

# NMPF Sputter (AJA) SOP

## Switching ON the tool:

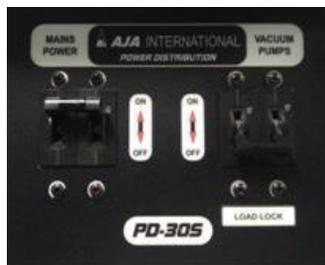
1. Turn ON the GN2, PN2, Ar valve located in the panel.
2. Switch ON the Main power supply for the tool.
3. Press the water interlock
4. Turn the mains nob to ON position on the tool
5. Check and note the main chamber vacuum pressure MKS gauge controller in the logbook
6. Switch ON the vacuum pump for main chamber
7. Switch ON the Mains power in power distribution panel and then the load lock pump switch
8. Once all the pump for main chamber has reached its full speed we can press OPEN for the gate valve in local mode

## Sample Loading process:

1. Place the sample on the sample holder (fig5).
2. Turn OFF the Load Lock Chamber vacuum pump (fig.7)
3. Wait for the Load Lock Chamber to come to atmospheric pressure (760Torr).
4. Take the lid OFF and place the sample holder in the Load Lock Chamber, taking care of the screws provided on the transfer arm to place the holder correctly (in“Y”position towards main chamber).
5. Place the lid properly.



Sample holder



load lock OFF



load lock ON

Fig.5

Fig.7

Fig.8

6. Turn ON the Load Lock Vacuum (fig 8).
7. Now wait for the pressure to reach  $4 \times 10^{-6}$  Torr on Load Lock Gauge. (Fig.9)
8. When the pressure reaches  $4 \times 10^{-6}$  Torr, check the position of the substrate height adjustment knob (fig 12). It should be at the mark (position = 32 on the substrate height adjustment knob). If not, then rotate the knob in anti-clockwise direction until it reaches the mark.
9. Rotate the Rotator to Load position (on substrate rotator) (fig 12a).
10. Open the gate valve between Main Chamber and Load Lock Chamber (fig 11).
11. Move the transfer arm into the Main Chamber (fig 13).
12. Rotate the substrate height adjustment knob in clockwise direction until it reaches the bottom mark (position =54).
13. Rotate the Rotator to lock position (on substrate rotator). If it does not rotate then adjust the height adjustment knob a bit and then try again to rotate the rotator to lock position.
14. Rotate the substrate height adjustment knob in anti-clockwise direction until it reaches below the upper mark (position =32).
15. Check if the substrate holder is placed properly on the substrate carrier.
16. Move the transfer arm back to the Load Lock Chamber.
17. Close the gate valve between Main Chamber and Load Lock Chamber.

Comment [STB1]: Image is to be added as I don't have it



Fig.9



Fig.11



Fig.13

## Sputtering Process:

1. Turn ON the Sputter laptop.
2. Start the software and enter the password. You will see the SYSTEM CONFIGURATION page as shown in [fig 14](#).
3. On the SYSTEM CONFIGURATION page you decide, which materials to deposit using DC and which ones to deposit using RF.
4. Once proper Gun Numbers and Valve Numbers have been put according to the material to be deposited, press the CONFIG SAVE button on the upper left corner. This will open the COMPUTER CONTROL page.
5. Press the REMOTE button on the front panel of Sputter System ([fig 15](#)).
6. Turn ON the substrate rotator using “ROTATION” button on the COMPUTER CONTROL page ([fig 16-a](#)).
7. Set STPT value to 30 for Argon gas ([fig 16-b](#)).
8. Set the pressure to 30 mTorr using the “PRESSURE” button ([fig 16-c](#)), for Plasma generation.
9. Turn ON Argon gas flow ([fig 16-d](#)).
10. Observe the changes in [fig 17-a](#), [17-b](#), [17-c](#), [17-d](#)
11. Select the gun that you want to use by pressing the respective “SW” button ([fig 17-e](#)).
12. Set the Ramp up time for power. (Generally, the ramp up time (in seconds) = forward power).
13. Set the forward power in the STPT.
14. Turn On the “OUTPUT” button.
15. As you turn ON the OUTPUT button, the power starts increasing and plasma will generate. Plasma has struck is shown by pink button ([fig 18-a](#)).
16. After the plasma has struck and ramp up time has elapsed, set the process vacuum to desired value (3 mTorr) using “PRESSURE” button ([fig 18-b](#)).
17. Start the deposition by pressing the “CLOSED” button.
18. Decide the deposition duration as per your thickness requirement.
19. Close the shutter when the deposition duration is over.
20. Set the Ramp down time. Ramp down time is same as the ramp up time.
21. Set the forward power to 0 in STPT.
22. After the elapse of the ramp down time, turn OFF the “OUTPUT” button.
23. If you want to deposit another material, repeat the steps 8, 11-22.
24. If no more deposition is to be done then –
  - a) Set the pressure to 30mTorr
  - b) Turn OFF “ROTATION”.
  - c) Set STPT of Argon to 0 and turn OFF the Ar gas flow.
  - c) Press the OPEN button in the PRESSURE CONTROL panel on software.

d) Press the “LOCAL” and “OPEN” button on the front panel of the Sputter System.  
25. LOGOUT the software and shut down the laptop.

