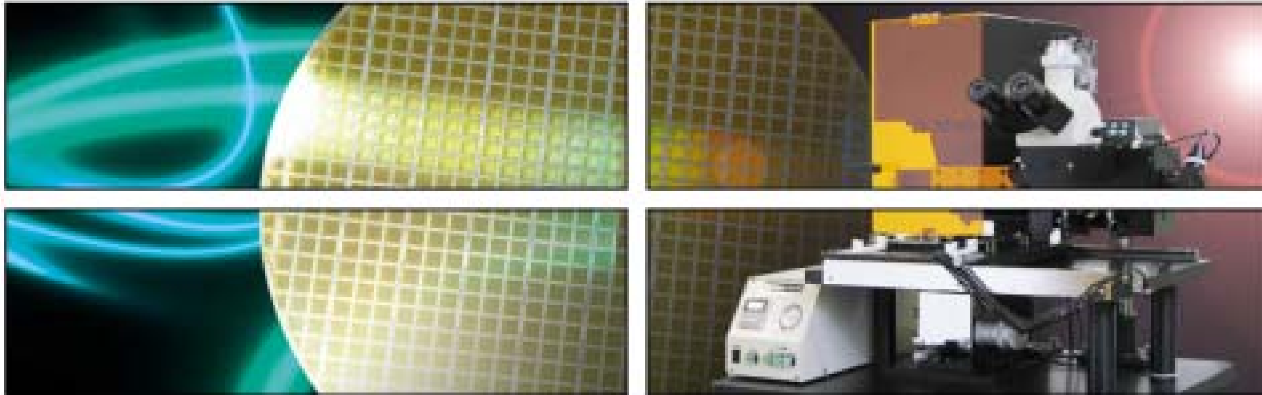


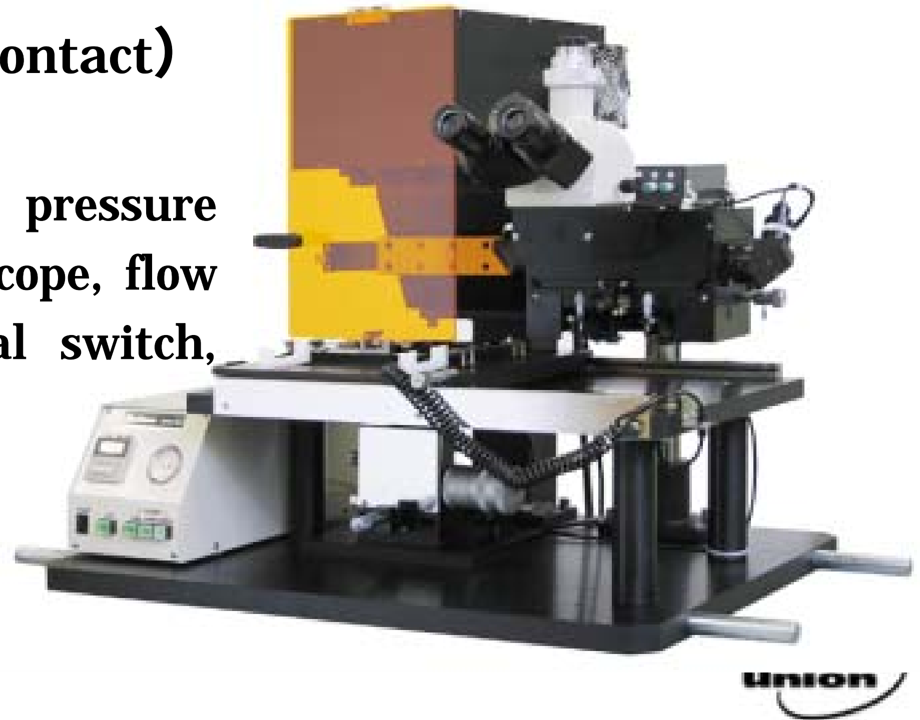
EMA-400

Desk Top Mask Aligner

Brief Summary

- Mask size; 5-inch max.
- Wafer size; 4-inch max.
- Integrator lens for exposure
- Soft contact method
- Hard contract method (option)
- Resolution; 3μm L/S at soft contact
  2μm L/S at hard contact)

Application: Ink-jet printer head, pressure sensor, acceleration sensor, gyroscope, flow path module, HDD head, optical switch, DNA analysis chip,
active catheter



