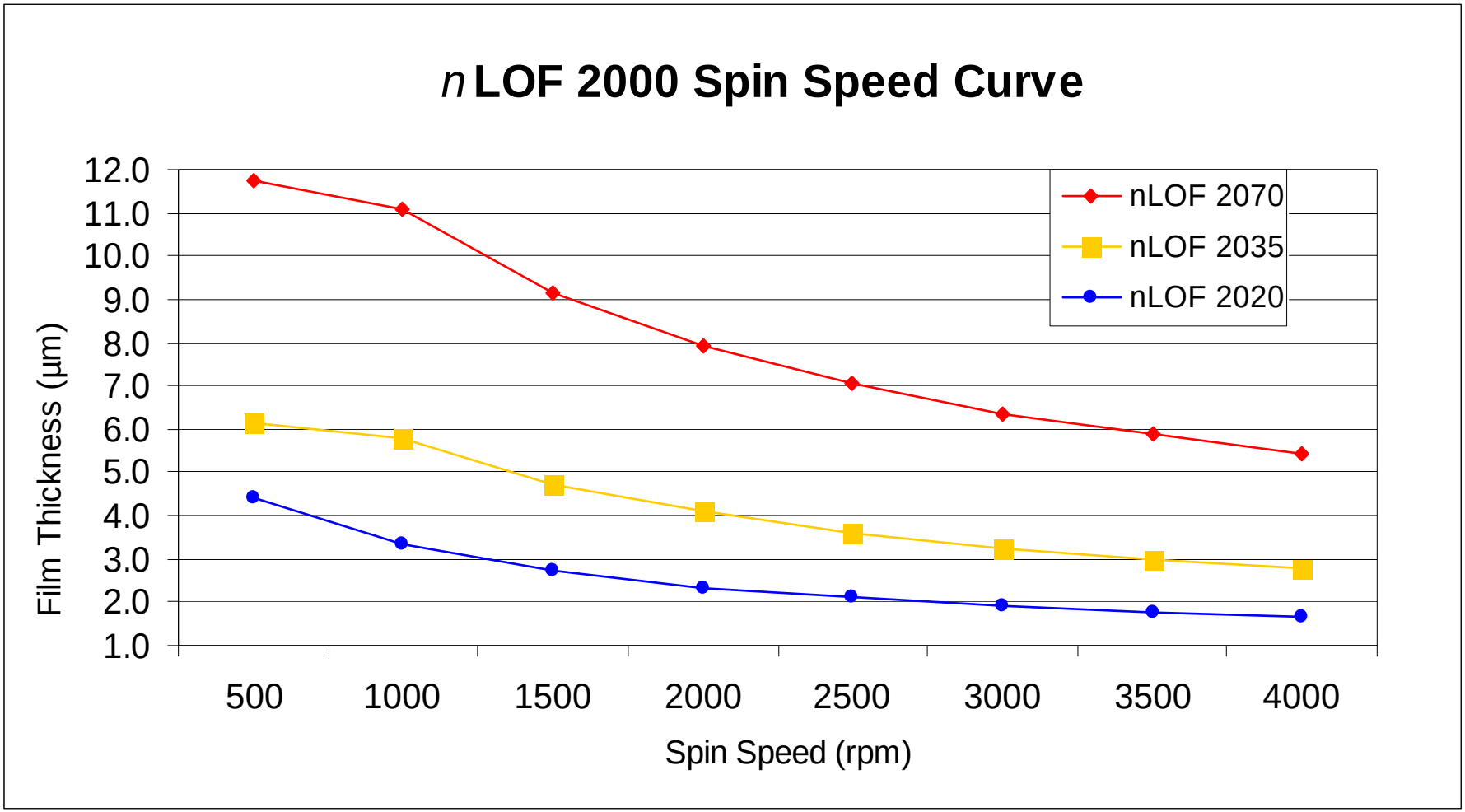
Processing

Softbake: 110°C for 60 sec.(2.0 - 3.5 µm FT) - contact mode
Exposure: NIKON 0.54 NA i-Line Stepper
PEB: 110°C for 60 sec (2.0 - 3.5 µm FT) - contact mode
Develop: AZ 300 MIF Developer, Single puddle for 60-120 sec. @ 23°C, varied with FT.

Analysis

Hitachi S-4000 SEM: SEM pictures at 75^{o} tilt.
CD's measured at top of resist profile

