AZ 5200-E Photoresist

Data Package

AZ 5200-E Photoresist

Original i-line resists

Various viscosity grades
for a multitude of applications.

Sensitive in i-line and g-line

Can be developed
in a variety of metal ion free
and inorganic developers
(with and without surfactants)

High thermal stability.

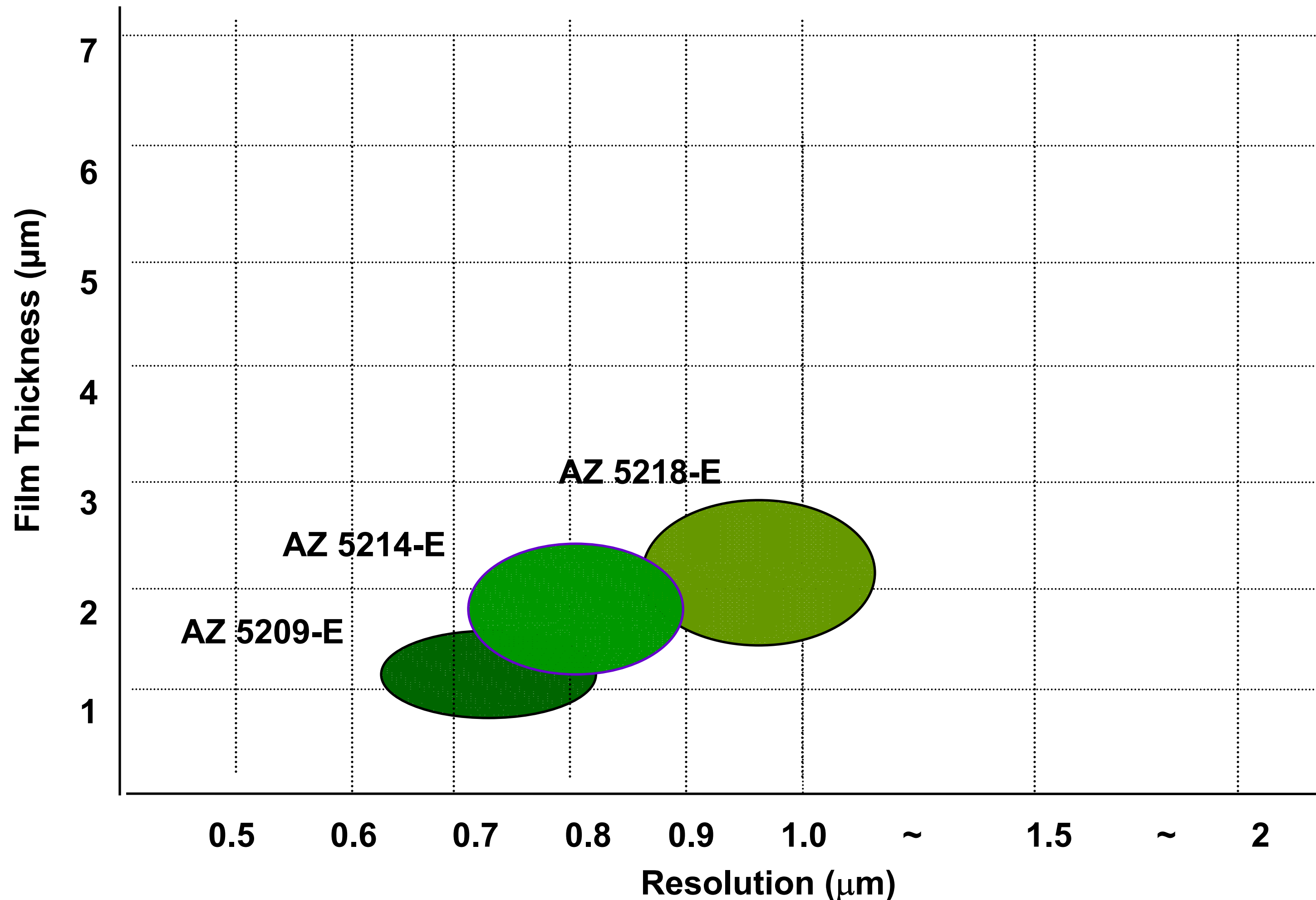
Can be used in a positive mode
and with a special
image reversal process.

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5200-E Photoresist

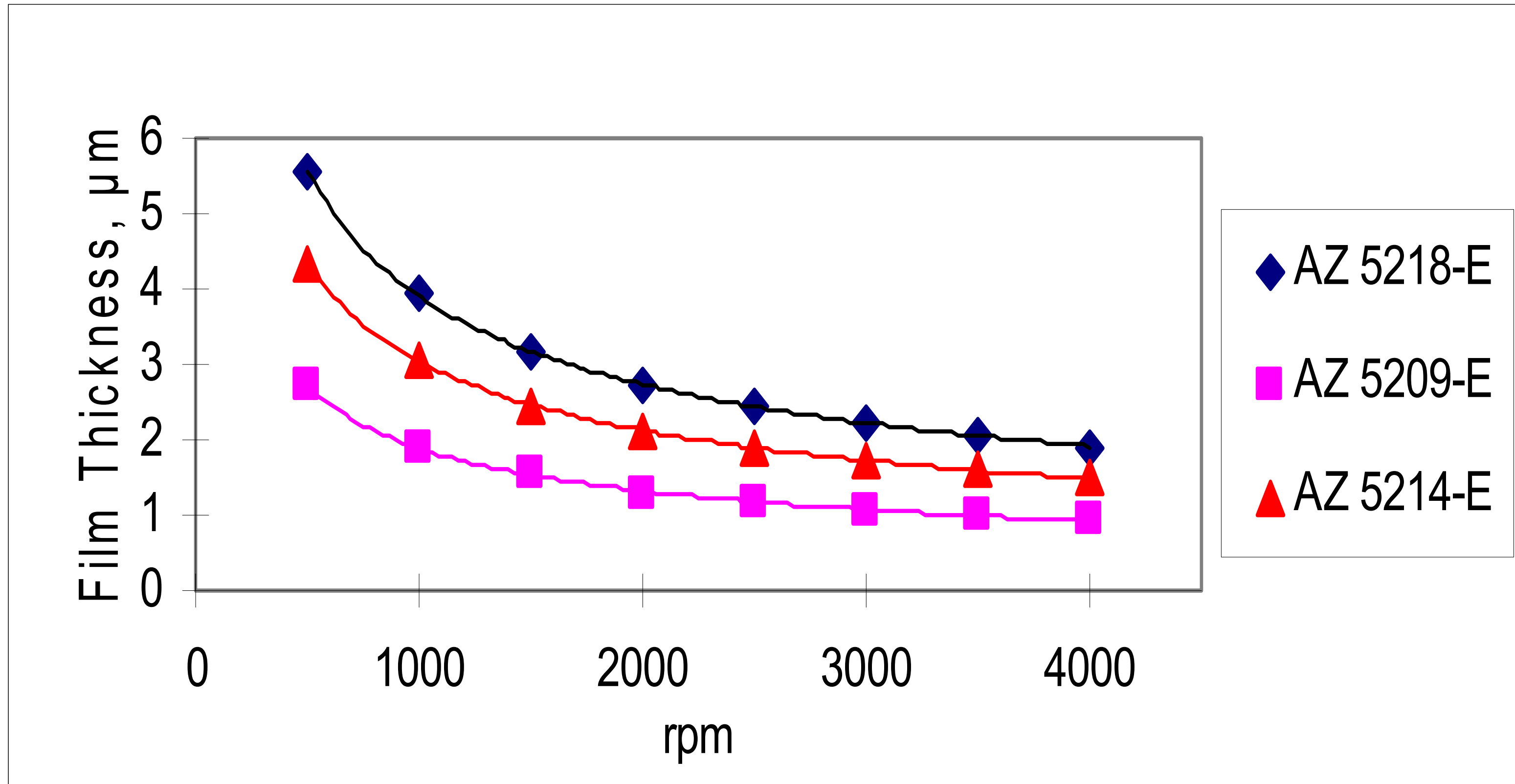
i-line Resolution at Specific Film Thickness



AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

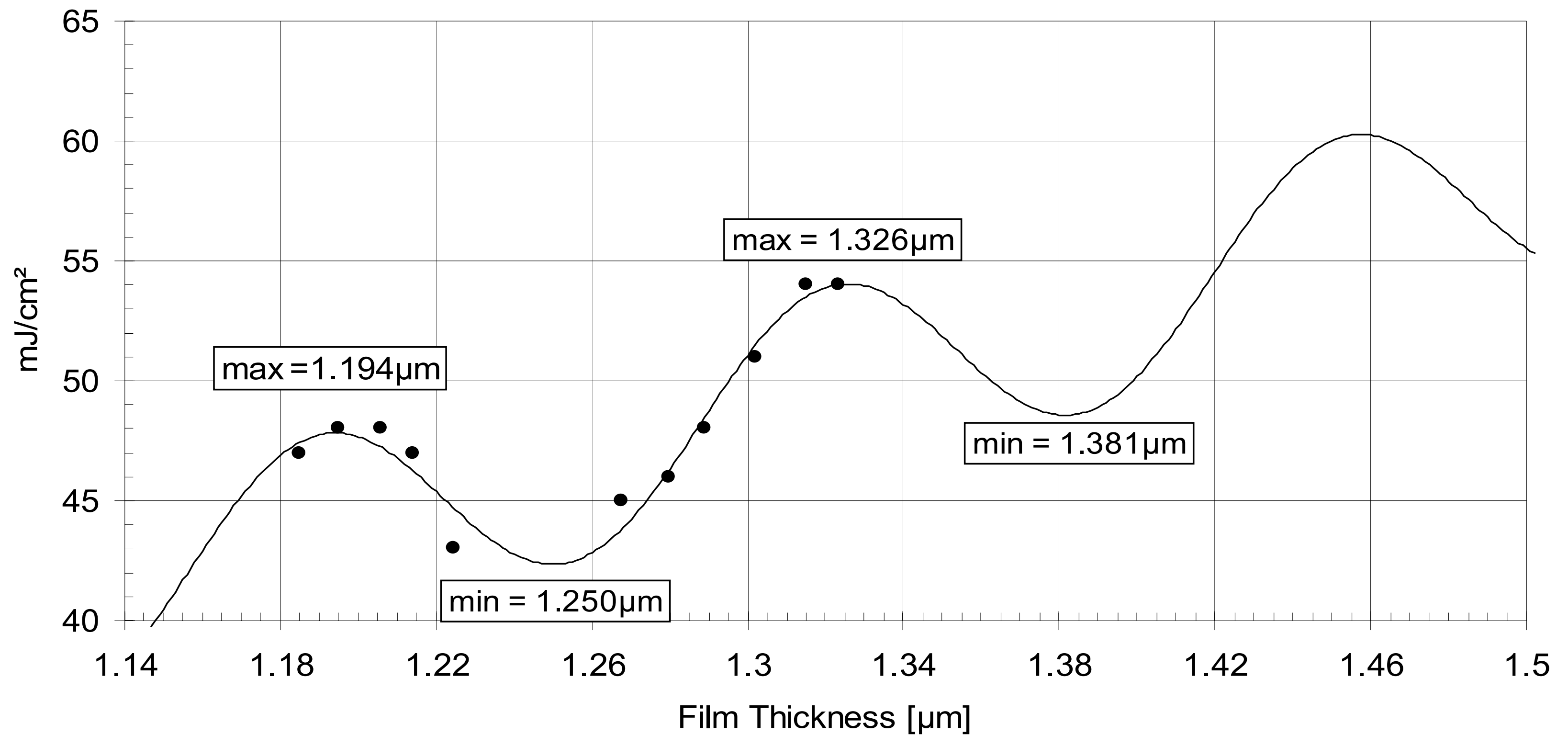
AZ 5200-E Photoresist
Spin Speed Curves



AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5200-E Photoresist



AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5200-E Photoresist
Optical Parameters

