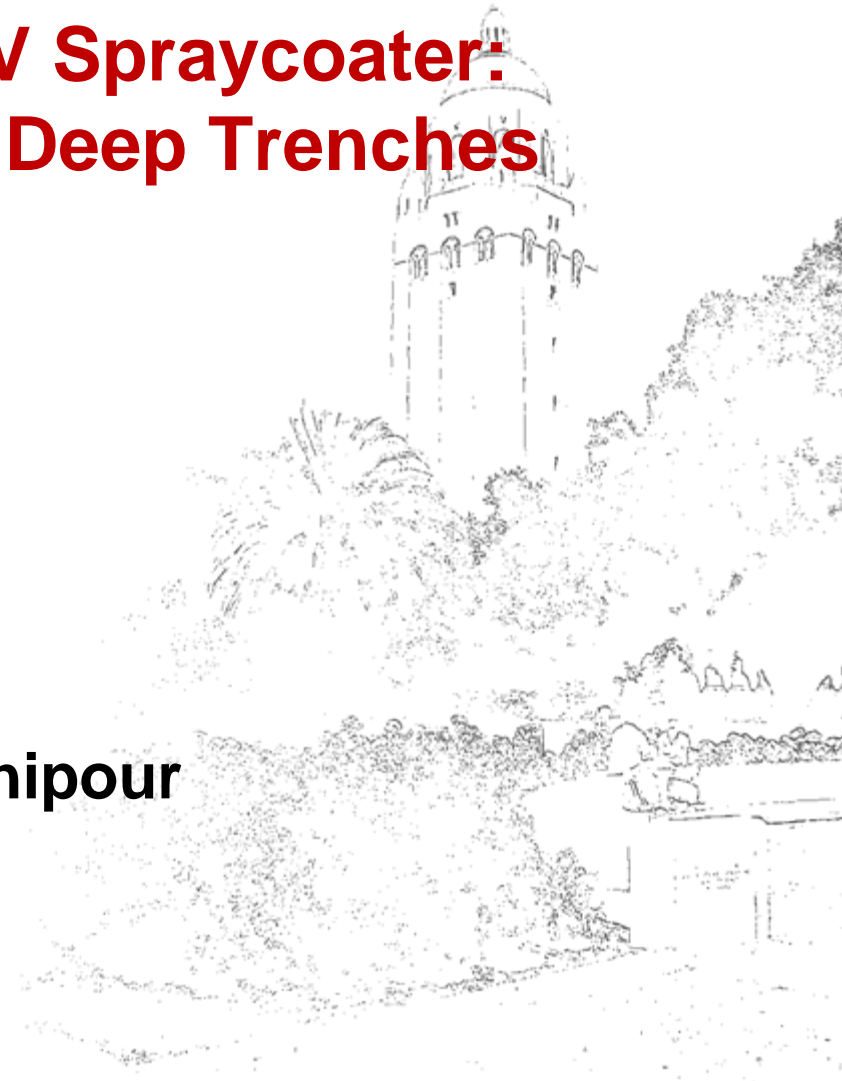


Characterization of EV Spraycoater: Conformal Coating in Deep Trenches

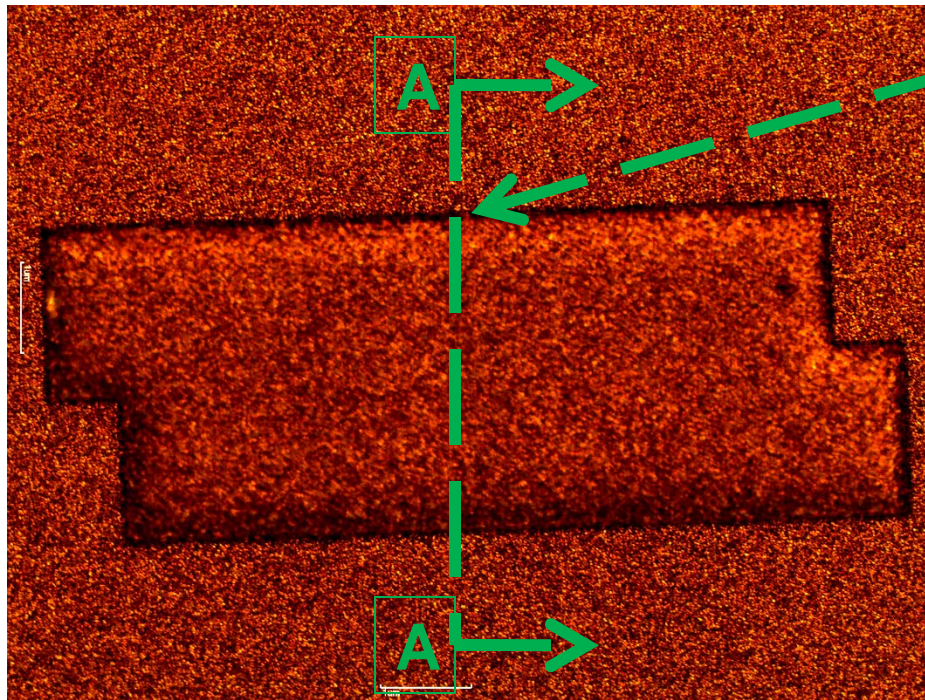
Ehsan Sadeghipour
3/16/2011



- The target is the conformal coverage of wafers with 30 um and 50 um deep features. Conformal coverage will be defined as 3 um thick +/- 0.5 um.
- Variables Studied:
 - Resist Mix
 - Nozzle Pressure
 - Number of Passes
 - Velocity Profile
- Success Criteria:
 - Keep up with the agreed upon schedule of throughput
 - Adjust experimental plan on weekly basis to account for previous week's learning
 - Goal is to reach 3 um thick +/- 0.5 um by the end of the quarter.

- Etch wafer using STS1 (DEEP recipe)
- Cleave into pieces
- Clean in Piranha solution at wbgeneral (80% H₂SO₄ & 20% H₂O₂)
- Use Yes oven
- Spray using Spraycoater

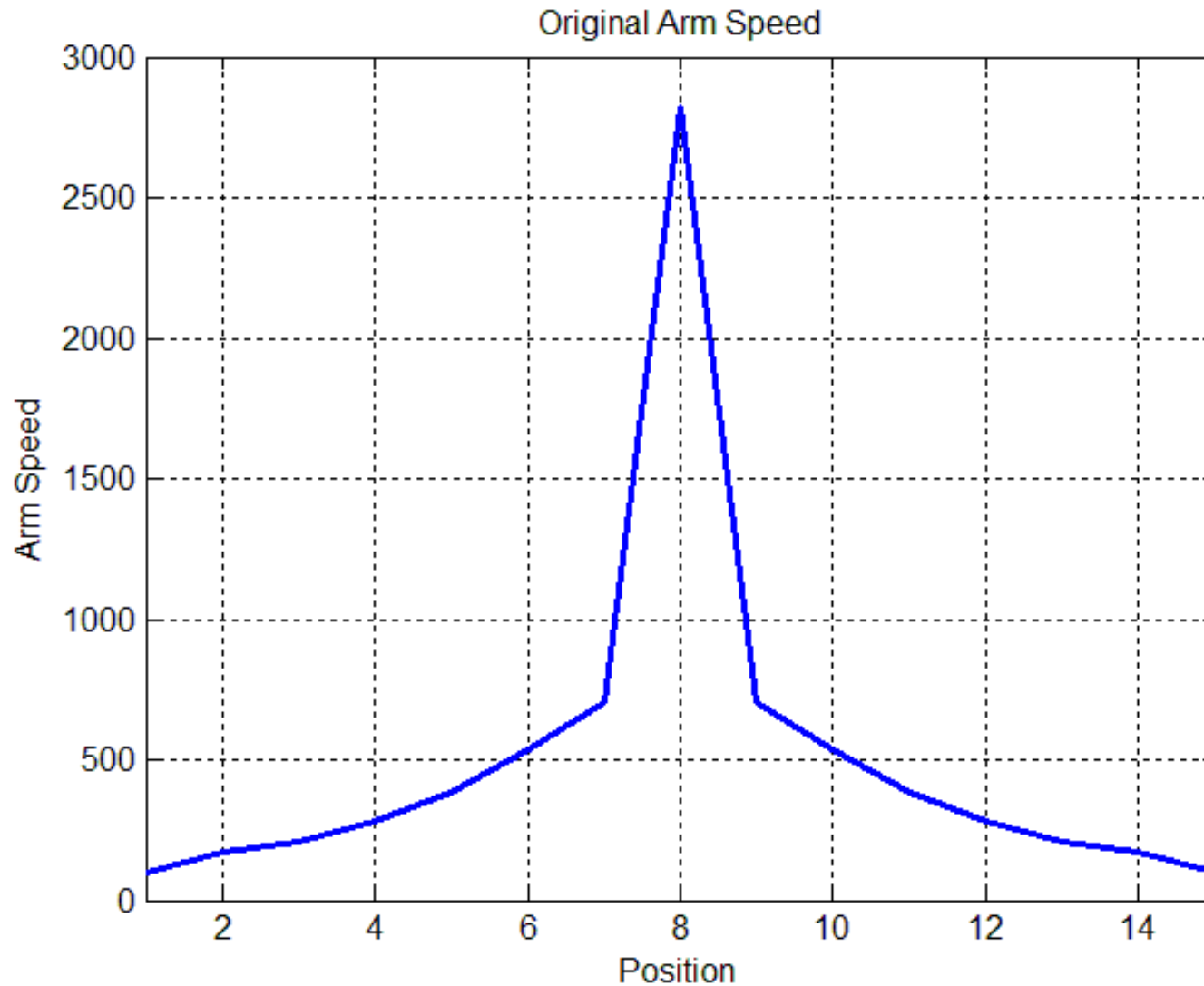
Trench Shape



Most SEMs at
this location

200 um

- Raise center 400,000 units from index 6 to 10



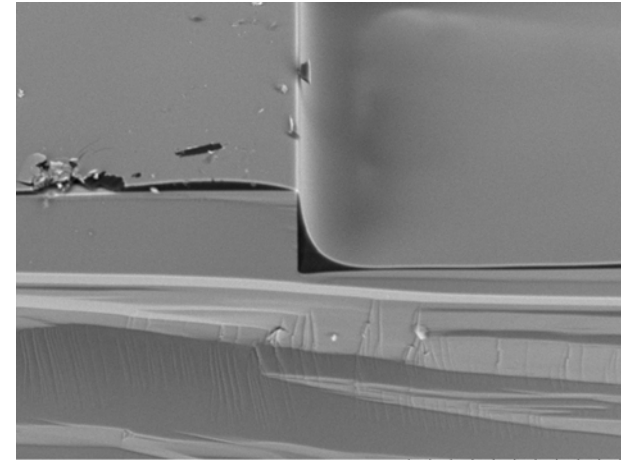
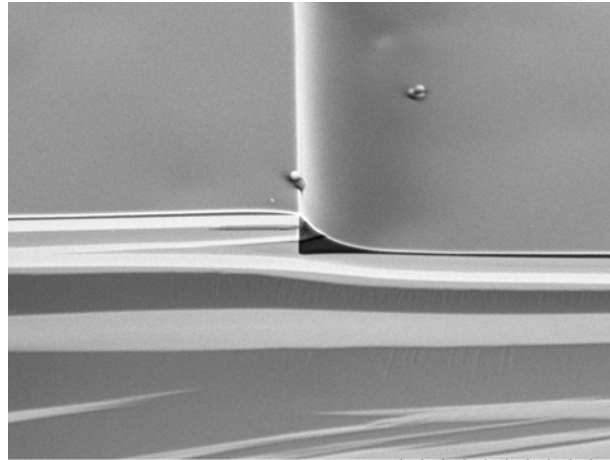
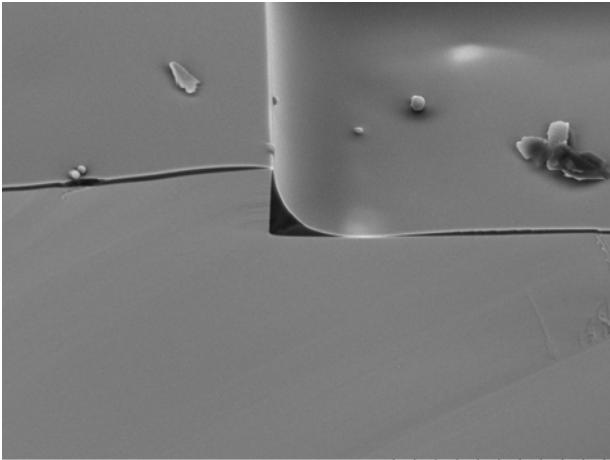
Vary Pressure and Resist Mix

	SPR220-7:MEK:EL	
Nozzle Pressure (mbar)	11.4:60.6:28	8:57:35
300	30 um & 50 um	30 um & 50 um
450	30 um & 50 um	30 um & 50 um
600	30 um & 50 um	30 um & 50 um

