4D LABS

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Plasma 1 (Technics)

Standard Operating Procedure

Revision: 1.0 — Last Updated: Feb.5/2013, Revised by Grace Li

Overview

This document will provide a detailed operation procedure of the Technics PE II-A plasma etcher. Formal Training is required for all users prior to using the system.

Revision History

#	Revised by:	Date	Modification
1	Grace Li	Feb.5/2013	Initial Releases
2			
3			
4			
5			

Document No. 4DSOP000X

Where new materials take shape.

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General Information

The Technics PE II-A plasma system is used in Descumming / Stripping photoresist. The chamber accommodates multiple 4” wafers or a single 6” wafer, and small pieces. Available gases are O_2 and Ar.

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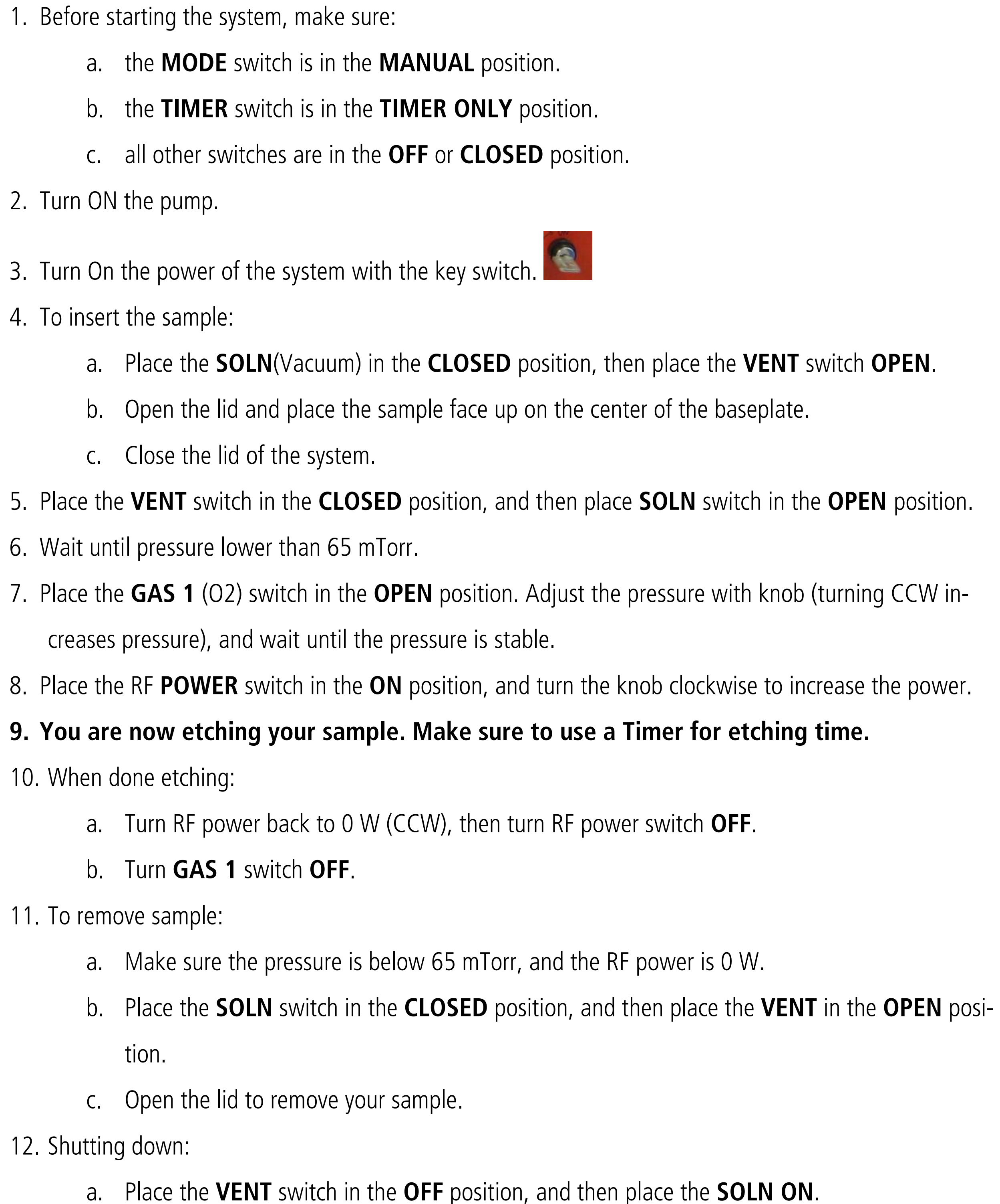
Operation Procedure

