

[Operation of ICP Film Deposition for PM3](#)

Check and/or Change Substrate Temperature:

1. From main manual screen, click on **MAINTENANCE** button, then, **DIRECT I/O**, then, **ENERGY SOURCES**.
2. **Focus on PM3** by click on the module box (hatch lines should appear inside of the box).
3. Under **Analog Actuators** category, make sure input value of **temperature2 temperature Setpt-deg** is what you want (either 100 or 250°C); if not, check the small square box left to the reading (x should appear inside of box), then, change the value by typing it and hitting **Enter** key in computer keyboard (you will see the change of temperature setting point in the display at the bottom of control cabinet).

Load Sample(s):

1. From main manual screen, click on **MAINTENANCE** button, then, **DIRECT I/O**.
2. **Focus on LM** by click on the module box (hatch lines should appear inside of the box).
3. Click on **Vent** button, wait until LM pressure up to ~ 755 T before opening door.
4. Take one of cassettes out and insert a 4" clean wafer carrier (holding the carrier at the edge spot opposite to the major flat) with unpolished side up (no deposited film on it) to a slot, the major flat should be parallel to the cassette side without the pins.
5. Load your sample(s) onto the carrier and put the cassette back to the holding position (the pin side of the cassette should be toward the inside of the LM chamber).
6. * Close door **gently** and click on **Pump Down** button (wait LM pressure down below 100 mT before transferring wafer and you will hear a sound of opening the door between LM and TM).

Edit Deposition Time:

1. From main manual screen, click on **EDITORS** button.
2. **Focus on PM3**.
3. Click on **EDIT STEP**.
4. Choose **SiN Process** (or **SiO2 Process**) in **Category Filter**.
5. Choose **SiN Deposition 100°C** (or **SiN Deposition 250°C** or **SiO2 Deposition 100°C** or **SiO2 deposition 250°C**).
6. Input process time (you can find the deposition rate for SiNx and SiO2 at 100 and 250°C on the posted paper attached to the machine).
7. Finally, click on **SAVE STEP** to save the change.

Transfer Cleaning Wafer from LM to PM3 before Cleaning Deposition Chamber:

1. From main manual screen, click on **MAINTENANCE**, then click on **CHANGE MODE**, make sure all modules are in maintenance mode, if not, click on **ALL** next to **MAINTENANCE** at top right corner of screen.
2. Click on **ROBOTICS**.
3. **Focus on LM**.
4. Click on **Map Carrier(s)** button to map all wafers in both cassettes [Cassette 1: on the left; Cassette 2: on the right; slot number increases from bottom (#1) to top (#25)].**Note: Each time you open the door of load module, you need to do mapping again, otherwise, the computer screen will be frozen.**
5. In **Set Source** box, pick up the wafer at slot #1 of process LM-Cassette 2 (this wafer is set aside for cleaning chamber only), then, click on **Set**.
6. Focus on PM3.
7. In **Set Destination** box, click on **Set**.
8. * Click on **Transfer Now**.

Clean & Seasoning Deposition Chamber:

1. Make sure the temperature reading of electrode (at the bottom of control cabinet) reaches to target one (otherwise, just wait for the temperature being reached).
2. From main manual screen, click on **MAINTENANCE**, and then **CHANGE MODE**.

3. **Focus on PM3** and click on **ENGINEERING** mode button at top right corner of screen.
4. Click on **MANUAL OPS**.
5. In **Manual Processing** box, go to **Sequences Category Filter** to pick up **CLEAN**.
6. Pick up one of the clean & seasoning sequences with the shortest SF6 clean time: if you want to
 - a) deposit SiNx film at 250°C, **pick up SF6 clean SiNx (0-100 nm) & SiN seasoning-250°C**;
 - b) deposit SiNx film at 100°C, **pick up SF6 clean SiNx (0-100 nm) & SiN seasoning-100°C**;
 - c) deposit SiO2 film at 250°C, **pick up SF6 clean SiNx (0-100 nm) & SiO2 seasoning-250°C**;
 - d) deposit SiO2 film at 100°C, pick up SF6 clean SiNx (0-100 nm) & SiO2 seasoning-100°C.
7. Click on **Execute Sequence**.

