

Dry Etch and Plasma System



1. Scope

1.1 This document provides operating procedures and requirements to etch silicon or silica with gas plasma system.

2. Before starting: Important note

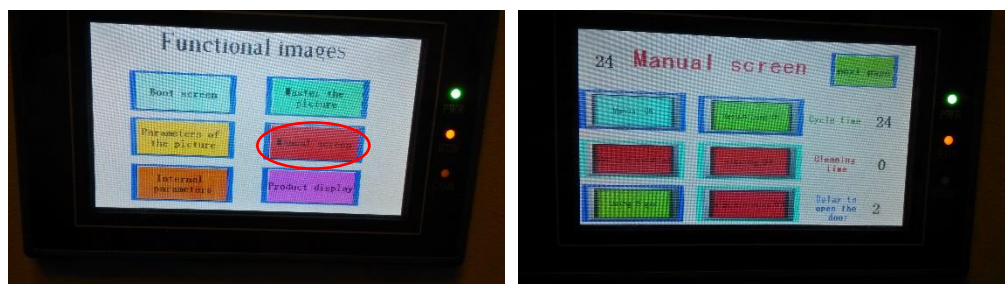
2.1 You have to be authorized by Dr. Tang and properly trained by Dr. Tang's group member before operate the system.

2.2 After plasma treatment, the samples could be very hot.

2.3 If use the highest power, the plasma can only be turned ON for less than 5min. You can turn plasma power back ON after 3mins cooling. If use power 6, plasma can only be turned ON for less than 10min; otherwise, the power supply will overheat and be damaged.

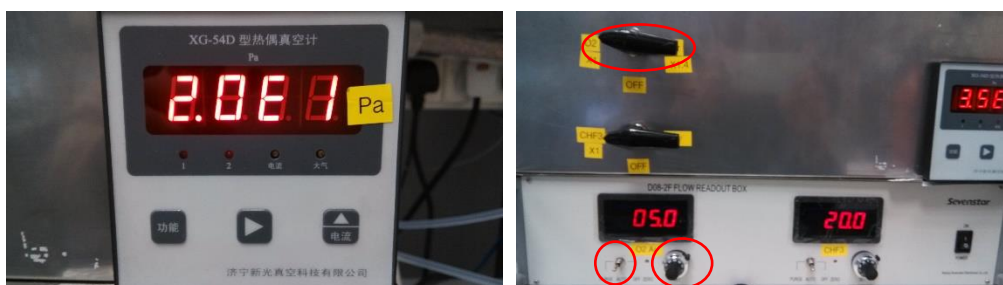
3. Operating Procedures

3.1 Load samples in the chamber. Manual Screen→Manual On→Vacuum pump ON→Using B gas.



3.2 After pressure is lower than 20Pa. Open the reaction gas.

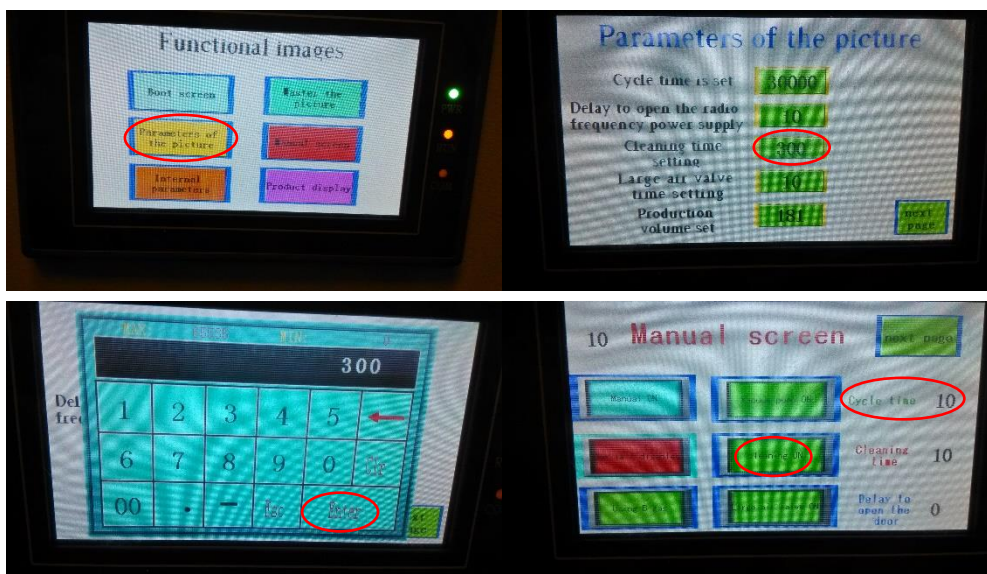
For example, if you want to supply 5sccm O₂ with 20sccm CHF₃ to etching chamber.
 Black arrow point to O₂→White button point to AUTO→Use the black knob to change the O₂ Flow rate to 5sccm.
 Set CHF₃ to 20sccm with similar process.