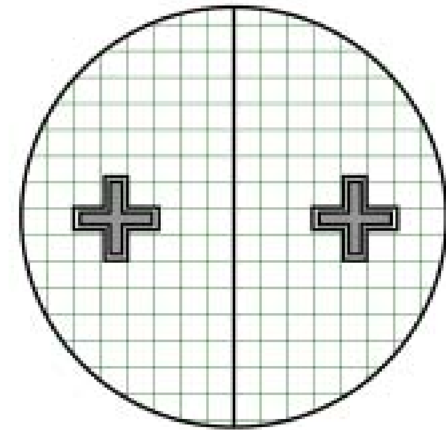
union

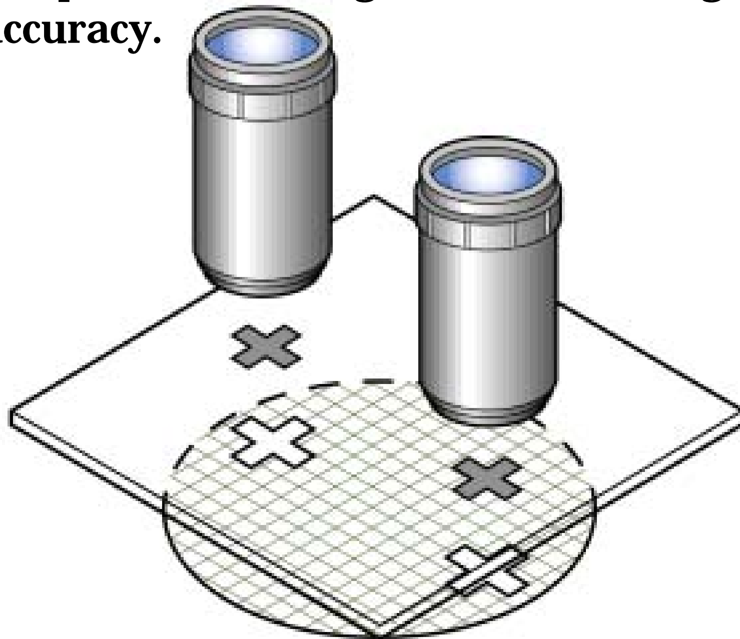
Easy alignment with Split-Field Microscope

(split-field image alignment scope)

Microscope is used to make an alignment (position adjustment) between mask & wafer

Confirming alignment marks in the double visual field can avoid discrepancy between mask & wafer, and it competes with large size mask aligner in alignment accuracy.





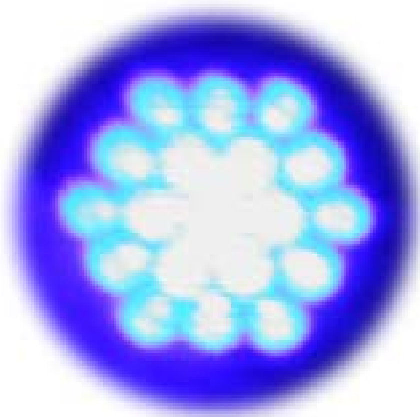
1) **Low-end machine, but having Split-Field Microscope**

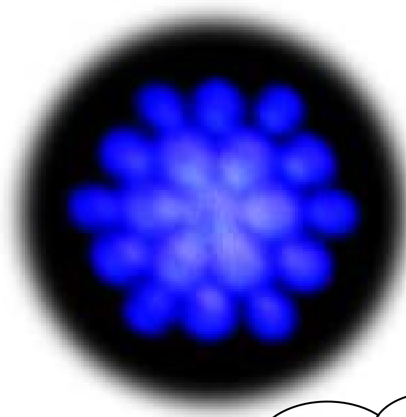
   ***Making alignment accuracy improved**

