AZ Electronic Materials

AZ 1500 Photoresist

Data Package

AZ 1500 Photoresist

AZ 1500 series positive photoresists are well established g-line and broad-band resists. Wide exposure latitude and good resolution and depth of focus improve yield and throughput. Various viscosity grades are available for a multitude of applications and dyed versions are engineered to control reflective notching. Resists of AZ's 1500 series can be developed in a variety of metal ion free developers (with and without surfactants) using a spray/puddle process.

For high throughput batch processing in a tank, inorganic developers are an excellent alternative.

AZ Electronic Materials

AZ 1500 Photoresist Products

AZ 1500 Photoresist

AZ 1505

AZ 1512

AZ 1518

AZ 1529

AZ 1500-SFD Photoresist

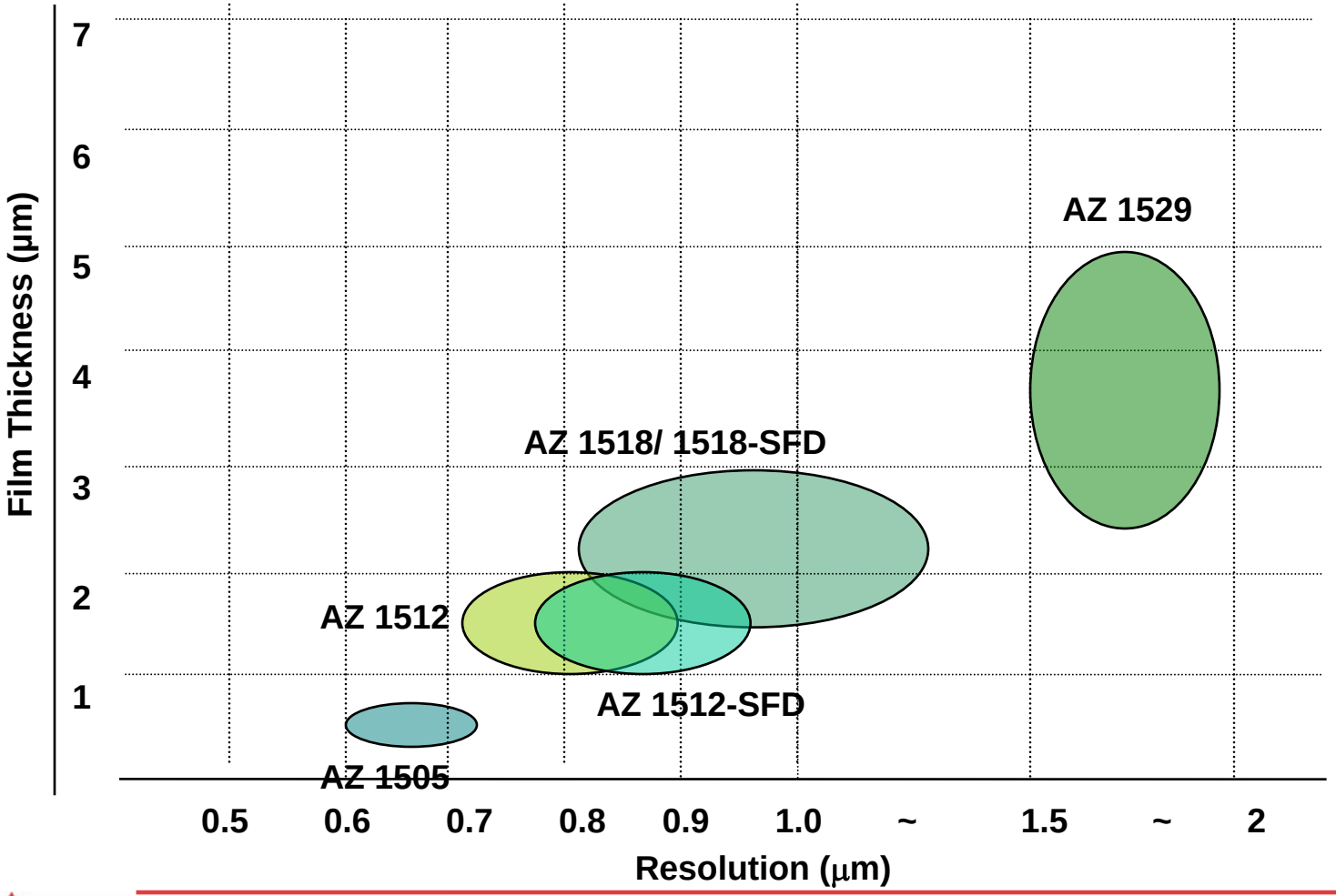
AZ 1512-SFD

AZ 1518-SFD

AZ Electronic Materials

AZ 1500 Photoresist

g-line Resolution at Specific Film Thickness



AZ Electronic Materials

AZ 1500 Photoresist

AZ 1505	Lift off process for patterning MR stripe
AZ 1512	Good process latitude in g-line, and broad band Excellent for wet etch processes
AZ 1518	Good process latitude in g-line, and broad band Excellent for wet etch processes Thicker film for increased etch resistance
AZ 1529	Great for pad layer applications Can be coated from 2.5 to 5µm Ideal for plating processes

AZ Electronic Materials

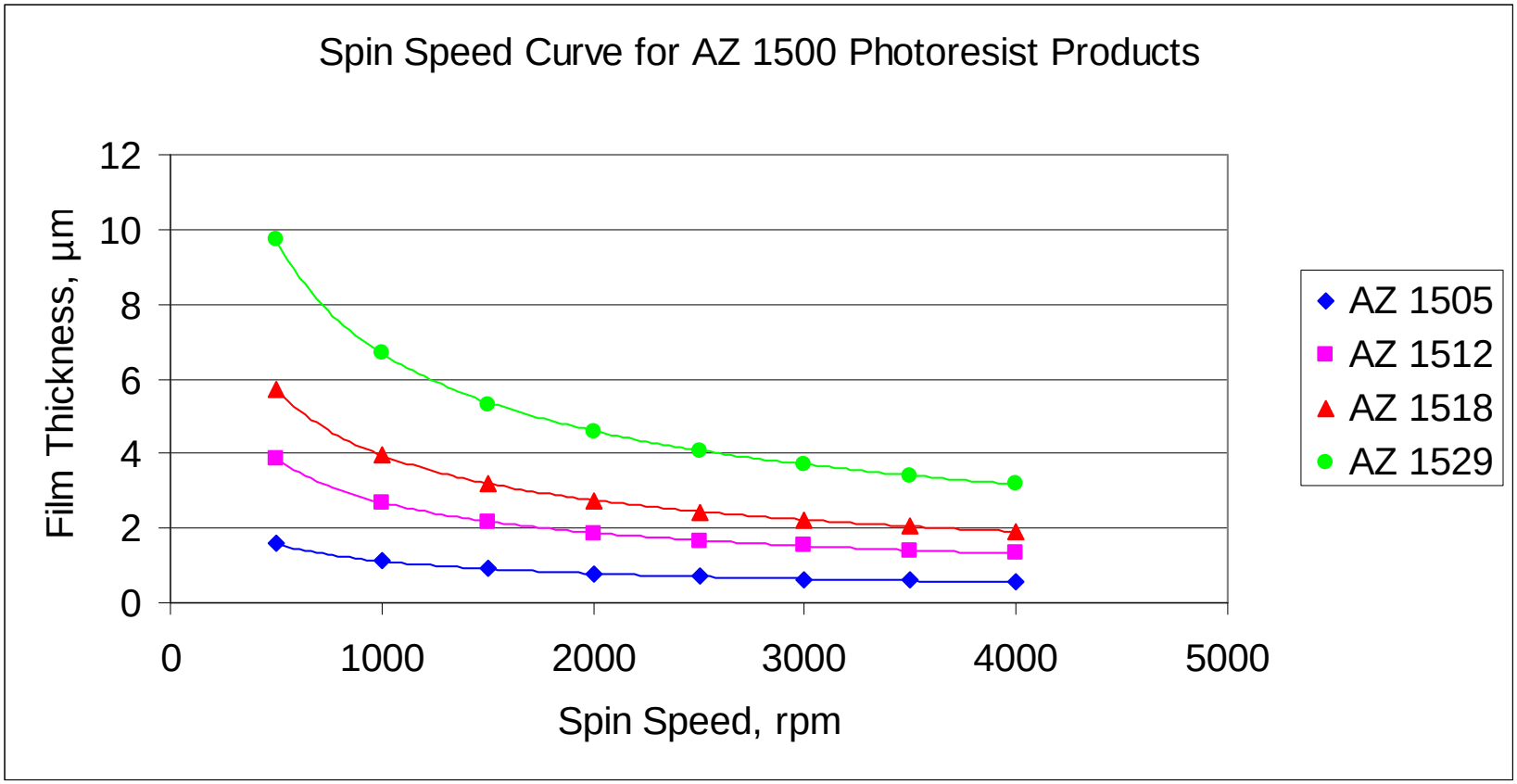
AZ 1500-SFD Photoresist	
AZ 1512-SFD	Dyed version Suppresses swing and reflective notching effects on substrates with high or varying reflectivity, e.g. metals and contacts
AZ 1518-SFD	Dyed version Higher film thickness, can be coated from 1.5 – 3µm Suppresses swing and reflective notching effects on substrates with high or varying reflectivity, e.g. metals and contacts