◊ Refractive Index

Bleached	365nm	405nm	435nm
n	1.6904	1.6667	1.6534
k	0.0012	0.0005	0.0004

Unbleached	365nm	405nm	435nm
n	1.6990	1.6888	1.6758
k	0.0175	0.0179	0.0040

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5200-E Photoresist
Optical Parameters

- **Dill Parameters**

i-line:	g-line:
A = 0.6181 (μm^{-1})	A= NA
B = 0.0314 (μm^{-1})	B= NA
C = 0.0284 (cm^2/mJ)	C= NA

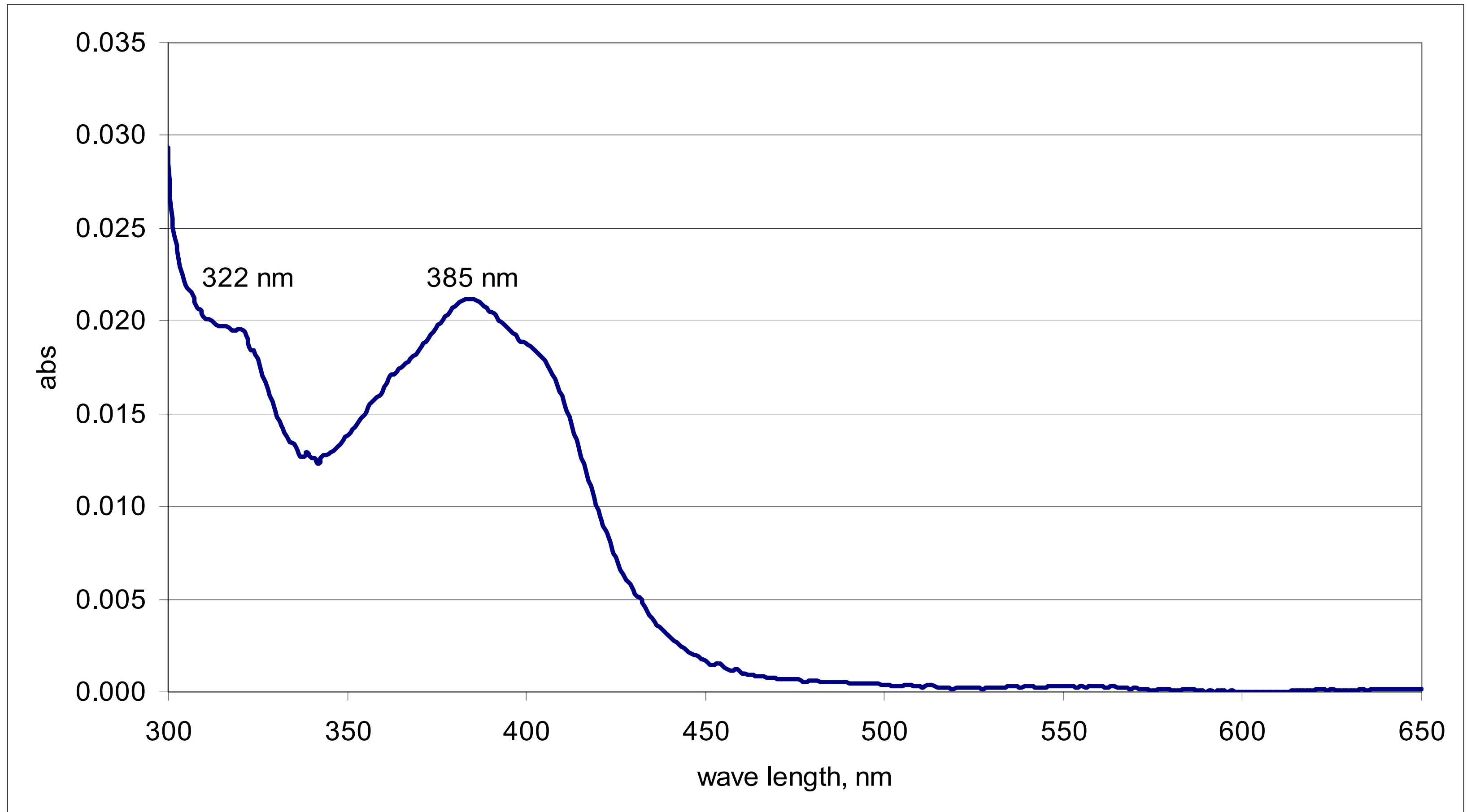
- **Cauchy Coefficients**

	A	B	C
Bleached	1.5908	$0.011525 \mu m^2$	$6.70E\text{-}07 \mu m^4$
Unbleached	1.6035	$0.005574 \mu m^2$	$2.34E\text{-}03 \mu m^4$

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5200-E Photoresist
Optical Parameters - Absorptivity



AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5200-E Photoresist

Image Reversal Process

Process step	Effect
1. Prepare wafers (e.g. HMDS prime)	Improved Adhesion
2. Spin coat 0.6-2.6µm	
3. Soft bake 90-100°C/ 45-60sec hot plate	Oven bake 90°C/ 30min
4. Expose (g-line, i-line, broad band)	Under-exposure gives lift off profile
5.PEB 110-120°C/ 45 sec or two step	Inducing cross linking
6. Flood exposure (365-405nm/ 1-2J/cm²)	Solubilization of previously unexposed resist
7. Develop (MIF or IN developers)	Optimum resolution and Line-width control with more dilute developers

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

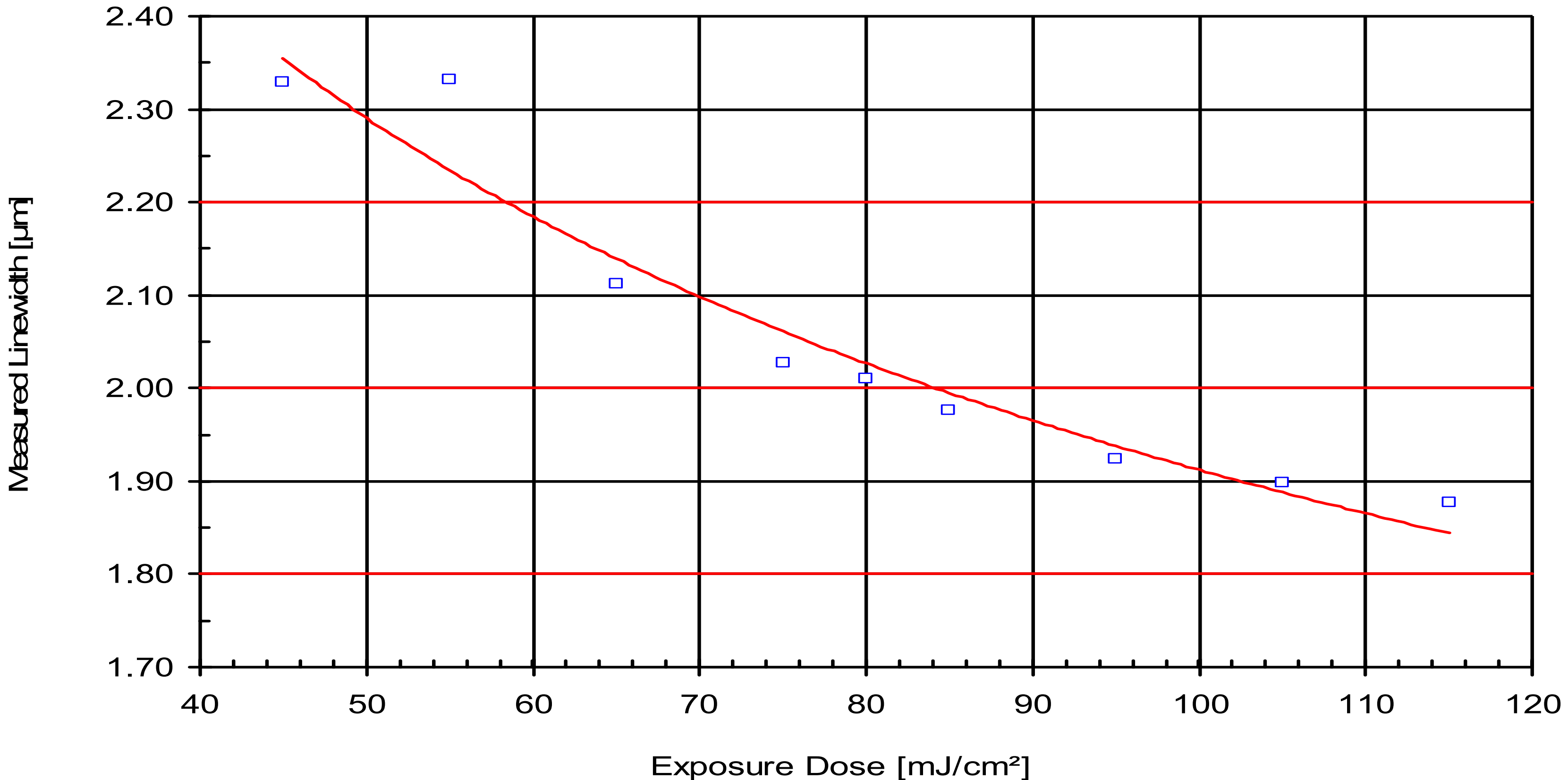
AZ 5214E Photoresist
Process Conditions

Dense Lines
FT: 1.25µm
SB: 100°C/ 42 sec
NIKON 0.54 NA i-Line
No PEB
AZ 300 MIF Developer ,70 sec double puddle @ 20.0°C

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214E Photoresist

2.0 µm L/S Exposure Latitude on Si, FT = 1.25 µm



SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70 sec double puddle @ 20.0°C

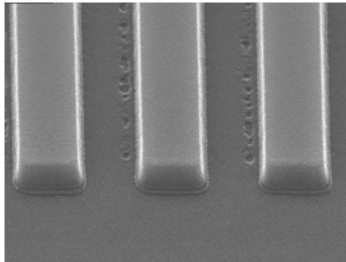
AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

