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Steven Wood
University of Pennsylvania, stewood@seas.upenn.edu

Gerald G. Lopez
Singh Center for Nanotechnology, lopezg@seas.upenn.edu

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SUSS MicroTec MA6 Gen3 – MicroChem SPR-220 7.0 Thickness vs. Dose-to-Clear and Contrast Curve Data

Abstract

The SOP for MicroChem SPR-220 7.0 at the Quattrone Nanofabrcation Facility is provided along with thickness vs. dose-to-clear and contrast curve data. The document is intended to provide a starting point when using MicroChem SPR-220 7.0.

Keywords

SPR220, MicroChem, SUSS, MA6, SPR-220

Disciplines

Nanoscience and Nanotechnology

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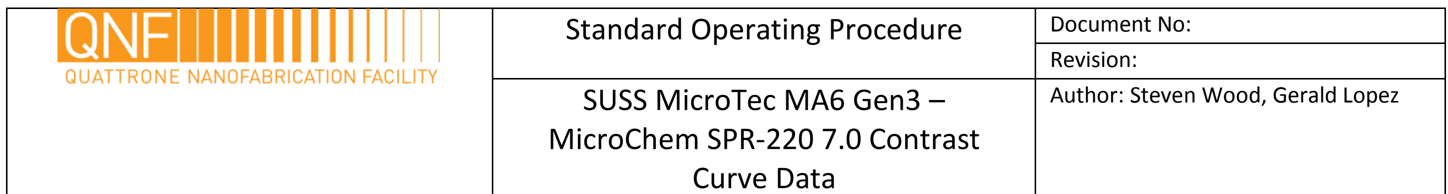


QNF QUATTRONE NANOFABRICATION FACILITY	Standard Operating Procedure	Document No:
		Revision:
	SUSS MicroTec MA6 Gen3 – MicroChem SPR-220 7.0 Contrast Curve Data	Author: Steven Wood, Gerald Lopez

Goal:

Accurately gauge the optimal dose for MicroChem SPR-220 7.0 using the SUSS MicroTec MA-6 Gen3.

Materials:

- MicroChem SPR-220 7.0 Photoresist
- SurPass 4000 Primer
- MicroChem MF-26A Developer
- Acetone
- Isopropyl Alcohol (IPA)
- 4 inch Silicon Wafers

Equipment:

- Torrey Pines Scientific Hotplate
- ReynoldsTech 1000 RPM/second spinner
- SUSS MicroTec MA-6 Gen3 Mask Aligner
- Benchmark Multi-Transmission mask

Protocol:

Prime

1. Mount wafer and ensure that it is centered.
2. Deposit 7 milliliters of SURPASS 4000 in the center of the wafer.
3. Spin on primer at 3000 RPM for 45 seconds.
4. Rinse with IPA with 15 seconds left on the spin cycle.

Coat

1. Mount wafer and ensure that it is centered.
2. Deposit 7 milliliters of SPR-220 7.0 photoresist in the center of the wafer.
3. Spin on photoresist at 1500 RPM for 60 Seconds. Resulting thickness is about 10.9um (measured after Soft Bake).