AZ Electronic Materials

AZ 1500 Photoresist
Recommended Process Conditions

Soft Bake:	90-100°C for 30-60sec (hotplate)
Exposure:	**g-line** or broadband
Post Exposure bake:	optional
Developer:	AZ 300MIF Developer AZ 917 MIF Developer AZ 1:1 Developer
Develop Cycle:	30-50sec spray@ 100-200rpm or 60-120sec immersion @
23±1°C	

AZ Electronic Materials



6” silicon wafers
Static dispense
SB: 100°C/60sec

AZ Electronic Materials

Summary
g-Line Performance

Parameter	1µm L/S	0.9µm L/S	1µm Trench
Depth of Focus	1.8µm	1.8µm	2.4µm
Exposure Latitude	20%	12%	12%
Dose to Print (DTP)	319mJ/cm²	339mJ/cm²	339mJ/cm²

Resolution	0.9µm	0.8µm

AZ Electronic Materials

AZ 1500 Photoresist
Optical Parameters

◊ **Refractive Index**

Bleached	365nm	405nm	435nm
n	1.6994	1.6714	1.6571
k	0.0058	0.0010	0.0003
Unbleached			
n	1.7123	1.6906	1.6948
k	0.0358	0.0336	0.0227

AZ 1500 Photoresist
Optical Parameters

◊ Dill Parameters

i-line:	g-line:
A = 1.0133 (µm-1)	A= NA
B = 0.2177 (µm-1)	B= NA
C = 0.0239 (cm^2/mJ)	C= NA

◊ Cauchy Coefficients

	A	B	C
Bleached	1.5966	0.003758	2.45E-03
Unbleached	1.5996	0.013498	1.90E-04

AZ Electronic Materials

AZ 1500-SFD Photoresist
Optical Parameters

◊ **Refractive Index**

Bleached	365nm	405nm	435nm
n	1.6947	1.6665	1.6503
k	0.0058	0.0021	0.0047
Unbleached			
n	1.7057	1.6822	1.6846
k	0.0337	0.0327	0.0257

AZ Electronic Materials

AZ 1500-SFD Photoresist
Optical Parameters

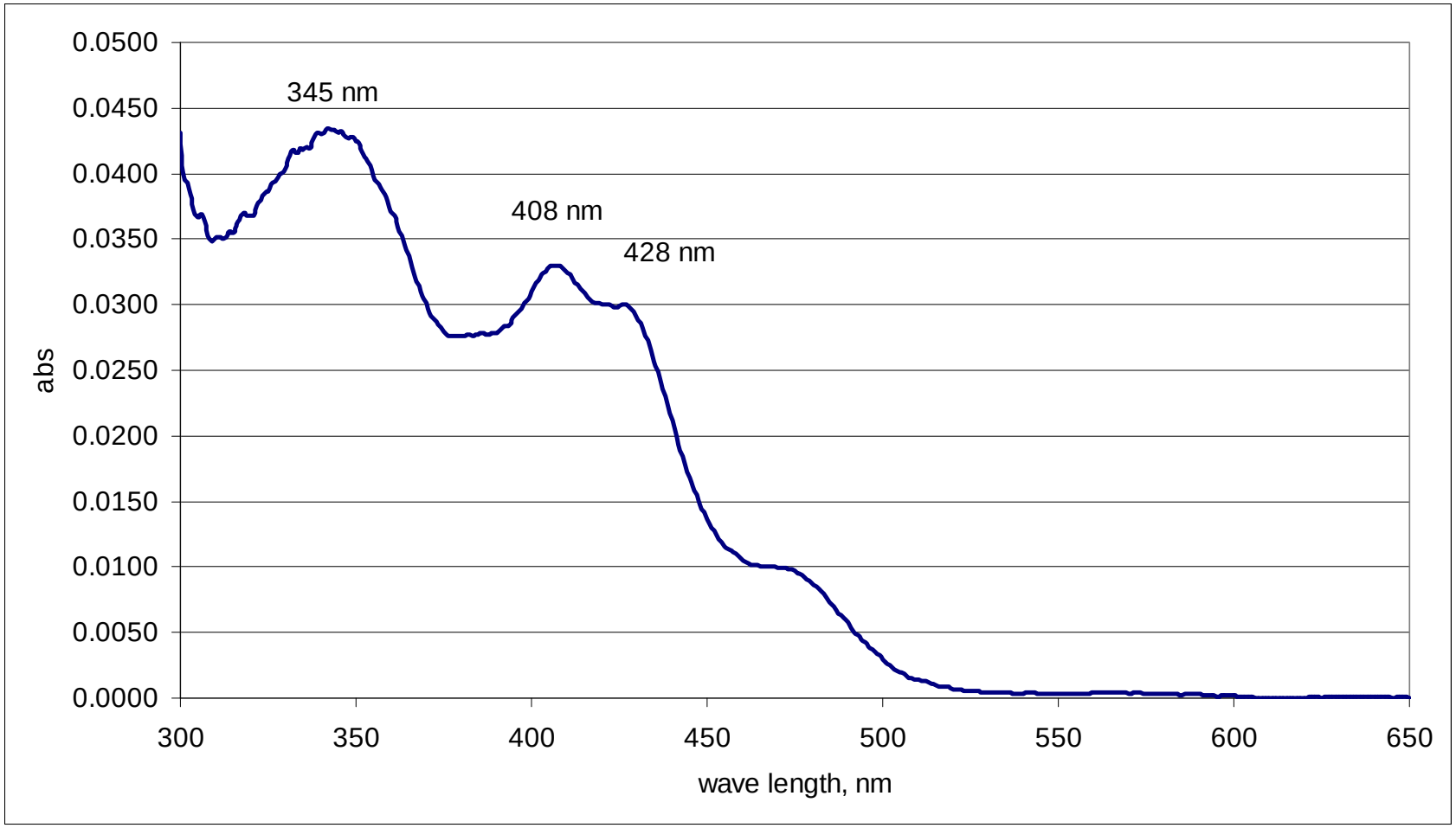
◊ Dill Parameters

i-line:	g-line:
A = 0.9765 (µm-1)	A= 0.48 (µm-1)
B = 0.2037 (µm-1)	B= 0.265 (µm-1)
C = 0.0254 (cm^2/mJ)	C= 0.0223 (cm^2/mJ)