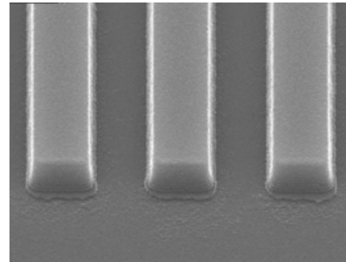
AZ 5214E Photoresist

2.0 µm L/S Exposure Latitude on Si, FT = 1.25 µm

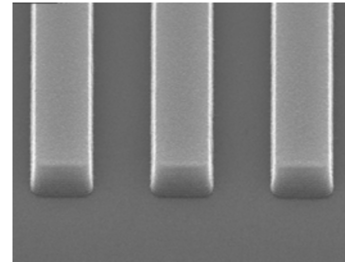
45mJ/cm²



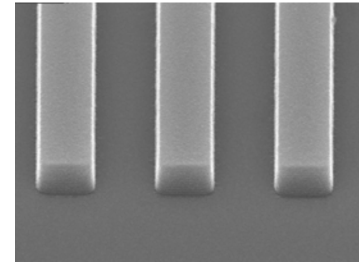
55mJ/cm²



65mJ/cm²

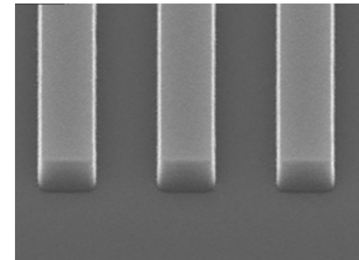


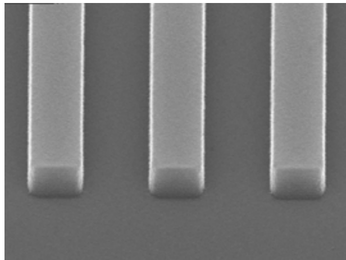
75mJ/cm²



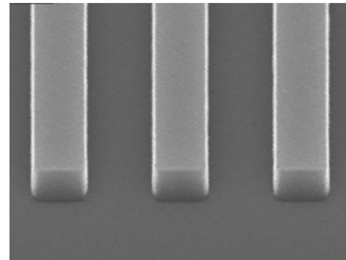
E_{nom} = 84 mJ/cm²
EXP.Lat. = 81%

80mJ/cm²

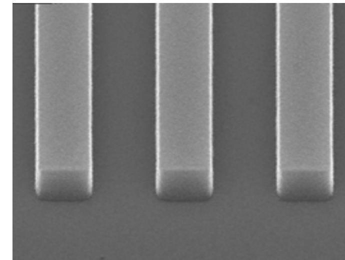




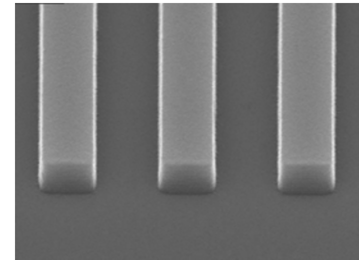
115mJ/cm²



105mJ/cm²



95mJ/cm²



85mJ/cm²

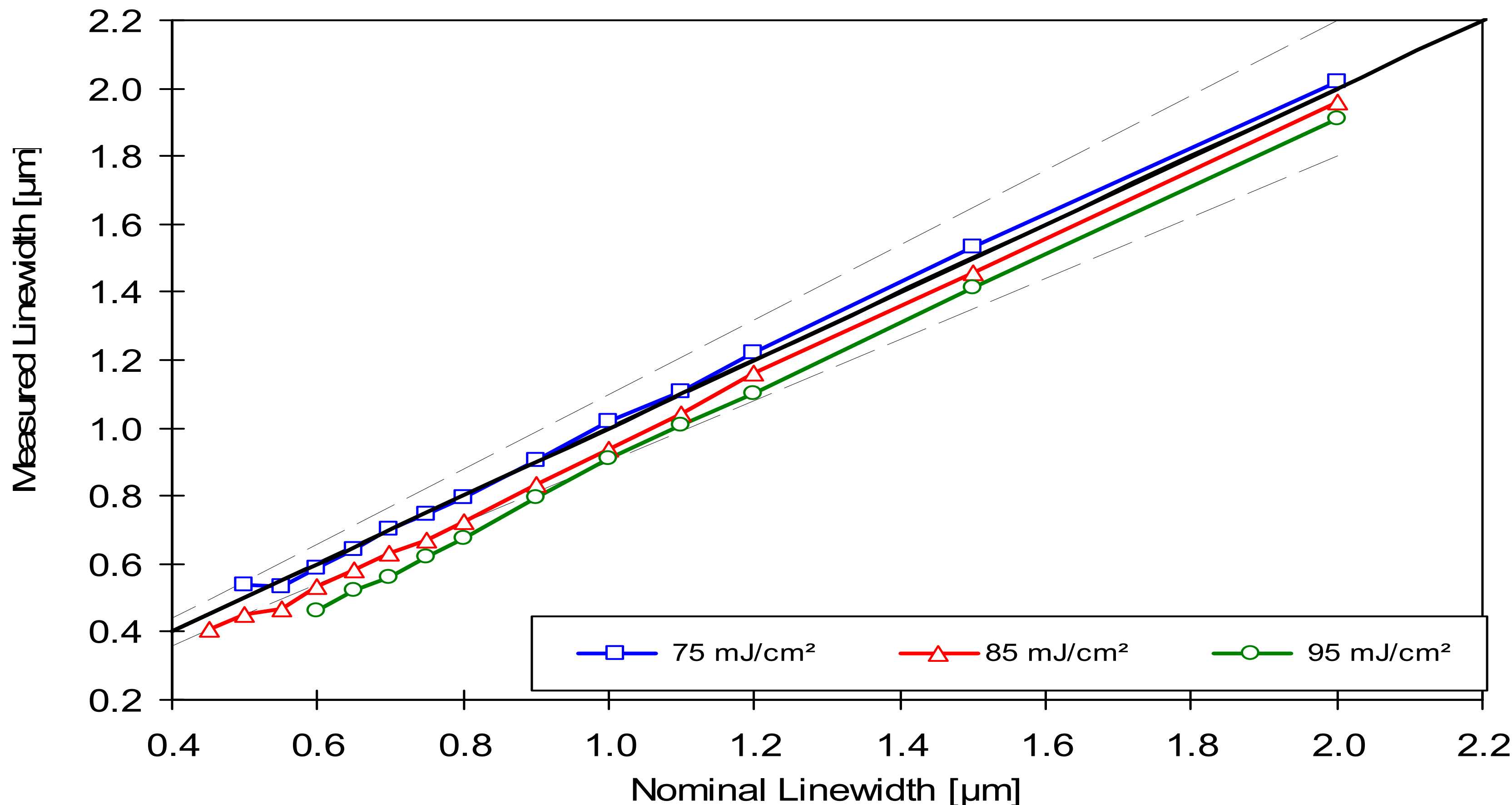
SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70sec double puddle @ 20.0°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214E Photoresist

Linearity on Si, FT = 1.25 µm Focus = 0.0 µm



SB: 100°C, 42 sec; PEB: None

NIKON 0.54 NA i-Line

AZ 300 MIF Developer ,70sec double puddle @ 20.0°C

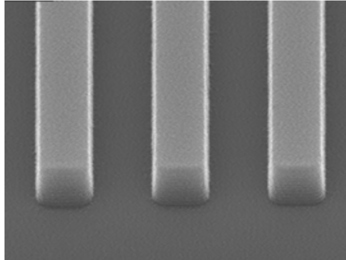
AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

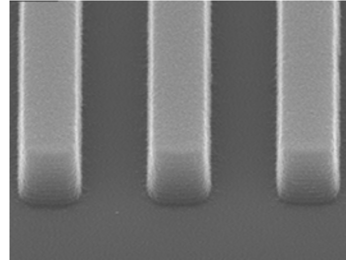
AZ 5214E Photoresist

Linearity on Si, FT = 1.25 µm

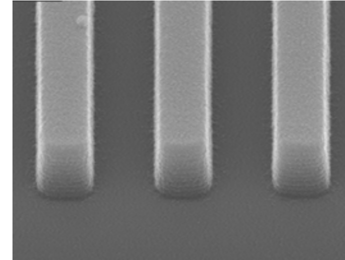
1.5µm



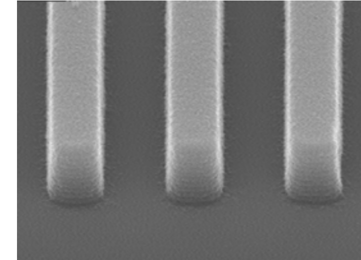
1.2µm



1.1µm

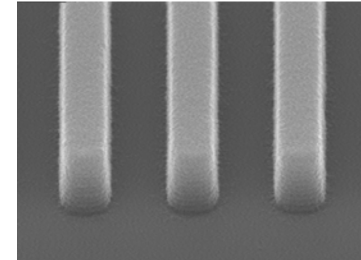


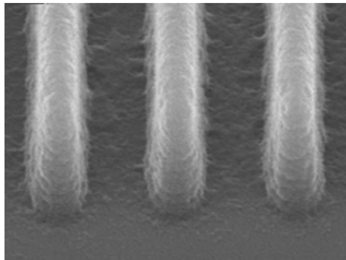
1.0µm



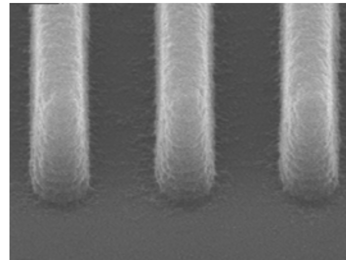
75 mJ/cm²

0.9µm

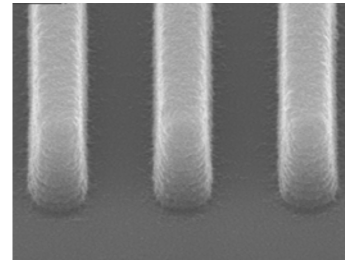




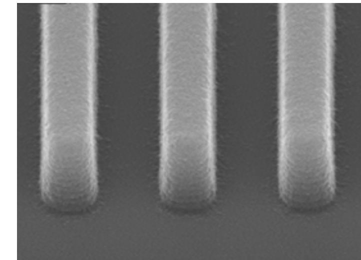
0.5µm



0.6µm



0.7µm



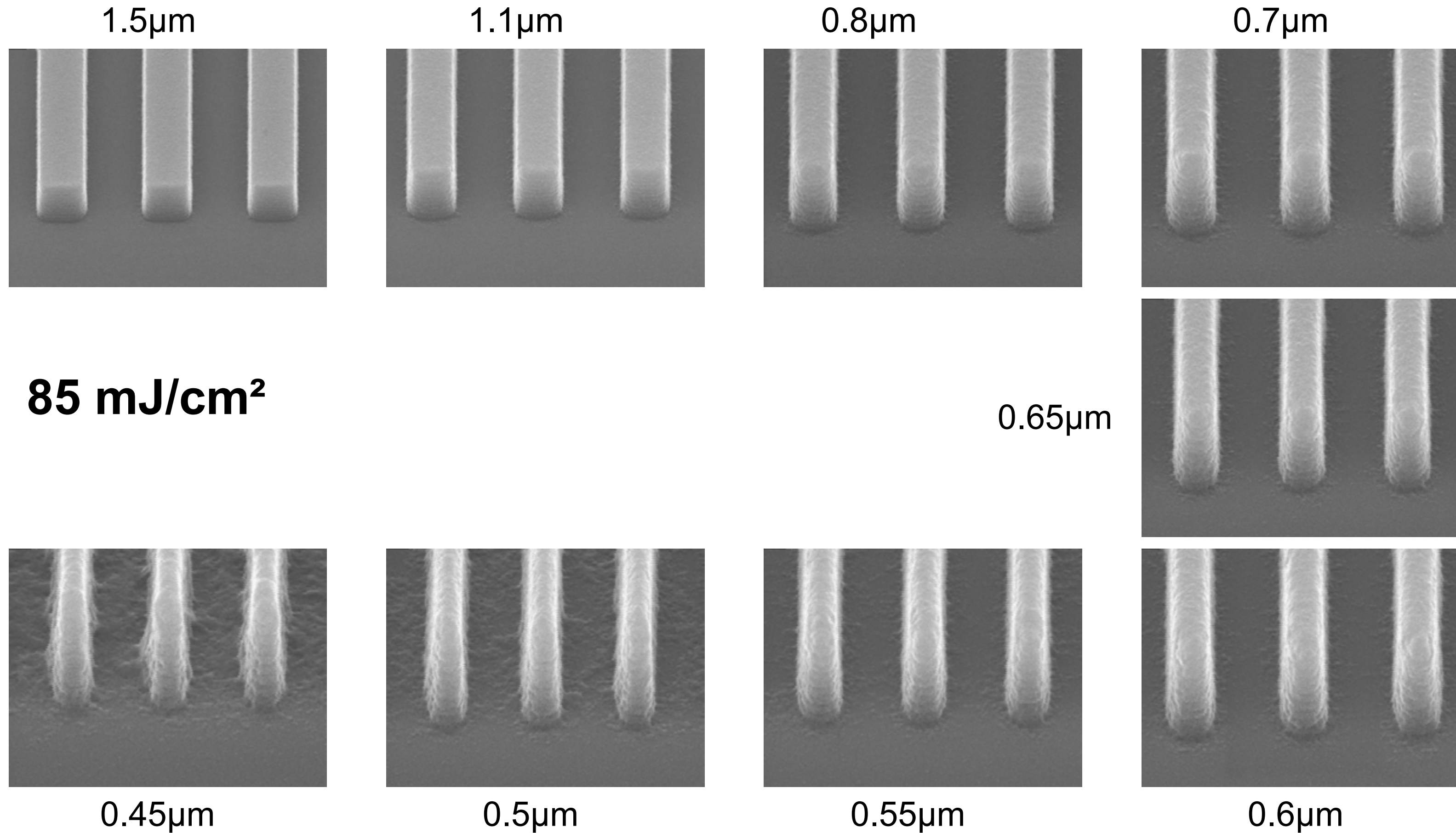
0.8µm

SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70sec double puddle @ 20.0°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214E Photoresist
Linearity on Si, FT = 1.25 µm