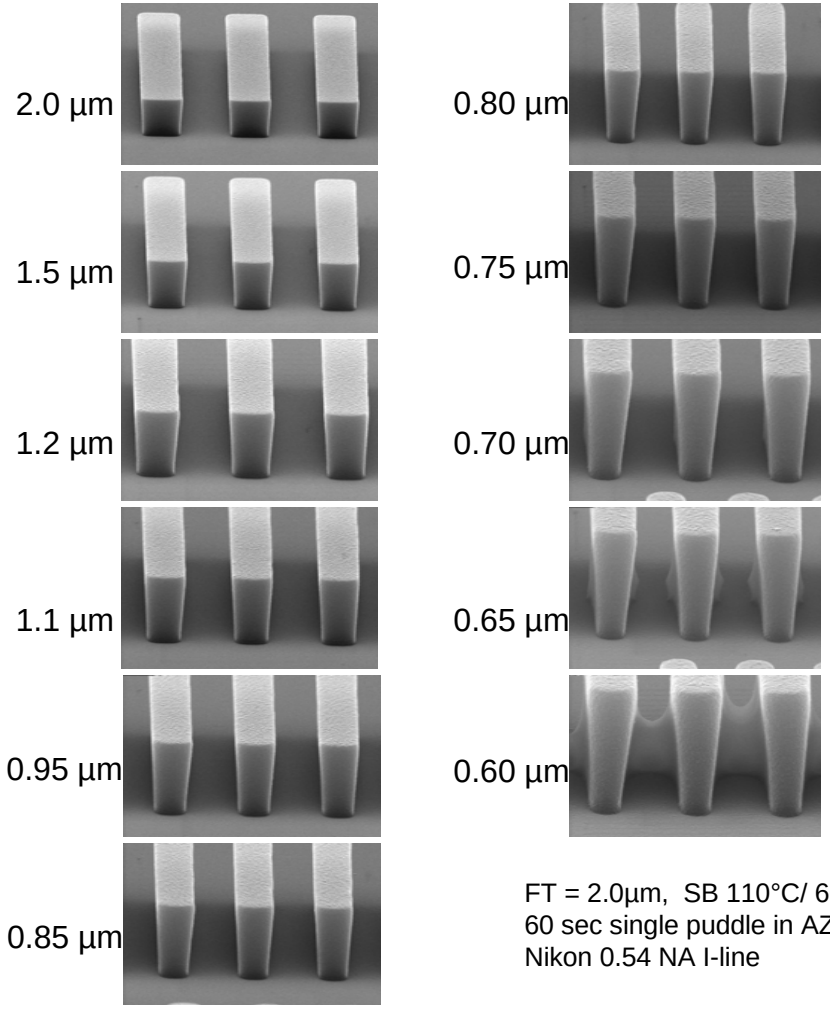
AZ nLOF 2000 Photoresist

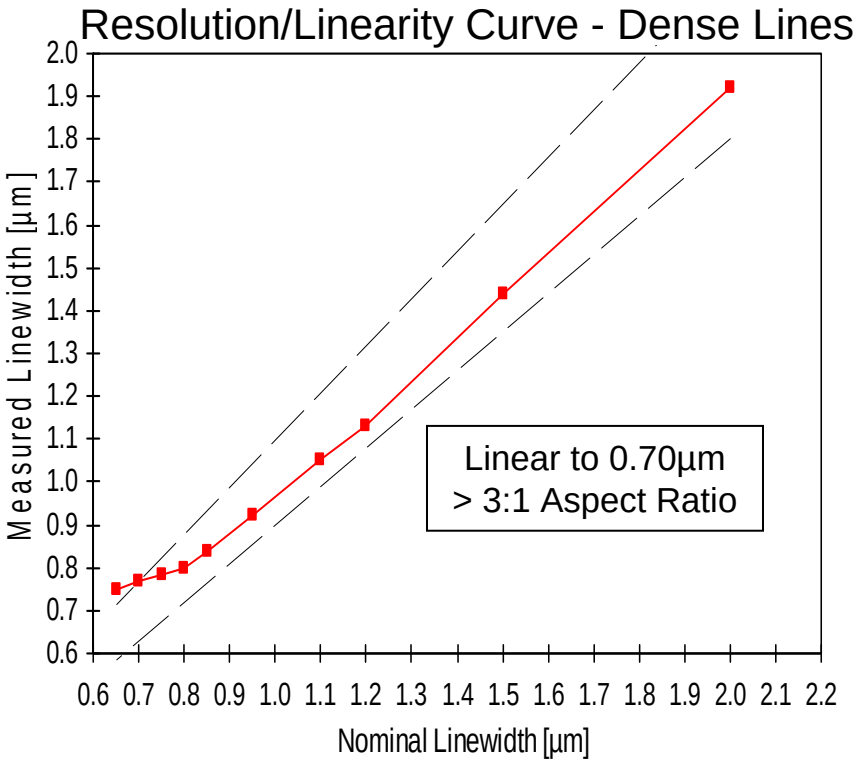


AZ Electronic Materials

AZ nLOF 2020
Resolution @ 2.0 µm FT

DTP = 66 mJ/cm²



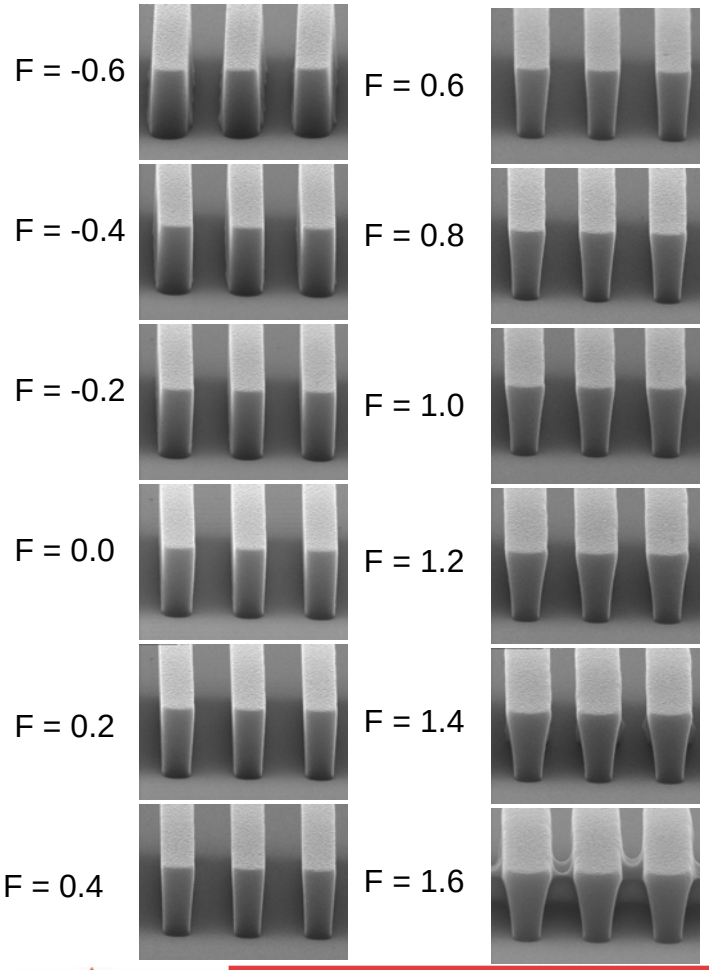


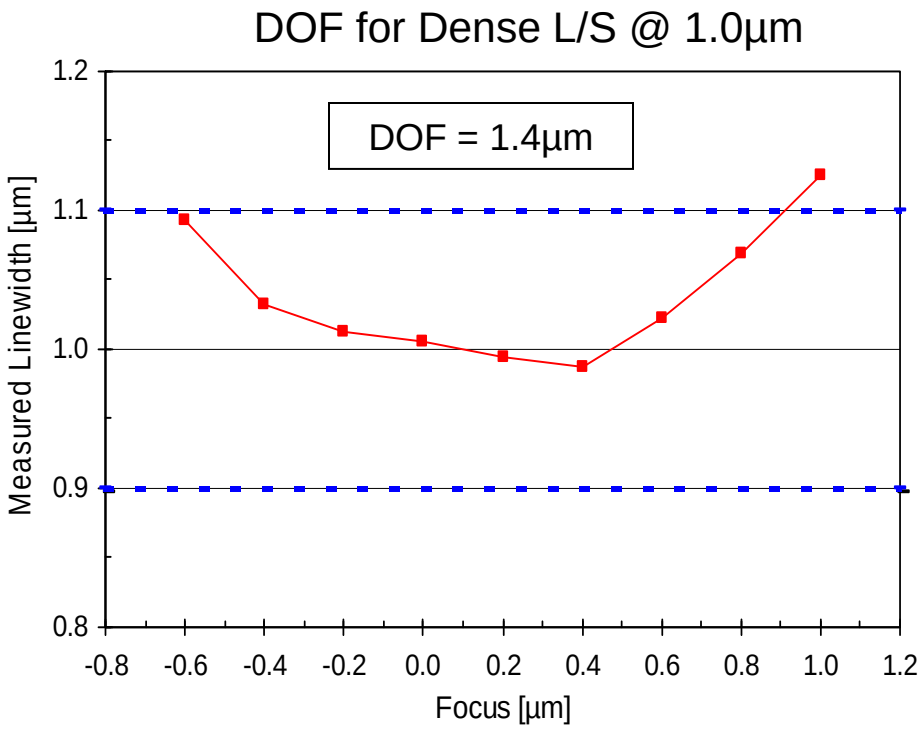
FT = 2.0µm, SB 110°C/ 60 sec, PEB 110°C/ 60 sec,
60 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

AZ Electronic Materials

AZ nLOF 2020
Depth of Focus @ 1.0 µm CD

FT = 2.0µm, DTP = 66 mJ/cm²





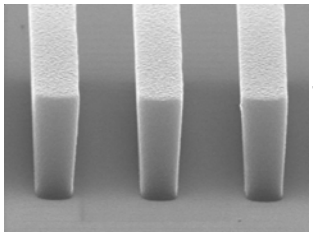
FT = 2.0µm, SB 110°C/ 60 sec, PEB 110°C/ 60 sec,
60 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

AZ Electronic Materials

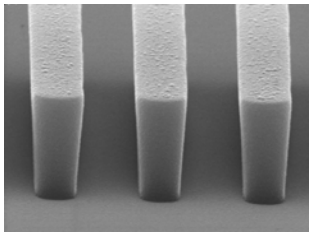
AZ nLOF 2020
Exposure Latitude @ 1.0 µm CD