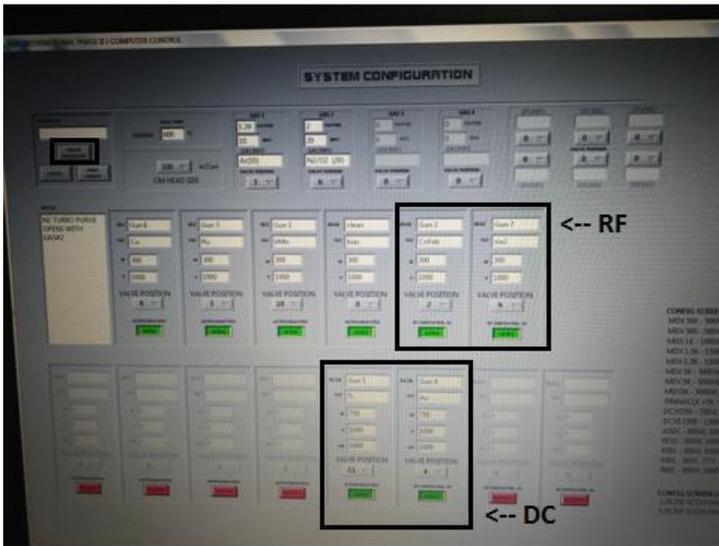


Fig.14

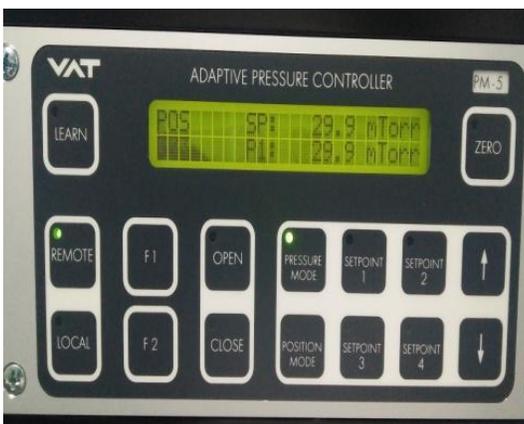


Fig. 15



Fig.16



Fig. 17

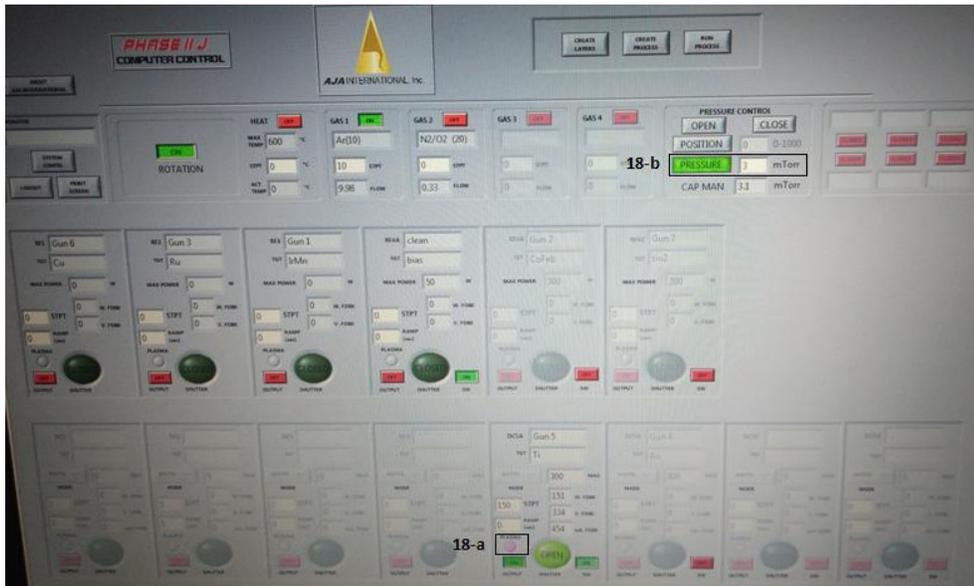


Fig.18

### Unloading Process:

1. Check if the position of the substrate height adjustment knob is at the mark (position=32). If not, then rotate the knob in the anti-clockwise direction until it reaches below the mark (position=32)
2. Check if the rotator is in unload position, if not, and then rotate the rotator to unload position.
3. Open the gate valve between the Main Chamber and Load Lock Chamber.
4. Move the transfer arm into the Main Chamber.
5. Rotate the substrate height adjustment knob to lower position (position =54).
6. Rotate the Rotator to lock position (on substrate rotator). If it does not rotate then adjust the height adjustment knob a bit and then again rotate the rotator to L position.
7. Rotate the substrate height adjustment knob to below the upper mark (position =32).
8. Check if the substrate holder is placed on the arm properly.
9. Move the transfer arm into the Load Lock Chamber.
10. Close the gate valve between the Main Chamber and Load Lock Chamber.
11. Turn OFF Load Lock Chamber Vacuum pump.
12. Wait for the Load Lock Chamber to come to atmospheric pressure (760 Torr).
13. Take the lid OFF and take out the sample holder.

14. Place the lid back and turn ON Load Lock Chamber vacuum pump.
15. Remove the samples from the sample holder.
16. Wait for the vacuum in load lock chamber to reaches E-6

### **Shutting down the system**

1. Write down the pressure inside the main chamber in the logbook.
2. Switch OFF the Main chamber vacuum pumps
3. Turn OFF the PN<sub>2</sub>gas.
4. Switch OFF the load lock vacuum pump
5. Once the vacuum pumps for the main and the load lock chamber are OFF completely, Switch OFF the main power for the power distribution.
6. Turn OFF the Mains Nob on the tool.
7. Turn OFF the Main power supply of the tool.
8. Switch OFF the GN<sub>2</sub> and Argon gas.