300 mbar

450 mbar

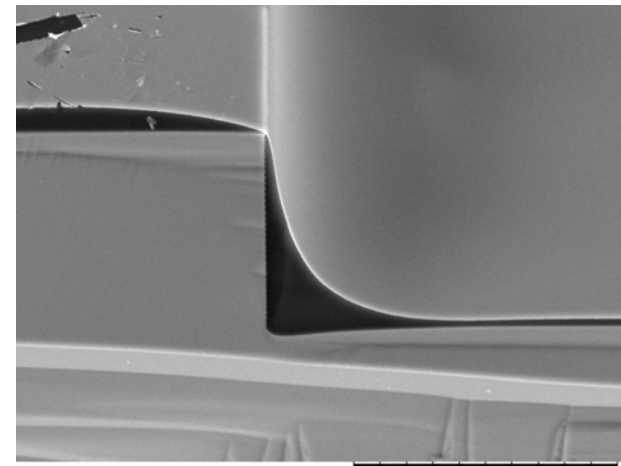
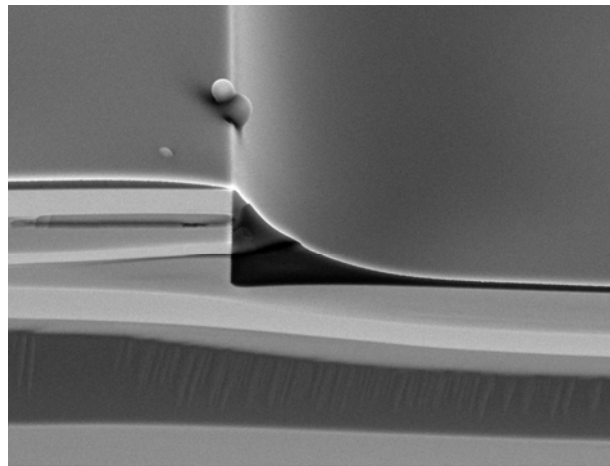
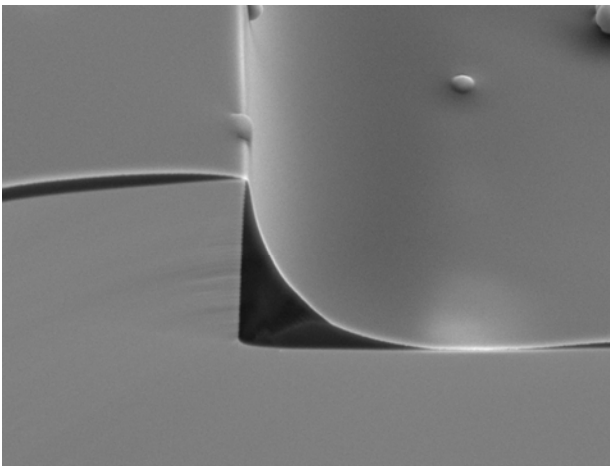
600 mbar