FT = 2.0µm, DTP = 66 mJ/cm²

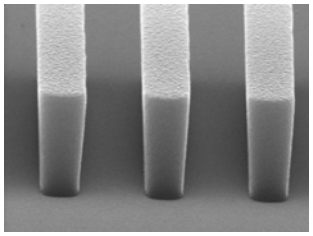
58 mJ/cm²



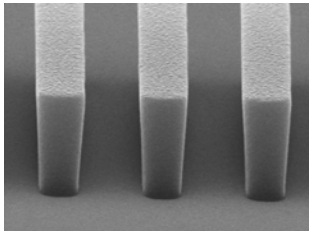
74 mJ/cm²



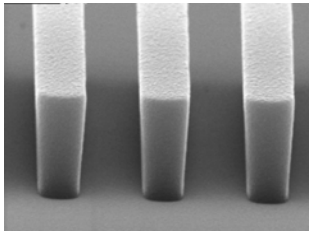
62 mJ/cm²



66 mJ/cm²

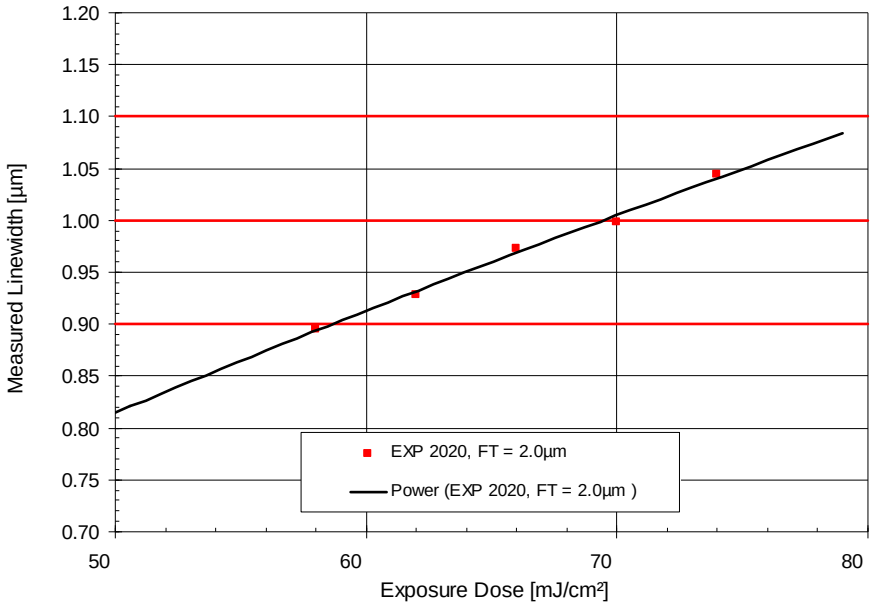


70 mJ/cm²



E-Lat for Dense L/S @ 1.0µm CD

Exposure latitude = 30%

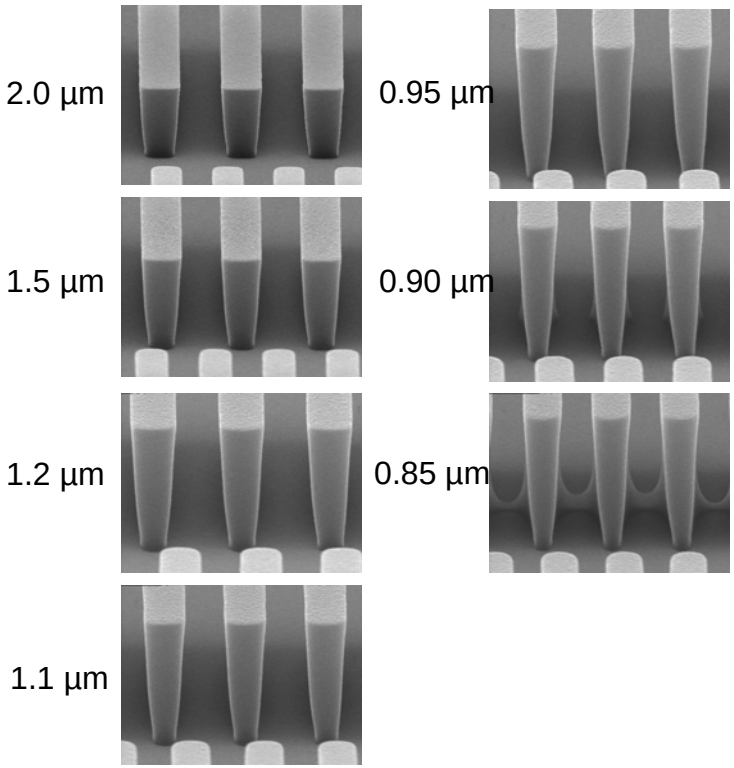


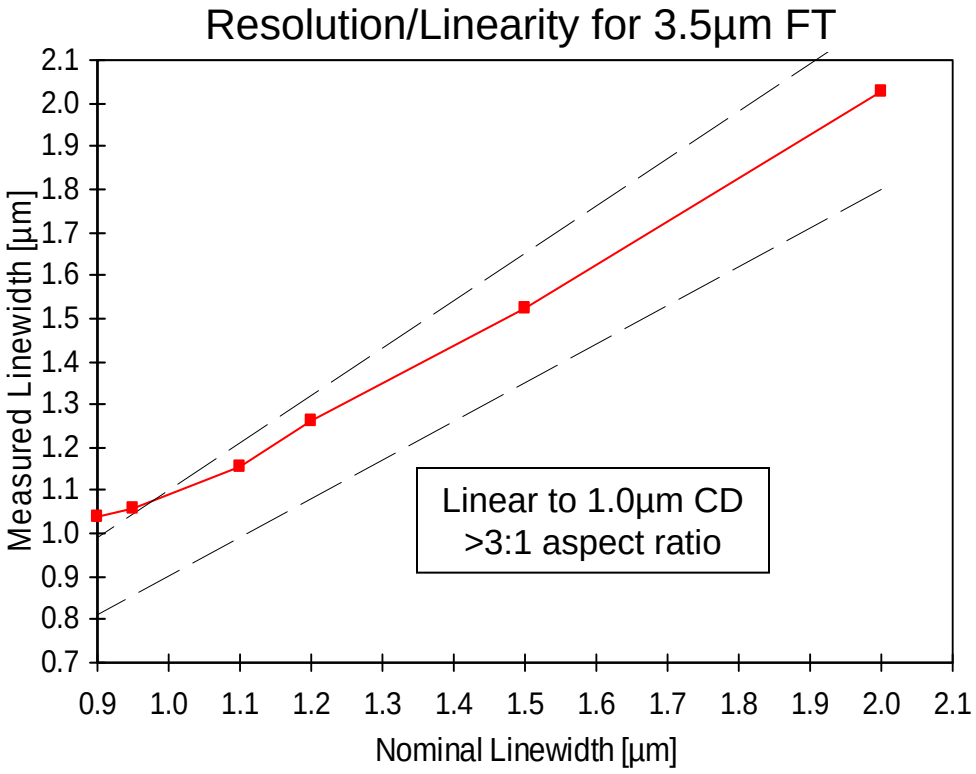
FT = 2.0µm, SB 110°C/ 60 sec, PE
60 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