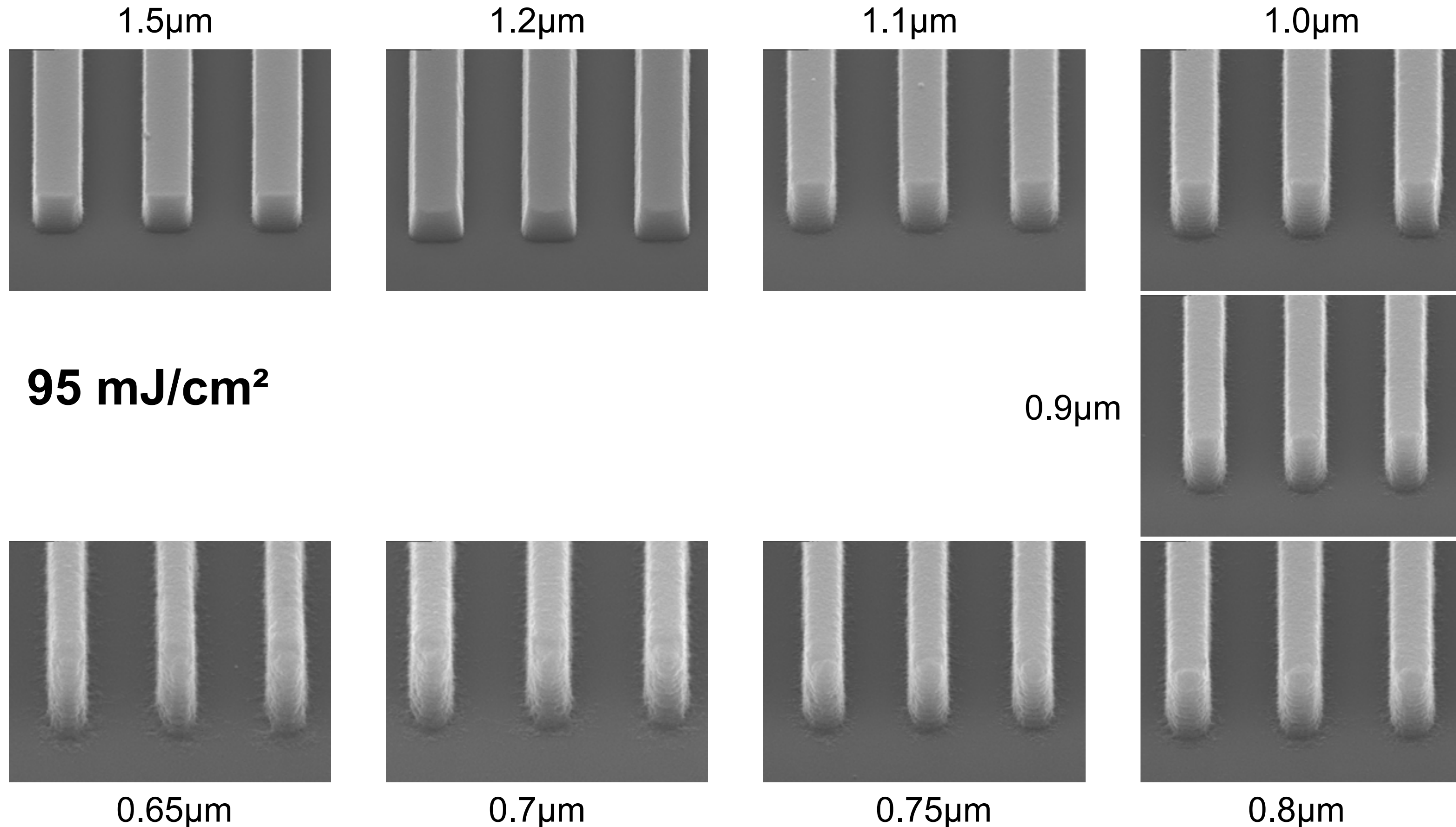


SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70sec double puddle @ 20.0°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214E Photoresist
Linearity on Si, FT = 1.25 µm

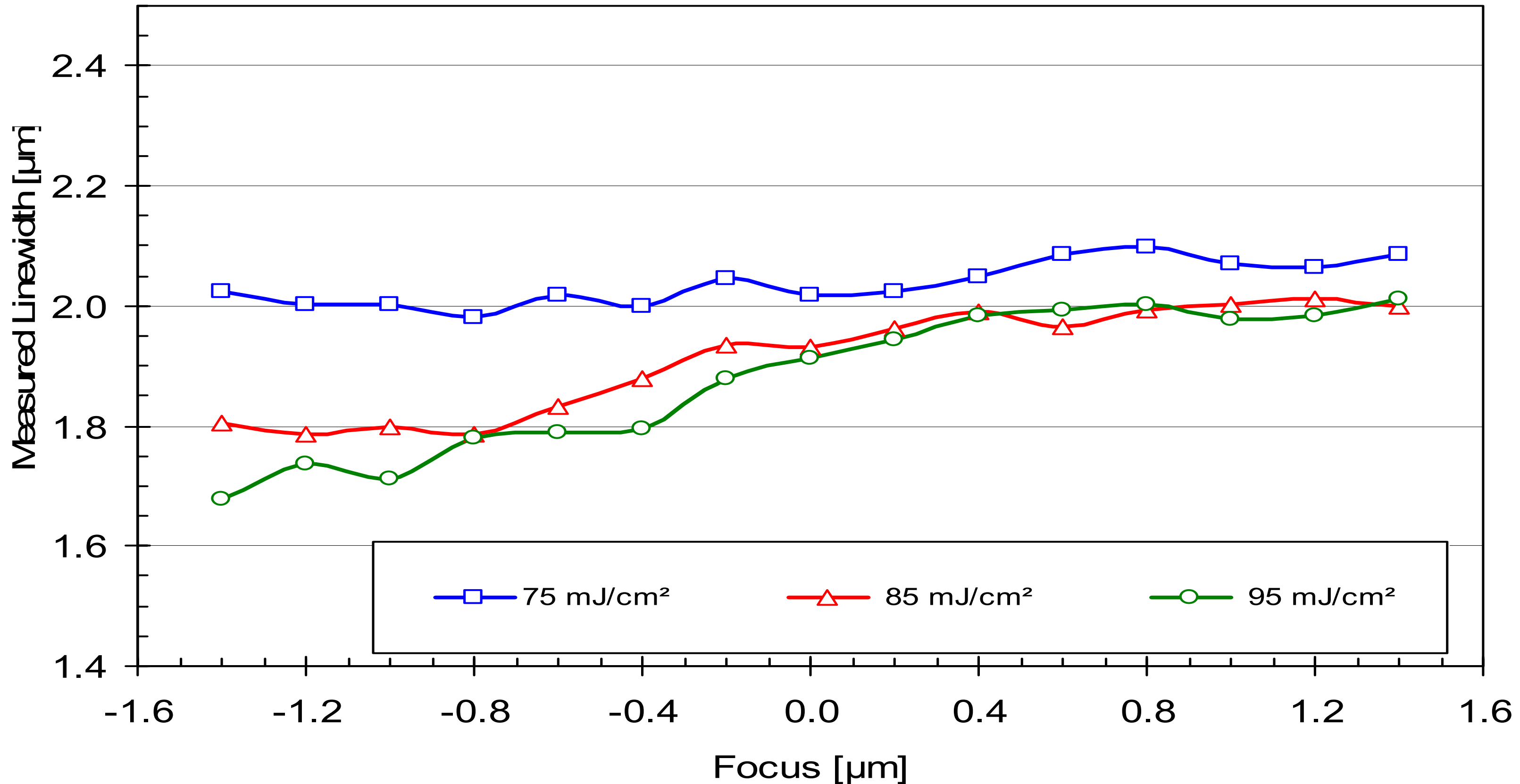


SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70sec double puddle @ 20.0°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214E Photoresist
2.0 µm L/S Focus Latitude on Si, FT = 1.25 µm

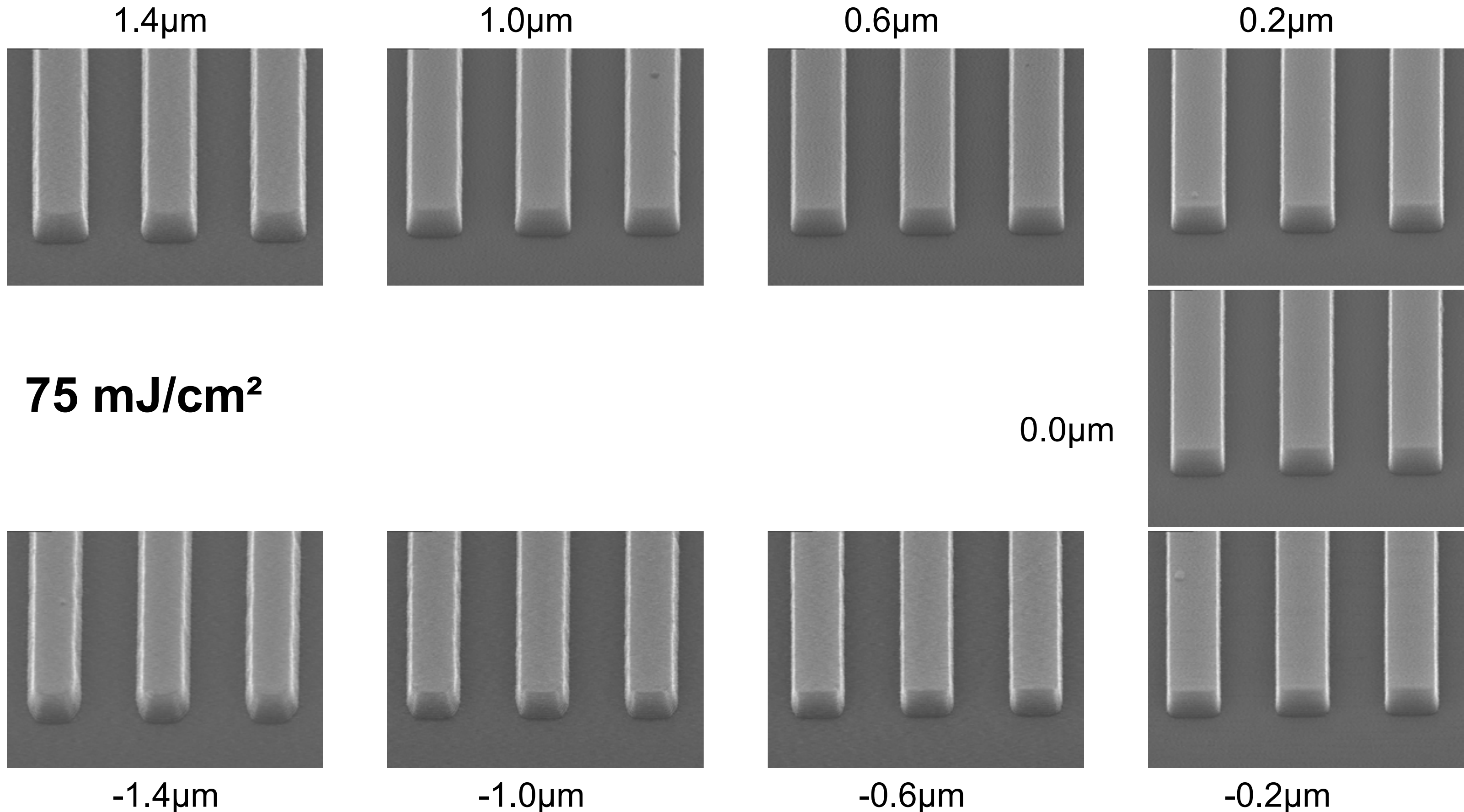


SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70sec double puddle @ 20.0°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214E Photoresist
2.0 µm L/S Focus Latitude on Si, FT = 1.25 µm