Stanford L x600 100 um

Stanford L x600 100 um

Stanford L x600 100 um

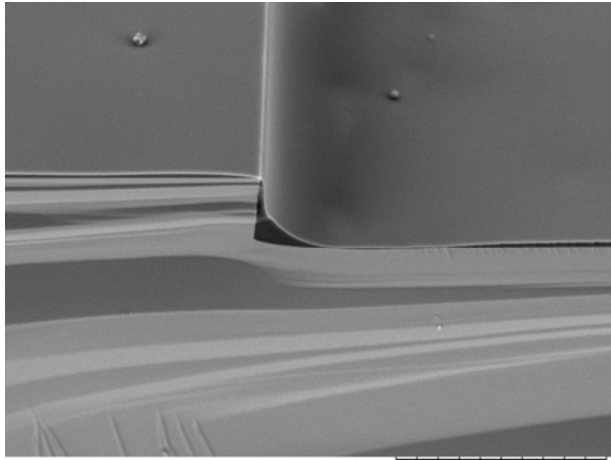


Stanford L x1.5k 50 um

Stanford L x1.5k 50 um

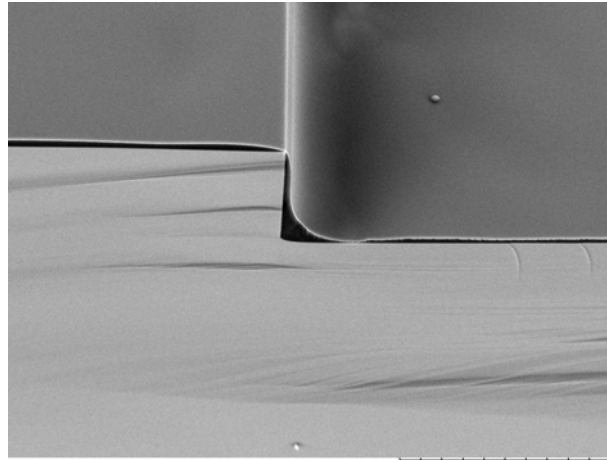
Stanford L x1.5k 50 um

300 mbar



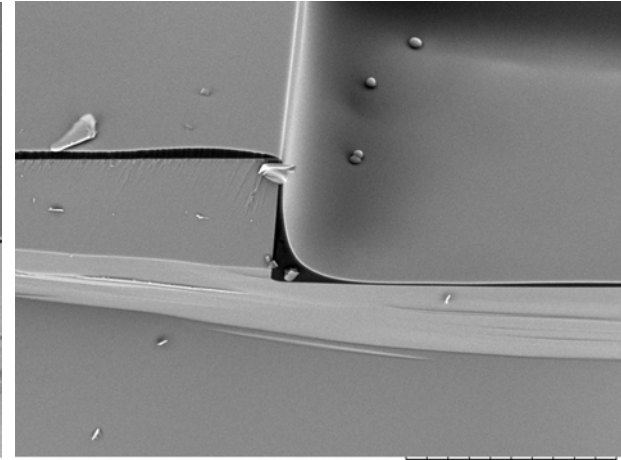
Stanford L x600 100 um

450 mbar

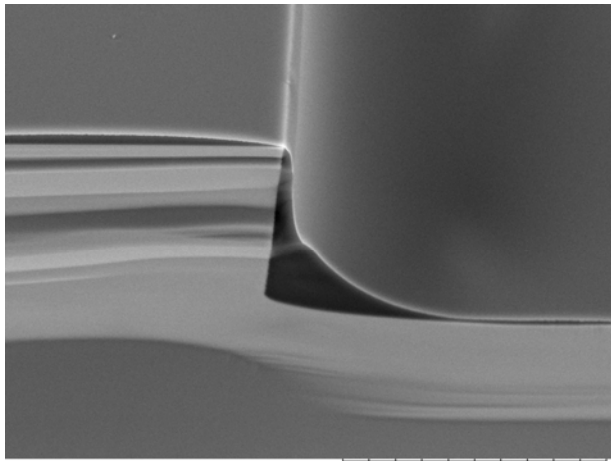


Stanford L x600 100 um

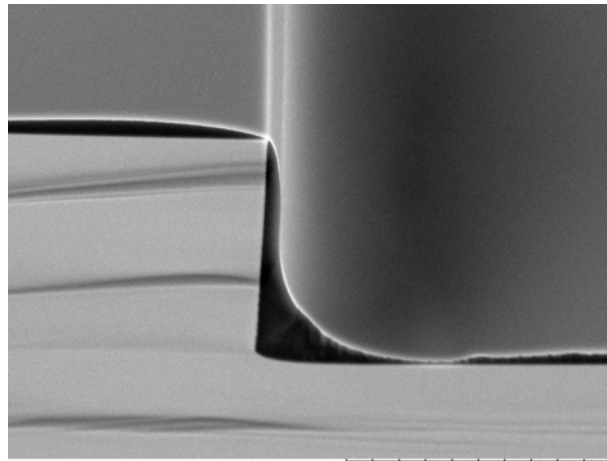
600 mbar



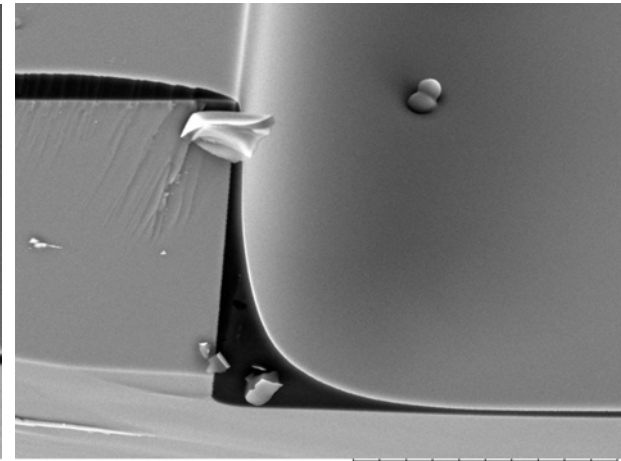
Stanford L x600 100 um



Stanford L x1.5k 50 um

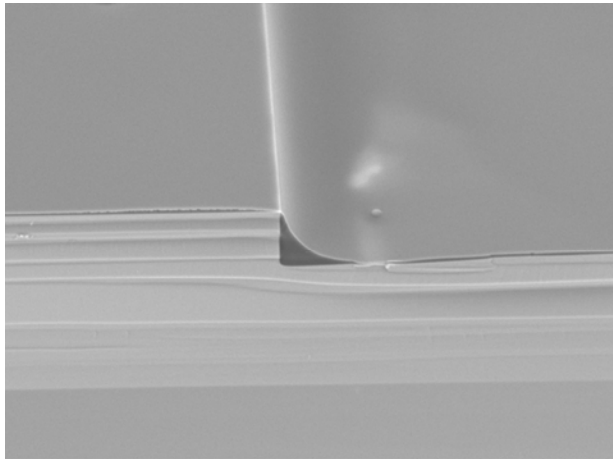


Stanford L x1.5k 50 um



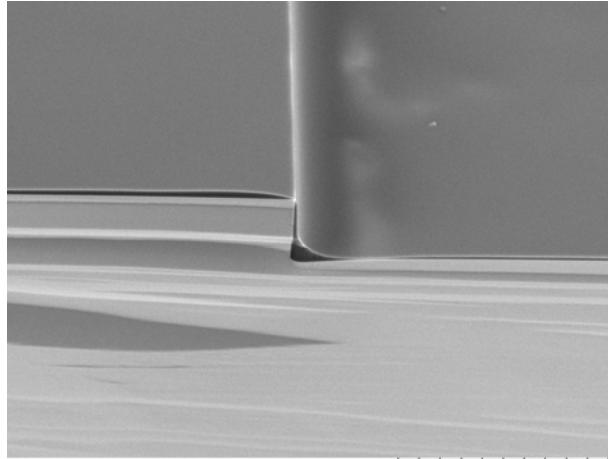
Stanford L x1.5k 50 um

300 mbar



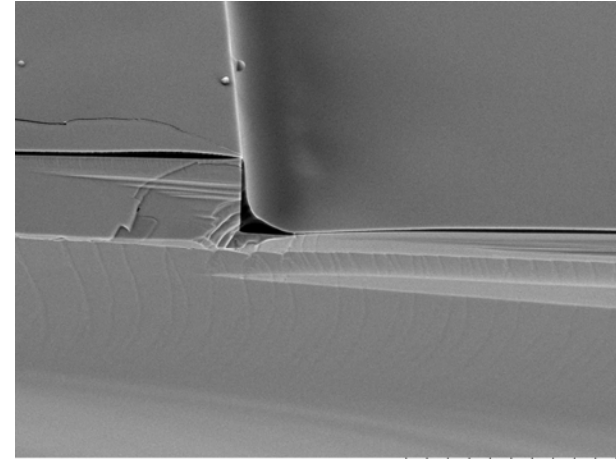
Stanford L x600 100 um

450 mbar

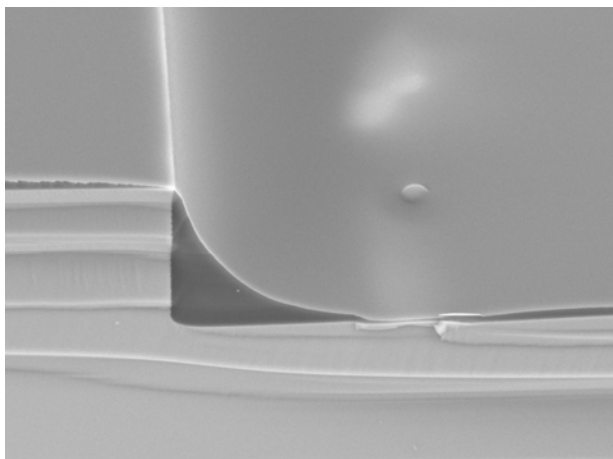


Stanford L x600 100 um

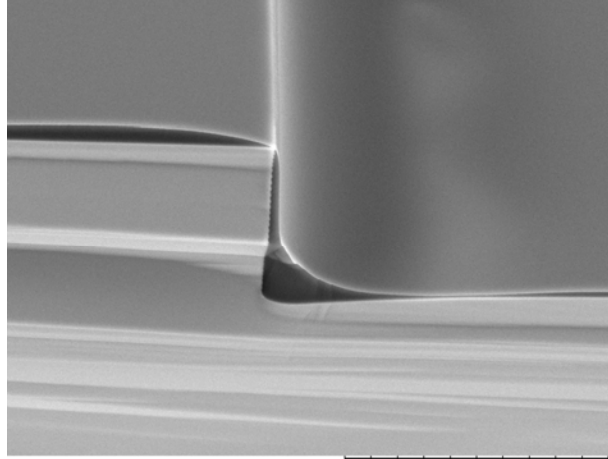
600 mbar



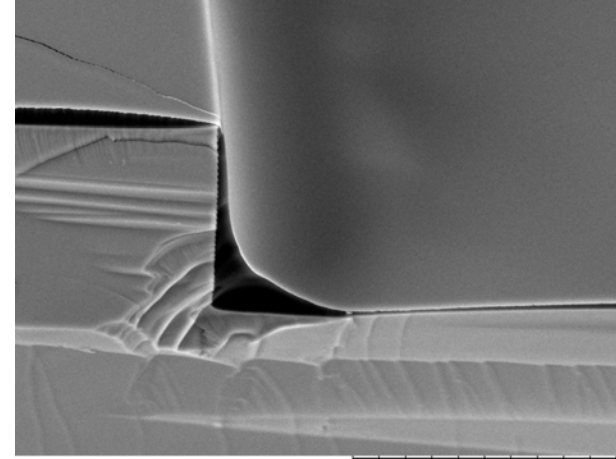
Stanford L x600 100 um



Stanford L x1.5k 50 um



Stanford L x1.5k 50 um

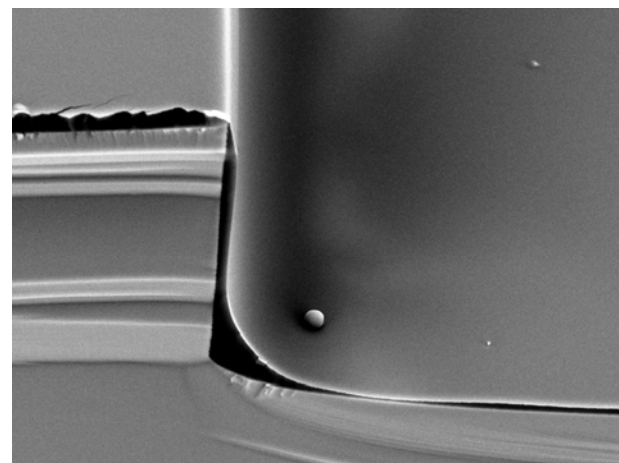
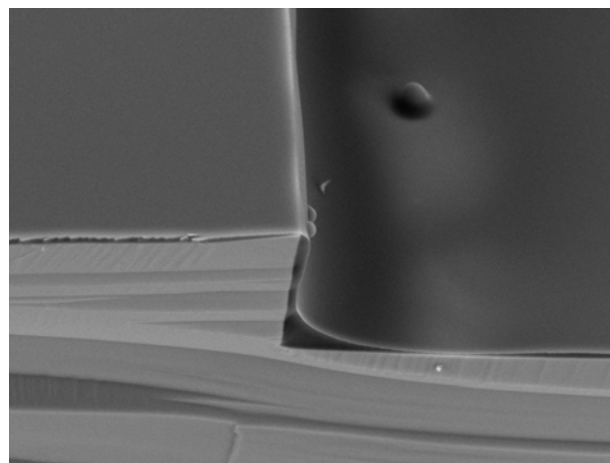
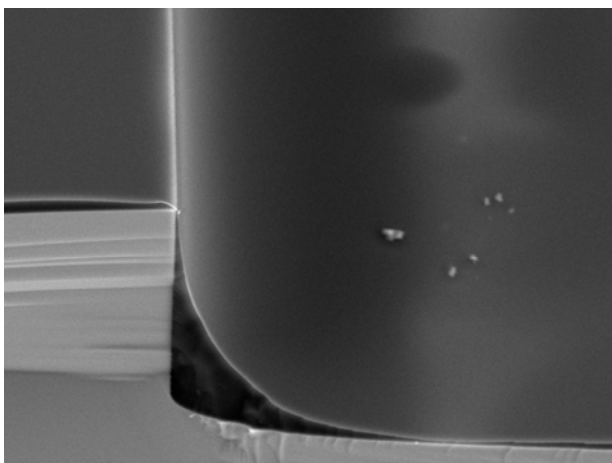
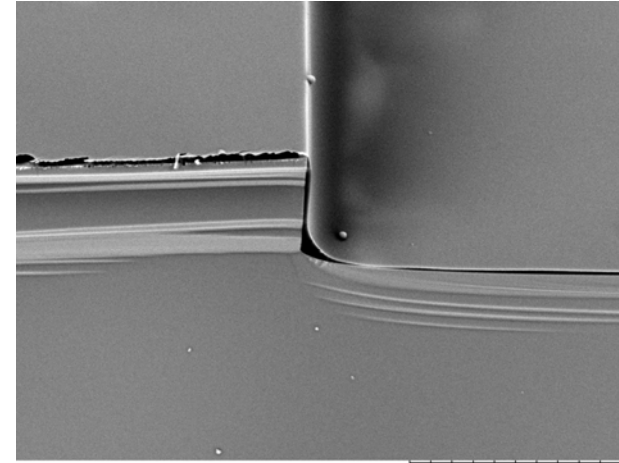
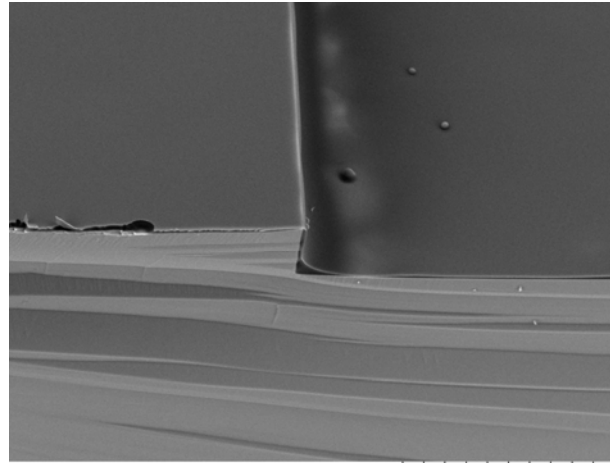
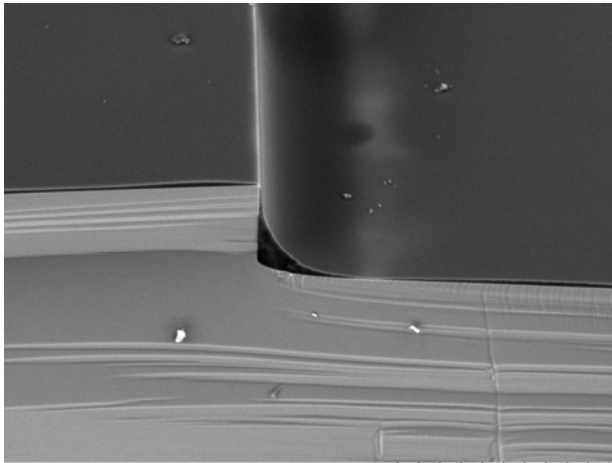


Stanford L x1.5k 50 um

300 mbar

450 mbar

600 mbar



Stanford

L x600 100 um

Stanford

L x600 100 um

Stanford

L x600 100 um

Stanford

L x1.5k 50 um

Stanford

L x1.5k 50 um

Stanford

L x1.5k 50 um

Vary Number of Passes

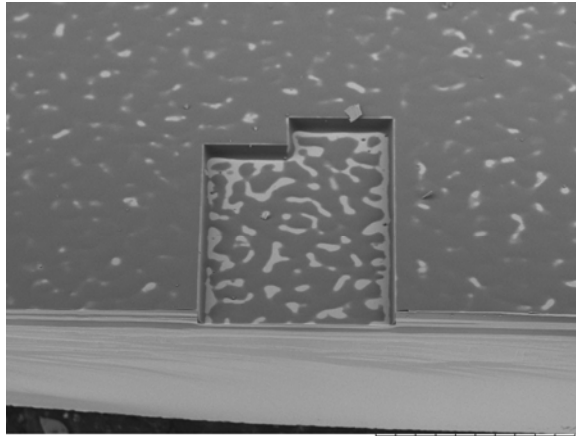
All at 600 mbar	SPR220-7:MEK:EL
Number of Passes	8:57:35
3 Passes	30 um & 50 um
5 Passes	30 um & 50 um
10 Passes	30 um & 50 um

