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PDMS-Glass Bonding Protocol - Technics

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Keywords

Bonding, PDMS, Glass, Technics

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Updated on 02/28/2015

Critical factors:

Set O₂ pressure to 2.16 Torr

Set power to 30W

Plasma for 15s

Wait 20 minutes before testing bond

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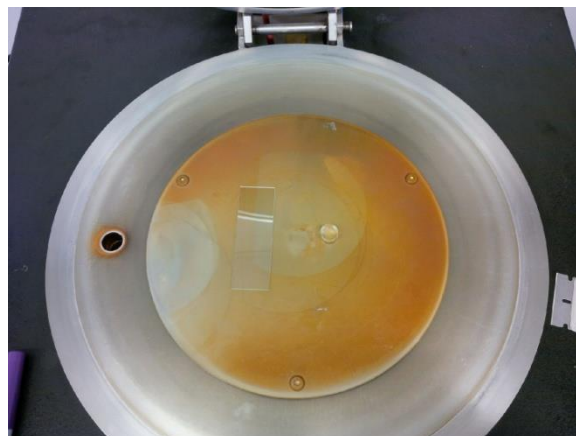
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Materials:

- Standard glass coverslides
- 20:1 PDMS disks (~10 mm tall, ~12 mm diameter)
 - 10 min sonication in 200 proof ethanol
 - 2x 60 mL rinse in MilliQ water
 - N_{2(g)} dried

Process Parameters:

- O₂ flow rate value “97.5” (bob between “100” and “95” markings)
- Vacuum (process valve) adjusted until pressure as reported on black box to the left of Technics reads 2.16 ± 0.02 Torr
- Power 30 W (0.030 kW)
- Plasma distributing plate in place
- Positioning of samples in chamber as follows:



Protocol:

- Prior to loading samples perform run on empty chamber to properly set power supply knob position for desired process parameters
- Load samples in orientation shown above
- Reestablish process parameters by *manipulation of process valve only*
- Perform plasma exposure for specified time
- Vent chamber
- Place PDMS in conformal contact with glass
- Apply gentle but uniform pressure to PDMS for 10s
 - Note: Extremely thin glass coverslips (#1-#2) will warp if excessive pressure is applied. Gently and uniformly distributed pressure is only necessary to ensure conformal contact of the glass/PDMS interface.
- Incubate PDMS on glass at RT for 15 min
 - Note: If more than one device was bonded, do not leave them in contact with one another at least for a few hours as partial plasma activation could have occurred on the other surfaces of the PDMS or glass.

Tested Parameter Results:

Power (W)	Pressure (Torr)	O ₂ Flow Rate "Value"	Treatment Duration (s)	Incubation Duration (min)	Peel Test Outcome
0	2.16	97.5	10 (held at 2.16 Torr w/o plasma)	15	Fail
30	2.16	97.5	2	15	Pass
30	2.16	97.5	5	15	Pass
30	2.16	97.5	10	15	Pass
30	2.16	97.5	15	15	Pass
30	2.16	97.5	30	15	Pass
30	2.16	97.5	60	15	Pass
30	2.16	97.5	120	15	Pass
30	2.16	97.5	300	15	Pass