3.3 Set etching time

Click the **next page** in Manual Screen→Functional images→Parameters.

Just change the **cleaning time setting** as you need. Click the button as show in red ring on the follow picture. Then enter the clean time and click the **Enter** to get back to **Parameters of the picture**. Click the **next page** to **Functional images**. Then get into Manual Screen. Click the **cleaning on** until the **Cycle time** is larger than 10.



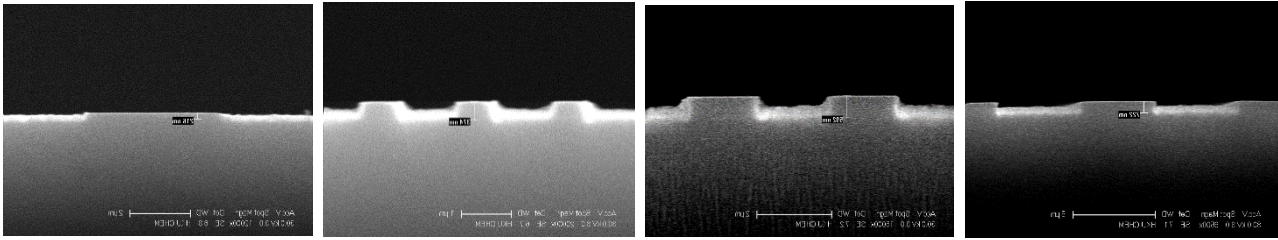
3.4 Wait until pressure stabilized for 1min. Turn on plasma in manual screen and start etching.
 No continuous etching for more than 10min under power 6 or 5min under full power is allowed.

Sample receipt is as following:

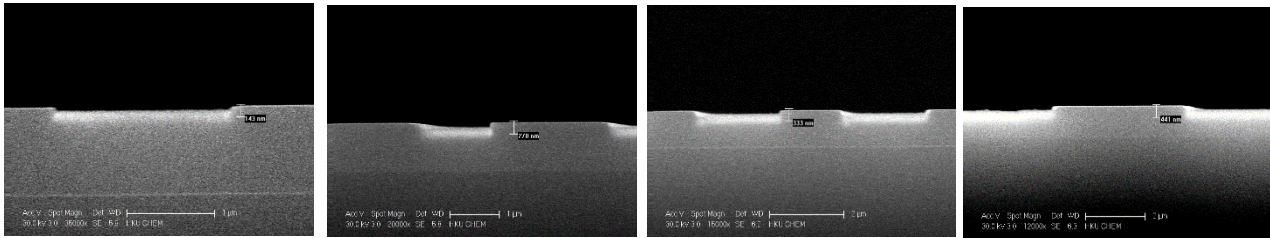
Silicon/Silica etching:

20sccm CHF₃+5sccm O₂, power 6.

Etch rate: Silicon: 20nm/minute Silica: 10nm/minute



Etch rate of Silicon: 10mins 20mins 30mins 40mins



Etch rate of Silica: 10mins 20mins 30mins 40mins

Photoresist Descumming:

20sccm O_2 power 6 for 1min

3.5 Close process

Click the cleaning ON (the color change from **green** to **red**), then close all gas. After more than 30s, click Using B gas → Vacuum pump ON → Large air value ON. Then get out the sample.