3 pass

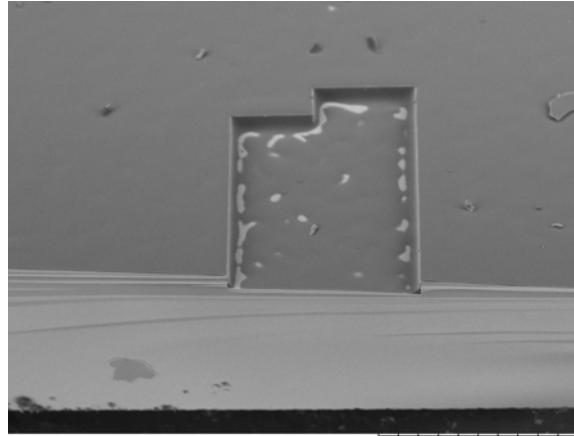
5 pass

10 pass

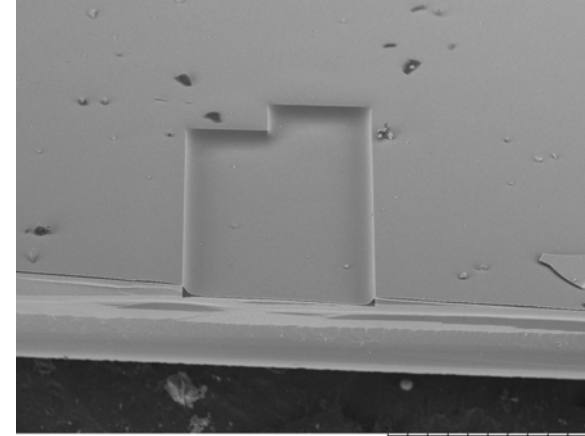
30
um



Stanford L x120 500 um

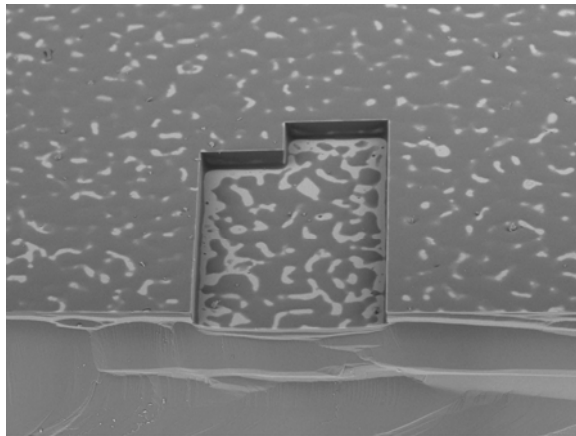


Stanford L x120 500 um

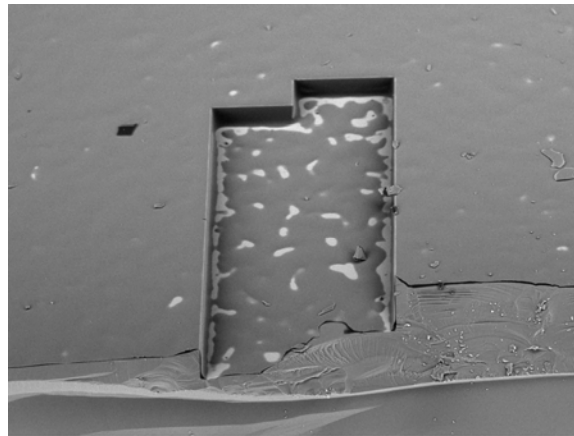


Stanford L x120 500 um

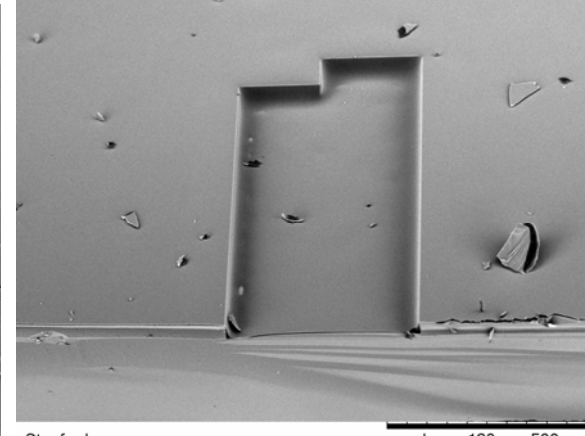
50
um



Stanford L x120 500 um



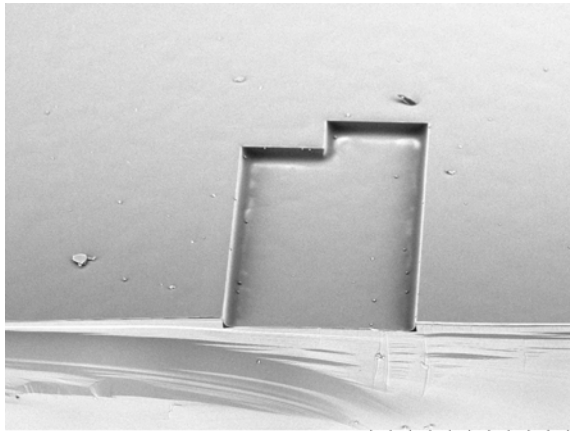
Stanford L x120 500 um



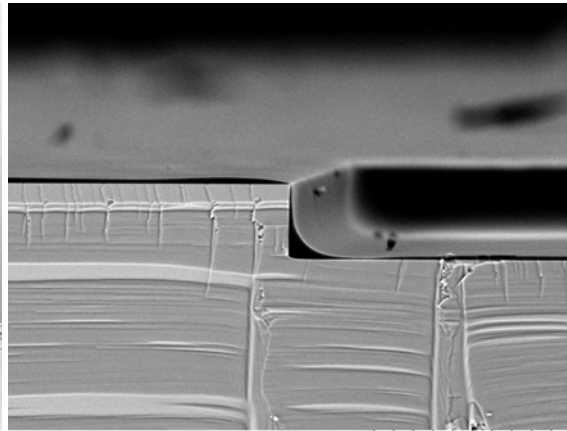
Stanford L x120 500 um

Test Effect of Surface Properties

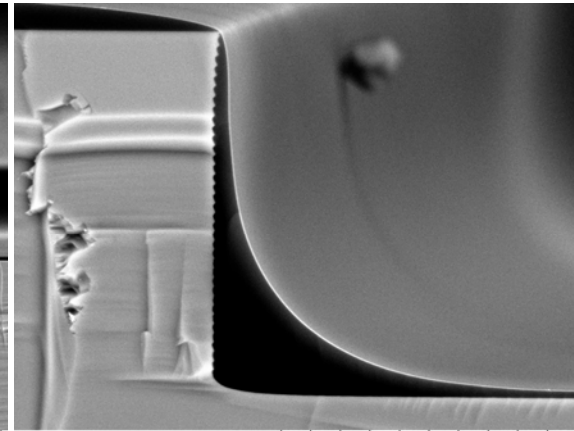
HF
Dip



Stanford L x120 500 um

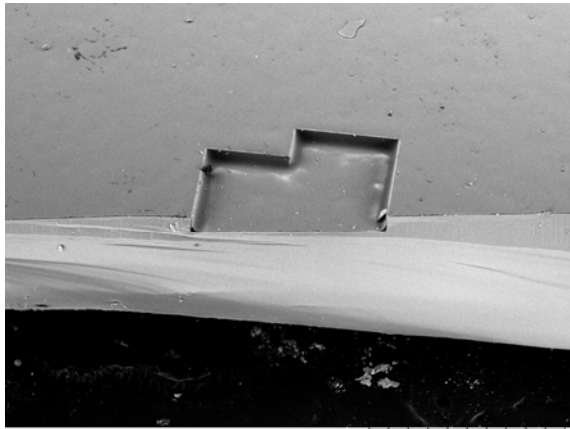


Stanford L x600 100 um

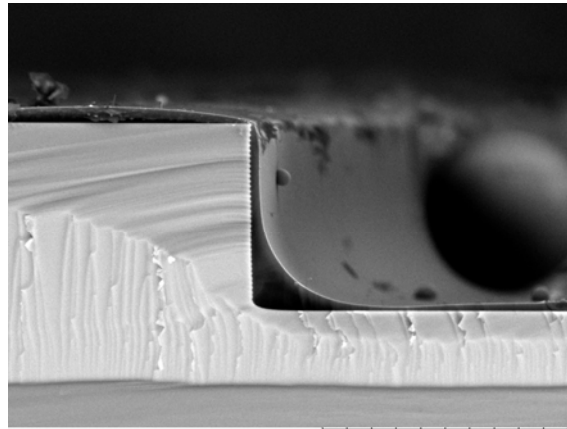


Stanford L x3.0k 30 um

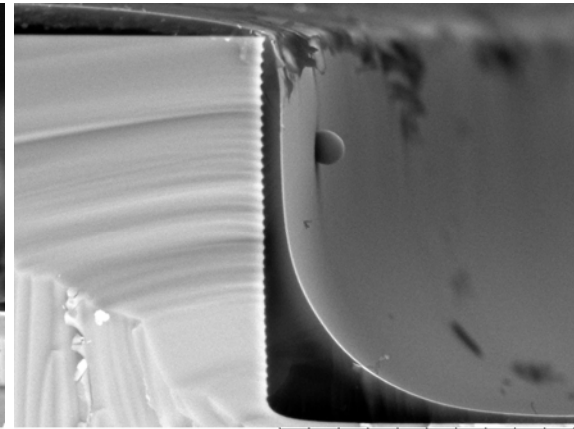
No
Dip



Stanford L x120 500 um



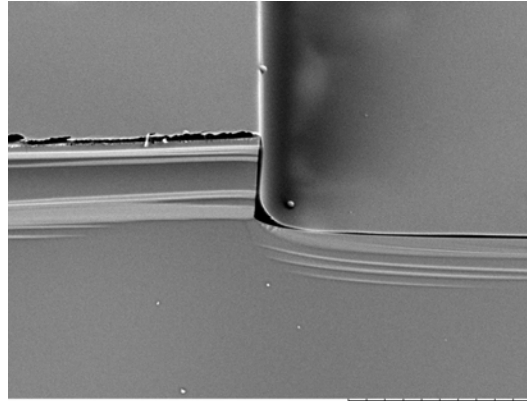
Stanford L x1.5k 50 um



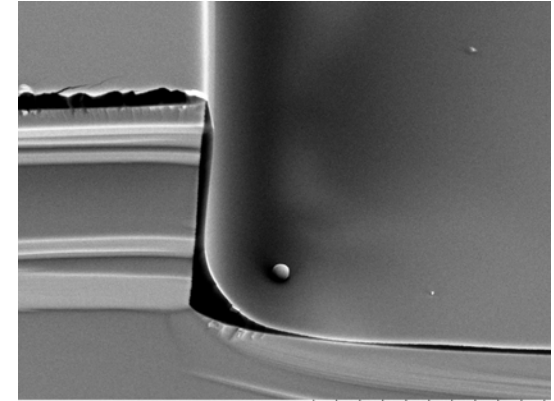
Stanford L x3.0k 30 um

r8%-p600-5pass-50um

1st
try

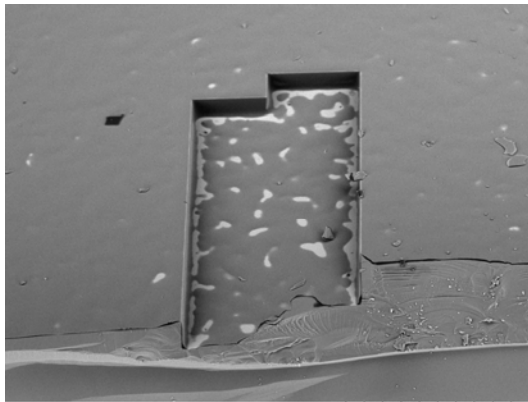


Stanford L x600 100 um

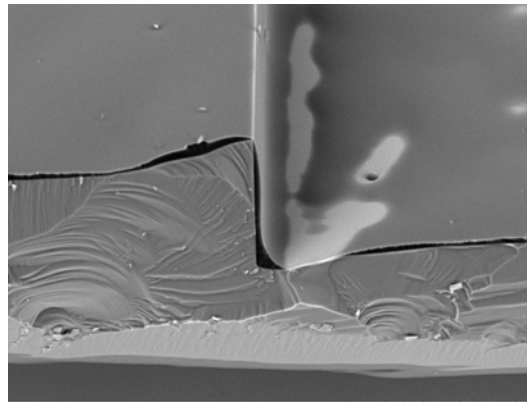


Stanford L x1.5k 50 um

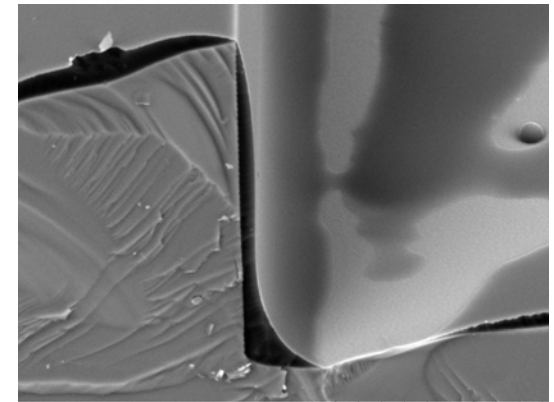
2nd
try



Stanford L x120 500 um

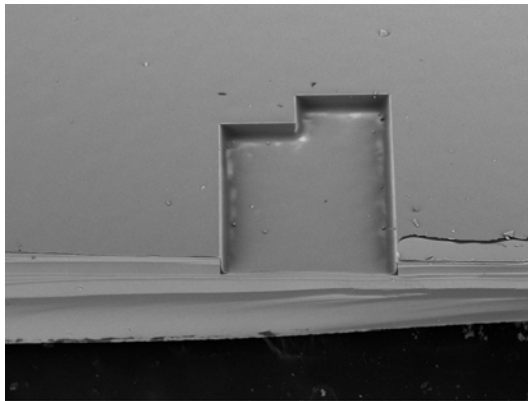


