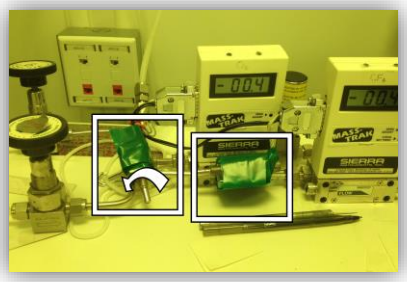
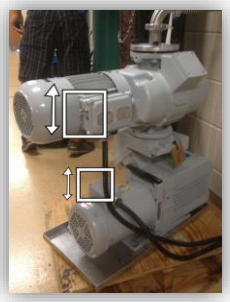
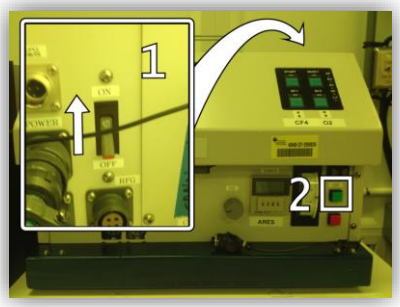
SAMCO COMPACT RIE
STANDARD OPERATING PROCEDURE

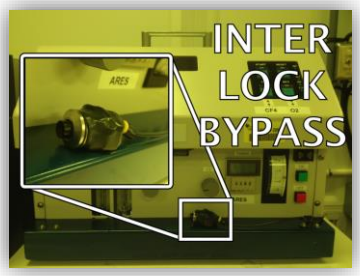
LAST REVISED: 31 MARCH 2014

INSPECTION

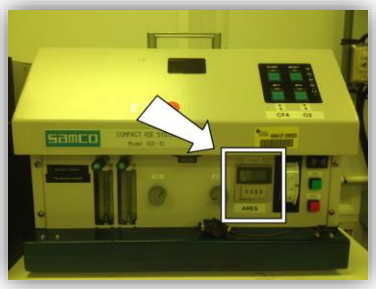
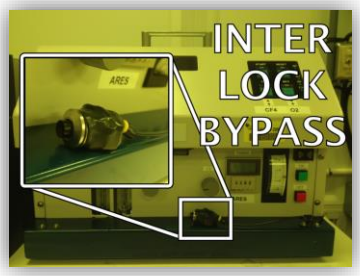
1) The SAMCO should be left under vacuum when not in use. Try opening the lid; it should not open.	
2) Make sure the mass flow controllers are not open. Try turning the potentiometers counterclockwise; they should not spin.	
3) Check the pressure of the N2 gas (P ~ 5 psi).	
4) Check the pressure on the regulator's outlet gauge of the processing gas(es) (O2, CF4, Ar) you wish to use. Open the cylinder valve and regulator outlet valve and check the pressure (P ~ 20 psi). **DO NOT ADJUST THE GAS PRESSURE! For instruction on operating the gas regulator, see the instructions posted on the door.** **If you notice any irregularities upon inspection, please inform the superuser.**	

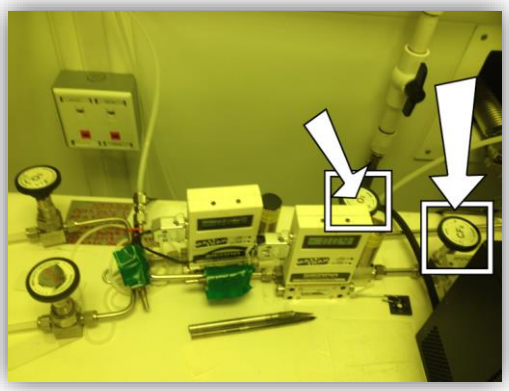
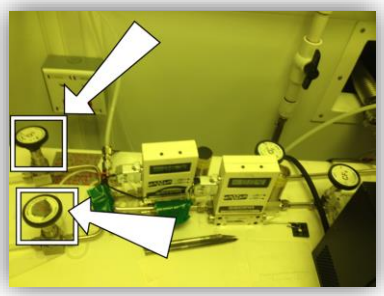
SYSTEM START-UP

1) Switch on both the roughing pump and the blower unit located in the corridor.	
2) Make sure the valve on the MKS pressure controller is 100% open (press OPEN if it is not already 100% open).	
3) Power on the SAMCO. Switch on the breaker located on the back of the SAMCO, and then press the green “ON” button on the front.	
4) Power on the RF generator. Switch on the breaker on the back of the RF power supply, then press POWER on the front of the power supply.	