AZ Electronic Materials

AZ nLOF 2035
Resolution @ 3.5 µm FT

DTP = 80 mJ/cm²



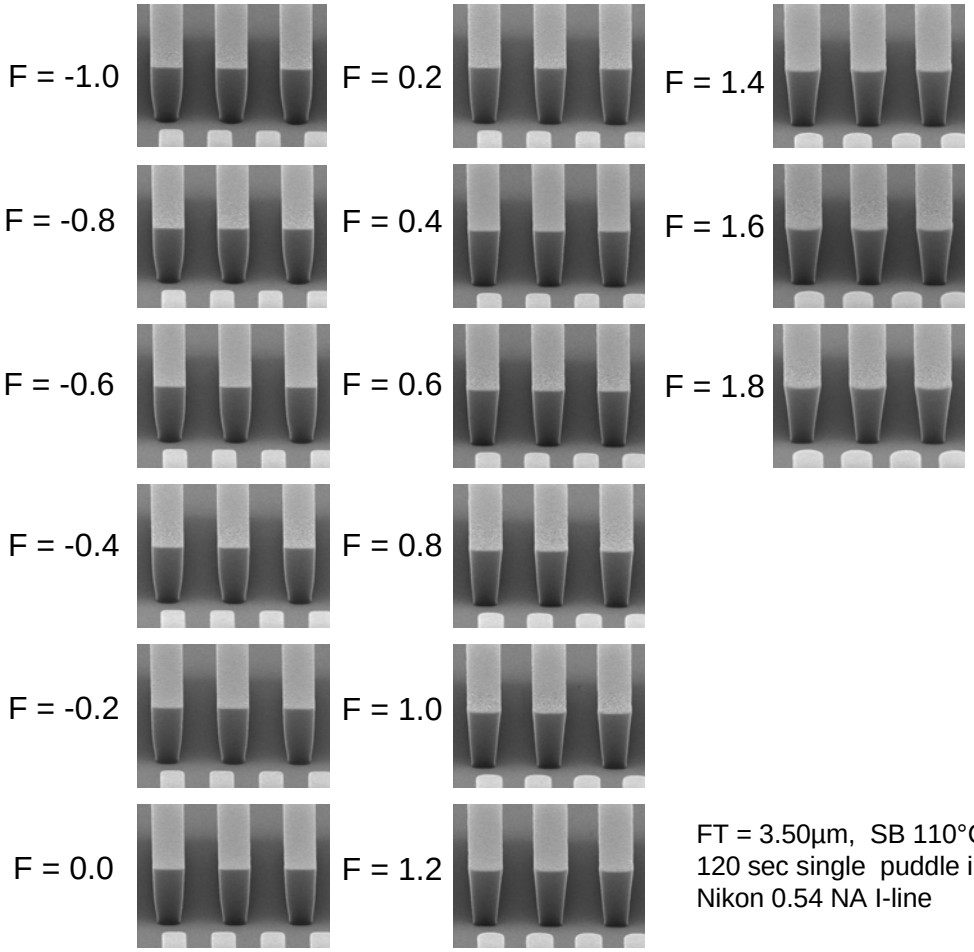


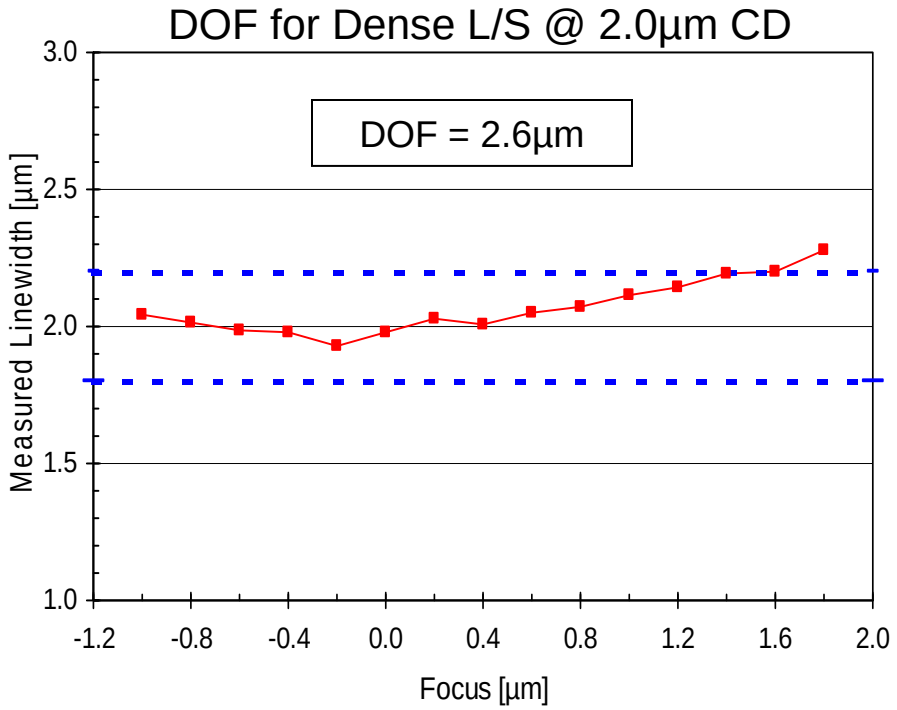
FT = 3.50µm, SB 110°C/ 60 sec, PEB 110°C/ 60 sec,
120 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