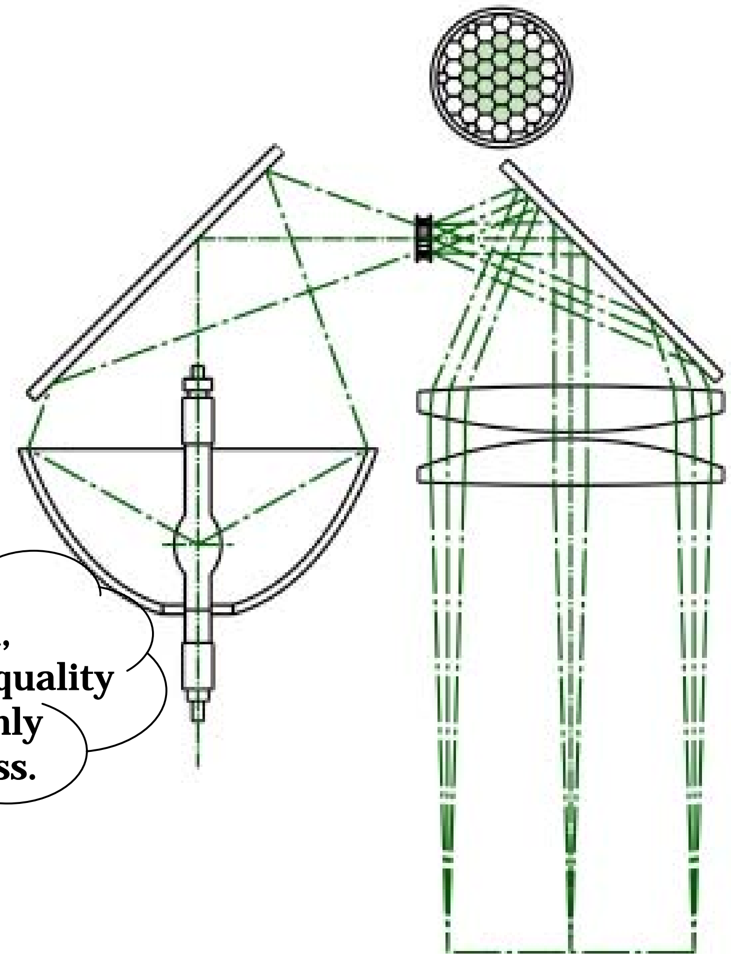
   ***Alignment accuracy is less than ±3μm**

2) **Objective lens separation 15 to 75mm variable to meet small amorphous size of wafer**

Integrated lens for exposure







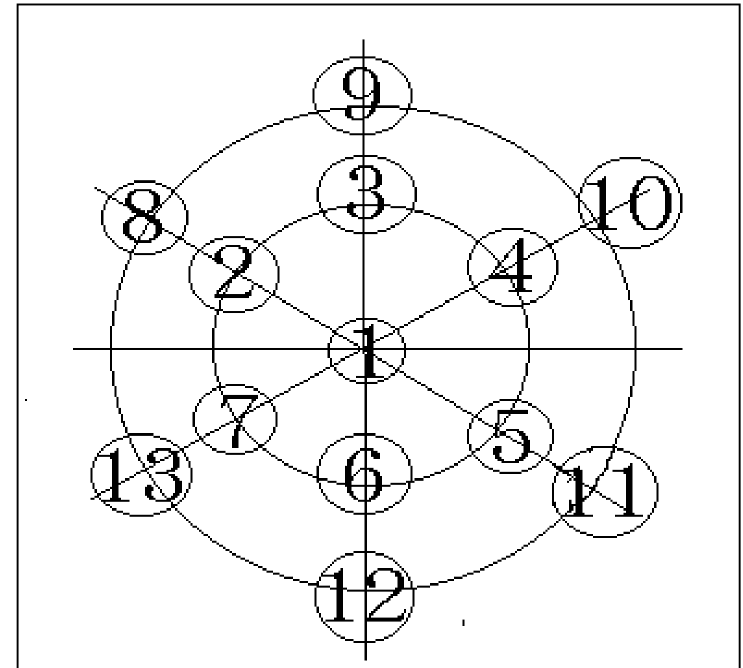
This is differential, competitive, high-quality lens to expose evenly without unevenness.

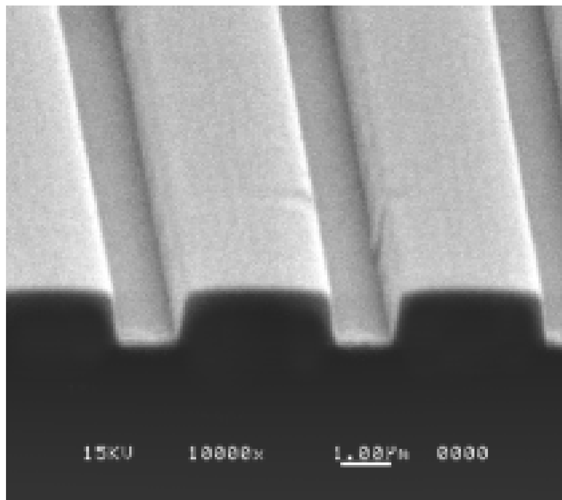
1) Light beam directions are parallel
2) Parallel angle is within 1 degree
3) The more all the light beams run parallel onto mask, the more illumination system becomes effective for exposure
4) Lens surface looks like honeycomb structure