◊ Cauchy Coefficients

	A	B	C
Bleached	1.5933	0.007923	1.39E-03
Unbleached	1.6028	0.002763	5.21E-03

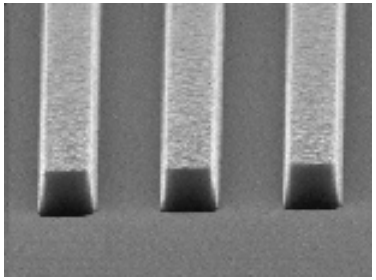
AZ 1500-SFD Photoresist
Optical Parameters - Absorptivity



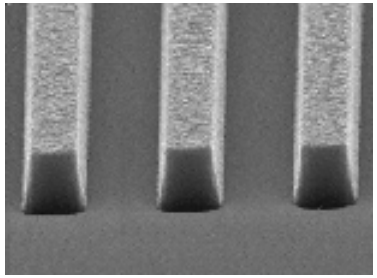
AZ Electronic Materials

AZ 1512 Photoresist

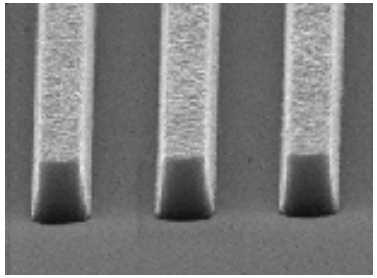
Resolution for Dense Lines, FT = 1.21 µm



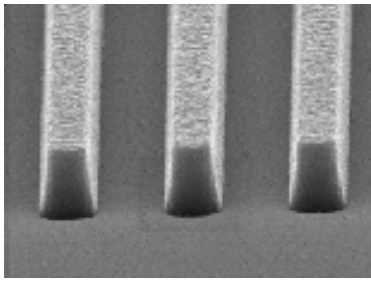
1.5µm



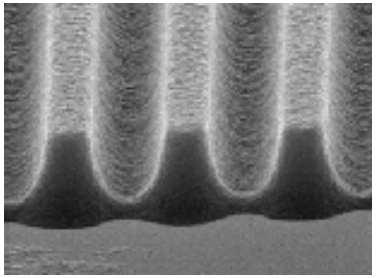
1.2µm



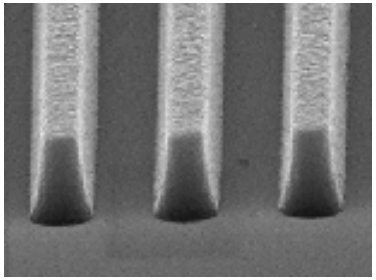
1.1µm



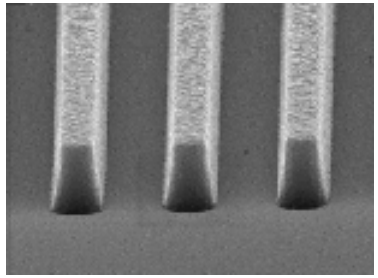
1.0µm



0.75µm



0.8µm



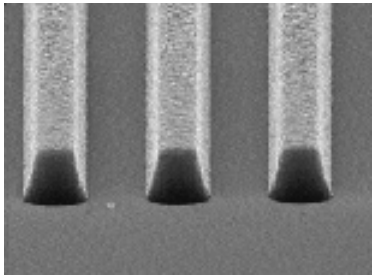
0.9µm

Focus –0.4µm
SB: 95°/ 50sec; PEB 105°C/50 sec
GCA 0.**42NA g-line** stepper, **70 mJ/cm²**
AZ 327 MIF developer, 40 sec spray/puddle @ 21°C

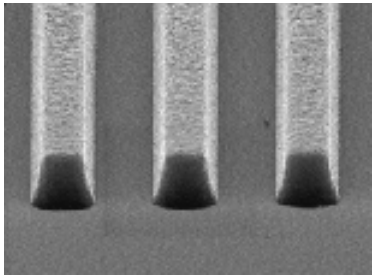
AZ Electronic Materials

AZ 1512 Photoresist

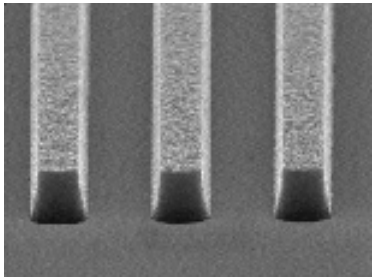
DOF for 1.3 µm Dense Lines, FT = 1.21 µm



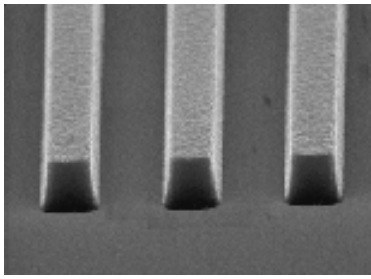
1.6µm



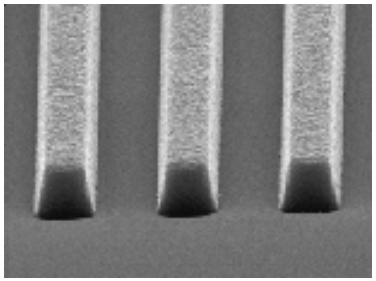
1.2µm



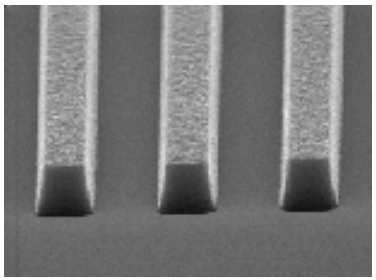
0.0µm



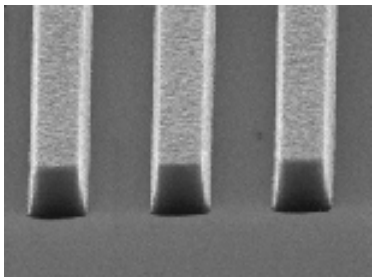
-0.4µm



-2.0µm



-1.6µm



-1.2µm

SB: 95°/ 50sec; PEB 105°C/50 sec
GCA 0.42NA **g-line** stepper, **70 mJ/cm²**
AZ 327 MIF developer, 40 sec spray/puddle @ 21°C

AZ Electronic Materials

AZ 1518-SFD Photoresist

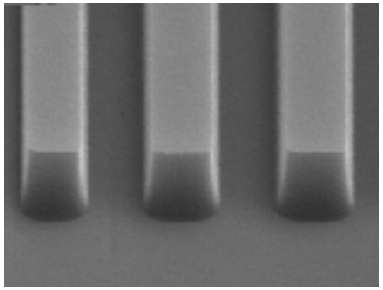
g-line Performance

AZ 425 MIF and 917 MIF Developer

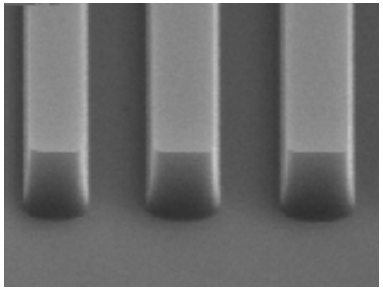
AZ Electronic Materials

AZ 1518-SFD Photoresist

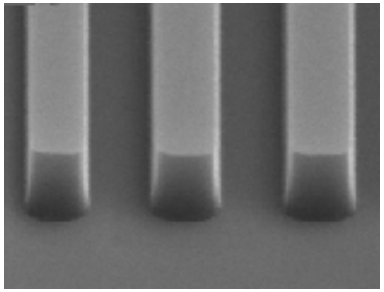
Exposure Latitude for Dense Lines, FT = 2.22 µm