Transfer Wafer from PM3 to LM:

1. From main manual screen, click on **MAINTENANCE**, and then click on **CHANGE MODE**, change PM3 mode from engineering to maintenance by clicking on **MAINTENANCE** at top right corner of screen.
2. Click on **ROBOTICS**, then, **Clear Material**.

Transfer Wafer from LM to PM3 for Deposition:

1. **Focus on LM**.
2. In **Set Source** box within **ROBOTICS** screen, pick up the wafer, on which your sample sits on, of process LM-Cassette, then, click on **Set**.
3. **Focus on PM3**.
4. In **Set Destination** box, click on **Set**.
5. * Click on **Transfer Now**.

Film Deposition:

1. Make sure the electrode temperature is correct.
2. From main manual screen, click on **MAINTENANCE**, and then **CHANGE MODE**.
3. **Focus on PM3** and click on **ENGINEERING** mode button.
4. Click on **MANUAL OPS**.
5. In **Manual Processing** box, go to **Sequences Category Filter** to pick up **SiN Process** (or **SiO2 Process**).
6. Pick up the deposition sequence.
7. Click on **Execute Sequence**.

Transfer Wafer from PM3 to LM:

1. From main manual screen, click on **MAINTENANCE**, and then click on **CHANGE MODE**, change PM3 mode by clicking on **MAINTENANCE** at top right corner of screen.
2. * Click on **ROBOTICS**, then, **Clear Material**.

Transfer Cleaning Wafer again from LM to PM3 to Clean Deposition Chamber:

1. **You need to clean the PM3 chamber at the end of film deposition or/and during multi-wafer film deposition runs (clean it between two film deposition runs).**
2. **Focus on LM**.
3. In **Set Source** box, pick up the wafer at slot #1 of process LM-Cassette 2 (this wafer is set aside for cleaning chamber only), then, click on **Set**.
4. **Focus on PM3**.
5. In **Set Destination** box, click on **Set**.
6. * Click on **Transfer Now**.

Clean & Seasoning Deposition Chamber:

1. From main manual screen, click on **MAINTENANCE**, and then **CHANGE MODE**.
2. **Focus on PM3** and click on **ENGINEERING** mode button at top right corner of screen.
3. Click on **MANUAL OPS**.
4. In **Manual Processing** box, go to **Sequences Category Filter** to pick up **CLEAN**.
5. Pick up one of the clean & seasoning sequences with a proper SF6 clean time:

Example 1: if you have deposited a 500 nm thick SiNx film at 250°C and want to do another SiO₂-film deposition at the same temperature, you need to choose the sequence **SF6 Clean SiNx (400-500 nm) & SiO₂ seasoning-250°C**.

Example 2: if you have deposited a 200 nm thick SiO₂ film at 100°C and want to do another SiNx-film deposition at the same temperature, you need to choose the sequence **SF6 Clean SiO₂ (0-250 nm) & SiNx seasoning-100°C**.

6. Click on **Execute Sequence**.

Transfer Cleaning Wafer from PM3 to LM:

1. From main manual screen, click on **MAINTENANCE**, and then click on **CHANGE MODE**, change PM3 mode from engineering to maintenance by clicking on **MAINTENANCE** at top right corner of screen.
2. Click on **ROBOTICS**, then, Clear Material.

Remove Wafer(s):

1. From main manual screen, click on **MAINTENANCE** button, then, **DIRECT I/O**.
2. **Focus on LM**.
3. Click on **Vent** button, wait until LM pressure up to ~ 755 T before opening door.
4. Unload the wafer carrier from cassette.
5. Remove your sample(s) from the carrier and put the used carrier aside for wet etch.
6. Close door and click on **Pump Down** button.