- **Unevenness in illumination intensity of integrated lens**

measuring points mentioned right, then figuring out illumination intensity = (MAX-MIN)/(MAX+MIN) → within ±5%

※Even exposure in an area of 4-inch can be achieved





- **Red LED 630nm is adopted as an illumination for alignment**

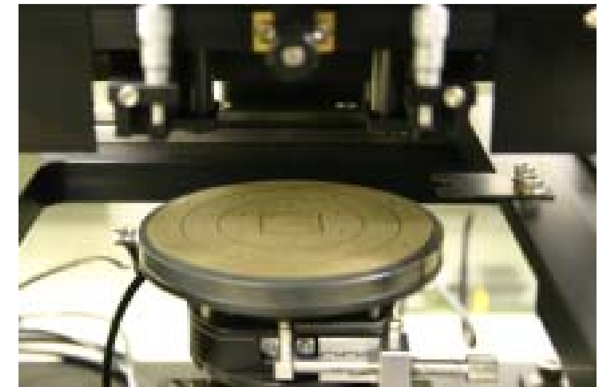
Advantages of adopting LED as compared with normal lighting;

* No exposure is done during alignment, because of monochromatic light (red).

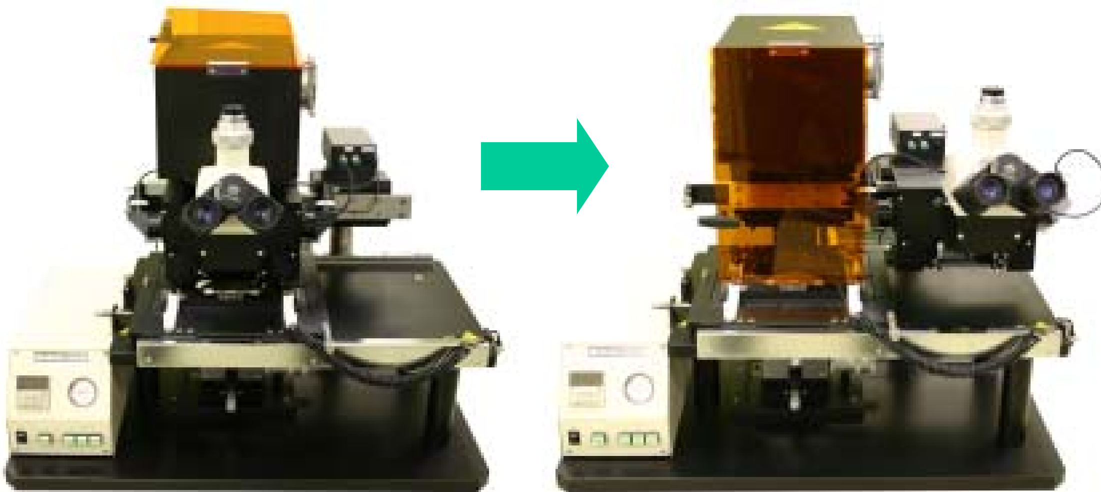
* Life span is longer than normal lighting; accordingly frequency of light source exchange is less.

Features

- Pursuing better operability with mask sliding method and 4-axis (X,Y,theta & Z) wafer stage unit
- Multi-wafer chuck is adopted to meet from small amorphous size of wafer to 4-inch wafer



Multi-wafer chuck
(Stage to put a wafer on)



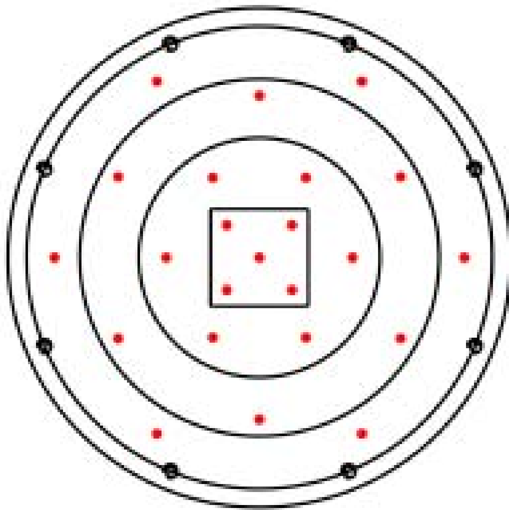
1) Sliding a stage unit and optical tube unit to right side, then put a specimen onto wafer chuck
2) Sliding the optical unit back to confirm alignment, then put down a cover to expose

Micrometers are adopted for stage to be moved it from side to side and up and down.