Stanford L x600 100 um

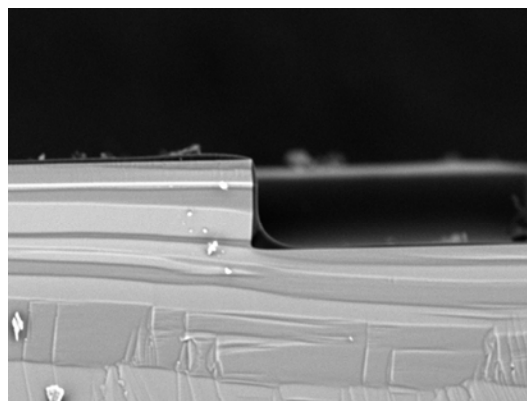


Stanford L x1.5k 50 um

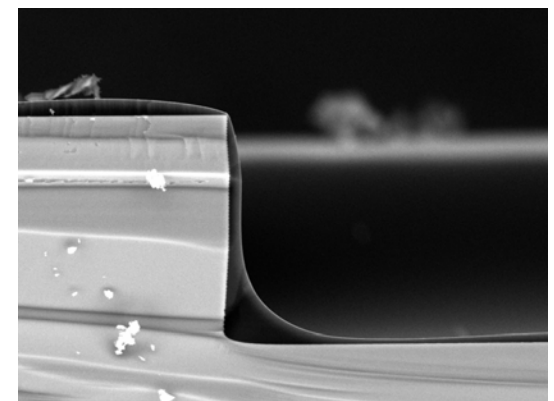
3rd
try



Stanford L x120 500 um

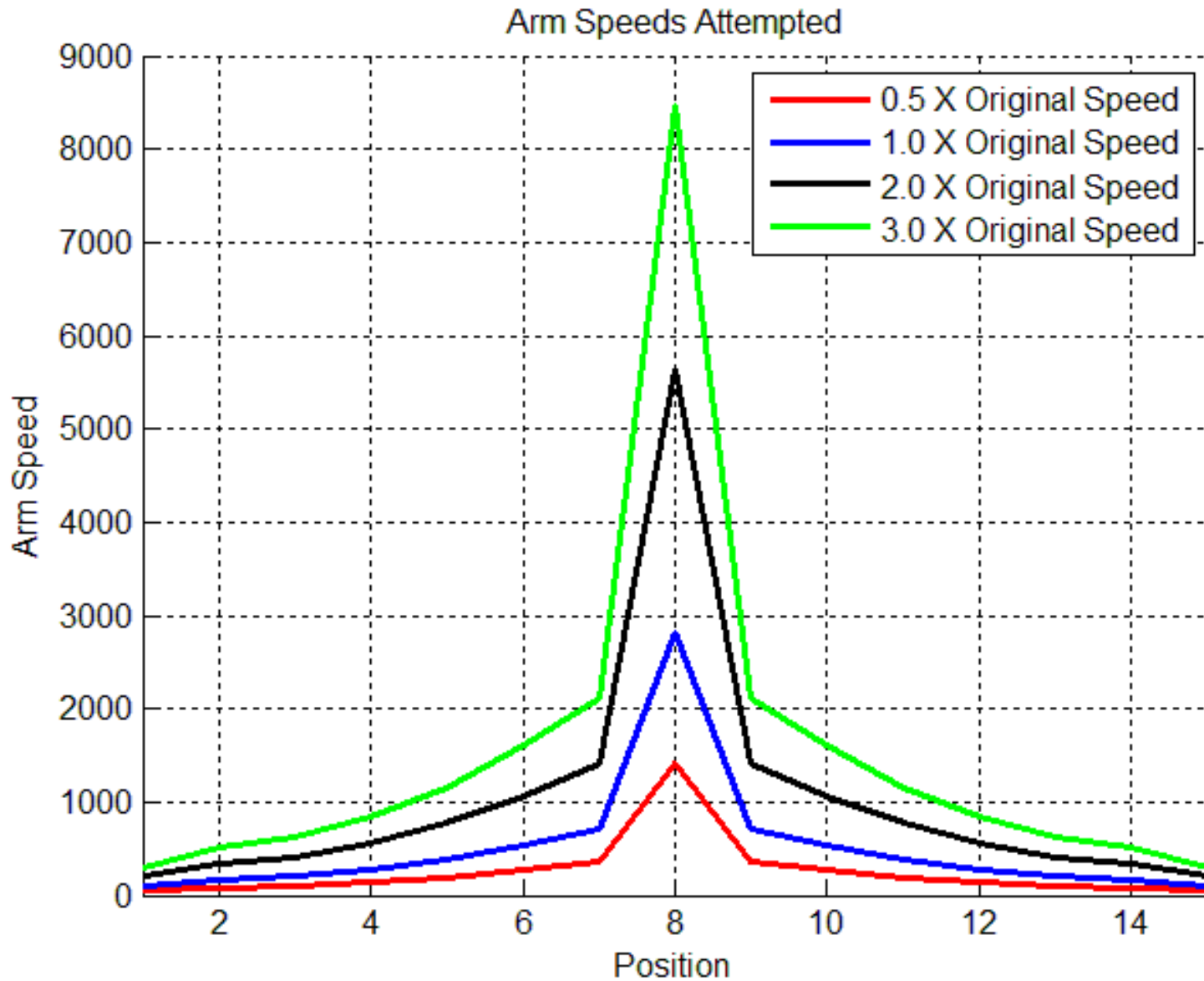


Stanford L x600 100 um

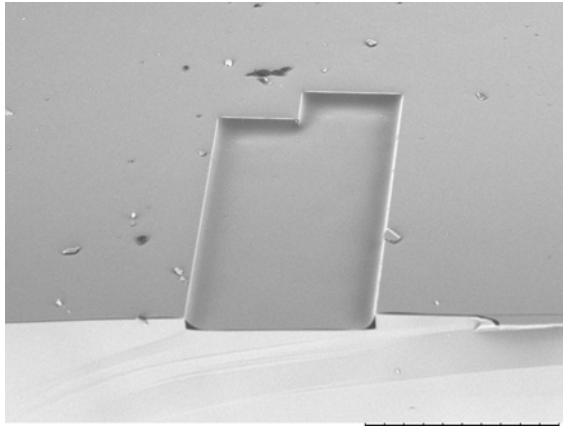


Stanford L x1.5k 50 um

Arm Speeds Attempted

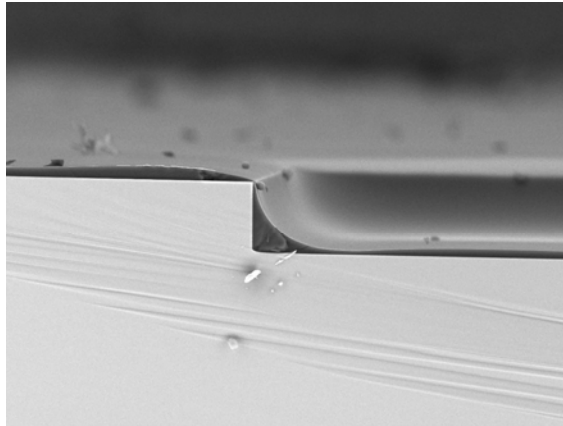


30
um



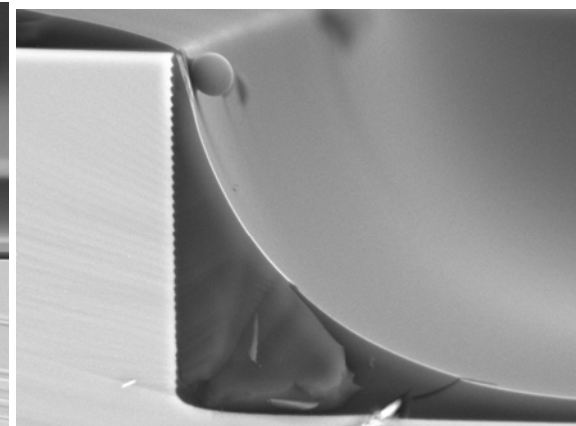
Stanford

L x120 500 um



Stanford

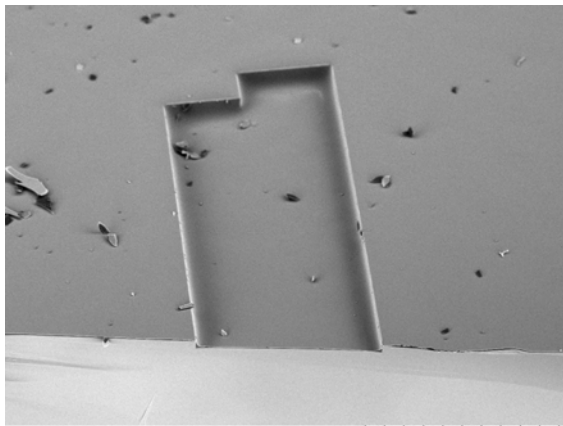
L x600 100 um



Stanford

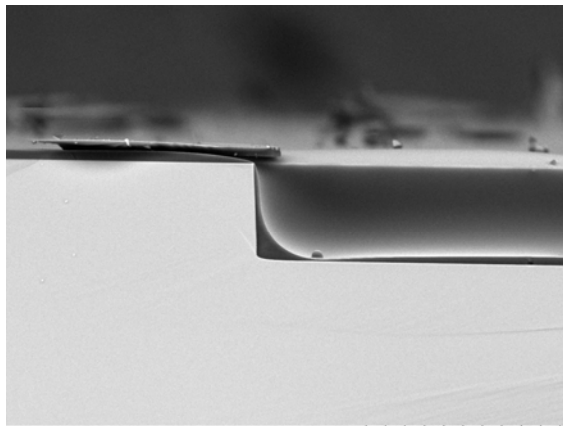
L x3.0k 30 um

50
um



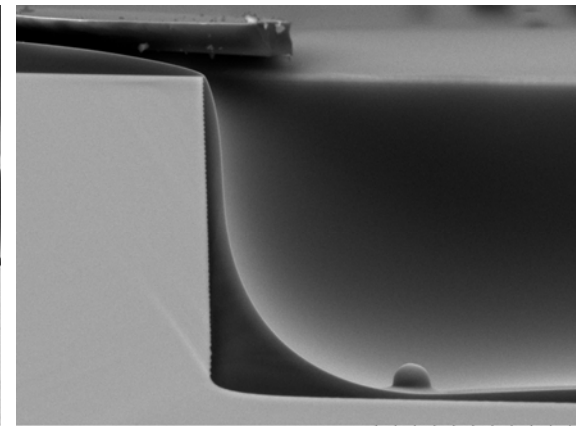
Stanford

L x120 500 um



Stanford

L x600 100 um

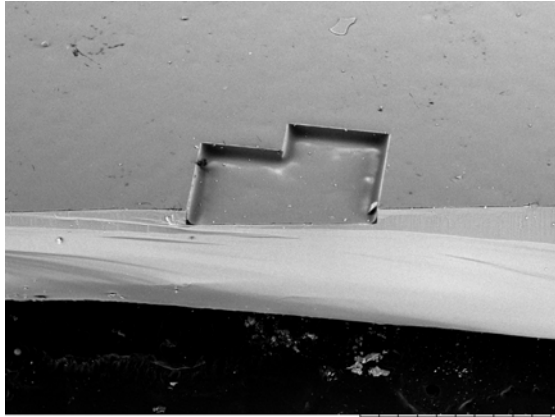


Stanford

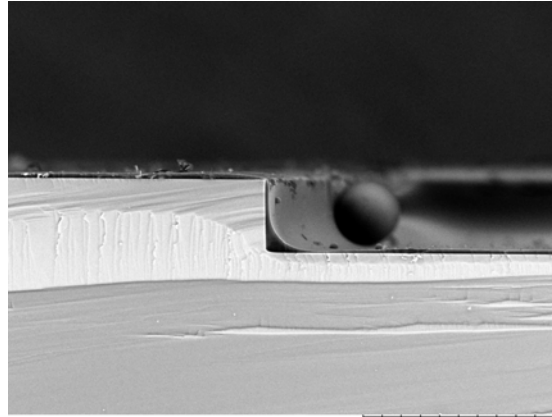
L x2.0k 30 um

r8%-p600-5pass-spd10

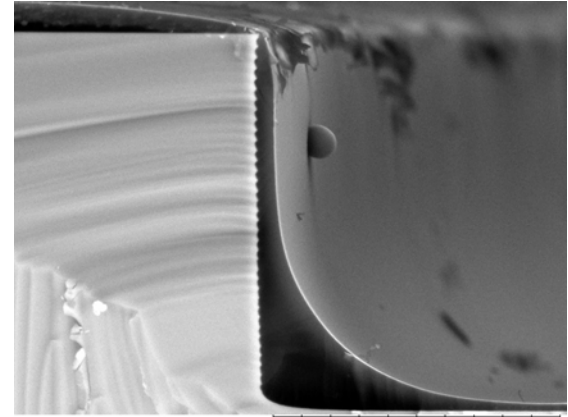
30
um



Stanford L x120 500 um

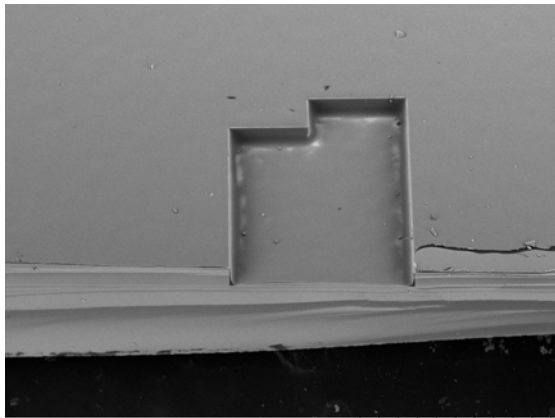


Stanford L x600 100 um

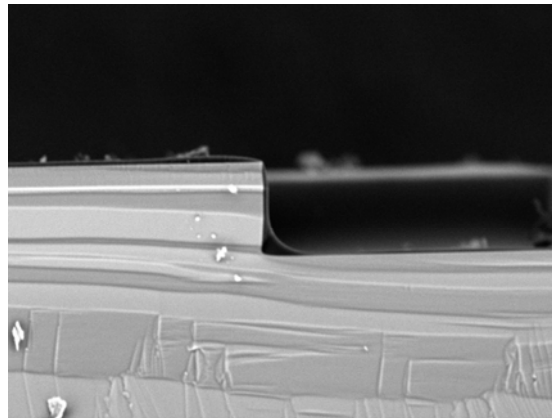


Stanford L x3.0k 30 um

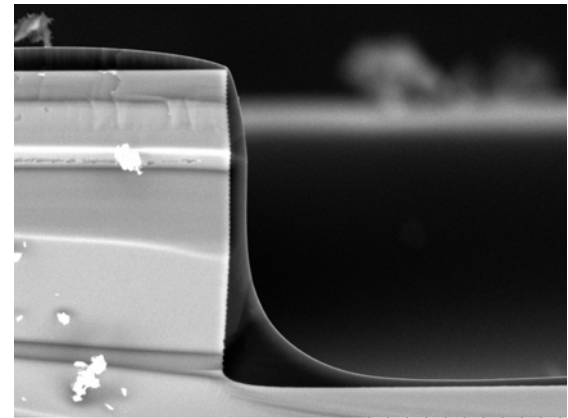
50
um



Stanford L x120 500 um



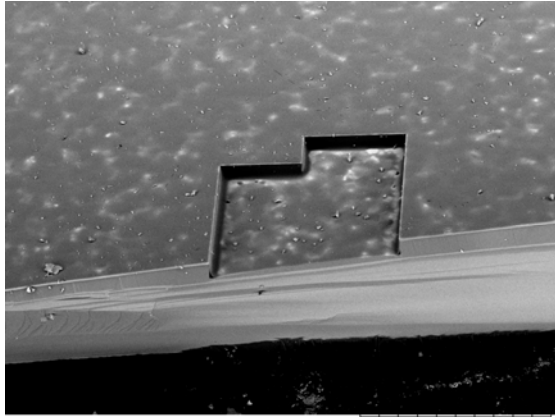
Stanford L x600 100 um



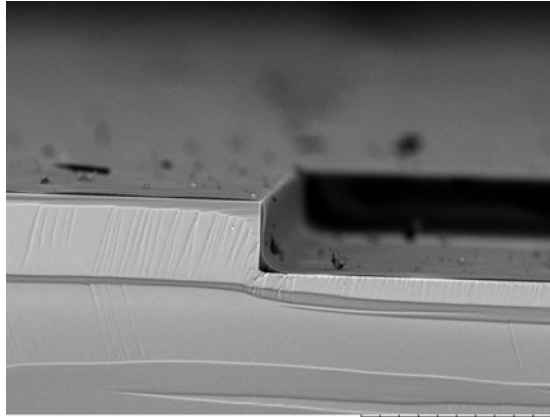
