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# Performance Check on ABM3000HR Mask Aligner

Lin Zhao  
[zhlin8921@gmail.com](mailto:zhlin8921@gmail.com)

Prashanth Gopalan  
[gpr@seas.upenn.edu](mailto:gpr@seas.upenn.edu)

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# Performance Check on ABM3000HR Mask Aligner

## **Keywords**

ABM3000HR

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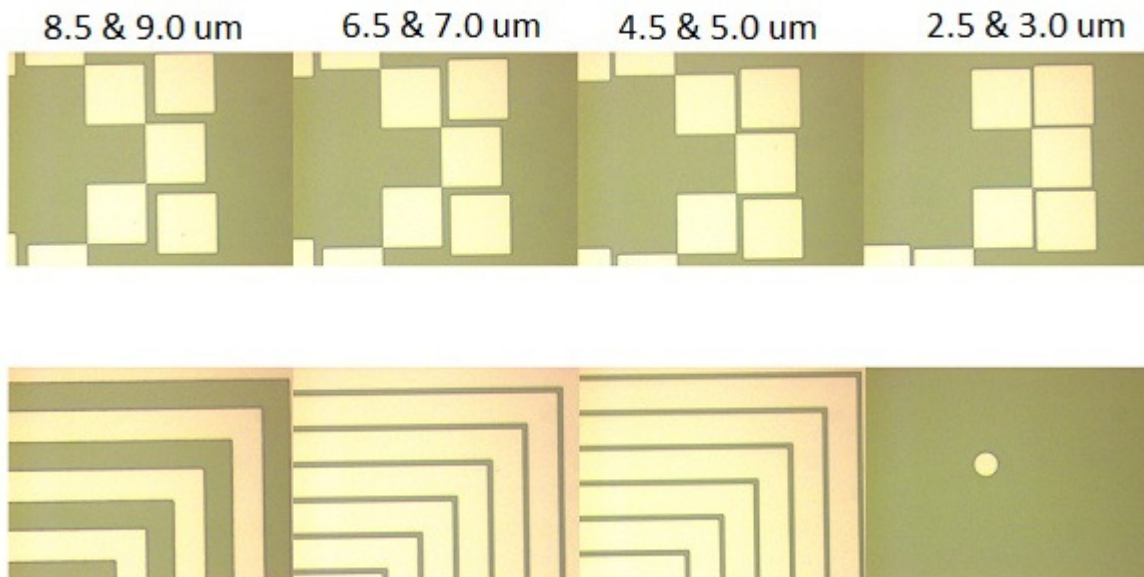
# On-site Inspection on ABM3000HR mask aligner (Graduate Student Fellow Program)

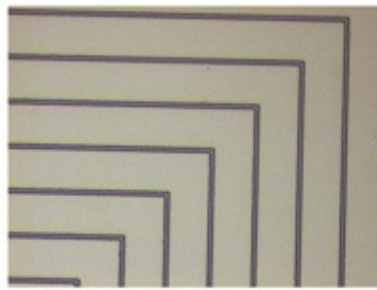
Prepared by Lin Zhao and Prashanth Gopalan

## Exposure

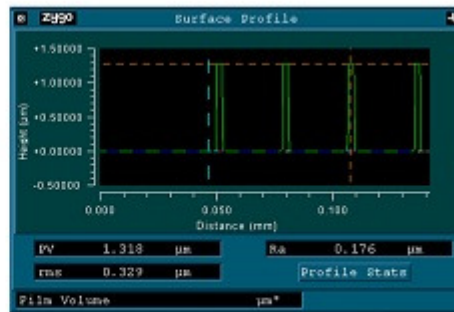
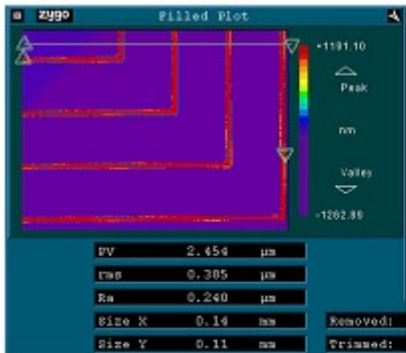
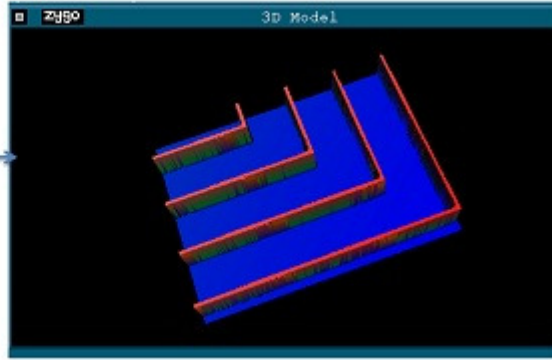
- 2/10/2014
- Resist: S1818
- Lithography tool: ABM3000HR
- Cleaning: Acetone Sonic-5min, IPA Sonic-5min
- Spinner: 5500RPM, 30 sec
- Pre-bake: 110C, 45 sec, a metal plate was placed on the hotplate, and then the sample was baked on the metal plate. The sample was covered by a beaker to block the turbulent air flow by ventilation of the bench.
- Exposure Time: 4 sec using 400 nm (37.9 mW/cm<sup>2</sup>) of ABM3000HR, 151.6 mJ/cm<sup>2</sup>
- Develop: MF-319, 60 sec
- P7 2D profiler: thickness = 1.2  $\mu$ m
- Zygo 3D optical profiler: thickness = 1.3  $\mu$ m

## Optical Images





Optical Image (0.7")