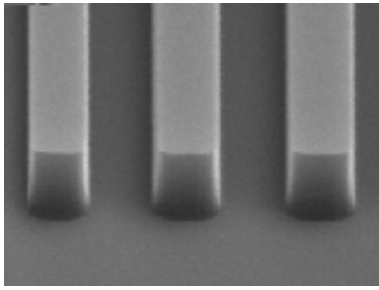
245mJ/cm²



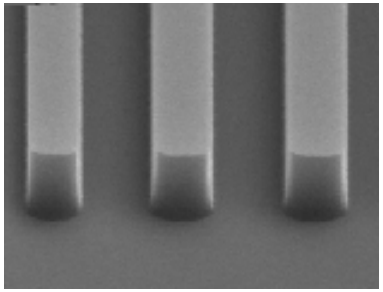
259mJ/cm²



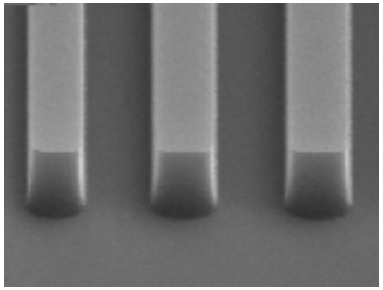
274mJ/cm²



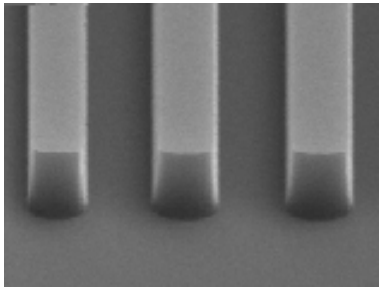
289mJ/cm²



334mJ/cm²



319mJ/cm²



304mJ/cm²

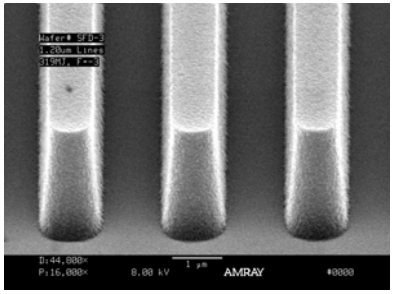
SB: 100°/ 60sec; PEB 110°C/60 sec
GCA 0.42NA **g-line** stepper
AZ 425 MIF developer

AZ Electronic Materials

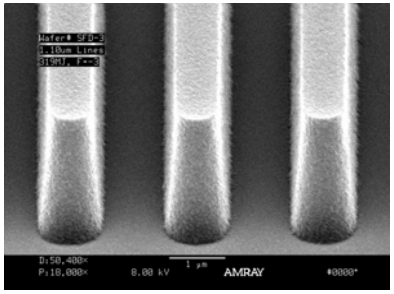
AZ 1518-SFD Photoresist

Linearity/Resolution - Dense Lines, FT = 2.32µm

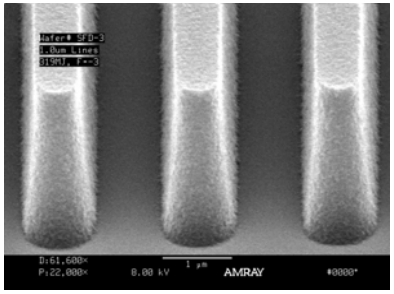
1.20 µm



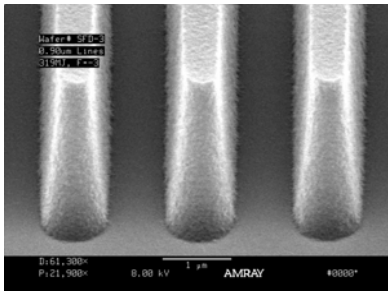
1.10 µm

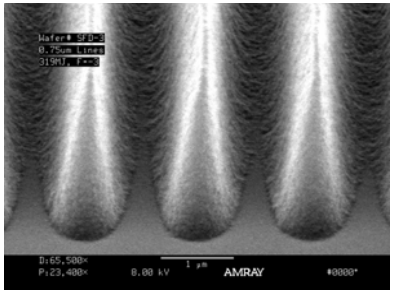


1.00 µm

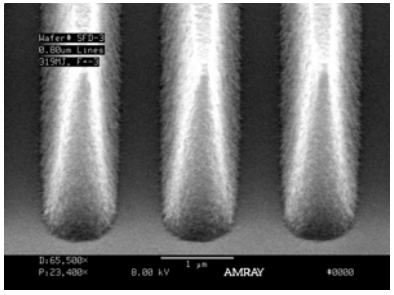


0.90 µm

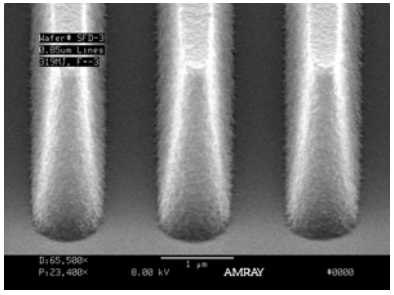




0.75 µm



0.80 µm



0.85 µm

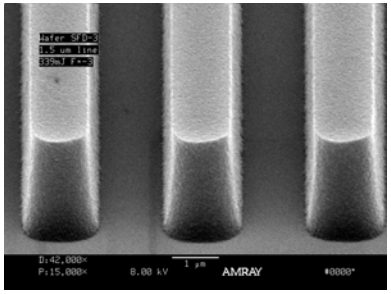
SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper, **319 mJ/cm²**
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer**./ Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

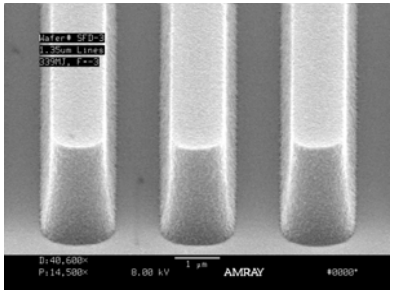
AZ 1518-SFD Photoresist

Linearity - Dense Lines, FT = 2.32 µm

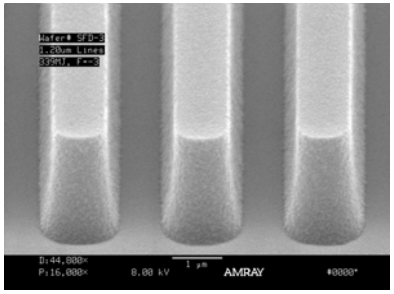
1.50 µm



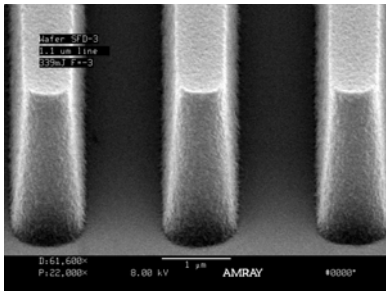
1.35 µm

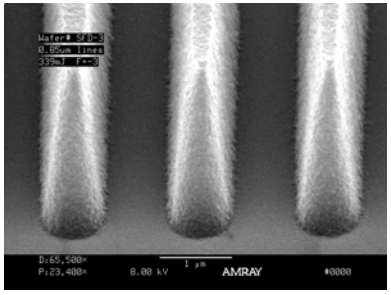


1.20 µm

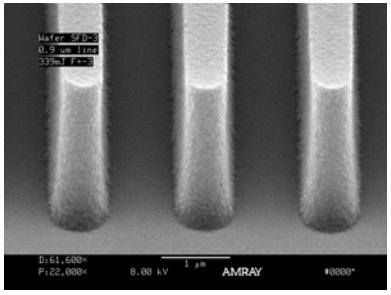


1.10 µm

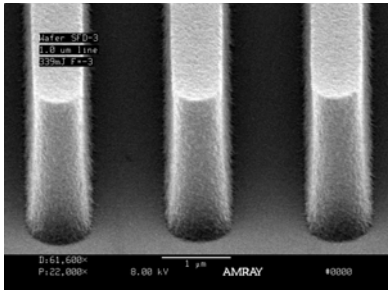




0.85 µm



0.90 µm



1.00 µm

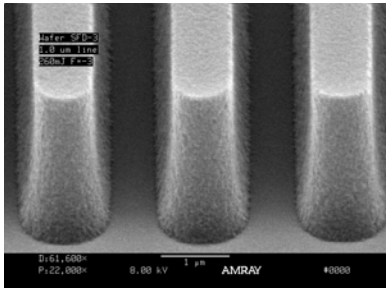
SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper, **339 mJ/cm²**
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer**/ Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