Stanford L x2.0k 30 um

r8%-p600-5pass-sp20

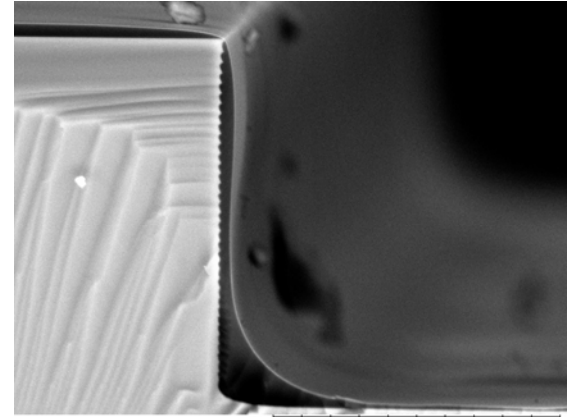
30
um



Stanford L x120 500 um

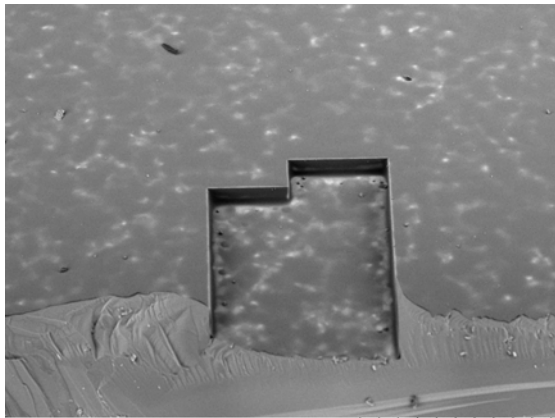


Stanford L x600 100 um

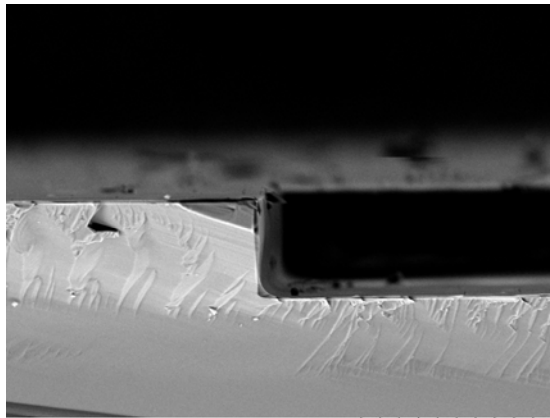


Stanford L x3.0k 30 um

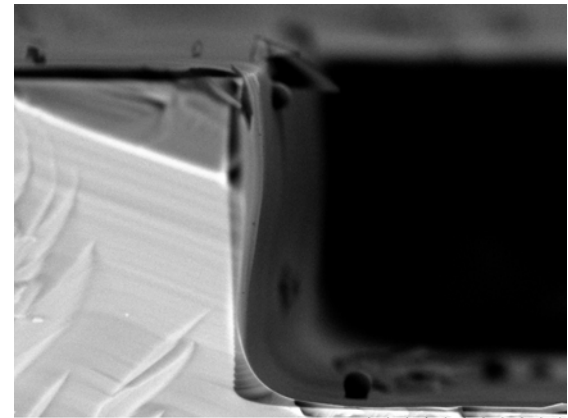
50
um



Stanford L x120 500 um



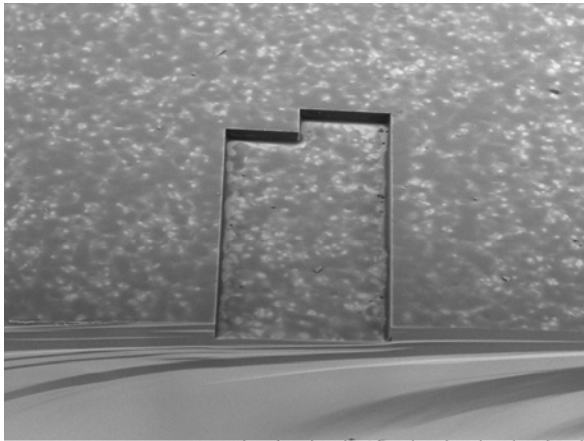
Stanford L x600 100 um



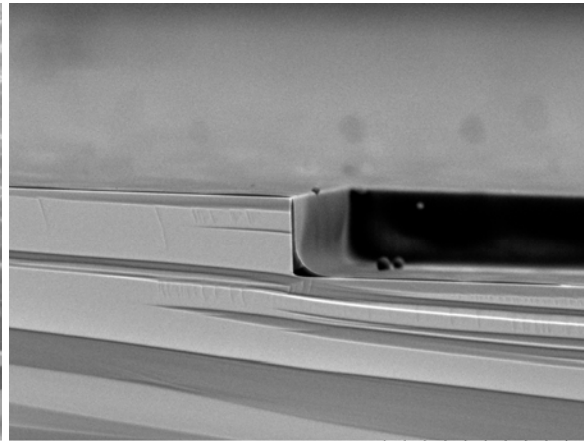
Stanford L x2.0k 30 um

r8%-p600-5pass-sp30

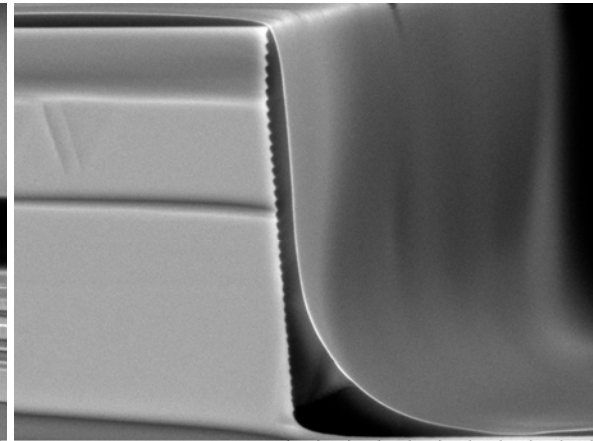
30
um



Stanford L x100 1 mm

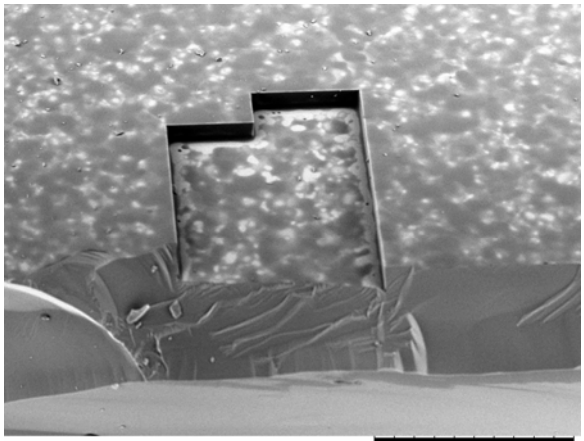


Stanford L x600 100 um

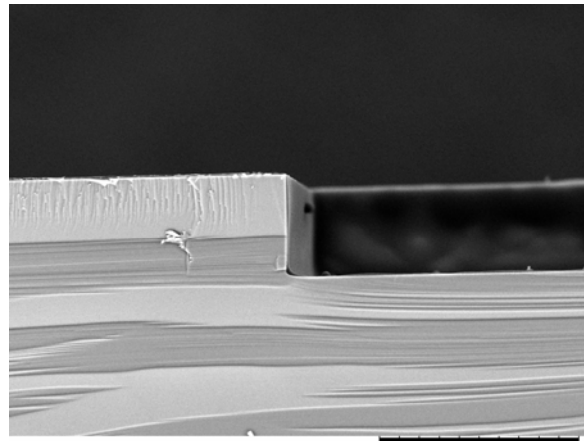


Stanford L x3.0k 30 um

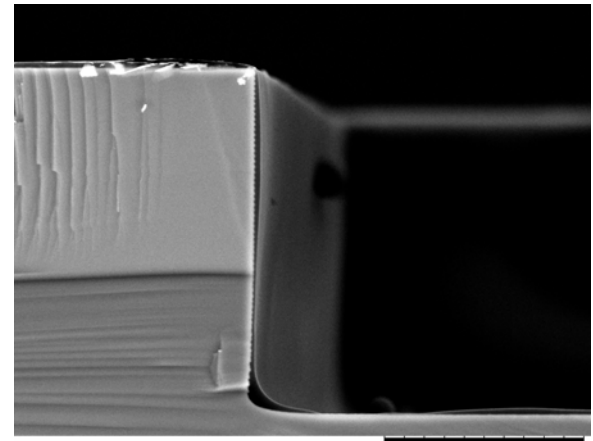
50
um



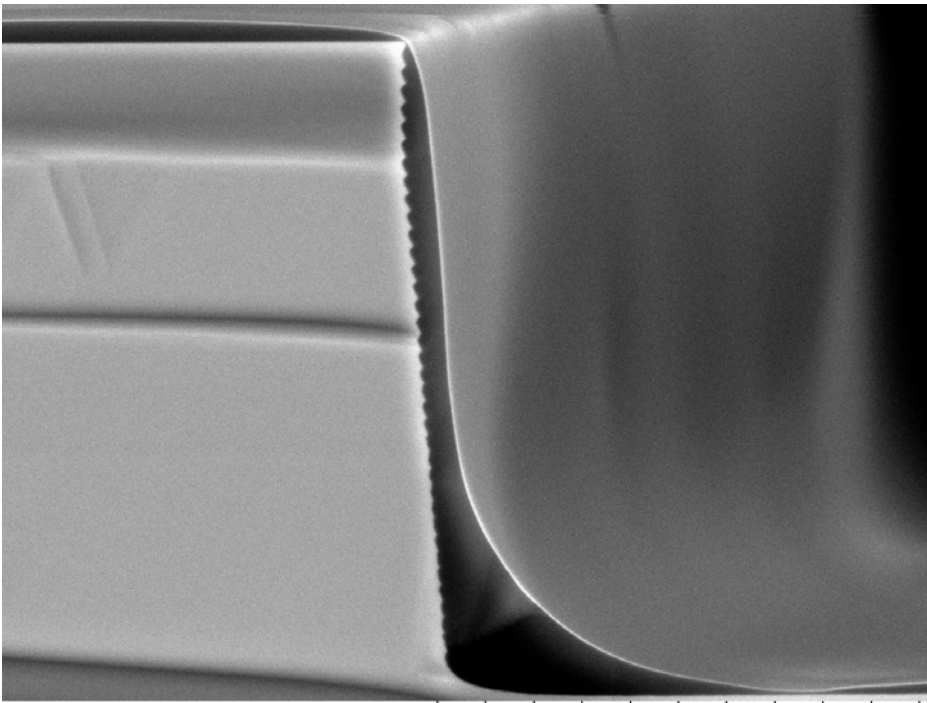
Stanford L x120 500 um



Stanford L x600 100 um



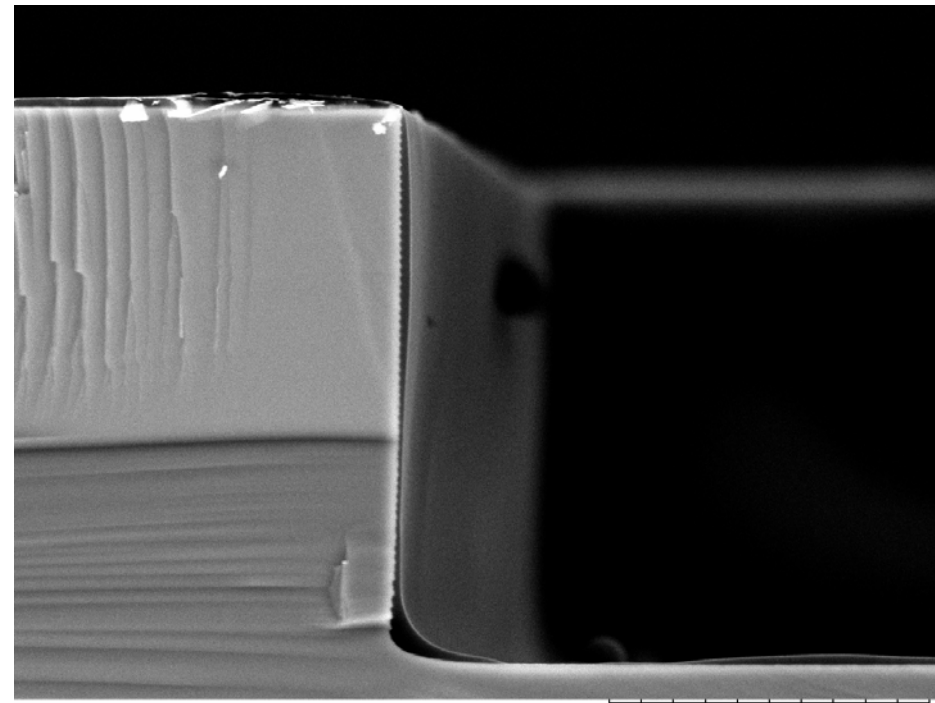
Stanford L x2.0k 30 um



Stanford

L x3.0k 30 um

30
um



Stanford

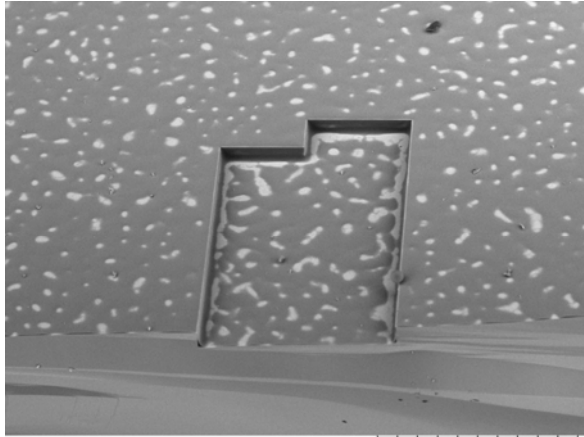
L x2.0k 30 um

50
um

Vary Number of Passes

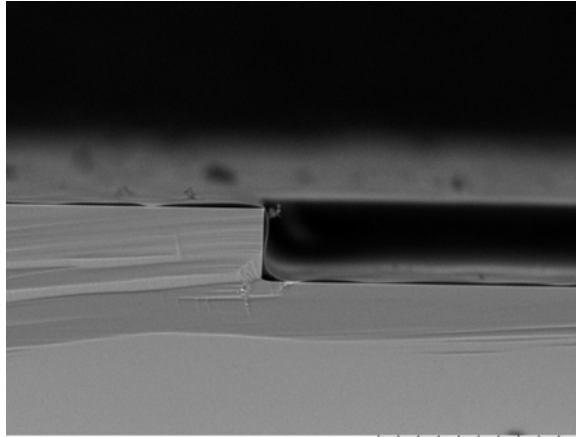
All at 600 mbar and 3 X Original Speed	SPR220-7:MEK:EL
Number of Passes	8:57:35
10 Passes	30 um & 50 um
15 Passes	30 um & 50 um
20 Passes	30 um & 50 um