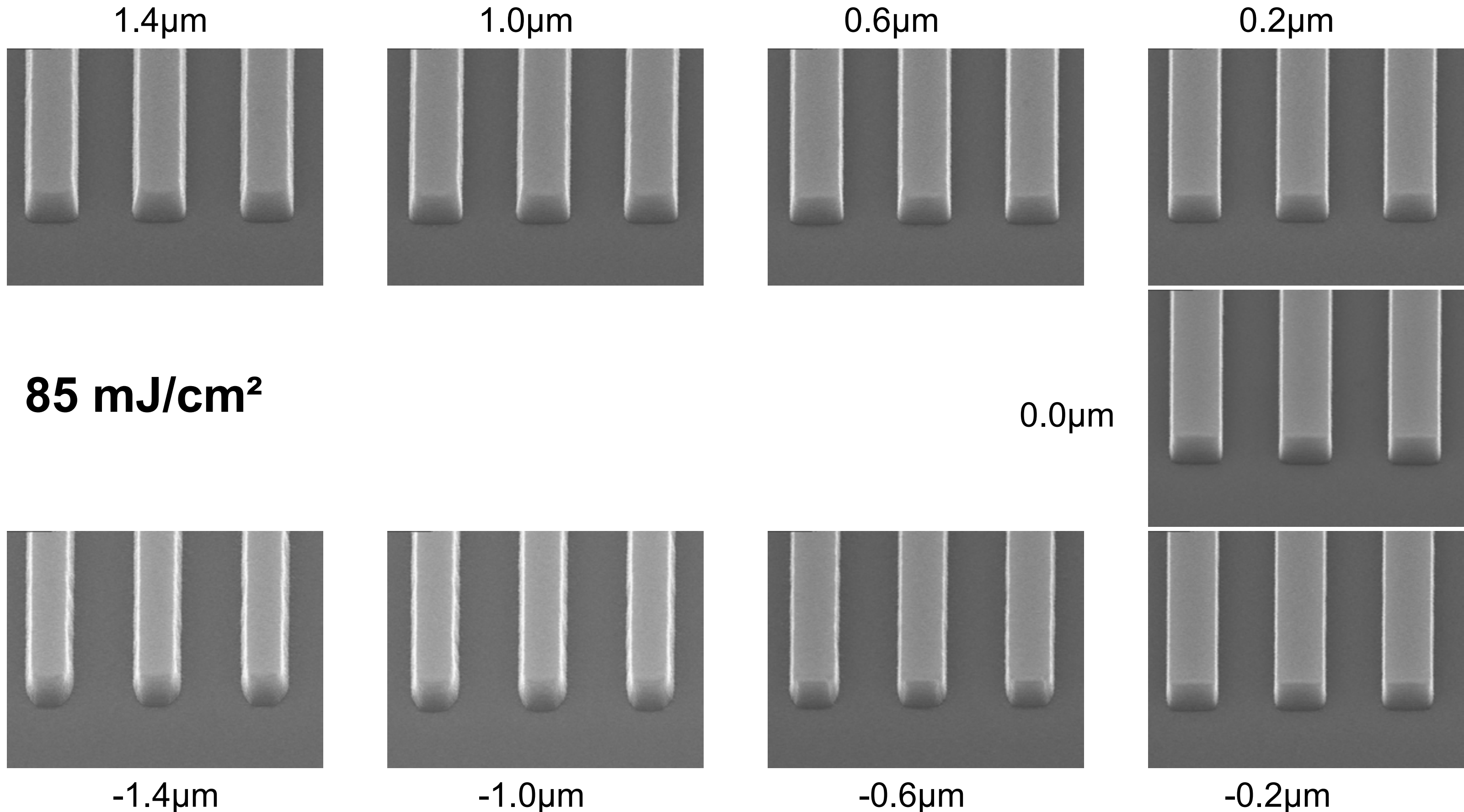


SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70sec double puddle @ 20.0°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214E Photoresist
2.0 µm L/S Focus Latitude on Si, FT = 1.25 µm



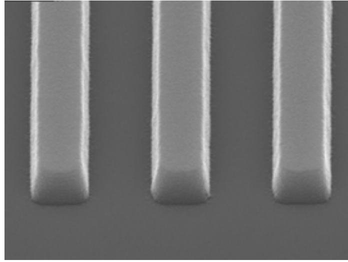
SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70sec double puddle @ 20.0°C

AZ Electronic Materials

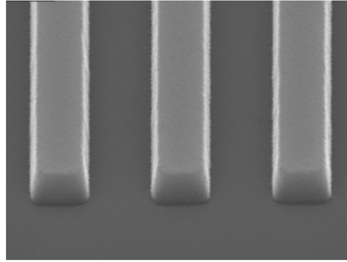
AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214E Photoresist
2.0 μm L/S Focus Latitude on Si, FT = 1.25 μm

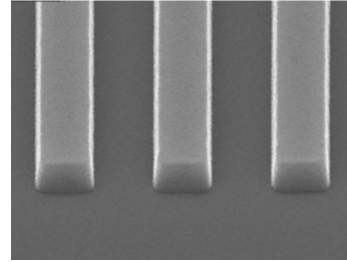
1.4μm



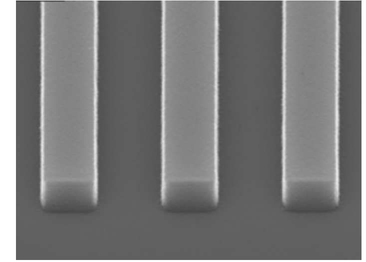
1.0μm



0.6μm

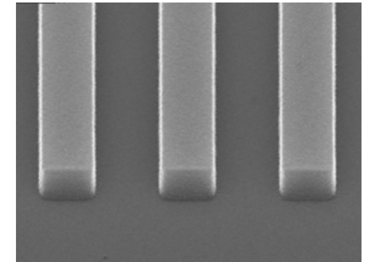


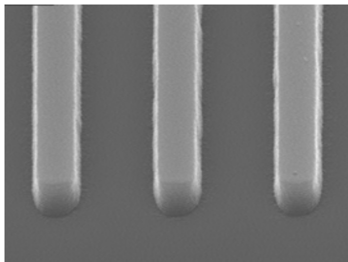
0.2μm



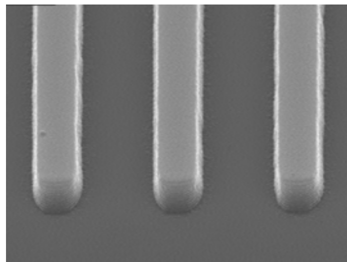
95 mJ/cm²

0.0μm

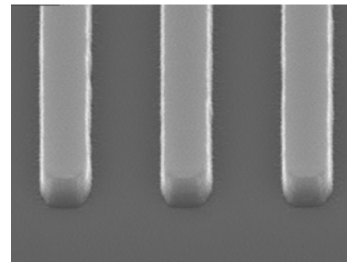




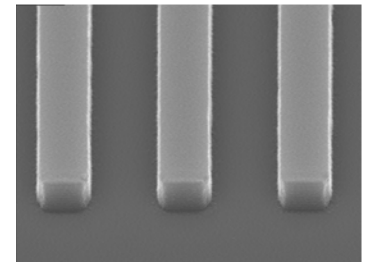
-1.4μm



-1.0μm



-0.6μm



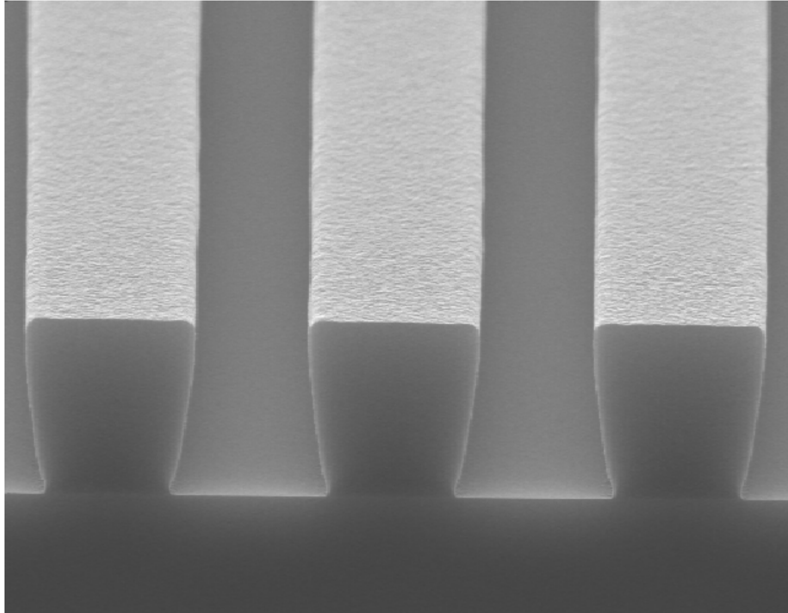
-0.2μm

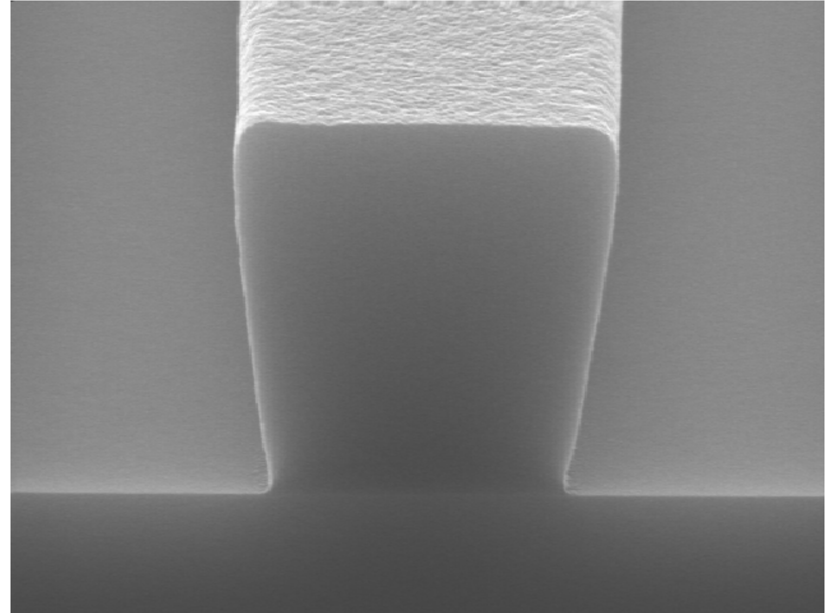
SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70sec double puddle @ 20.0°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5218-E Photoresist
3µm L/S Image Reversal Process





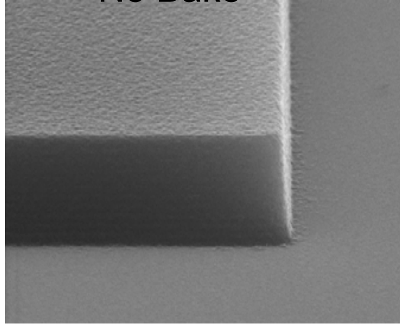
<u>Process conditions</u>
FT: 4µm, SB: 110°C/90 sec
Exp. PE 400mJ/cm² with **i-Line** filter, PEB: 50°C/60sec then 110°C/90sec
Develop: AZ 917 MIF developer, 90sec spray @ room temperature

AZ Electronic Materials

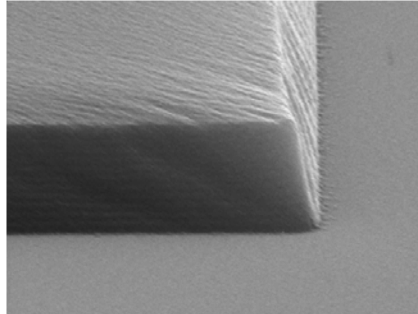
AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214-E Photoresist
Thermal Stability of Large Pad