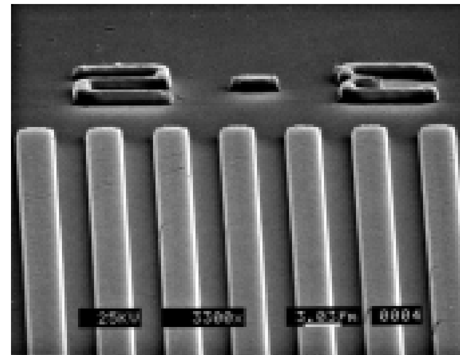
Features

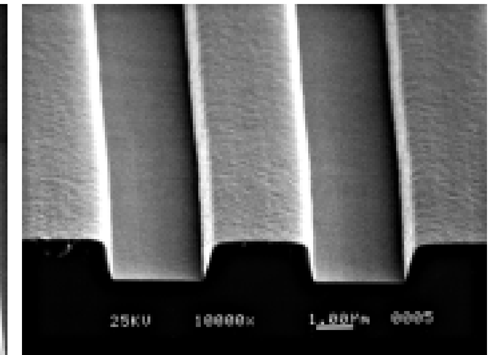
- **Resolution less than 2μm L/S can be realized with an optional function: hard contact method (N_2 blowing up)**

N_2 Blowing Up Method: Blowing up a wafer by N_2 (or dry air) from beneath to contact it to a mask (hard contact)



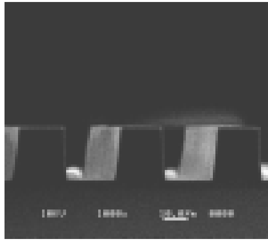
Blowing up or absorbing by N_2 from holes on multi-wafer chuck



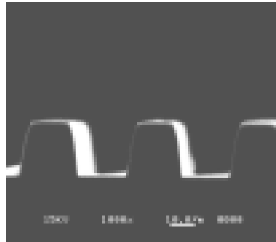


Hand contact method can realize clear edge on exposure

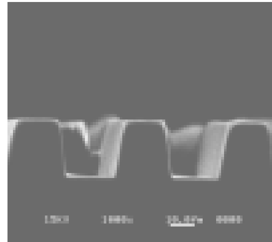
Resolution as per various gap / SEM photo



