Characterization of SU-8 Spin Coating over High Aspect Ratio Substrate Topography

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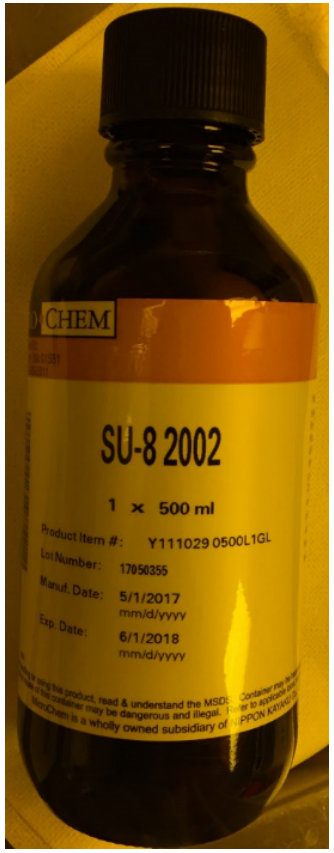
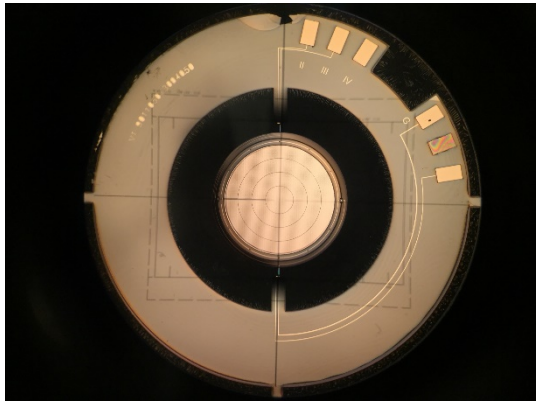
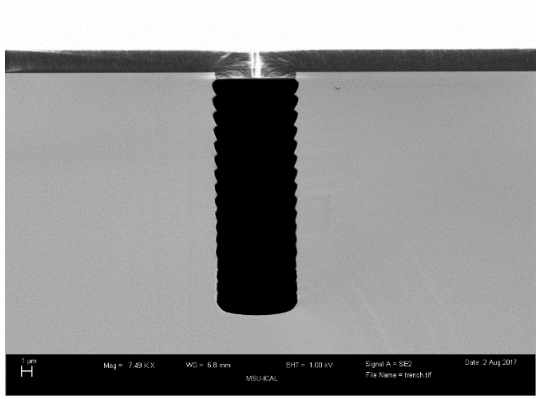
Background

- What is SU-8?
- Role of SU-8 in MEMS fabrication
- Spin coating
- Complications from topography
- High aspect ratio topography