AZ Electronic Materials

AZ nLOF 2035
Depth of Focus for 2.0µm CD

FT = 3.5µm, DTP = 80 mJ/cm²



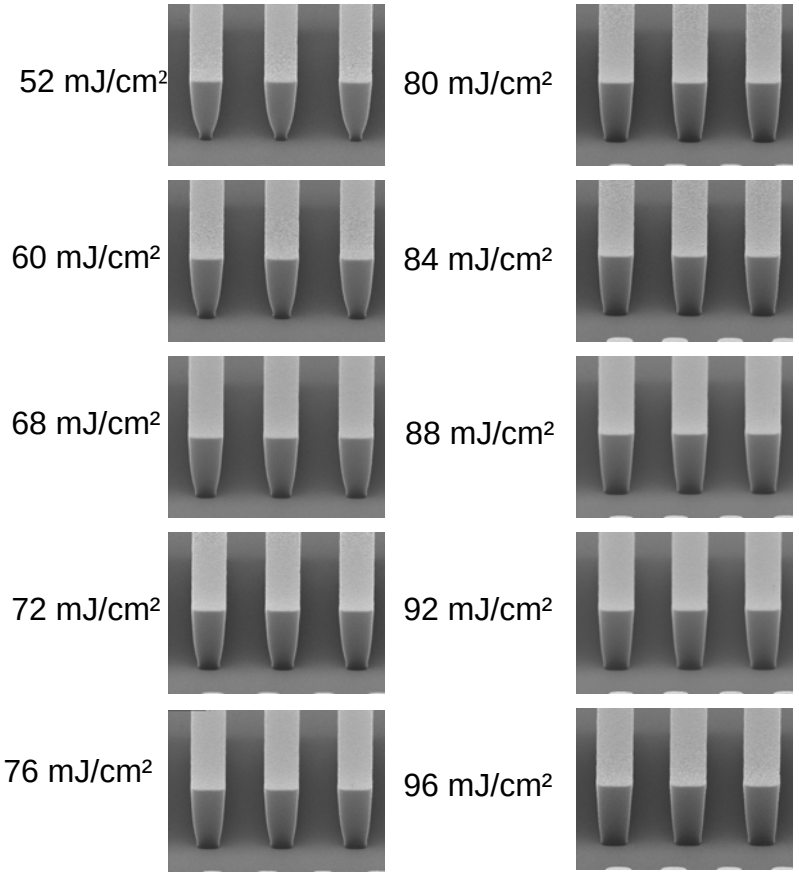


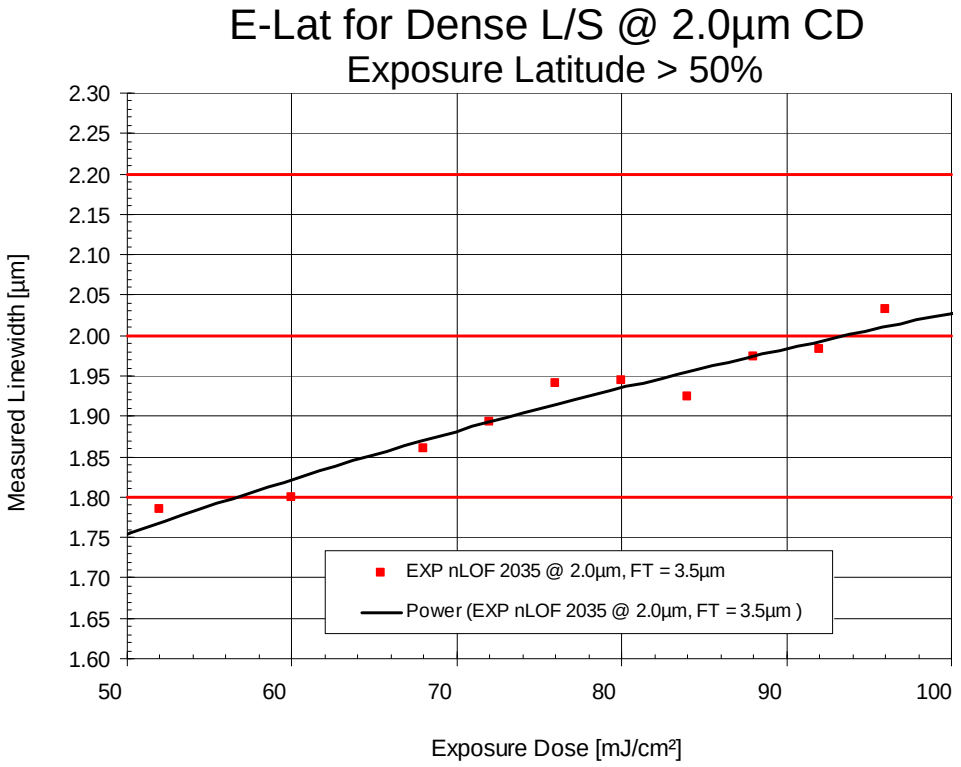
FT = 3.50µm, SB 110°C/ 60 sec, PEB 110°C/ 60 sec,
120 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

AZ Electronic Materials

AZ nLOF 2035
Exposure Latitude for 2.0µm CD

FT = 3.5µm, DTP = 80 mJ/cm²





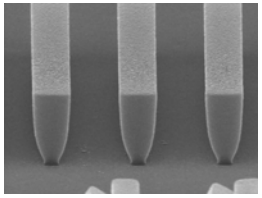
FT = 3.50µm, SB 110°C/ 60 sec, PEB 110°C/ 60 sec,
120 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

AZ Electronic Materials

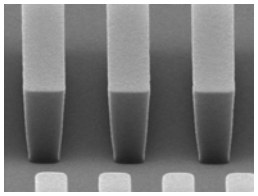
AZ nLOF 2035
PEB Sensitivity, 2.0um Dense L/S

FT = 3.5µm, DTP = 80 mJ/cm²

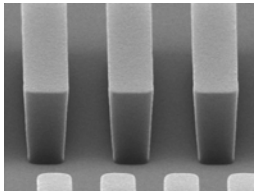
PEB **105°C**/60sec
Top size: 1.734
Bottom size: 0.726