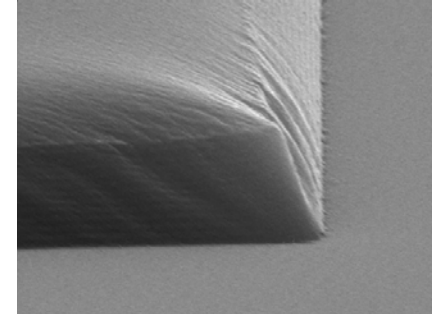
No Bake



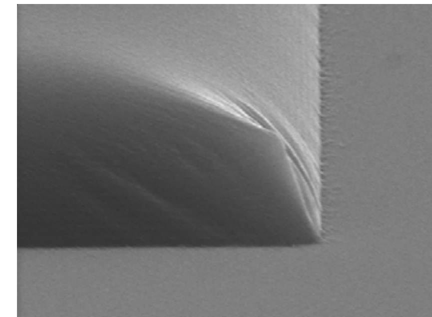
110°C



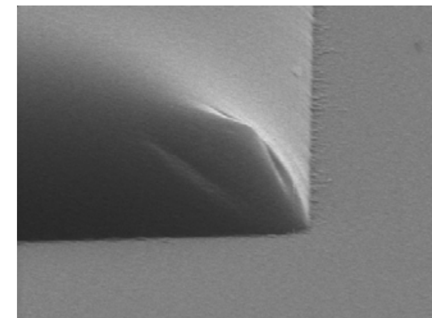
115°C



120°C



125°C



SB: 100°C, 42 sec; PEB: None
NIKON 0.54 NA i-Line
AZ 300 MIF Developer ,70sec double puddle @ 20.0°C
Hard Bake: 120 sec/ hot plate

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

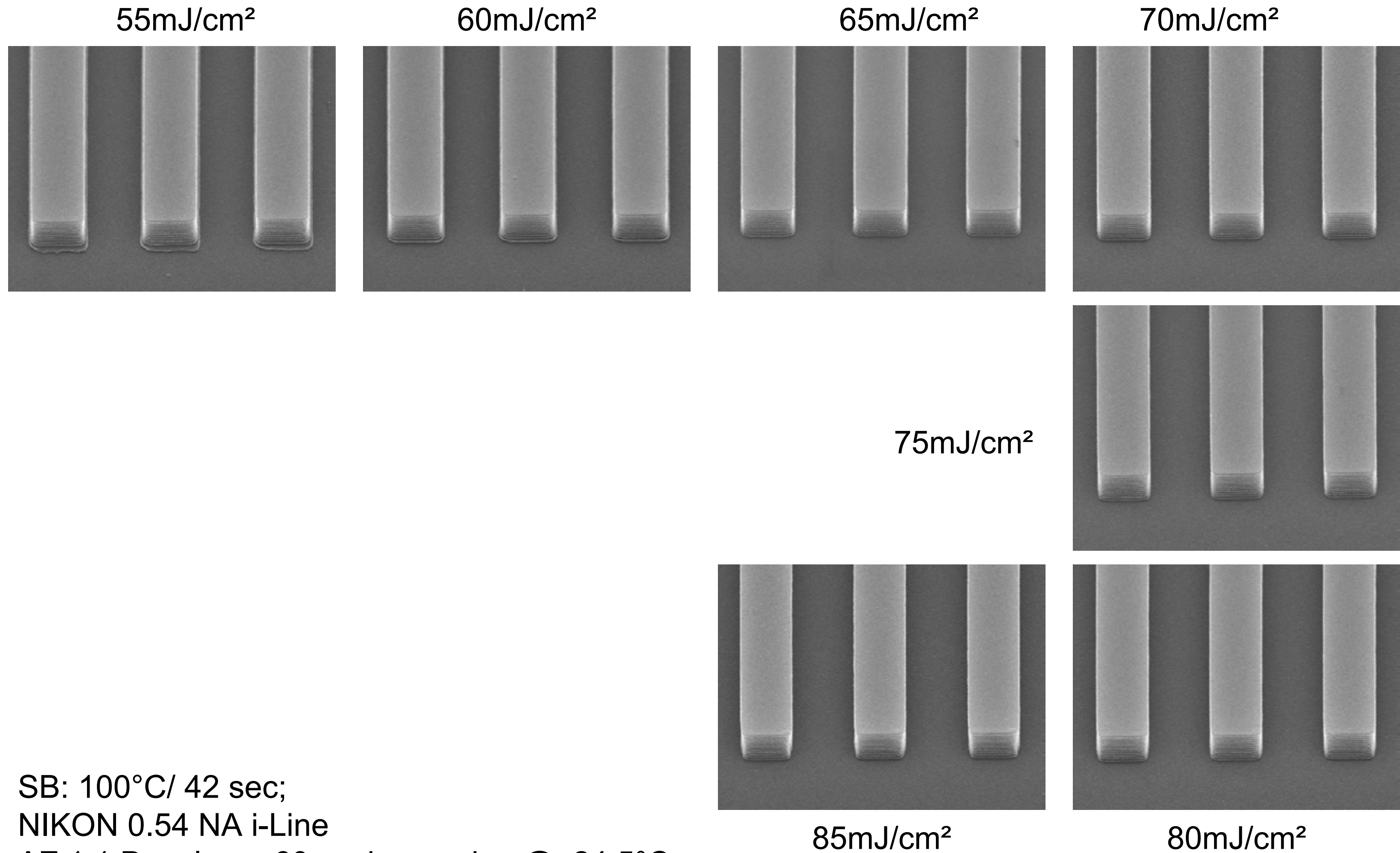
AZ 5214-E Photoresist
Process Conditions

Dense Lines
FT: 1.25µm
SB: 100°C/ 42 sec;
NIKON 0.54 NA i-Line
No PEB
AZ 1:1 Developer, 60 sec Immersion @ 24.5°C

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214-E Photoresist

Exposure Latitude 2.0 µm L/S on Si, FT = 1.25µm

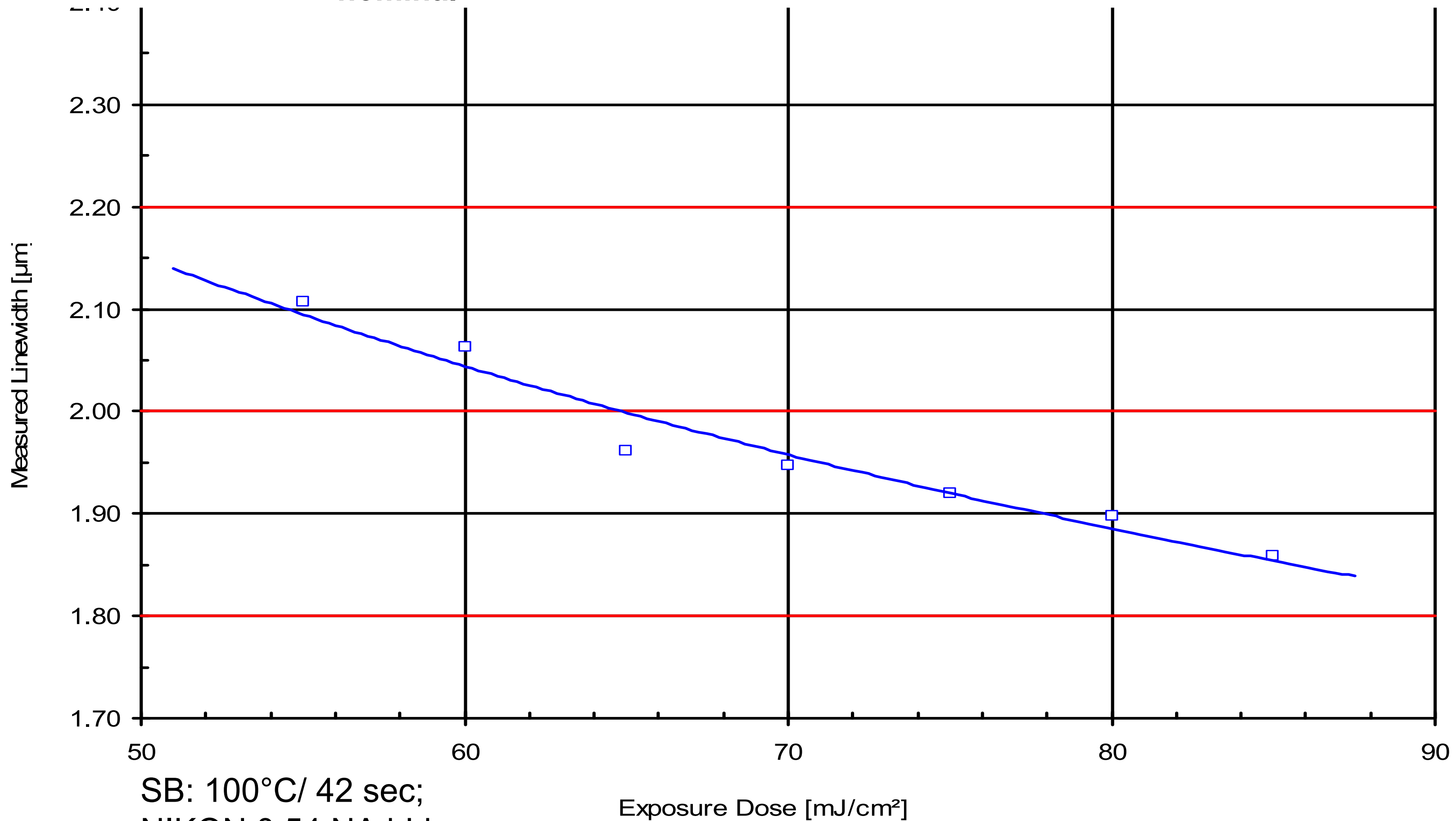


SB: 100°C/ 42 sec;
NIKON 0.54 NA i-Line
AZ 1:1 Developer 60sec immersion @ 24.5°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214-E Photoresist
Exposure Latitude 2.0 µm L/S on Si, FT = 1.25µm



SB: 100°C/ 42 sec;
NIKON 0.54 NA i-Line
AZ 1:1 Developer 60sec immersion @ 24.5°C