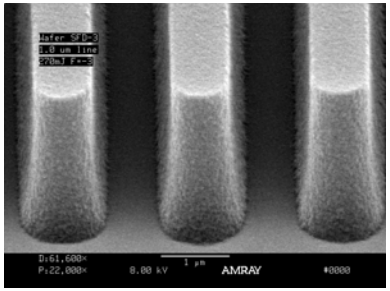
AZ 1518-SFD Photoresist

Exposure Latitude – 1.0 µm Dense Lines, FT = 2.32µm

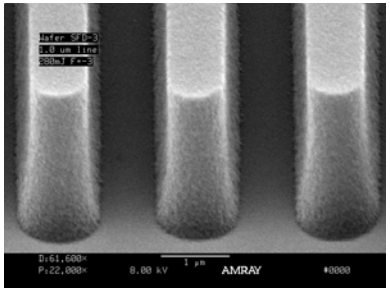
260 mJ/cm²



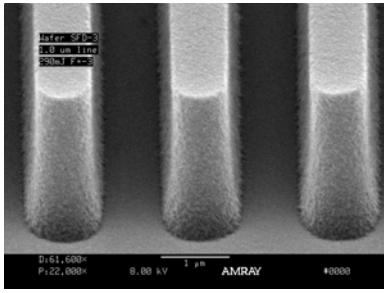
270 mJ/cm²



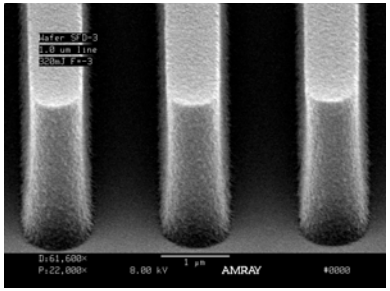
280 mJ/cm²



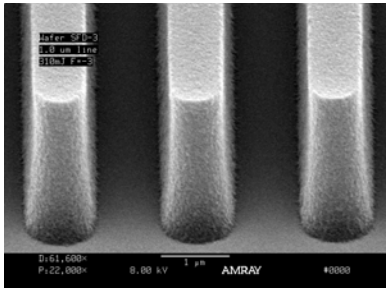
290 mJ/cm²



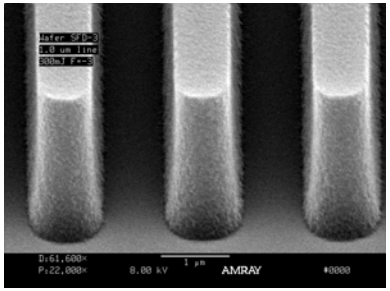
319 mJ/cm²



310 mJ/cm²



300 mJ/cm²



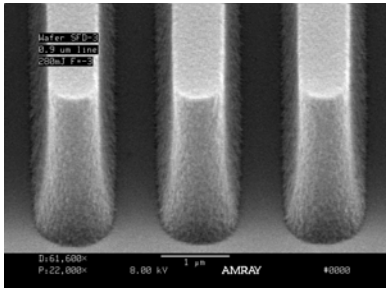
SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer**./ Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

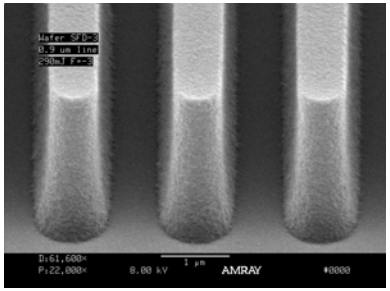
AZ 1518-SFD Photoresist

Exposure Latitude - 0.9 µm Dense Lines, FT = 2.32µm

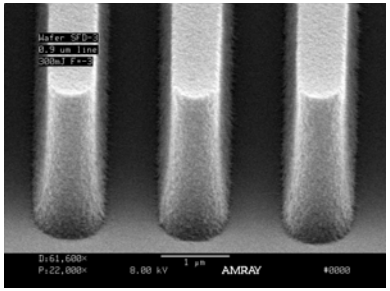
280 mJ/cm²



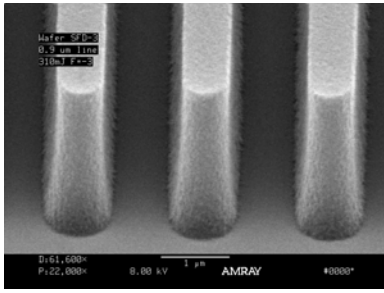
290 mJ/cm²



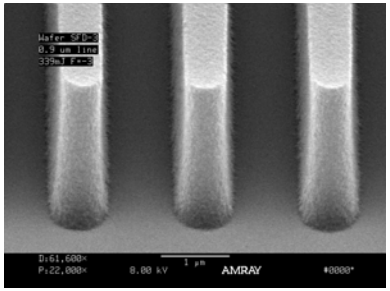
300 mJ/cm²



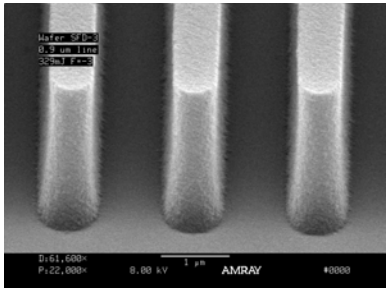
310 mJ/cm²



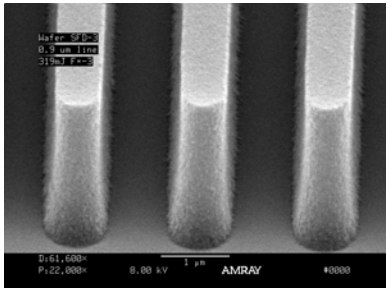
339 mJ/cm²



329 mJ/cm²



319 mJ/cm²



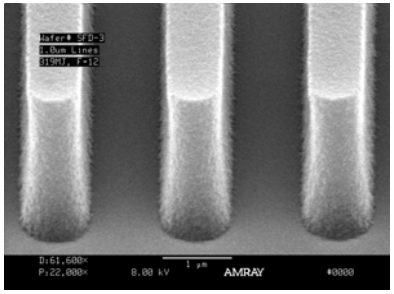
SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer/** Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