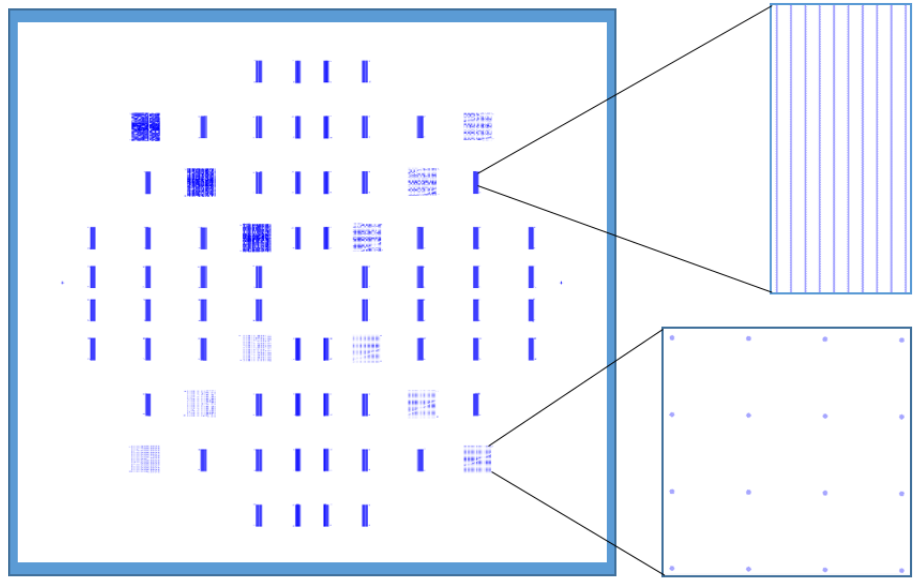




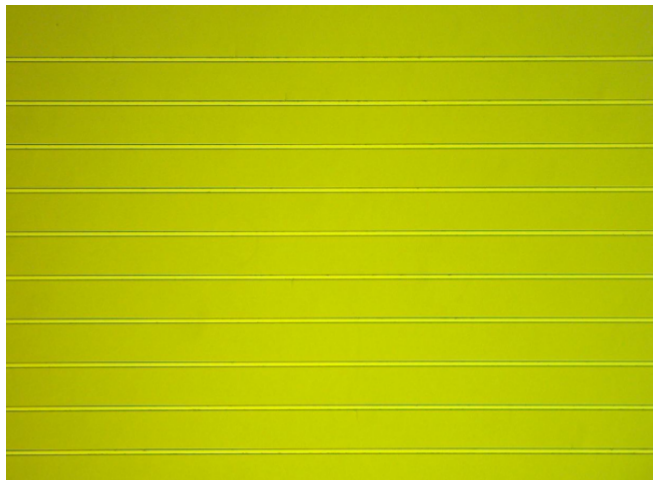


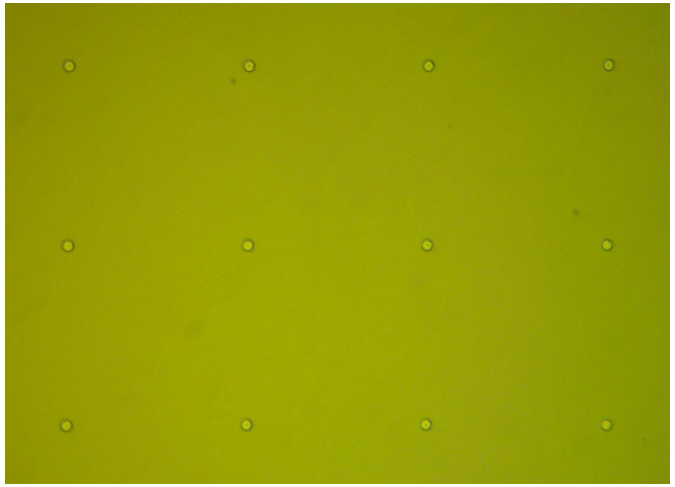
Objective

- Design and complete parametric study of SU-8 coating to help optimize MEMS mirror fabrication
  - 1. Bridging
  - 2. non-Planarity
  - 3. Fill