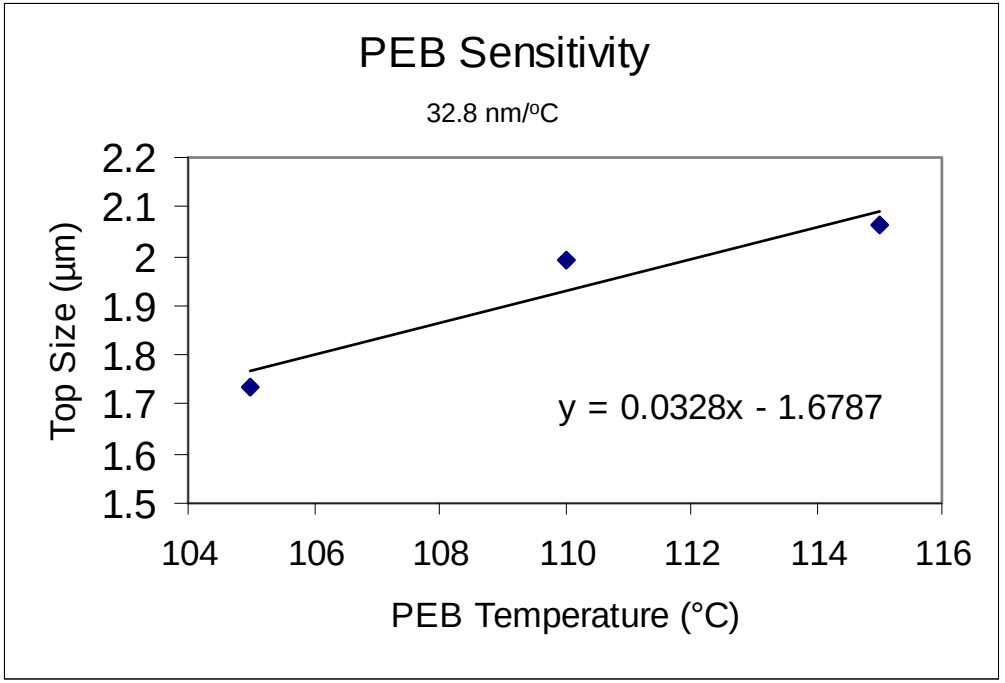


PEB **110°**C / 60sec
Top: 1.992 µm
Bottom : 1.439 µm



PEB **115°**C / 60sec
Top: 2.062 µm
Bottom: 1.687 µm



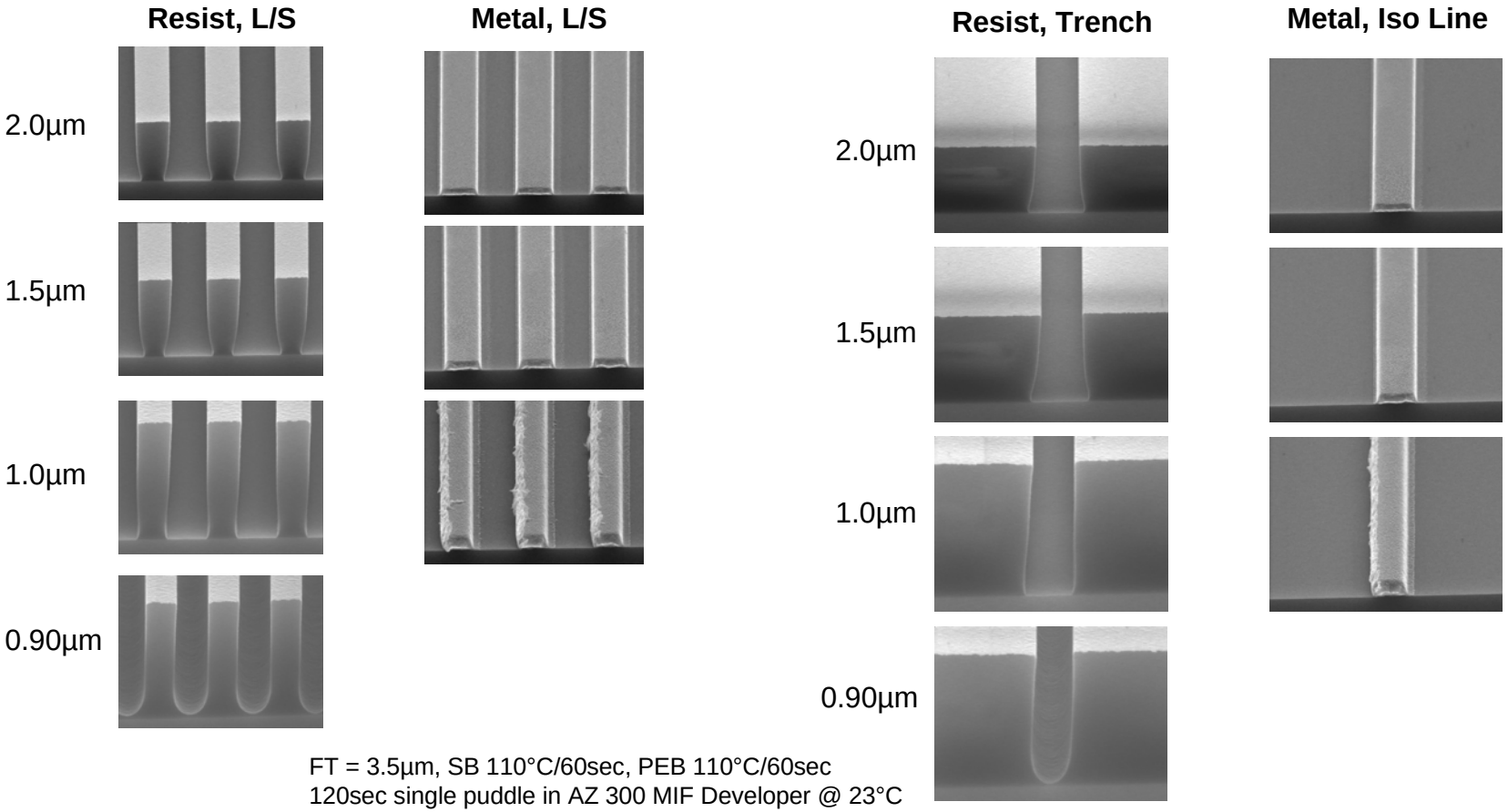


FT = 3.5µm, SB 110°C/ 60 sec
120 sec single puddle in AZ 300 MIF Developer @ 23°C
Nikon 0.54 NA I-line