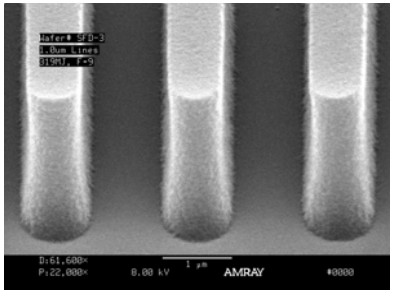
AZ 1518-SFD Photoresist

DOF for 1.0 µm Dense Lines, FT = 2.32µm

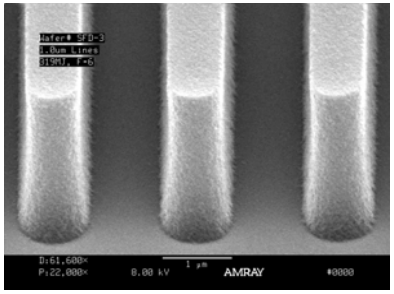
1.20 µm



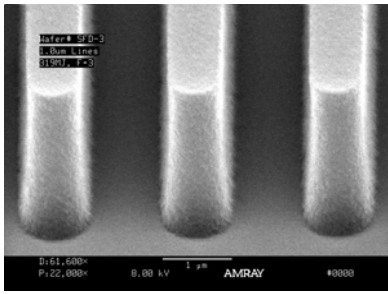
0.90 µm



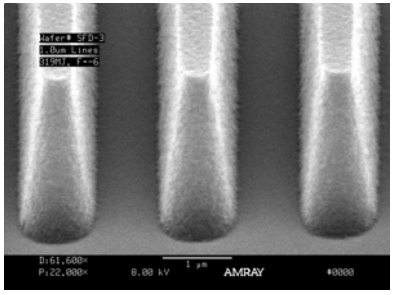
0.60 µm



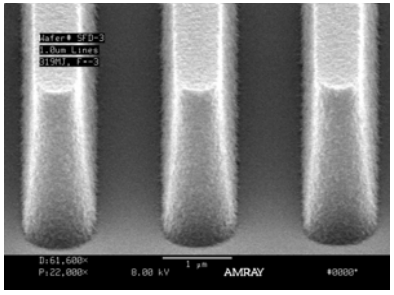
0.30 µm



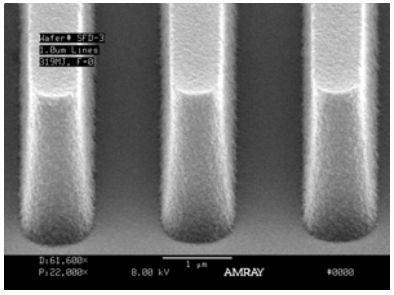
-0.60 µm



-0.30 µm



0.00 µm



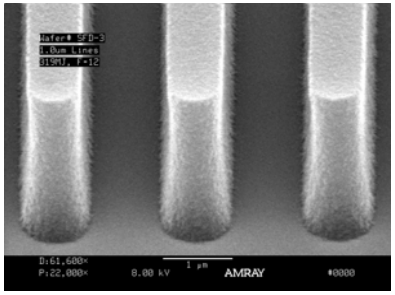
SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper, **319 mJ/cm²**
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer**/ Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

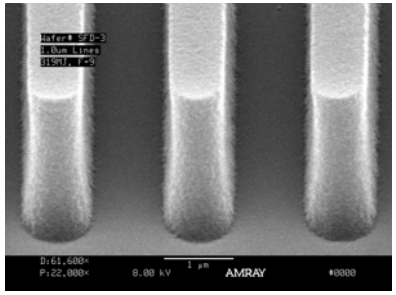
AZ 1518-SFD Photoresist

DOF for 1.0 µm Dense Lines, FT = 2.32 µm

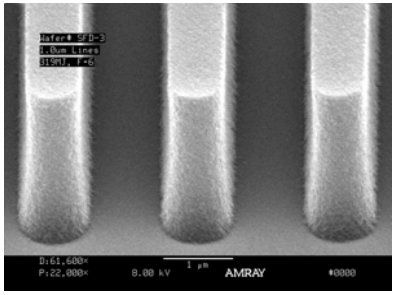
1.20 µm



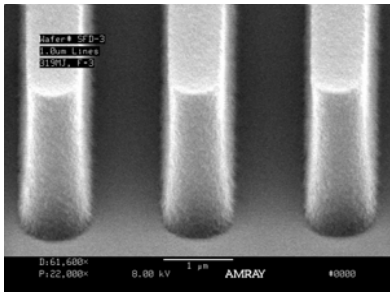
0.90 µm



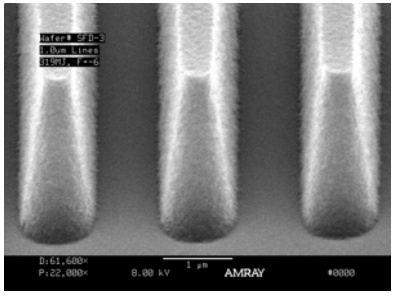
0.60 µm



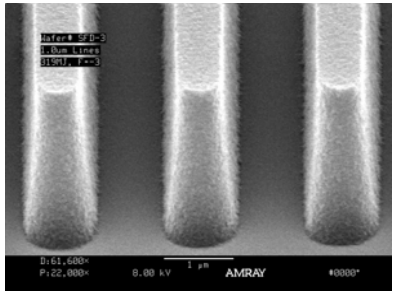
0.30 µm



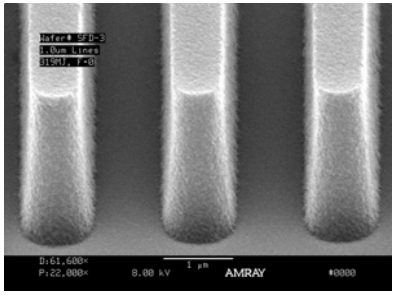
-0.60 µm



-0.30 µm



0.00 µm



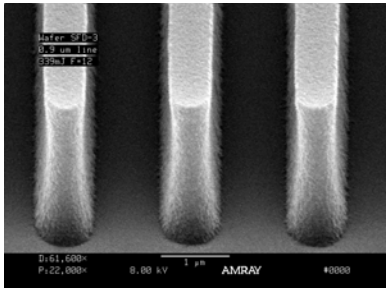
SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper, **319 mJ/cm²**
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer**/ Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

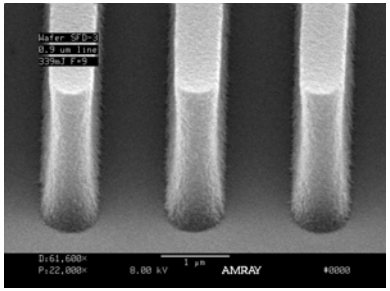
AZ 1518-SFD Photoresist

DOF for 0.9 µm Dense Lines, FT = 2.32µm

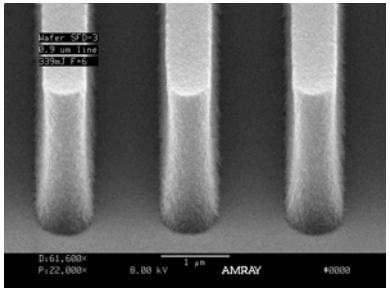
1.20 µm



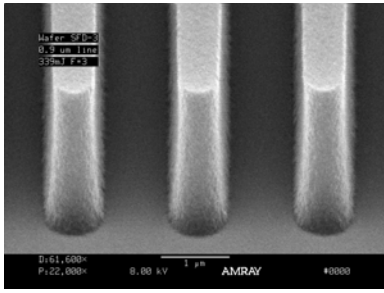
0.90 µm



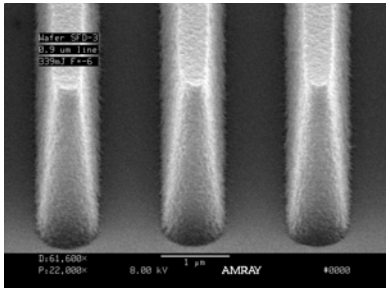
0.60 µm



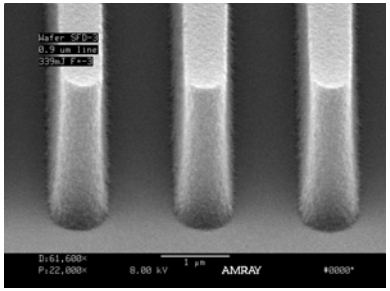
0.30 µm



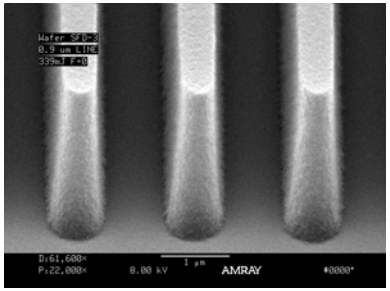
-0.60 µm



-0.30 µm



0.00 µm



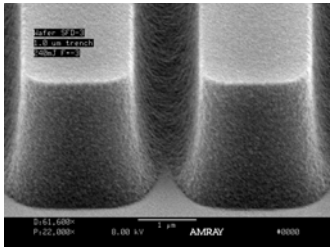
SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper, **339 mJ/cm²**
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer**/ Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