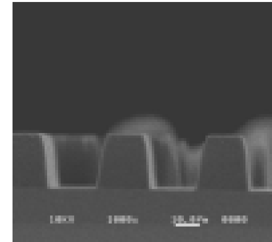
Hard contact



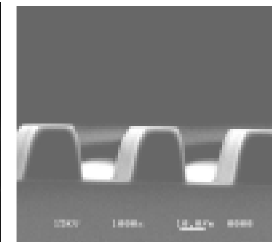
Gap 0 μm



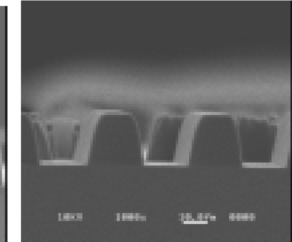
Gap 10 μm



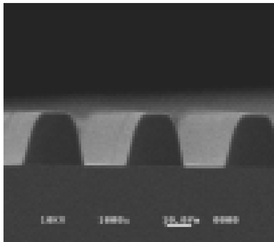
Gap 20 μm



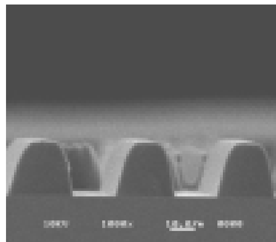
Gap 30 μm



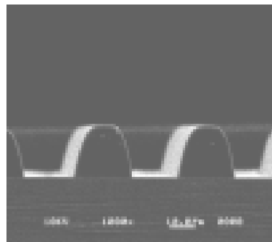
Gap 40 μm



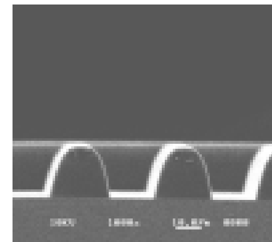
Gap 50 μm



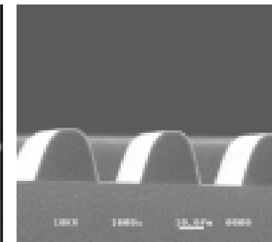
Gap 60 μm



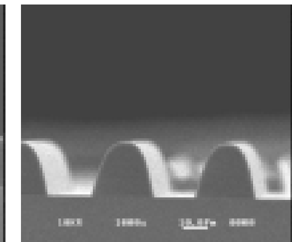
Gap 70 μm



Gap 80 μm

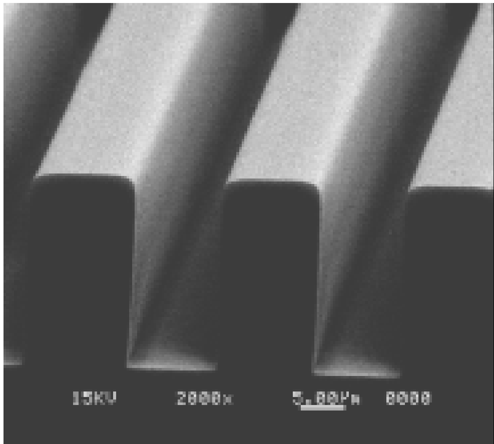


Gap 90 μm

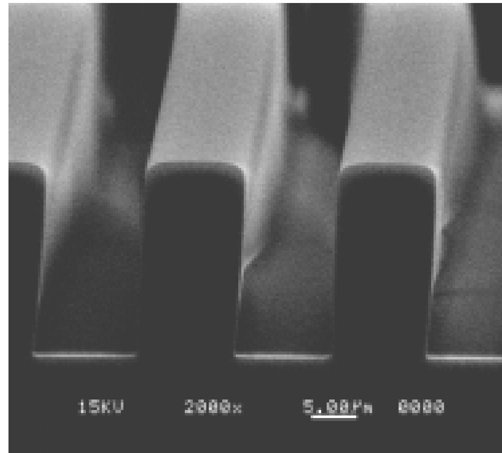


Gap 100 μm

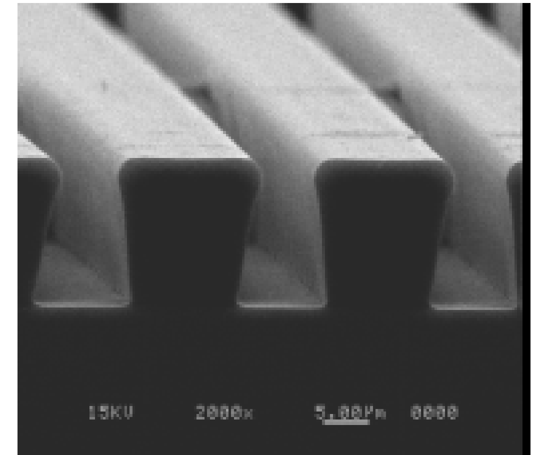
Resolution as per various photoresist / SEM photo



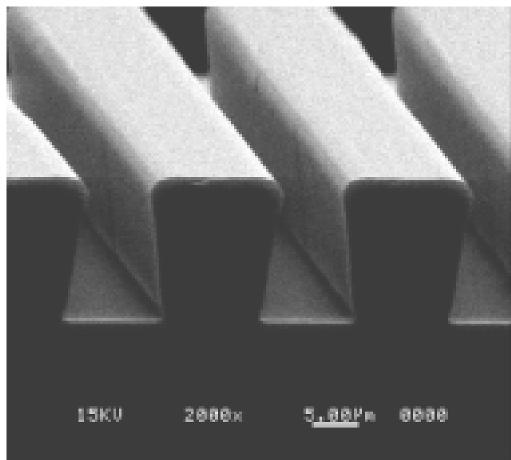
PMER / Gap 0 μm



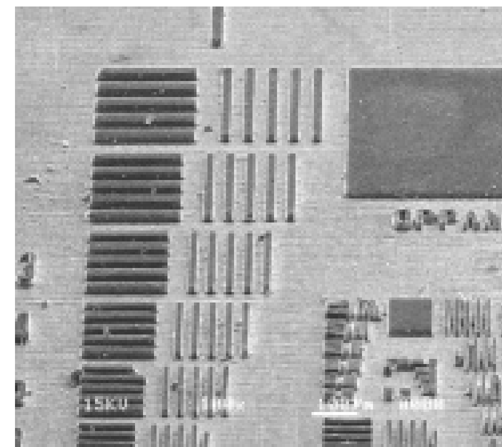
PMER / Gap 20 μm



SU8 / Gap 0 μm



SU8 / Gap 20 μm



using Toppan Chart