Fabrication Procedure/Tip Talk

1. Piranha/Acetone treatment for microscope slides
2. SU 8 seed layer fabrication
3. SU 8 feature layer fabrication

Piranha/Acetone treatment

- Piranha microscope slides treatment
  - Piranha: 75% Sulfuric acid + 25% hydrogen peroxide
    - **CAUTION: upon mixing, the solution becomes extremely hot and highly corrosive**
  - Immerse slides in the solution for at least 30 minutes
  - Wash with plenty of DI water and then dry with nitrogen gun after dip the slides in isopropanol
- Acetone
  - Immerse for at least 48 hours before use

SU 8 seed layer fabrication

- Seed layer: a very thin layer of SU 8
  - Enhance the adhesion strength of features
- Pre-alloquate SU 8 to smaller centrifuge tubes
  - Pour about 1 mL in the middle of a 1x3 slide
  - Gently tilt the slide so that the entire slide is covered with SU 8
- For SU 8 25 photoresist (viscosity: 2500):
  - 30 seconds @ 500 RPM @ ACL 5s
  - 30 seconds @ 3500 RPM @ ACL 10s
  - 10 seconds @ 0 RPM @ ACL 10s

SU 8 seed layer fabrication (cont'd)

- Pre-bake
  - 65° for 2 minutes
  - 95° for 5 minutes
- UV at 31mJ/s for 6 seconds
- Post-bake
  - 65° for 2 minutes
  - 95° for 5 minutes
- Develop for 2 minutes

SU 8 seed layer fabrication (cont'd)

- Wash with DI water
- Dry with nitrogen gun
- Bake at 175° for at least 20 minutes to further harden the seed layer

SU 8 feature layer fabrication

- Pour about 1mL of SU 8 onto seeded slides
- Spincoat for desired thickness (see table 1)
- Prebake
  - [?] mins @ 65°
  - [?] mins @ 95°
- UV exposure
  - Make sure to press the photomask tightly against the slide before exposure (I used two stacks of microscope slides)
- Postbake
  - [?] mins @ 65°
  - [?] mins @ 95°

SU 8 feature layer fabrication (cont'd)

- Develop with SU 8 developer
  - 20 mL for two 1x3 slides for 20 minutes with mild agitation
  - Replace developer and then develop for another 20 minutes with mild agitation
- Wash with DI water
- Dry with nitrogen gun
- Optional: Bake at 175° for at least 20 minutes to further harden the seed layer

SU 8 25 spincoat speed vs thickness

Spinspeed	Prebake	Postbake	Thickness
3,100 RPM	2 @ 65 | 5 @ 95	2 @ 65 | 3 @ 95	~15 um
2,100 RPM	2 @ 65 | 6 @ 95	2 @ 65 | 4 @ 95	~22um
1,600 RPM	3 @ 65 | 8 @ 95	2 @ 65 | 5 @ 95	~27um
1,350 RPM	4 @ 65 | 10 @ 95	2 @ 65 | 6 @ 95	~30um

- UV exposure 20 seconds
- Do not place slides on metal surface right after postbake to prevent feature crack
- Thickness measured by using optical profilometer in Institute of Optical Science

Other tips…

- If some SU 8 gets to the underside of the slides after pouring and tilting, take a swap and clean it with some acetone
- If slides stuck to the hot plate after baking, tap it lightly on the edge with tweezers until it starts moving
- Spincoater head can be taken off for easy replacement of aluminum foil
- Turn on the laminar flow hood to reduce particles from falling on to the slides
- Clean your tweezers with acetone before using it to handle your slides

Good resource for fabrication

- http://memscyclopedia.org/su8.html
  - Very comprehensive and up-to-date resource and tips for fabrication

Photomask Printing

- Email PDF sheet to: citygfx@on.aibn.com
- Ask for printing on transparency film
- positive (black = ink, white = clear)
- Address: 82 Berkeley Street, Toronto, ON M5A 2W7
- Tel: 416 366 2666
- Fax: 416 366 8811
- $20 cash pickup