30
um



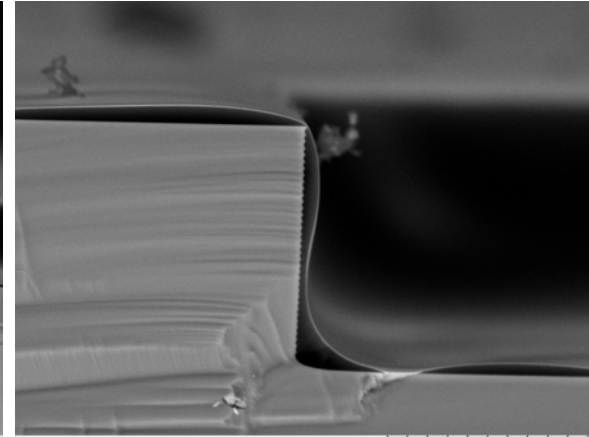
Stanford

L x120 500 um



Stanford

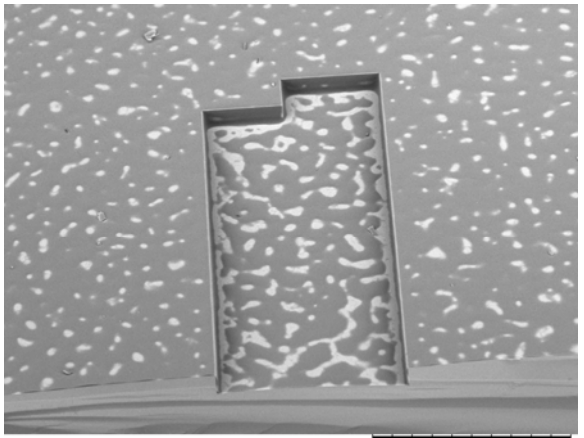
L x600 100 um



Stanford

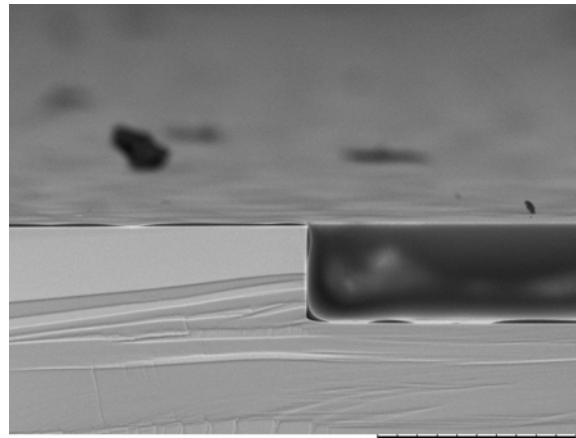
L x2.0k 30 um

50
um



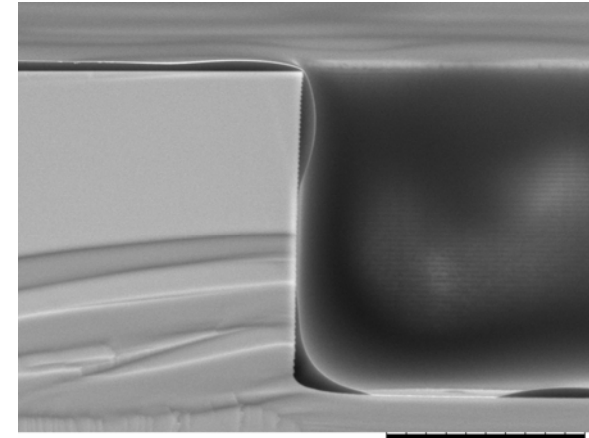
Stanford

L x120 500 um



Stanford

L x600 100 um

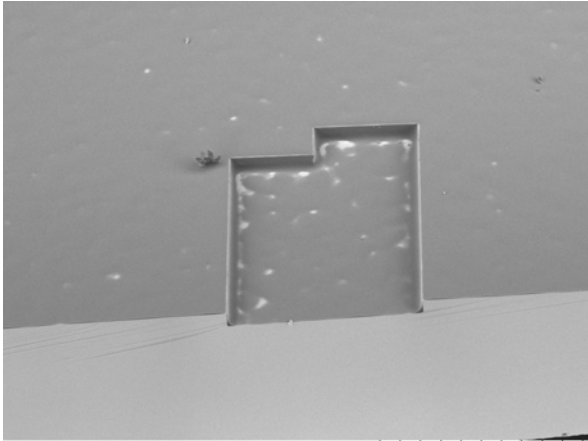


Stanford

L x2.0k 30 um

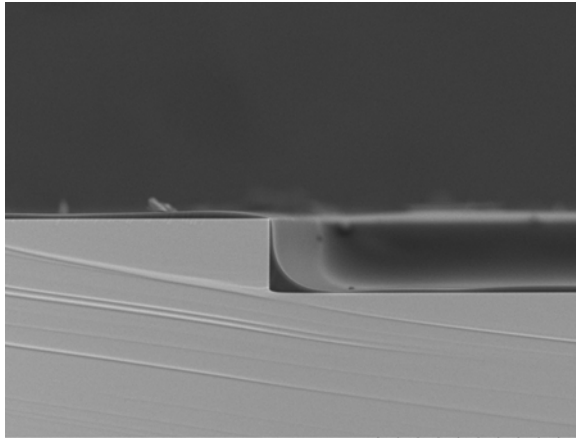
r8%-p600-spd30-20pass

30
um



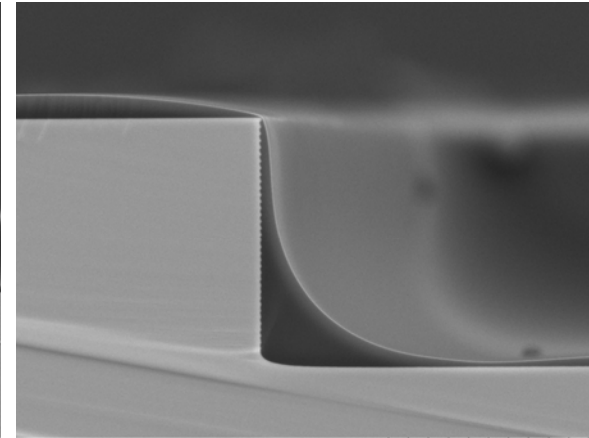
Stanford

L x120 500 um



Stanford

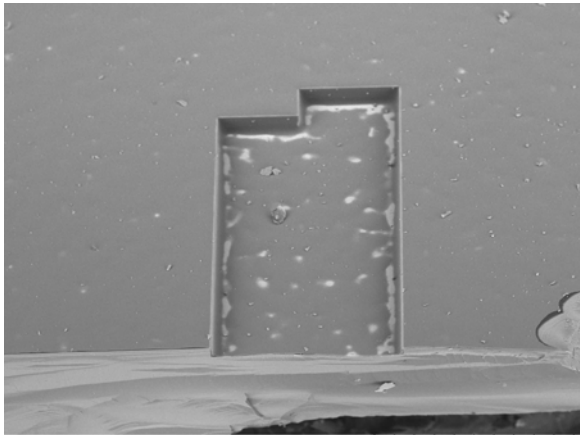
L x600 100 um



Stanford

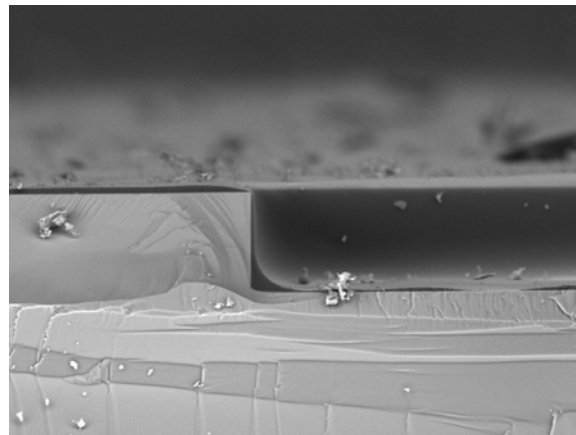
L x2.0k 30 um

50
um



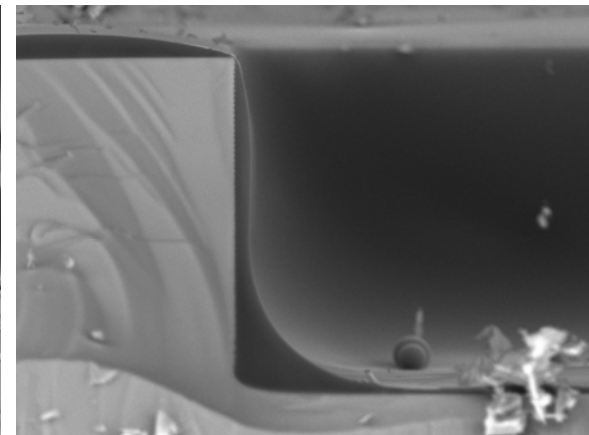
Stanford

L x120 500 um



Stanford

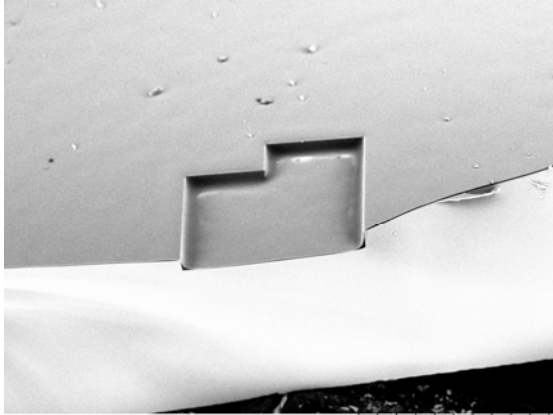
L x600 100 um



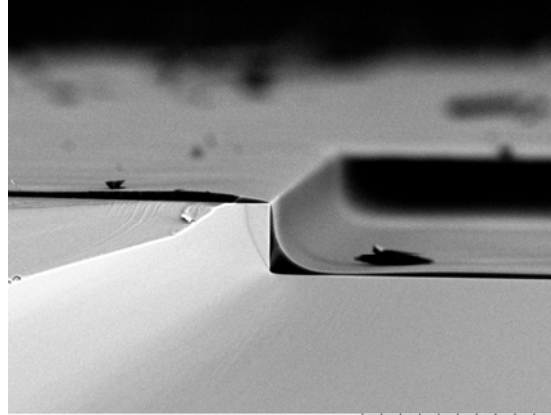
