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## CSAR 62 Contrast Curves

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Azadi, Mohsen; Griggs, Georgia; de Villafranca, Glen; and Lopez, Gerald, "CSAR 62 Contrast Curves", *Protocols and Reports*. Paper 49.

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# CSAR 62 Contrast Curves

**Keywords**

CSAR, CSAR 62, Contrast, Curve, Contrast Curve, Curves

**Disciplines**

Electronic Devices and Semiconductor Manufacturing | Nanotechnology Fabrication

## Goal:

This report documents the contrast curves for the CSAR electron beam lithography resist from AllResist at 50keV. The aim is to provide an approximate clearing and base dose for the CSAR 62 standard process at the Singh Center for Nanotechnology.

## Materials:

- AllResist CSAR 62
- 3" Si wafers
- Two clean beakers large enough to develop a 3" wafer
- O-xylene
- Isopropyl Alcohol (IPA)
- Timer
- TexWipe

## Equipment:

- ReynoldsTech Spinner
- Torrey Pines Scientific Hotplate
- Filmetrics F40
- Elionix ELS-7500EX Electron Beam Lithography (EBL) Tool

## Protocol:

### Spin Coat and Soft Bake

1. Mount wafer and ensure that it is centered on the ReynoldsTech Spinner
2. Spin wafer at a fixed RPM for 60 seconds.
3. Bake wafer at 180 °C for 90 seconds and allow wafer to cool after removal.

### Exposure

1. Generate an array of 60 micron by 60 micron square in a dose matrix on a 100 micron pitch.
2. Using the Elionix ELS-7500EX EBL tool, expose the pattern using 200pA at 20nm shot pitch with a 30 micron objective lens aperture (OLA, a.k.a. final aperture).

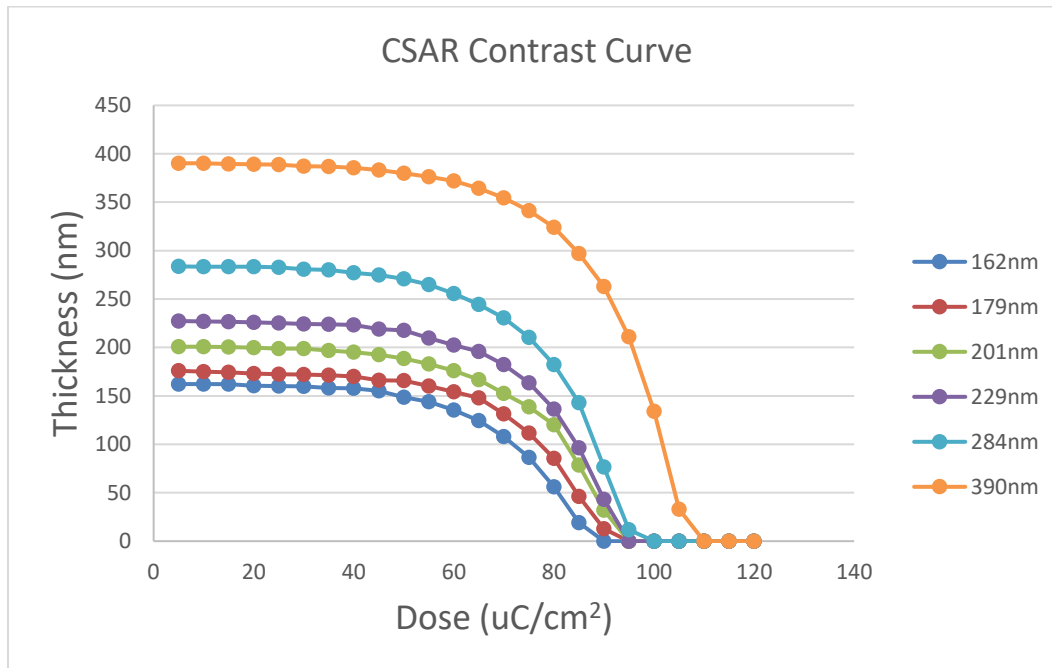
### Development at ~20°C

1. Pour o-xylene into the first clean beaker.
2. Pour IPA into the second clean beaker.
3. Set timer to 70 seconds.
4. Drop exposed wafer into bath of o-xylene making sure the wafer is completely submerged, and start the timer. Do not agitate.
5. After 70 seconds submerge the wafer into the IPA bath to stop development.
6. After roughly 30 seconds remove the wafer and place on a TexWipe.
7. Blow dry the wafer with N<sub>2</sub>.

### Measurement

1. Allow the Filmetrics F40 light to warm up for at least 5 minutes.
2. Click *Baseline...* to calibrate the tool using the SiO<sub>2</sub> and Si standards.
3. Mount wafer and select the *CSAR on Si* recipe.
4. Measure the resist thickness at the center of each square.

**Results:**



	6000rpm	5000rpm	4000rpm	3000rpm	2000rpm	1000rpm
Dose	162.2	178.9	201	228.5	284	390.2
5	162.2	175.9	200.8	227.3	283.7	390.2
10	162.2	174.9	200.8	226.8	283.4	389.4
15	162.1	174.4	200.3	226.5	283.4	389.1
20	160.4	173	199.7	225.9	283.3	388.8
25	160.1	172.5	198.9	225.1	282.6	387.1
30	159.8	171.9	198.7	224.1	280.6	386.7
35	158.2	171.5	196.7	223.9	280	385.6
40	157.7	169.9	195.1	223.1	277.2	383.1
45	155.1	166	192.5	219.1	274.8	379.9
50	148.7	165.8	188.6	217.8	270.8	376.1
55	143.9	160.2	183.1	209.8	265	372
60	135.2	154.2	176.1	202.5	255.6	364.5
65	124.4	147.8	166.8	195.8	244.5	354.5
70	108	131.4	152.6	182.3	230.5	341.1
75	86.5	111.7	138.7	163.4	210.3	324.1
80	56	85.5	120.3	136.2	182.3	296.8
85	19	46.1	78.5	96.3	142.8	263
90	0	12.9	31.8	43.3	76.6	211
95	0	0	0	0	11.7	134
100	0	0	0	0	0	33