PDMS-PDMS Bonding Study Report – Anatech

Updated on 03/08/2015

Critical Factors
- Set Power to 30W, Time to 15s, and O_2 Flow Rate (MFC) to 50sccm for bonding PDMS to PDMS
- Ensure the cleanliness of the glass slide before bonding

Table of Contents

Goal

Test the effects of varying power, etch time, O_2 flow rate and position on the bonding of PDMS to glass in the Anatech Barrel Etcher.

Materials
- PDMS/PDMS Curing Agent
- Glass Microscope Slides

Equipment
- Anatech Barrel Etcher
- Spinner

Protocol

<u>PDMS Spun Slides</u>
1. Mix PDMS with PDMS curing agent at a 10:1 weight ratio and degas until clear.
2. Pour a small amount of PDMS on the glass slide and spin at 500 rpm for 10s and 3000 rpm for 50s.
3. Allow the spun PDMS to level for ~2 hours.
4. Bake the slides overnight at 65C to cure.

<u>PDMS-PDMS Bonding Testing</u>
1. Approximately 1 cm x 1 cm x 1 cm cubes of PDMS were cut to be used for testing.
2. PDMS spun glass slides were scored and broken in half for testing.
3. One PDMS spun glass slide and one PDMS cube were placed side by side on the stand into the Anatech barrel etcher.
4. Plasma etching was run at the selected parameters for power, etch time and O_2 flow rate.
5. The slide and PDMS cube were removed from the etcher and the upward faces of both were carefully pressed together and held for approximately 10 seconds.

6. The slide and PDMS were allowed to sit undisturbed for approximately 20 minutes.
7. After 20 minutes, the PDMS-PDMS bond was subjected to forceful peeling.
8. The PDMS-PDMS bond was considered successful if the thin film of PDMS spun on the glass slide was completely removed in the section bonded underneath the PDMS cube. This was verified by scratching the area under the peeled cube to check for adherent PDMS.

Results

Power (W)	Duration (s)	O_2 Flow Rate – MFC (sccm)	Peel Test
15	15	50	Fail
15	15	99	Fail
30	15	25	Fail
30	5	50	Pass
30	15	50	Pass
30	30	50	Pass
60	15	50	Pass
120	15	50	Pass