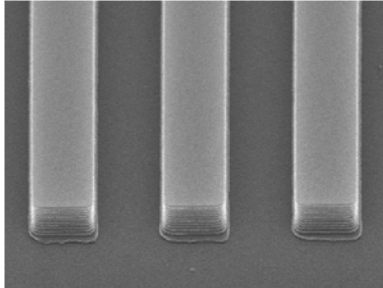
AZ Electronic Materials ®

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

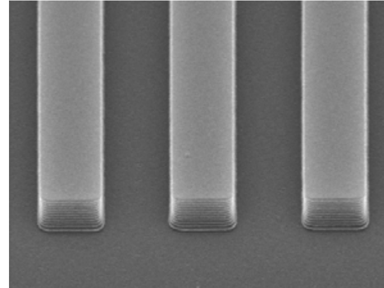
AZ 5214-E Photoresist

Exposure Latitude 2.0 µm L/S on Si, FT = 1.25µm

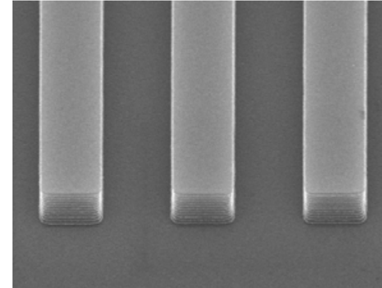
55mJ/cm²



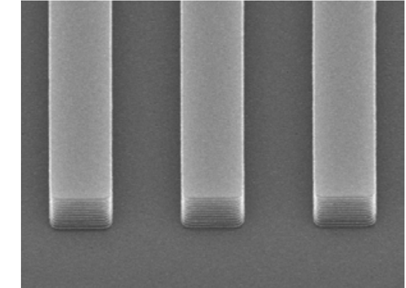
60mJ/cm²



65mJ/cm²

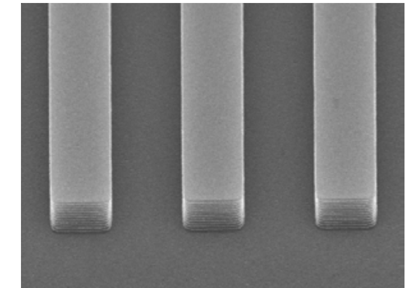


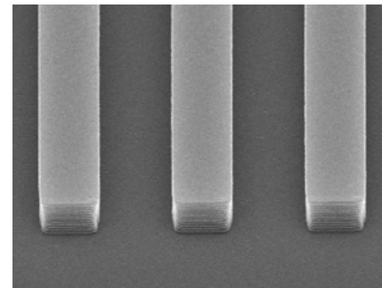
70mJ/cm²



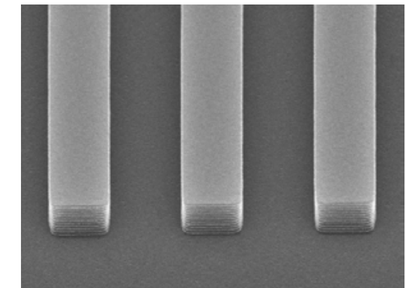
E_{nom} = 68 mJ/cm²
Exp.Lat. = 59%

75mJ/cm²





85mJ/cm²



80mJ/cm²

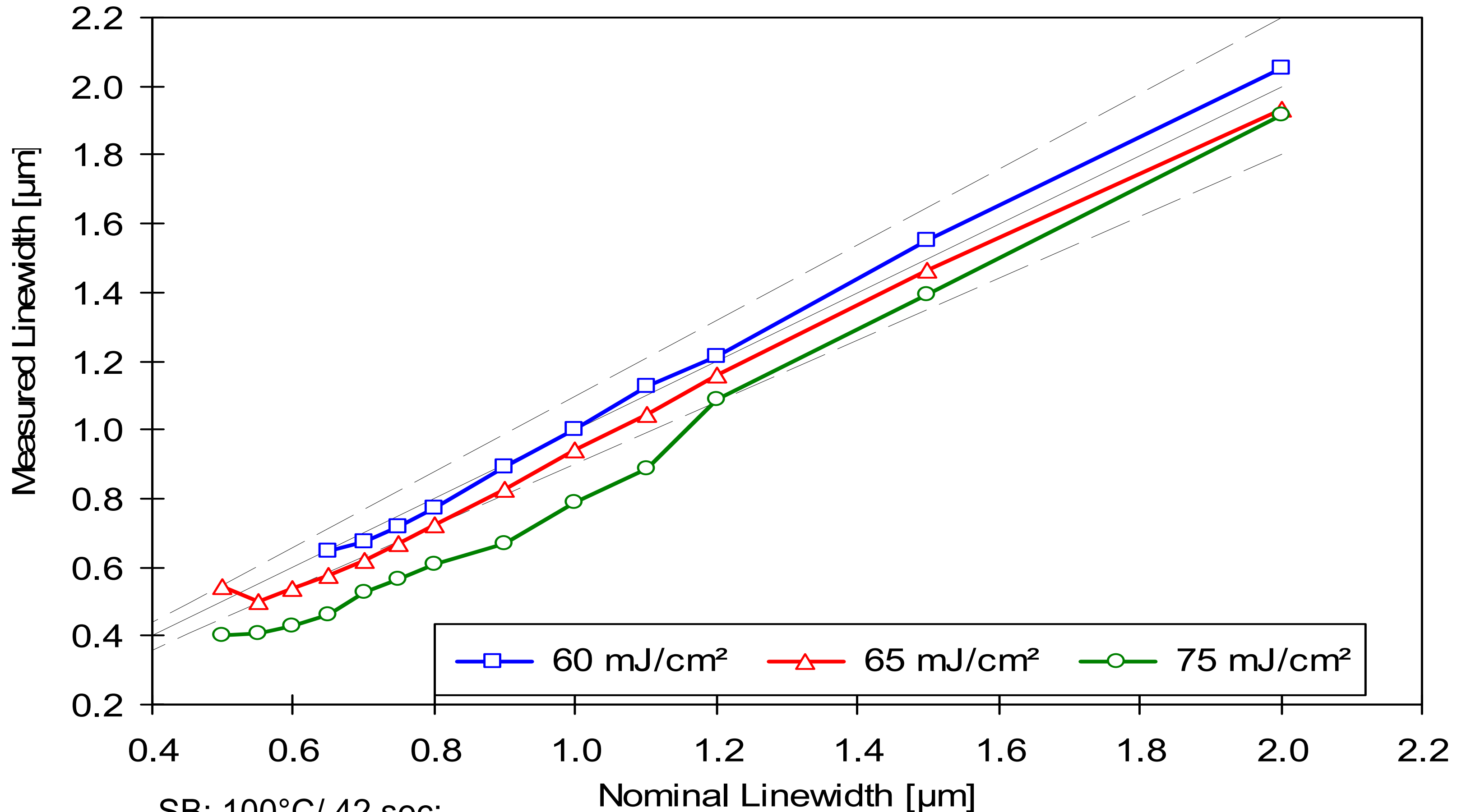
SB: 100°C/ 42 sec;
NIKON 0.54 NA i-Line
AZ 1:1 Developer 60sec immersion @ 24.5°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214-E Photoresist

Linearity on Si, FT = 1.25µm



SB: 100°C/ 42 sec;
NIKON 0.54 NA i-Line
AZ 1:1 Developer 60sec immersion @ 24.5°C

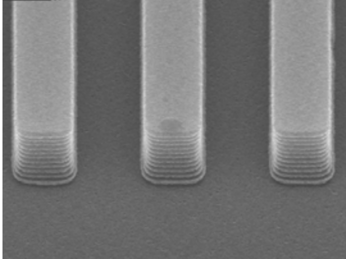
AZ Electronic Materials ®

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

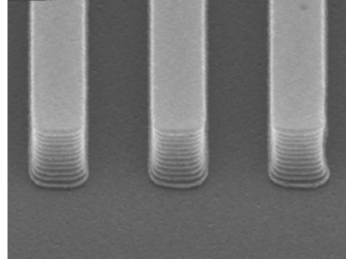
AZ 5214-E Photoresist

Linearity on Si, FT = 1.25µm

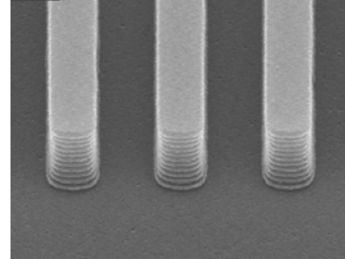
1.2µm



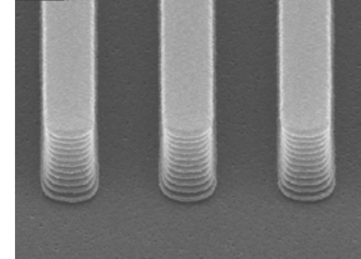
1.0µm



0.90µm

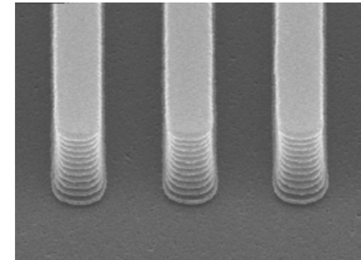


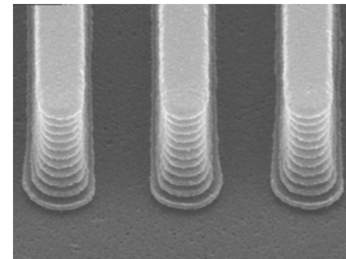
0.80µm



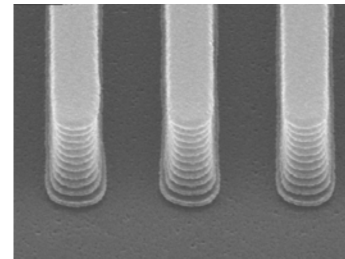
60 mJ/cm²

0.75µm

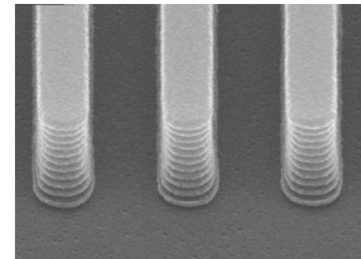




0.60µm



0.65µm



0.70µm

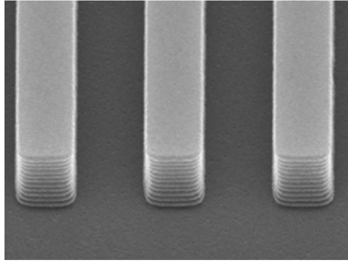
SB: 100°C/ 42 sec;
NIKON 0.54 NA i-Line
AZ 1:1 Developer 60sec immersion @ 24.5°C

AZ Electronic Materials

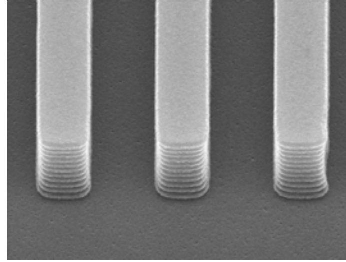
AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214-E Photoresist
Linearity on Si, FT = 1.25μm

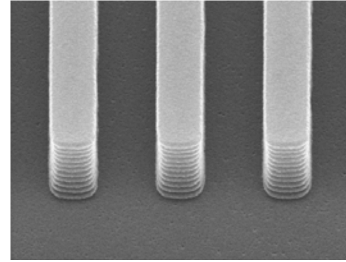
1.2μm



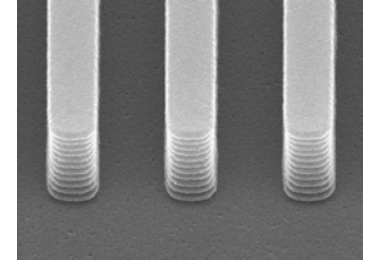
1.0μm



0.90μm

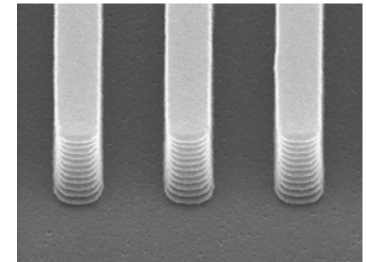


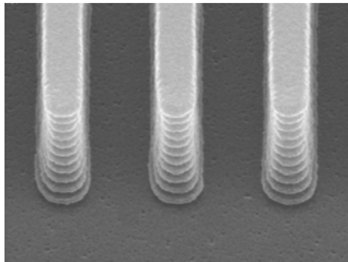
0.80μm



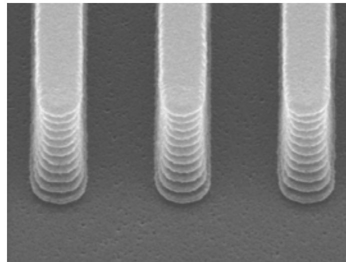
65 mJ/cm²

0.75μm

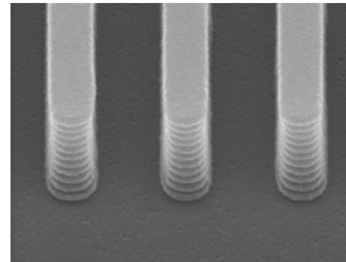




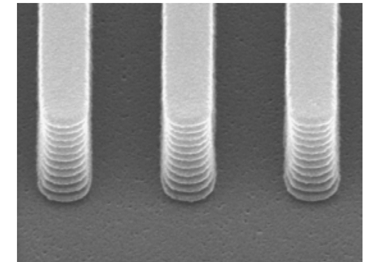
0.55μm



0.60μm



0.65μm



0.70μm

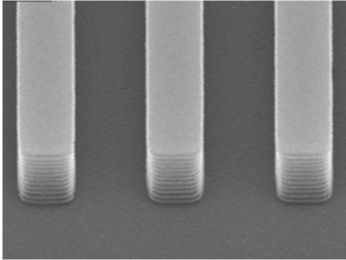
SB: 100°C/ 42 sec;
NIKON 0.54 NA i-Line
AZ 1:1 Developer 60sec immersion @ 24.5°C

