

Laboratory Assignment 4 Soft Lithography

Objectives:

1. Gain familiarity with replica molding.
2. Gain familiarity with PDMS punching and alignment techniques.

I. Prelab work:

1. What is soft lithography?
2. Briefly describe three different soft lithography techniques (e.g. replica molding).

II. Lab Work:

1. Mix 55g of PDMS from the two parts provided at a ratio of 10 A to 1 B.
2. Place wafers B and C into plastic weigh boats.
3. Cast the PDMS onto wafers B and C such that the PDMS has a thickness of approximately 3mm and 2mm respectively.
4. Cure the PDMS on wafers B and C in a Blue M oven at 70°C until it is solid enough to cut cleanly (approximately 40 minutes).
5. Keep the remaining PDMS for later use.
6. Peel the PDMS from wafer C. Cut apart the four designs using the trim guides. Punch the ports and the center well.
7. Peel the PDMS from wafer B, Cut apart the four designs using the trim guides. Cut the center well only.
8. Align each of the designs from wafer C with its mate from wafer B. Bake at 70°C for 10 minutes to allow them to bond.
9. Spin 1.5mL of the remaining PDMS onto wafer A at 3000rpm for 45 seconds.
10. Bake for approximately 10 minutes at 70°C.
11. Place the assembled layers from wafers B and C onto wafer A.
12. Bake for approximately 10 minutes at 70°C.
13. Remove the PDMS from the wafer.
14. Punch the ports from the design on wafer B through the entire PDMS assembly.
15. Place the PDMS on a glass slide and bake overnight.

III. Post-Lab Work:

1. Discuss the results of your work in the lab. Include yield, any imperfections in your devices and any difficulties you encountered.