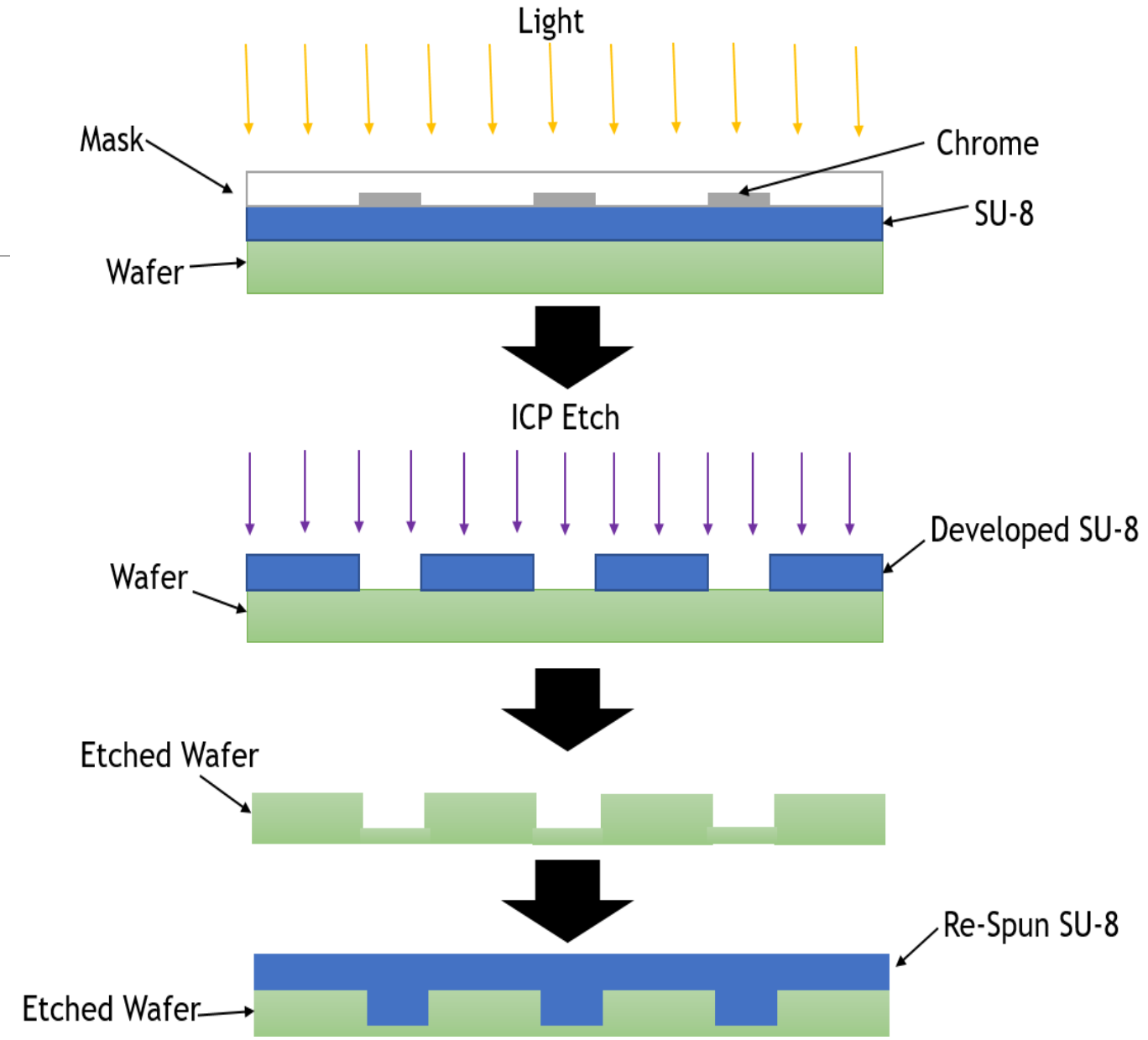
- Experimental parameters:
  - Feature width
  - Feature depth
  - Feature radial location
  - Feature angular orientation
  - SU-8 viscosity
  - Spin speed