AZ Electronic Materials

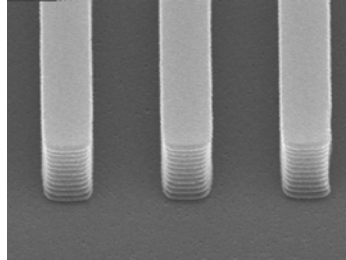
AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214-E Photoresist
Linearity on Si, FT = 1.25µm

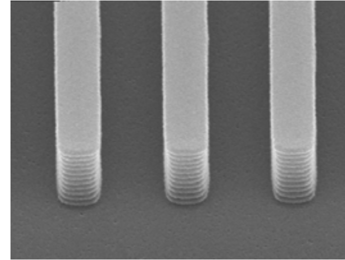
1.2µm



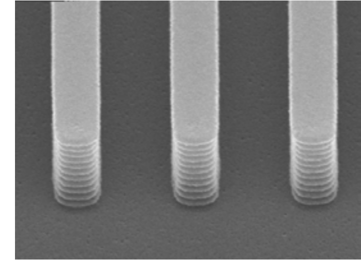
1.0µm



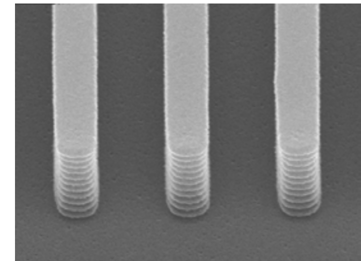
0.90µm



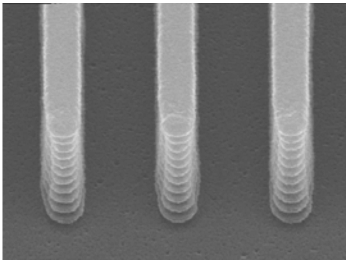
0.80µm



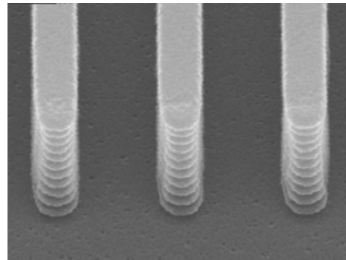
0.75µm



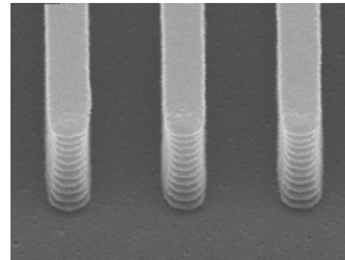
75 mJ/cm²



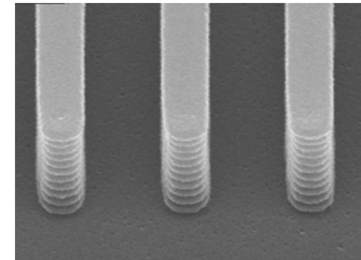
0.55µm



0.60µm



0.65µm



0.70µm

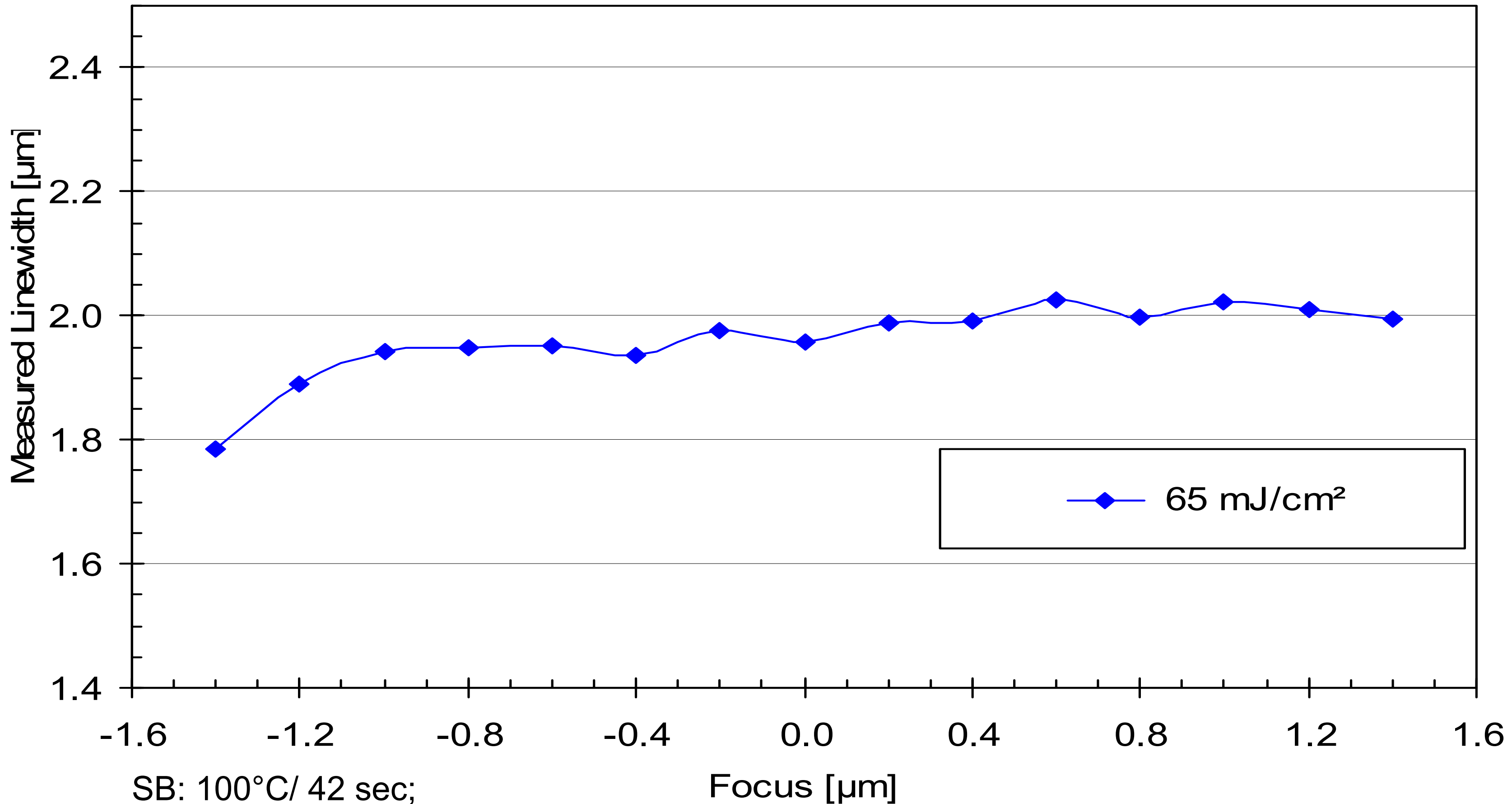
SB: 100°C/ 42 sec;
NIKON 0.54 NA i-Line
AZ 1:1 Developer 60sec immersion @ 24.5°C

AZ Electronic Materials ®

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214-E Photoresist

Focus Latitude 2.0 µm L/S on Si, FT = 1.25µm

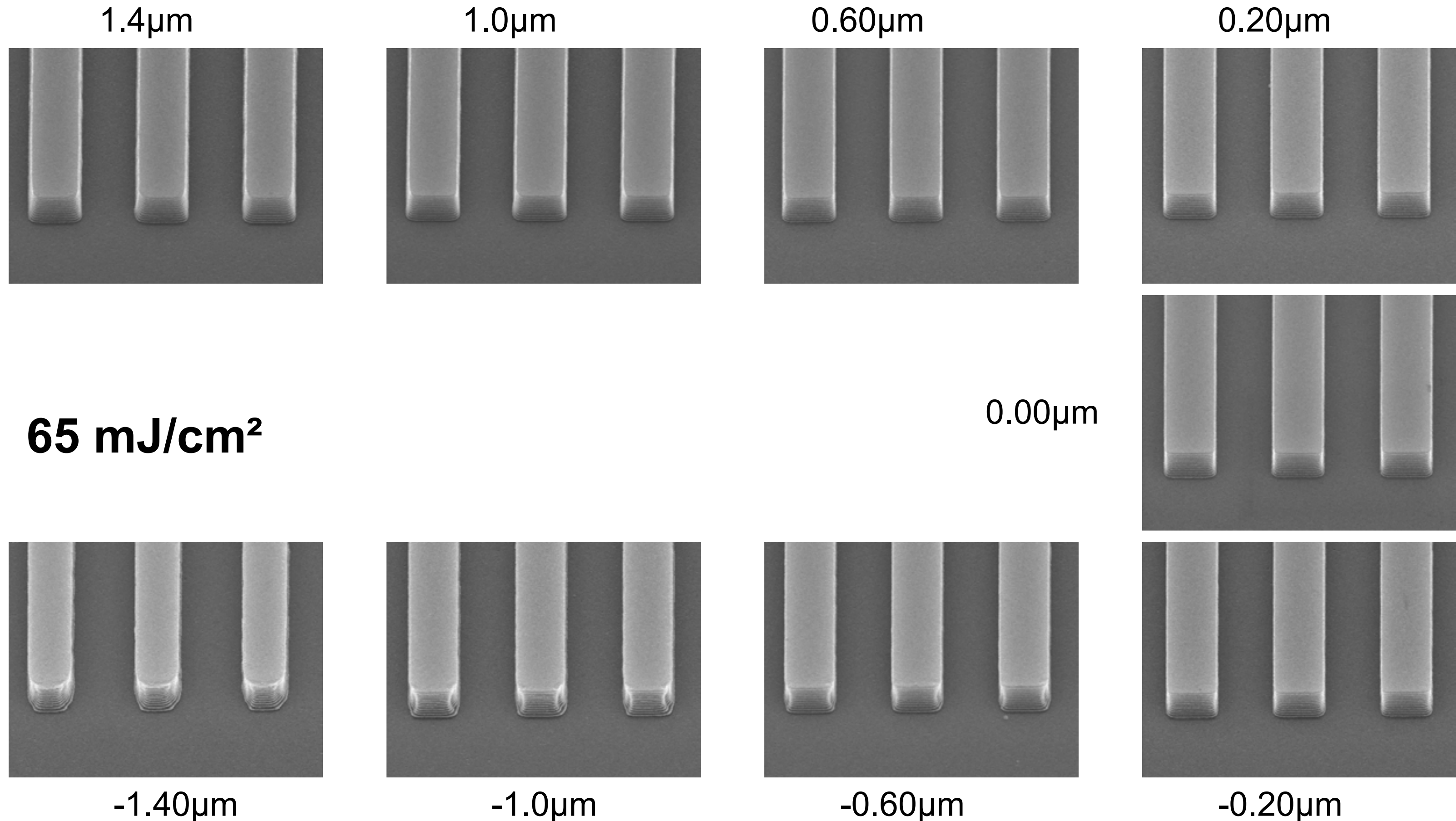


AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.

AZ 5214-E Photoresist

Focus Latitude 2.0 µm L/S on Si, FT = 1.25µm



SB: 100°C/ 42 sec;
NIKON 0.54 NA i-Line
AZ 1:1 Developer 60sec immersion @ 24.5°C

AZ Electronic Materials

AZ, the AZ logo, BARLi, Aquatar, nLOF, Kwik Strip, Klebosol, and Spinfil are registered trademarks and AX, DX, HERB, HiR, MiR, NCD, PLP, Signiflow, SWG, and TARP are trademarks of AZ Electronic Materials.