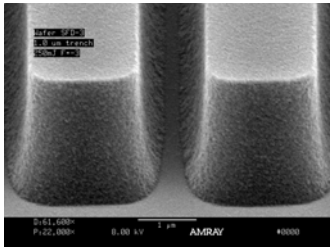
AZ 1518-SFD Photoresist

Exp.Latitude – 1.0 µm Trench – Pitch 1:2, FT = 2.32µm

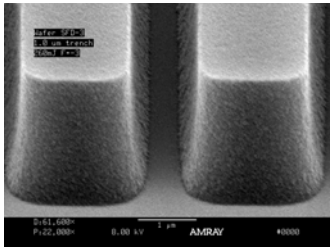
240 mJ/cm²



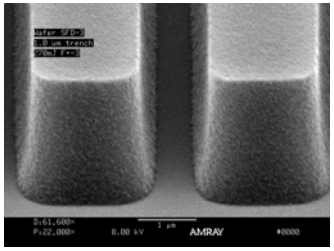
250 mJ/cm²



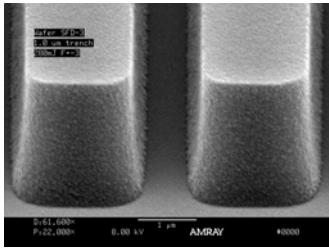
260 mJ/cm²



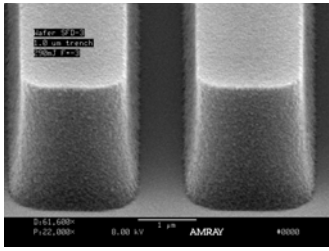
270 mJ/cm²



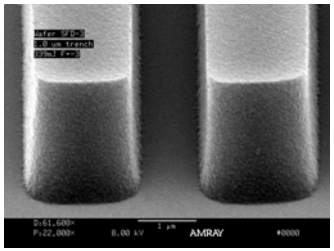
280 mJ/cm²



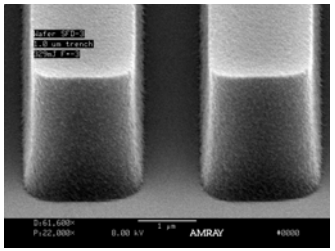
290 mJ/cm²



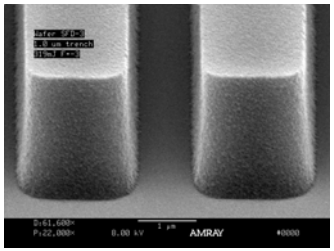
339 mJ/cm²



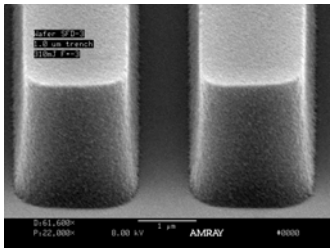
329 mJ/cm²



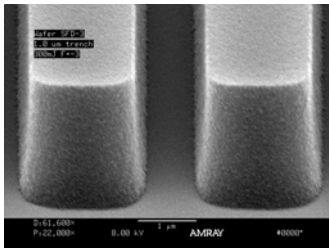
319 mJ/cm²



310 mJ/cm²



300 mJ/cm²

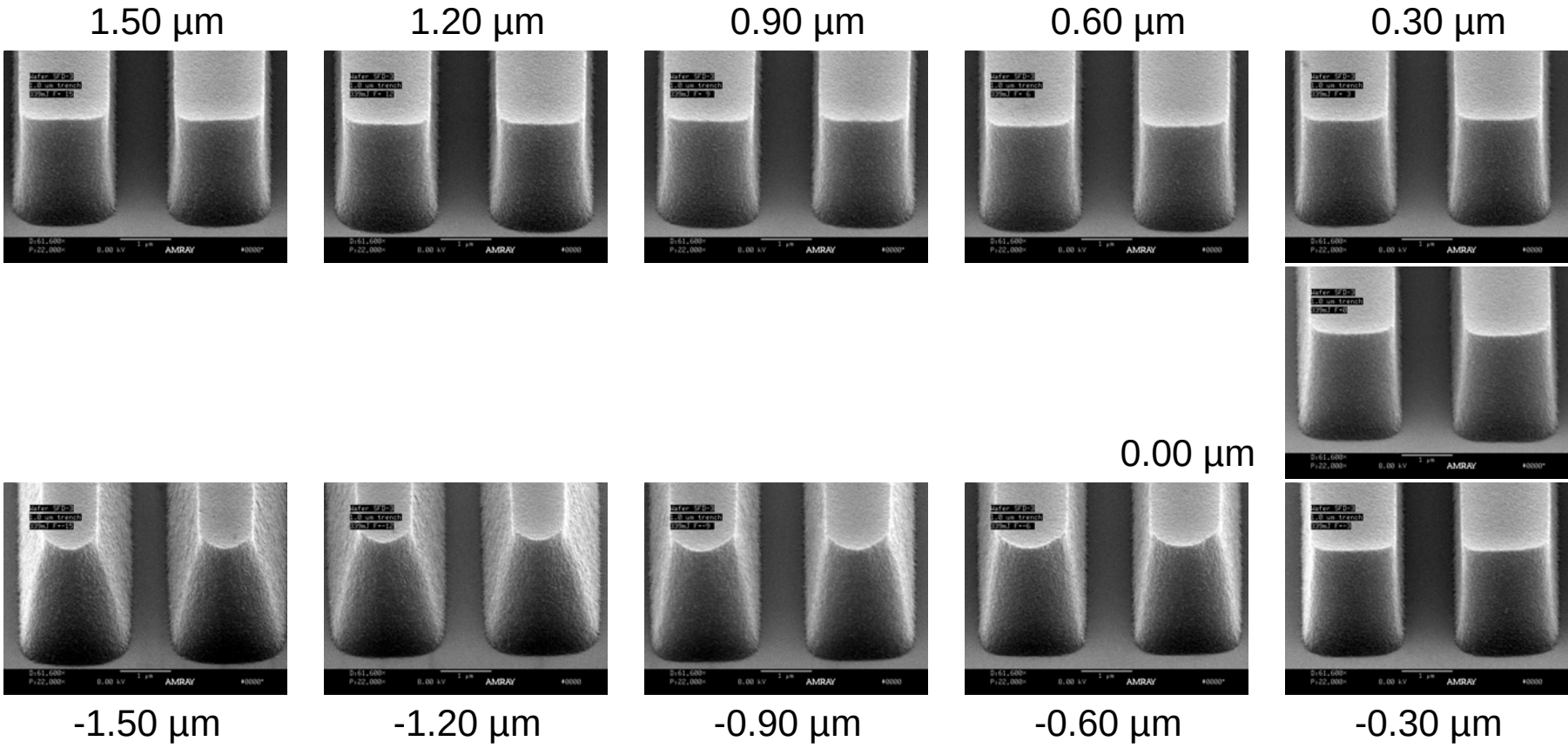


SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer**/ Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

AZ 1518-SFD Photoresist

DOF for 1.0 µm Trench – Pitch 1:2, FT = 2.32µm



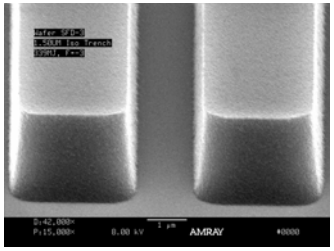
SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper, **339 mJ/cm²**
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer**/ Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