Soft Bake

1. Bake wafer at 115 °C for 60 seconds.

Expose

1. Expose wafer using Benchmark mask.

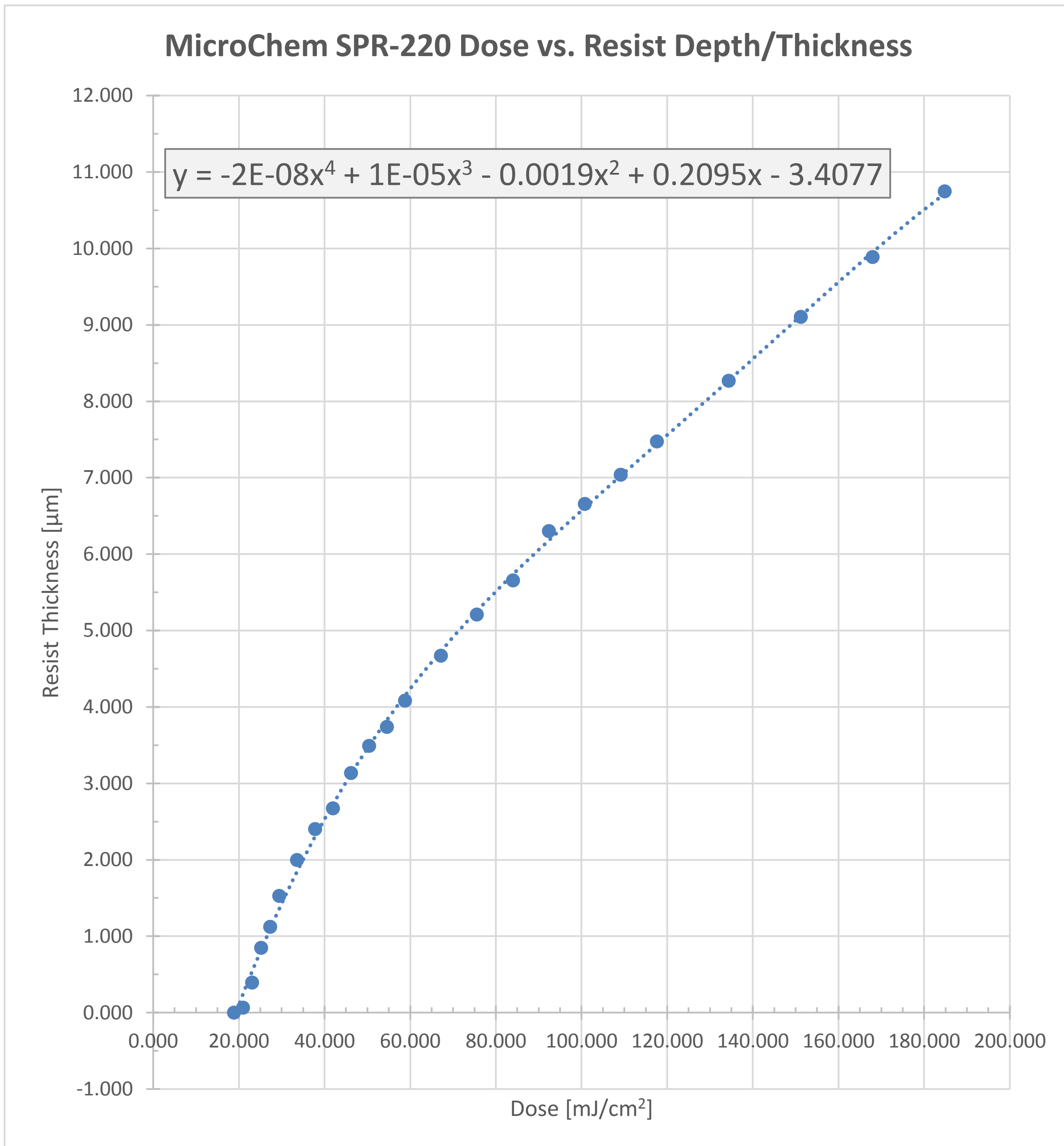
Develop

1. Dispense approximately 150 milliliters of MF-26A in two containers.
2. Fully submerge the exposed wafer.
3. Agitate and develop the wafer for 60 seconds.
4. Fully submerge the wafer in the fresh bath.
5. Agitate and develop for 60 seconds.
6. Remove wafer, rinse with DI water and dry.

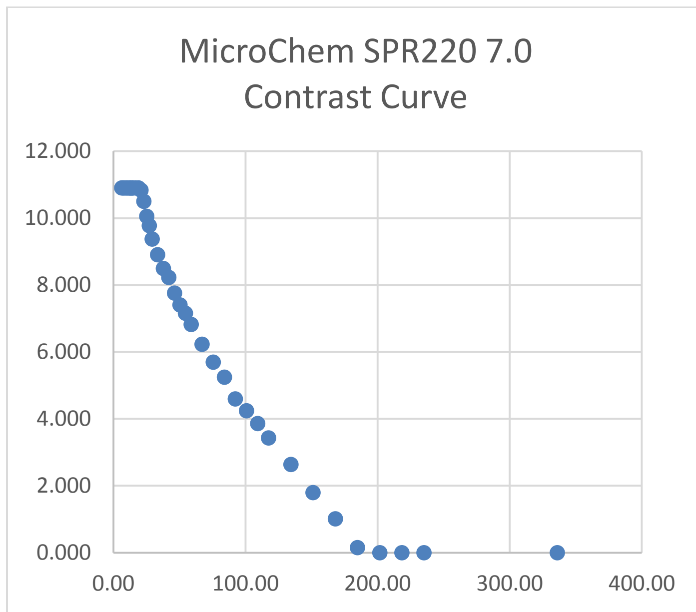
Results:

Measured feature size 100um^2.

Use the following chart to determine the dose needed to clear for a specific resist thickness for SPR220. For example, if a spin condition yields a 4um thickness for SPR-220, the suggested starting dose to use would be roughly between 55-60mJ/cm^2.



Contrast Curve:



Dose [mJ/cm^2]	Height [um]	Remaining Resist [um]
6.30	0.000	10.900
7.35	0.000	10.900
8.40	0.000	10.900
9.45	0.000	10.900
10.50	0.000	10.900
11.55	0.000	10.900
12.60	0.000	10.900
12.60	0.000	10.900
13.65	0.000	10.900
14.70	0.000	10.900
14.70	0.000	10.900
16.80	0.000	10.900
18.90	0.000	10.900
21.00	0.065	10.836
23.10	0.393	10.507
25.20	0.850	10.050
27.30	1.124	9.776
29.40	1.530	9.371
33.60	1.998	8.902
37.80	2.404	8.496
42.00	2.674	8.227
46.20	3.137	7.763
50.40	3.492	7.409
54.60	3.740	7.160
58.80	4.082	6.818
67.20	4.672	6.228
75.60	5.210	5.690
84.00	5.656	5.244
92.40	6.303	4.597
100.80	6.658	4.243
109.20	7.038	3.862
117.60	7.475	3.425
134.40	8.270	2.630
151.20	9.105	1.795
168.00	9.891	1.010
184.80	10.750	0.150
201.60	10.900	0.000
218.40	10.900	0.000
235.20	10.900	0.000
336.00	10.900	0.000