Stanford

L x2.0k 30 um

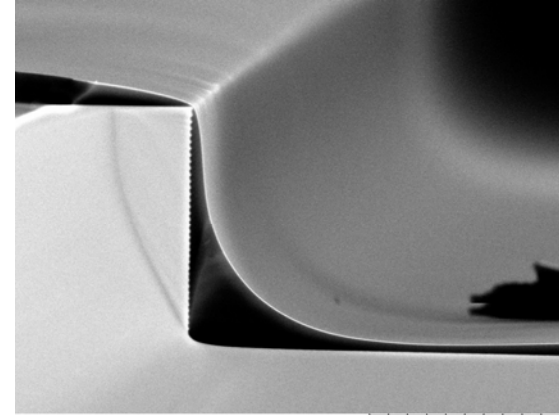
30
um



Stanford L x120 500 um

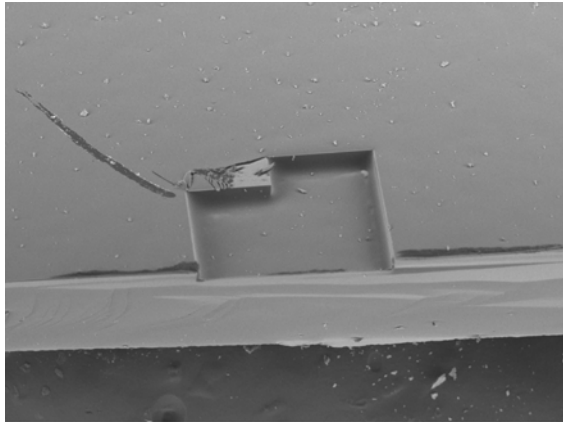


Stanford L x600 100 um

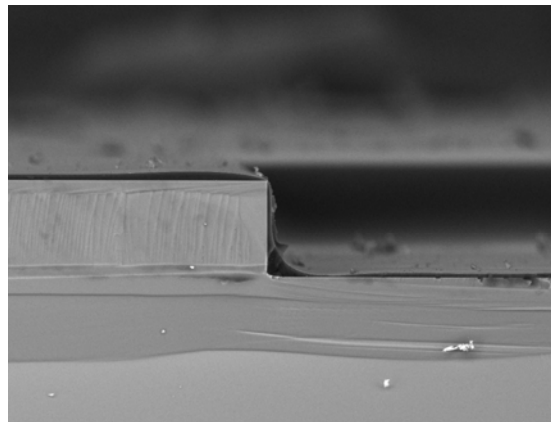


Stanford L x2.0k 30 um

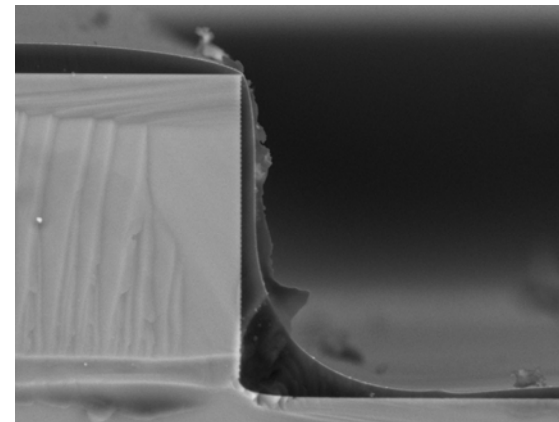
50
um



Stanford L x120 500 um



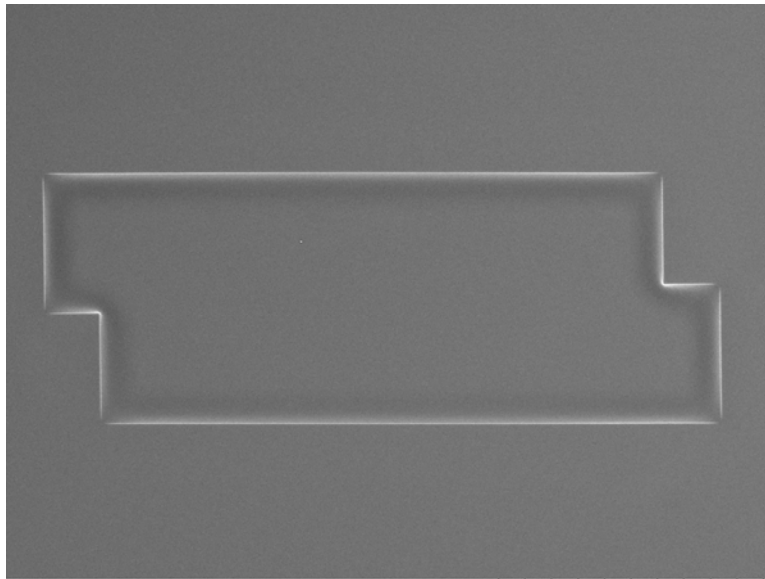
Stanford L x600 100 um



Stanford L x2.0k 30 um

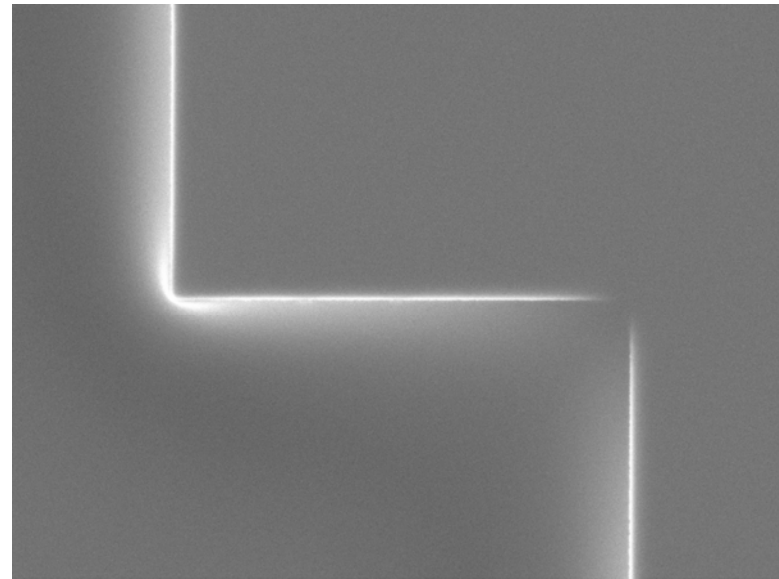
XeF2 Etch Test

30 μm



Stanford

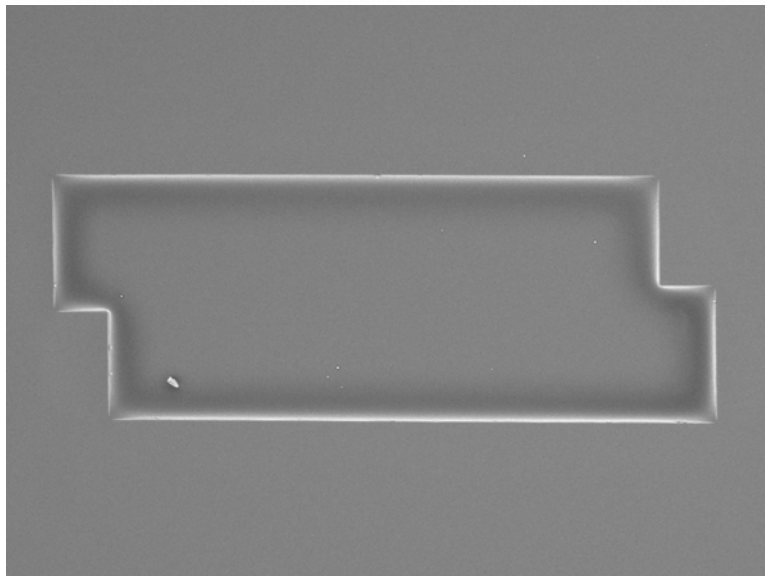
L x120 500 μm



Stanford

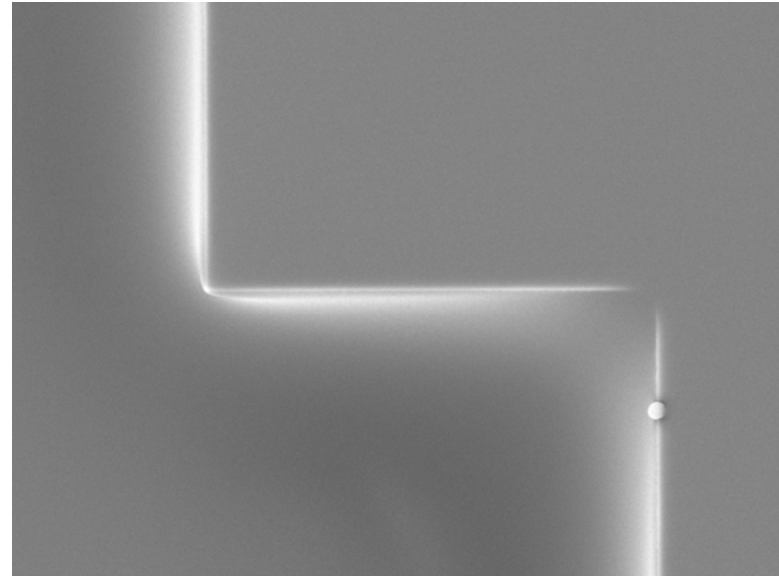
L x1.0k 100 μm

50 μm



Stanford

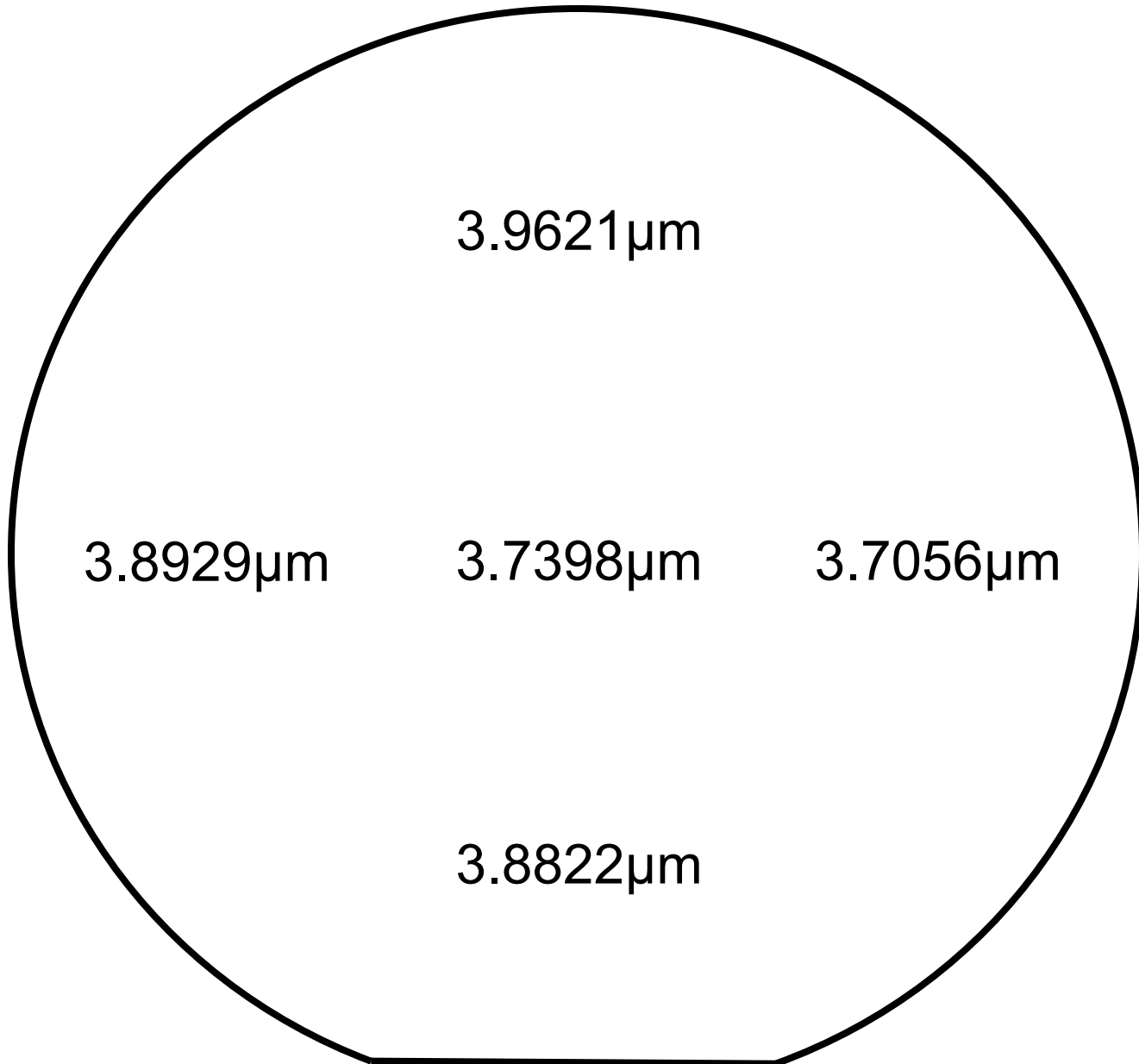
L x120 500 μm



Stanford

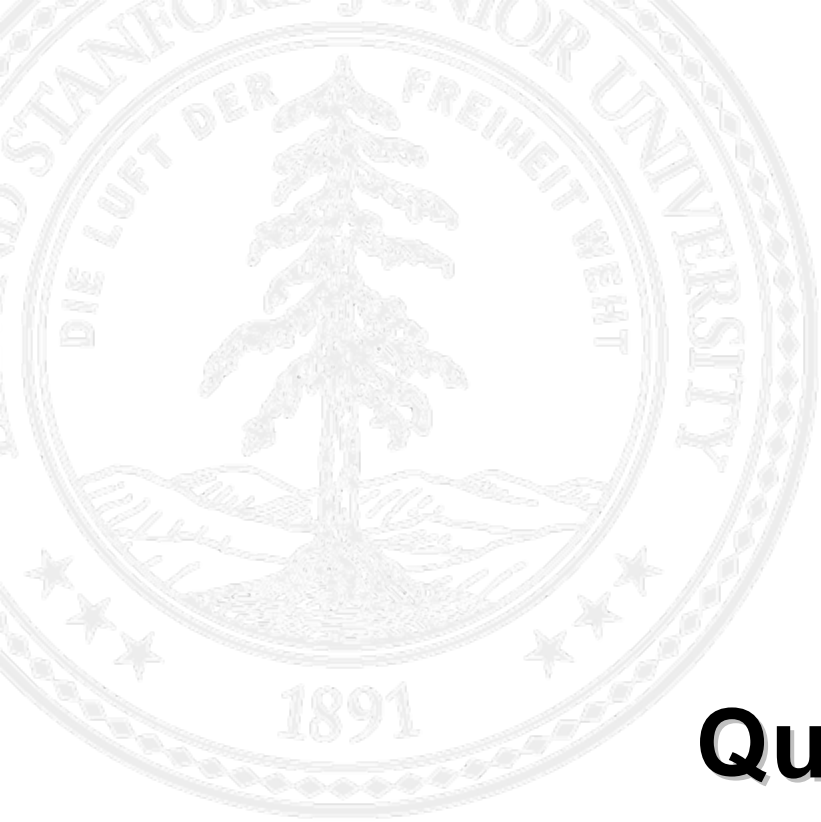
L x1.0k 100 μm

Resist Thickness Across Wafer



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Questions?