1. Before starting the system, make sure:
   a. the **MODE** switch is in the **MANUAL** position.
   b. the **TIMER** switch is in the **TIMER ONLY** position.
   c. all other switches are in the **OFF** or **CLOSED** position.
2. Turn ON the pump.
3. Turn On the power of the system with the key switch. 
4. To insert the sample:
   a. Place the **SOLN**(Vacuum) in the **CLOSED** position, then place the **VENT** switch **OPEN**.
   b. Open the lid and place the sample face up on the center of the baseplate.
   c. Close the lid of the system.
5. Place the **VENT** switch in the **CLOSED** position, and then place **SOLN** switch in the **OPEN** position.
6. Wait until pressure lower than 65 mTorr.
7. Place the **GAS 1** (O2) switch in the **OPEN** position. Adjust the pressure with knob (turning CCW increases pressure), and wait until the pressure is stable.
8. Place the RF **POWER** switch in the **ON** position, and turn the knob clockwise to increase the power.
9. **You are now etching your sample. Make sure to use a Timer for etching time.**
10. When done etching:
    a. Turn RF power back to 0 W (CCW), then turn RF power switch **OFF**.
    b. Turn **GAS 1** switch **OFF**.
11. To remove sample:
    a. Make sure the pressure is below 65 mTorr, and the RF power is 0 W.
    b. Place the **SOLN** switch in the **CLOSED** position, and then place the **VENT** in the **OPEN** position.
    c. Open the lid to remove your sample.
12. Shutting down:
    a. Place the **VENT** switch in the **OFF** position, and then place the **SOLN ON**.

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b. Wait until pressure is below 65 mTorr.

c. Place the **SOLN** in the **CLOSED** position.

d. Turn off the POWER of the system.

e. Turn off the power of the pump.

Where **new materials** take shape.

Recipes

It is suggested that you approximate the time you will need to etch through your film.

1. Oxygen Scourge

Use this procedure to clean the chamber when needed

Gas: O2 (Gas #1)

Power: 300 Watts

Pressure: 300 mTorr

Time: **20 - 30** min

2. Descum

This is used after developing exposed photoresist, before hard baking, to eliminate any residual scum which may be present on the developed areas.

2.1 AZ703 Resist Descum Recipe

Gas: O_2 (Gas #1)

Power: 50 Watts

Pressure: 280 mTorr

Time: **30-60** seconds

Etch Rate: 1980 Å/min

2.2 ma-N2403 Resist Descum Recipe

Gas: O_2 (Gas #1)

Power: 30 Watts

Pressure: 150 mTorr

Time: **1** min

Etch Rate: 840 Å/min

2.3 PMMA-A6 Resist Descum Recipe

Gas: O_2 (Gas #1)

Power: 30 Watts

Pressure: 100 mTorr

Time: **30-60** seconds

Etch Rate: 1560 Å/min

3. Resist Stripping or Ashing

For complete removal of standard hard baked photoresist.

3.1 AZ703 Resist Ashing Recipe

Gas: O_2 (Gas #1)

Power: 300 Watts

Pressure: 280 mTorr

Time: **3** min.

Example of etch rate for AZ703 resist Stripping

Sample	Hard Bake Temperature (°C)	Hard Bake Time (min)	Etch Rate (Å/min)
S-1	120	5	5900
S-2	110	10	6100

3.2 PMMA, ma-N2403 Resist Ashing Recipe

Gas: O_2 (Gas #1)

Power: 300 Watts

Pressure: 280 mTorr

Time: **2** min.

References and Files

Technics PE II-A plasma etcher Manual.

Contact Information

Questions or comments in regard to this document should be directed towards Tom Cherng (cherng@4dlabs.ca) in 4D LABS at Simon Fraser University, Burnaby, BC, Canada.