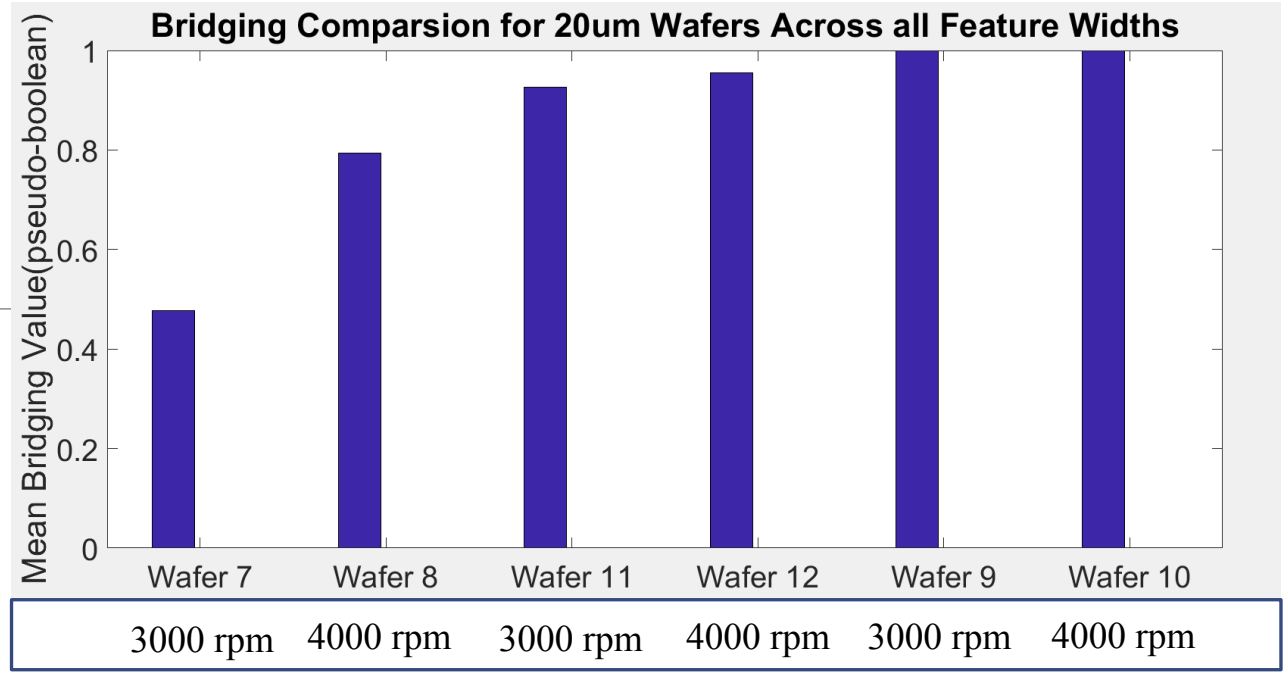
Methodology

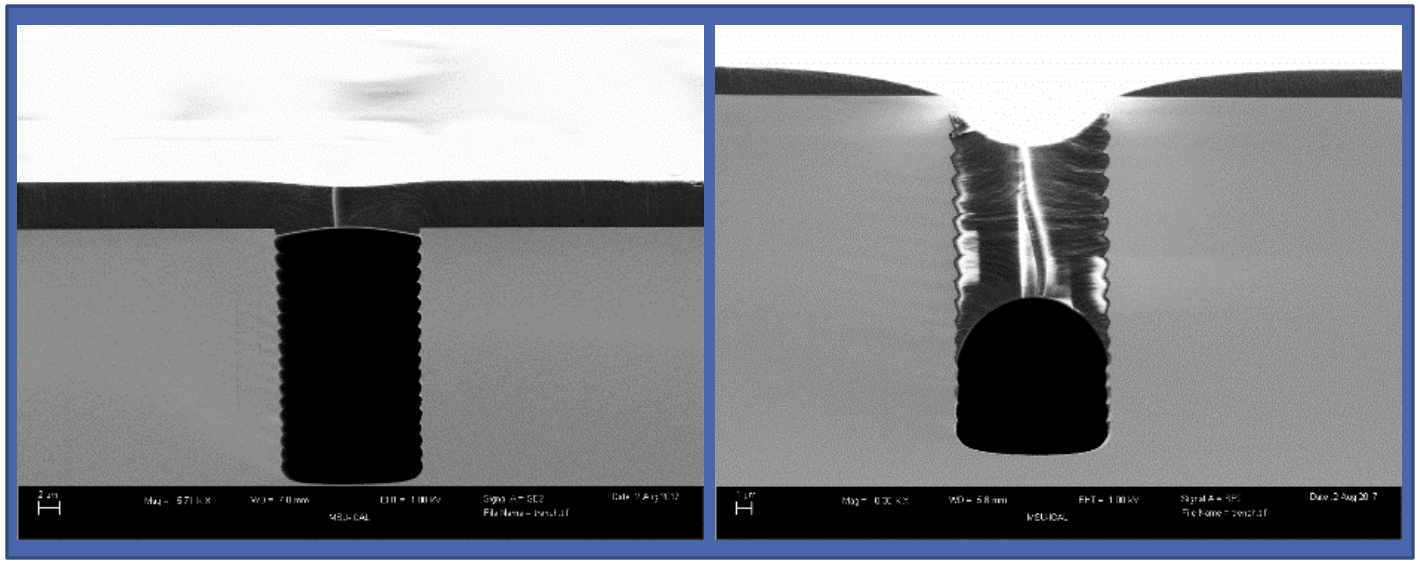
1. Photolithography and ICP etch to create topography
2. Spin coating SU-8 over topography
3. Imaging with microscope and profilometer
4. Cleave across features and image with SEM for side profiles