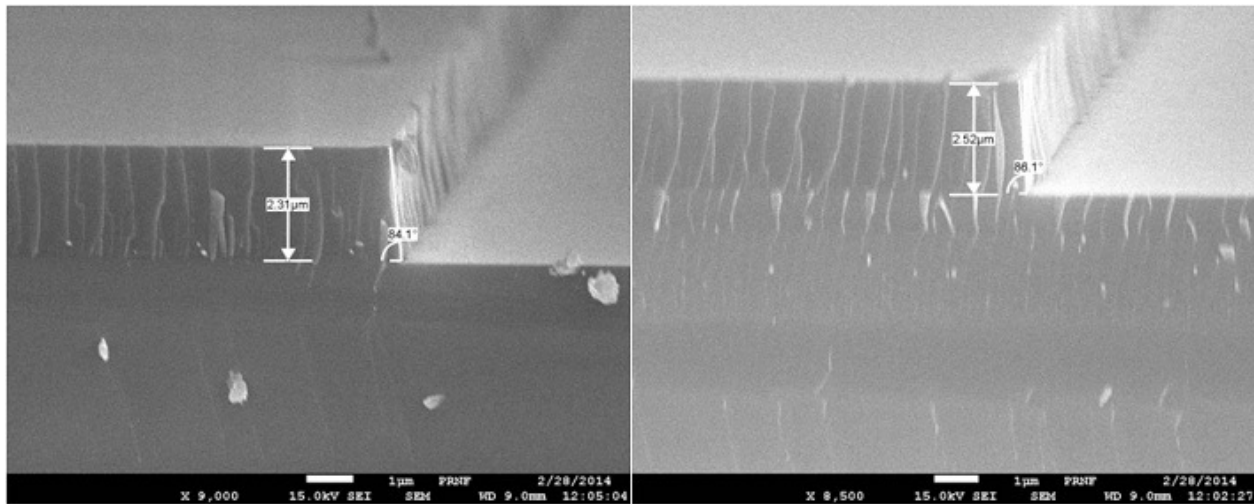
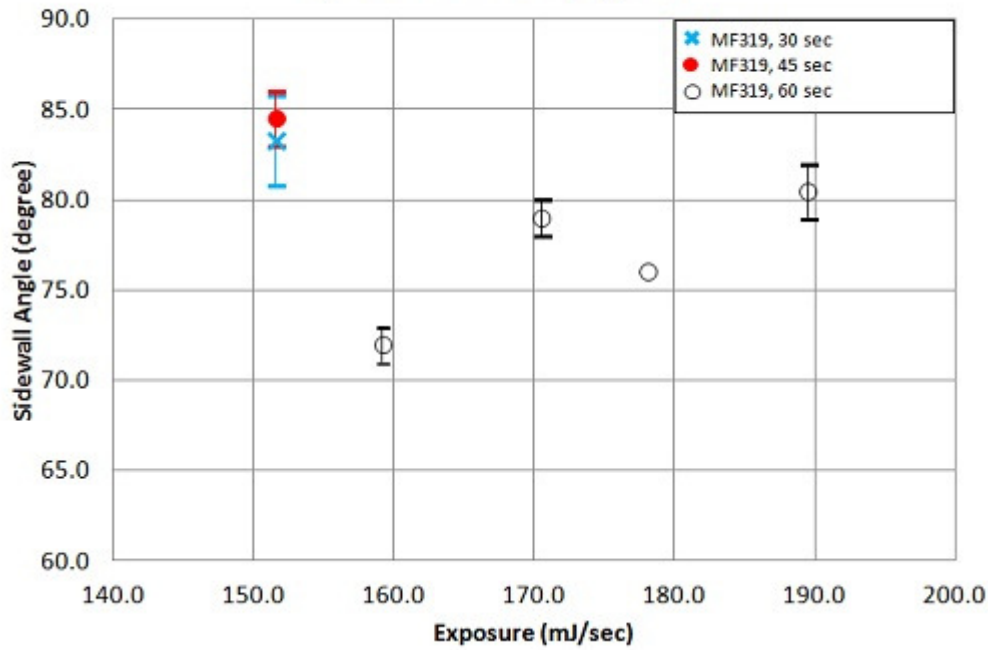


Zygo Film Thickness: 1.318um

## Sidewall Angle

- Lithography tool: ABM3000HR
- Cleaning: Acetone Sonic-5min, IPA Sonic-5min
- Spinner: 2500 or 3000 rpm, 30 sec
- Thickness: ~2 µm
- Pre-bake: 110C, 45 sec, a metal plate was placed on the hotplate, and then the sample was baked on the metal plate. The sample was covered by a beaker to block the turbulent air flow by ventilation of the bench.
- Exposure Time: 4.0, 4.2, 4.5, 4.7, and 5.0 sec using 400 nm (37.9 mW/cm<sup>2</sup>) of ABM3000HR
- Develop: MF-319, 30, 45 and 60 sec

Dependence of sidewall angle of S1818 on exposure and developing time



SEM images of cross-sections of S1818 resist films. The film was spin-coated at 2500 rpm. The exposure at 400 nm was 151.6 mJ/sec, and the developing time in MF319 was 45 sec. Sidewall angles were 84.1 and 86.1°.

## Sidewall angle

- 3/24/2014
- Lithography tool: ABM3000HR
- Resist: S1813
- Cleaning: Acetone Sonic-5min, IPA Sonic-5min
- Spinner: 5500RPM, 60sec
- Thickness: ~1.3  $\mu\text{m}$
- Pre-bake: 110C, 45sec, with metal plate and beaker
- Exposure Time: 3.8 sec using 400 nm (37.9 mW/cm<sup>2</sup>) of ABM3000HR, 144 mJ/cm<sup>2</sup>
- Develop: MF-319, 25sec
  
- The result: 80.5-85.8  $^\circ$ .