AZ Electronic Materials

AZ nLOF 2035
Resolution @ 3.5 µm FT

DTP = 98 mJ/cm²



FT = 3.5µm, SB 110°C/60sec, PEB 110°C/60sec
120sec single puddle in AZ 300 MIF Developer @ 23°C
ASML 0.60 NA, 0.75 sigma

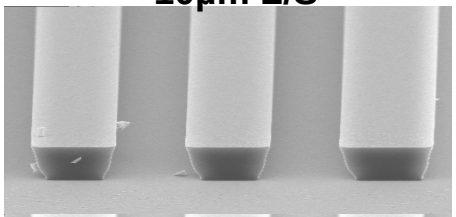
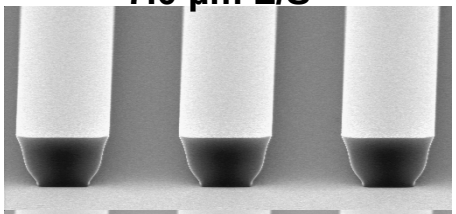
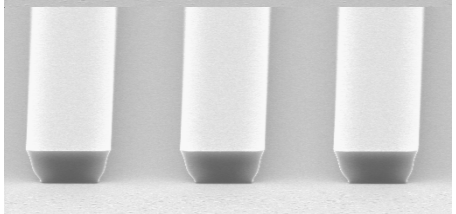
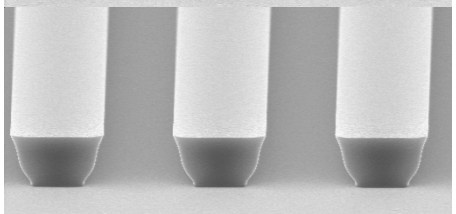
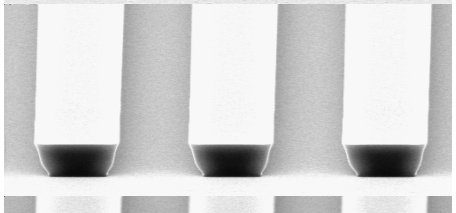
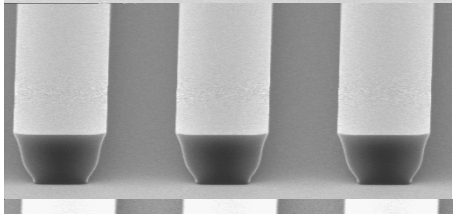
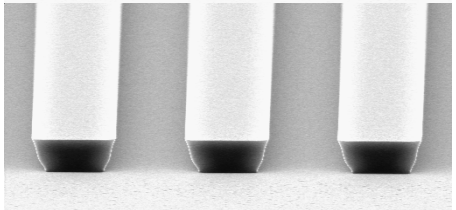
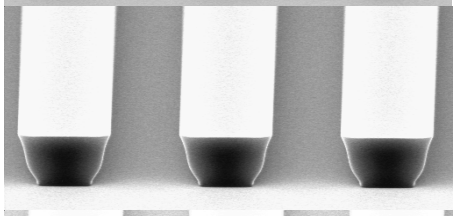
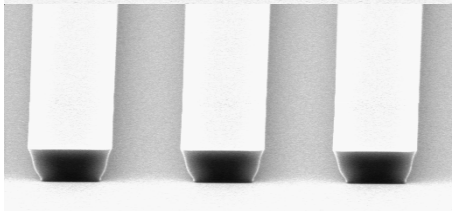
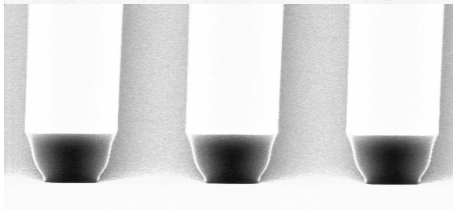
AZ Electronic Materials

AZ nLOF 2070
Baseline Process for 7.0 µm FT

Coated Thickness:	7.0 µm
Softbake:	110°C/ 90 sec - Contact mode
PEB:	110°C/ 90 sec - Contact mode
Exposure:	ASML i-line, 0.60 NA
Develope:	120 sec double-puddle in AZ 300 MIF Developer @ 23°C
Data:	On following page

AZ Electronic Materials

AZ nLOF 2070
Dense Line/Spaces @ 7.0 µm FT

	10µm L/S		7.0 µm L/S	
DTP=174mJ/cm^2		Top=10.80µm Bottom=7.72µm		Top=8.02µm Bottom=4.45µm
DTP=180mJ/cm^2		Top=10.90µm Bottom=7.73µm		Top=8.13µm Bottom=4.69µm
DTP=186mJ/cm^2		Top=11.37µm Bottom=8.20µm		Top=8.28µm Bottom=4.84µm
DTP=192mJ/cm^2		Top=11.25µm Bottom=8.44µm		Top=8.44µm Bottom=5.16µm
DTP=198mJ/cm^2		Top=11.25µm Bottom=8.20µm		Top=8.20µm Bottom=5.31µm

AZ Electronic Materials