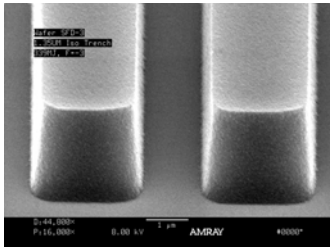
AZ 1518-SFD Photoresist

Linearity - Pitch 1:2, FT = 2.32µm

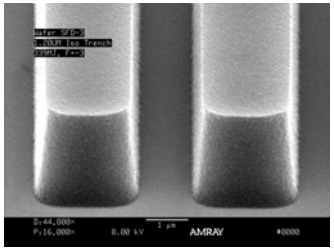
1.50 µm



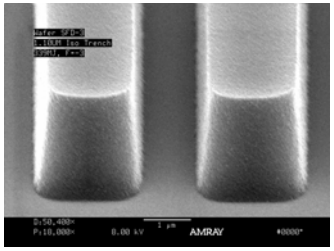
1.35 µm



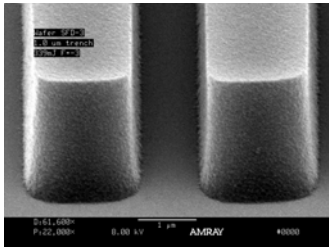
1.20 µm



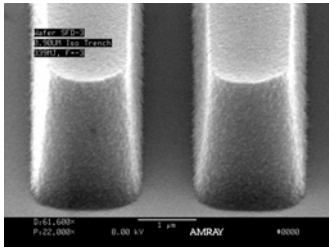
1.10 µm

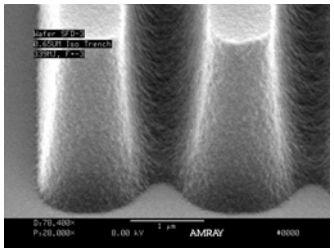


1.00 µm

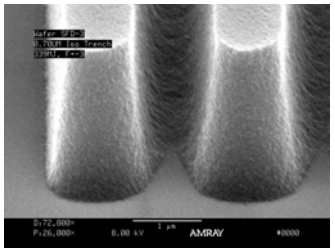


0.90 µm

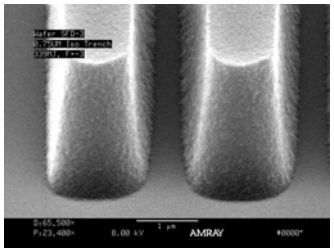




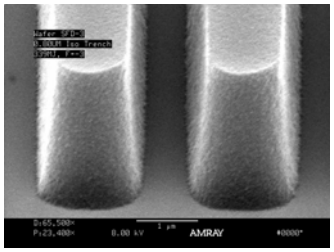
0.65 µm



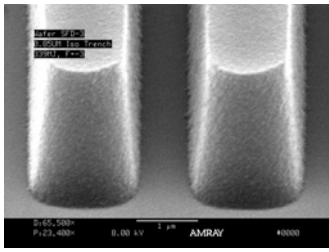
0.70 µm



0.75 µm



0.80 µm

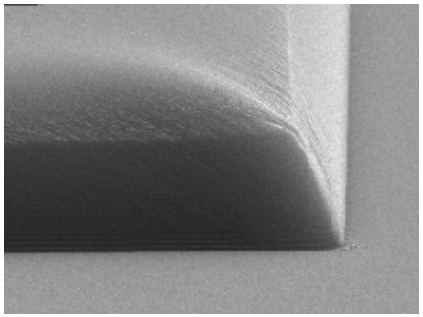


0.85 µm

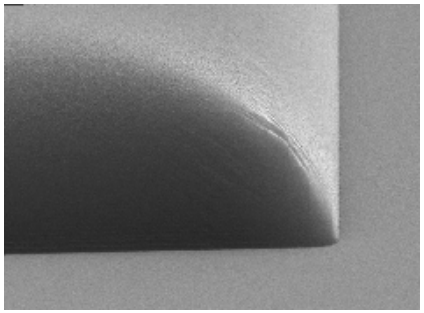
SB : 95°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper, **339 mJ/cm²**
PEB : 115°C for 60sec contact
Develop: **AZ 917 MIF Developer**/ Single puddle for 60 sec @ 21.0°C

AZ Electronic Materials

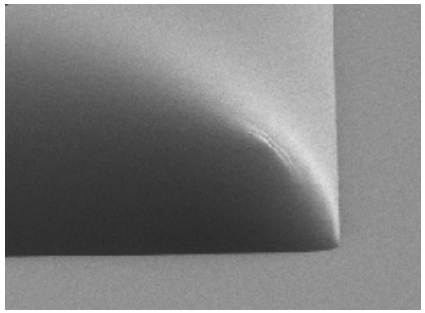
AZ 1529 Photoresist
Thermal Stability - Large Pads



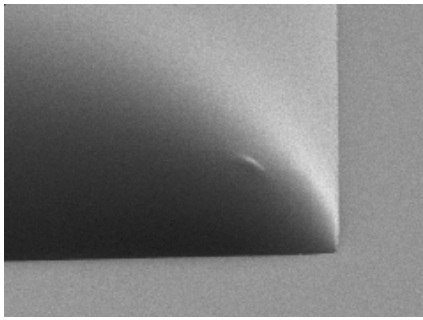
105°C



110°C



115°C



120°C

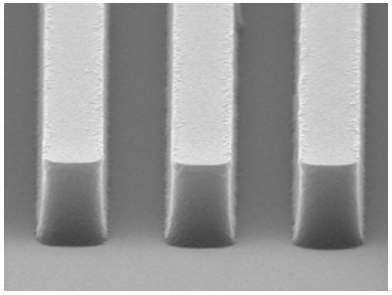
Film Thickness: 3.5µm
SB : 95°C for 25min convection oven
Exposure : Ultratech 1500 stepper
Develop: **AZ Developer** (diluted to 0.21N)
Hardbake: 2min hot plate

AZ Electronic Materials

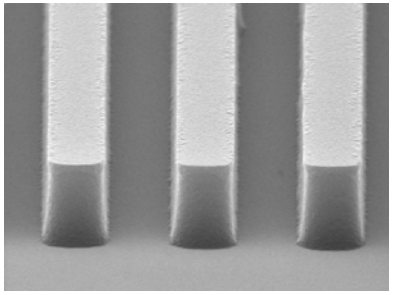
AZ 1518-SFD Photoresist

Exp. Latitude for 1.30 µm Dense Lines, FT = 1.825 µm

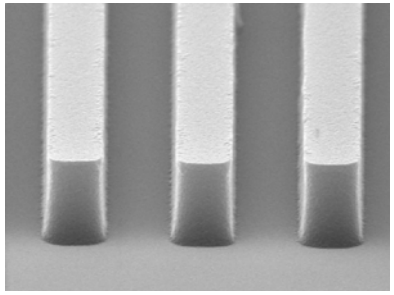
155 mJ/cm²



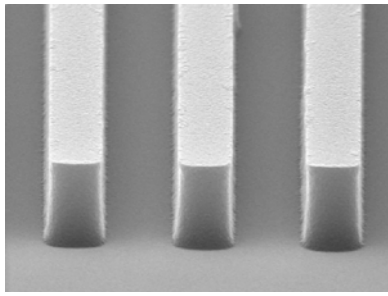
170 mJ/cm²

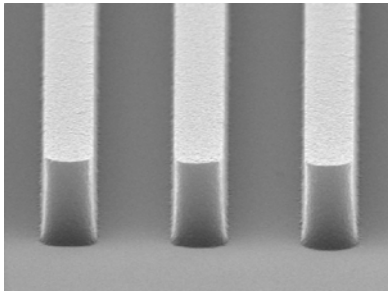


185 mJ/cm²

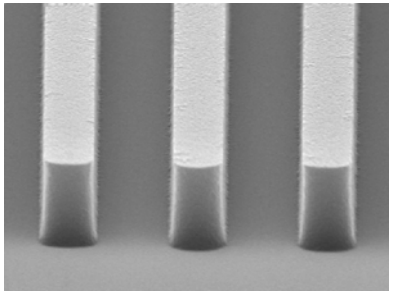


200mJ/cm²

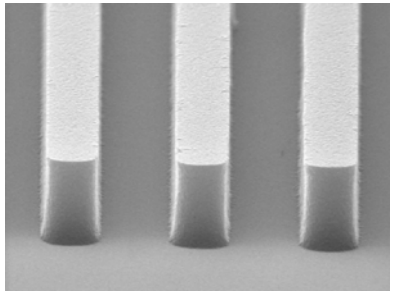




245mJ/cm²



230mJ/cm²



215 mJ/cm²

SB : 100°C for 60sec contact
Exposure : GCA 0.42 NA **g-line** stepper
PEB : 110°C for 60sec contact
Develop: **AZ 917 MIF Developer**/ Single puddle for 60 sec @ 21°C

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