5) Press START on the SAMCO.	
6) Press RESET and the interlock bypass button in order to vent the chamber with N2.	 
7) Once the alarm sounds, the chamber is vented. Press RESET again to turn off the alarm	

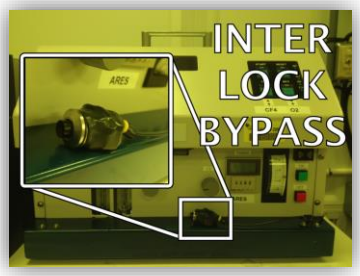
DRY RUN (BEFORE INSERTING SAMPLE)

1) Open the lid and ensure the chamber is empty	
2) Press OPEN on the MKS controller to open the RIE vacuum valve.	
3) Close the lid and press START to	
4) Make sure the timer on the RIE is set to 1 hour or more.	
5) Wait until pressure is **BELOW** 20 mTorr, then press the interlock bypass button in front of the SAMCO. The GV LED will illuminate. **DO NOT bypass the interlock unless pressure is below 20 mTorr!**	

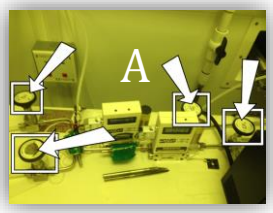
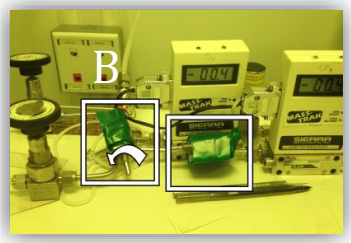
6) Open the RIE gas valves for desired gas(es) and press GV1 or GV2 (or both) depending on the desired gases.	 
7) Open the Nupro gas valves for the gas(es) you wish to use.	
8) Set the mass flow controller(s) (MFC) to the desired flow rate(s) (in SCCMs) by turning the potentiometer(s) clockwise.	

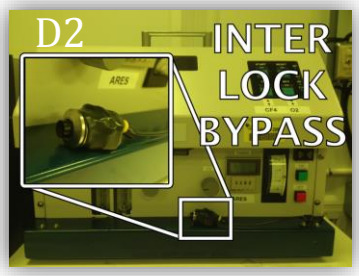
9) When the indicated pressure is below the set point pressures, select the set point (A through E, or press OPEN) on the MKS controller to achieve the desired pressure.	
10) **When the pressure stabilizes**, press RF ON on the RF generator and simultaneously start your stopwatch (look in the view port and make sure plasma is being generated).	
11) Adjust the tuning capacitors on the SAMCO labeled C1 and C2 to achieve the lowest reflected power (< 6 W)	
12) When 3 minutes have passed, press RF OFF to turn off the RF generator.	

13) Turn off GV1, GV2, or both.	
14) If not already open, press OPEN on MKS controller.	
15) When pressure is below 20 mTorr, press CLOSE on the MKS controller.	

16) Vent the chamber by pressing RESET on the RIE and then pressing the interlock bypass button. Make sure the LEDs turn off.	 
17) When the alarm sounds, press RESET again.	

INSERTING AND PROCESSING YOUR SAMPLE

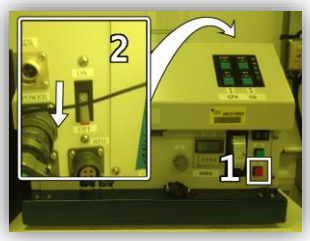
1) Open the reactor lid and place your sample onto the sample stage.	
2) Close the reactor lid and repeat the DRY RUN procedure with the following modifications: a. The capacitors C1 and C2, as well as the flow rate(s) for the MFC(s), may need tuning depending on your specific OP. b. Processing time will depend on your OP. c. **BEFORE VENTING AND REMOVING YOUR SAMPLE**, see 3.	
3) After your timed run(s) is(are) comlpete, do the following: a. Close the Nupro gas valves b. Set the flow rates on the MFC(s) to 0 sccm. c. Press OPEN on the MKS controller. d. Press RESET and the interlock bypass button to vent the chamber (press RESET again once the chamber is vented in order to silence the alarm) e. Open the chamber lid, remove your sample, and close the lid.	 

When you finish with your processing, **you must perform a 3 minute dry run** with the same gas(es) you used to process your sample.

SHUT DOWN PROCEDURE

1) Press START to begin pumping down the chamber.	

2) When pressure P < 50 mTorr, press CLOSE on the MKS controller.	
3) Turn off the RIE by pressing the red OFF button on the front of the SAMCO and then the breaker on the rear.	
4) Turn off the RF generator by pressing the POWER button.	
5) Wait 10 minutes (meanwhile proceeding to steps 6 and 7), then switch off the breaker on the back of the RF generator.	
6) While you're waiting, close the gas valves on the cylinder(s) of your processing gas(es) (ensure that no one else in the lab is using those gases before you shut them off).	

7) Shut off the roughing pump and blower unit in the corridor.