Results-bridging

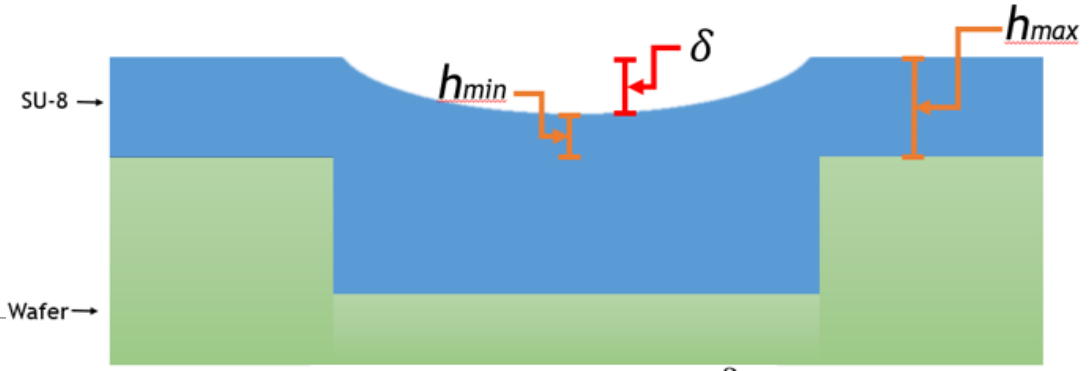
- Correlations- viscosity, spin speed, well width, and etch depth





Increasing Viscosity

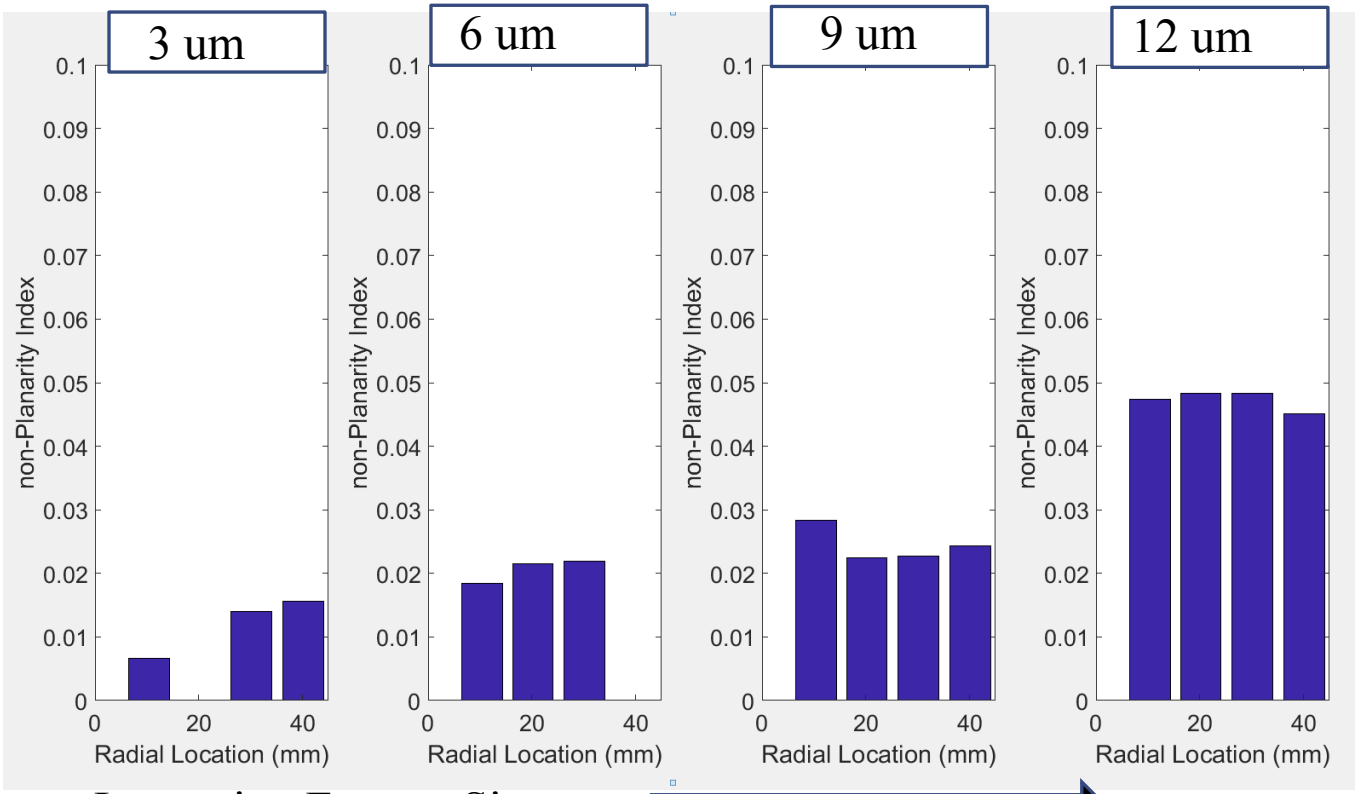
Results- non-planarity



$$non - planarity = \frac{\delta}{h_{max}}$$

Higher non-Planarity correlated with:

- Wider features
- Slower spin speeds
- Lower viscosity
- Deeper etch depths



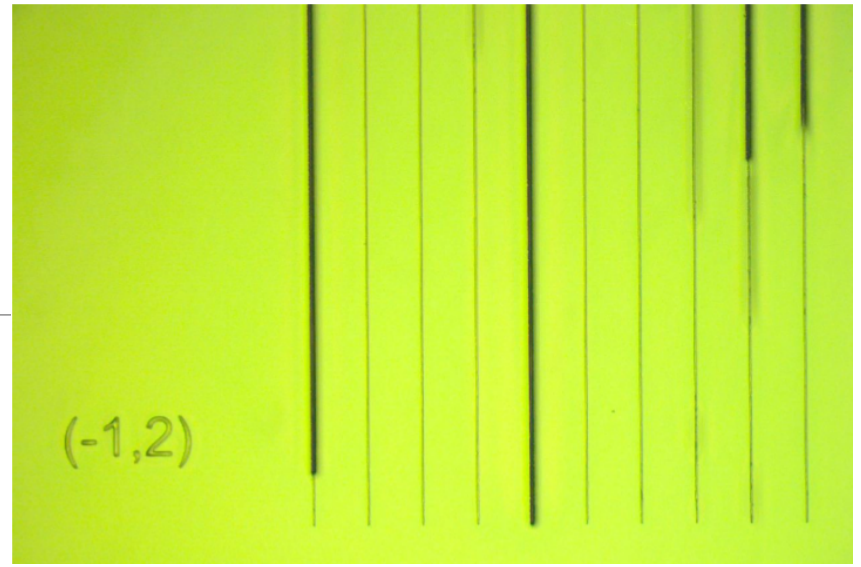
Increasing Feature Size

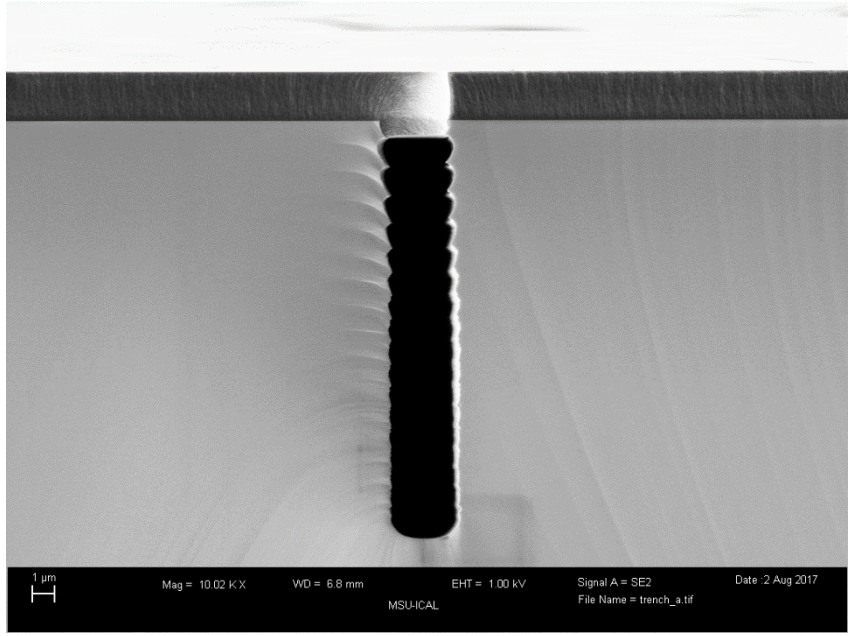
Conclusion

Spin coating over high aspect ratio substrate topography can be a highly sensitive process

Viscosity and spin speed are individually influential beyond the resultant film thickness

Future research





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