

COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK COLUMBIA NANO INITIATIVE / CENTER FOR INTEGRATED SCIENCE AND ENGINEERING

Autofinder (and Glovebox) Standard Operating Procedure



These instructions are intended for reference only, and will *not* replace the thorough training required for proper system operation. Contact a staff member/ superuser with questions or to report a system problem.

SOP prepared by Dr. Manju Rajeswaran and Anjaly Rajendran Jan., 2022





1.	Enable the tool in BADGER	• Remisnaw mva Raman microscope 4.00 • Woollam Apha SE ellipsometer 4.30 • Woollam Variable Angle Ellipsometer 5.30 • Phi XP S* 600 • Horiba micro-Raman 5.30 • Autofinde Enable • Autofinde Enable • Autofinde Enable • Bergues Work 8.30 • EcoSEC F Shutdown • EcoSEC F Shutdown • Search PCS • • Qualify User • • Browse Manual •
2.	Glovebox N2 Gas supply - Always check N ₂ cylinder/Dewar pressure levels before, during, and after using antechamber. If the glovebox gas supply is below 80 psi, DO NOT USE THE GLOVEBOX or if N ₂ cylinder/Dewar is empty, please report on badger and if possible, inform staff (SMCL_equipment@colu mbia.edu) and super- user.	<image/> <image/>





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-		
	vibrations do not damage	
	your stack or device.	
4.	Glovebox Control Panel -	P: 4.7 mbar H2O: <0.5 ppm O2: 2.6 ppm IN BRAUN
	Always check O_2 and H_2O	Circulation Reactor 1 Vacuum Pum
	levels before using	Regeneration Reactor 1 Analyzer
	antechamber, if O ₂ level is	Box Light
	above 2 ppm or moisture	Circulation
	level is above 0.5 ppm,	End LMF Filter LMF Filter
	please report problem on	Alarms
	badger and if possible,	
	inform staff	
	(SMCL_equipment@colu	
	mbia.edu) and super-	
	user.	
5.	Please fill out the logbook,	
	whenever antechamber is	
	used Please include	
	Name UNI Date Start	
	Time End Time Ω_2 and	
	H_2O levels before and	
	after, what was put in the	
	box etc.	





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To transfer materials into 6. the glovebox please use the mini antechamber located on the right side of the glovebox Open the valve fully 7. REFILL counterclockwise to CLOSED ACUATE pump the antechamber. Purge antechamber by turning the valve to the "refill" position, gauge indicator will rotate to its extreme clockwise position. Whenever moving something from ambient conditions into the glovebox, the antechamber must be pumped and purged 3 times with a total pumping time of at least 20 minutes.





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	When moving in layered plastic objects like tapes, PDMS and many glass objects like crystal vials and more than 3 glass	
	slides, the antechamber	
	should be pumped	
	overnight.	
	Please ensure that	
	containers transported in	
	the box are open and can	
	be evacuated.	
8.	Make sure the interior door of antechamber is closed. Unlatch exterior door of antechamber and open antechamber.	



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9. Slide stainless steel tray out, please be careful and do not pull it out all the way. Load your material of interest on the tray and Close the antechamber lid **10** Next, pump and purge (vacuum and refill) the antechamber 3 times to make sure the FULL EMPTY (Empty then Fill) x 3 antechamber is approximately at the same pressure as the inside of the glovebox. Then leave the antechamber under pump down (active vacuum) for minimum 20 minutes to remove all oxygen and moisture.





11.	Always wear long sleeves and gloves while using the glovebox system. Please make sure you are not wearing a watch or any sharp jewelry, so you don't puncture the gloves.	Always wear gloves while using lovebox system No watches or sharp jewelry Wear long sleeves	ng the
12.	Insert gloved hand and sleeved arm into glove closest to internal antechamber port carefully. In general, aim to miss all obstacles while inserting your arms into gloves.		
13.	Open latch on interior antechamber port and slide out the stainless- steel tray to remove your material. Close interior small antechamber port and close the latch.		





14	Evacuate the antechamber until it is completely empty, then turn valve to "closed" position. Antechambers should always be left under vacuum with their respective valves in closed positions when not in use.	Republic Closed (ACUATE (ACU
15	If you are leaving samples for overnight pumping in the antechamber, please remember to leave a note on antechamber.	Pumpíng overníght
16	Turn on Heating stage - Heating Stage takes a few min for the PID to stabilize, so turn the stage on and preset the temperature before you setup the transfer. Use the Platinum software for setting the temperature.	





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17	Platinum software,	Relations − □ × File Tools Help □
	Manual mode – change	Device fromation Statistics Extensions Device ID 0000CA19 Connected To COM4-1 Version 13.0.27 Connected To COM4-1
	Setpoint 1, press RUN	System Status 00000000 Run Mode RUNNING Rate of Change 0.00 Config ratio Config ratio
		Configuration Group 40,0,0,40,0,40,0, Selporet Tourie 2 Wet Run Ide Reads Valey Recet Calibrate TARE Manual Control Configuration Graphing Referation Referation Communications Referation Communications Referation Communications Referation Communications Configuration Configur
18	Platinum software, Ramp	Image: Platinum Monitor − □ × File Tools Help − □ ×
	& Soak mode – to avoid	Device Infomation Statistics Device ID 0000CA19 Venion 1.30.27
	overshooting	System Skatus 00000000 Run Mode RUNNING Process Variable 0.00 / second
	please turn it off after finishing	Contiguation Group Process Input Process Inp
	your session,	40,0 40.0 Auslay Input Sepoints Alams
		Wat Run Ide Digital Input Ramp & Soak Outputs Stop Standby Pause Inactive 0-0 Imactive 0-0
		Pesk Valey Latch 130.3 24.9 Peset Display Safety Excitation Communications
		Manual Control Configuration Graphing Refresh Refresh 2.00 Addo Refresh Timer
19	Select R&S control -	Ramp and Soak X
	PANEL/D IN START', End	R&S Control PANEL/D IN STAI → Ramp Time 00:02:00
	of profile Action "HOLD'	Profile Ramp Time 00/01:00 ♦ RE Setpoint 39.0 ♦ Soak Time 01:00:00 ♦ SE Tracking Mode CYCLE ✓ Segment 3
	soak time is set to a large	Number of Segments 1 Ramp Time 00:10:00 ♦ RE Segpinit 0.0 ♦ Soak Time 00:10:00 ♦ SE End of Proble Action HOLD Segment 4
	value like 20:00:00 so	No Linking 0 ↓ Ramp Time 00:10:00 ↓ RE Setpoint 0.0 ↓ Soak Time 00:10:00 ↓ SE (Update Refresh Segment 5
	that the temperature	Ramp Time 00:10:00
	remains at the desired	Ramp Time 00:10:00 ♦ RE Setpoint 0.0 ♦ Soak Time 00:10:00 ♦ SE Segment 7
	value throughout the	Ramp Time 00:10:00
	stacking process. Specify	Select Profile 1 © Ramp Time 00:10:00 0 RE Setpoint 0.0 0 Soak Time 00:10:00 0 SE
	target temperature in	
	'Setpoint', time to ramp	



	up in 'Ramp Time'. Press 'Update' to register new settings.	
20.	Turn on Vacuum Chuck Supply - Turn on the vacuum chuck supply to the stage which holds the chip. Press the red button to turn on/off vacuum to the stage	
21	Turn on N ₂ supply for floating table - Double Check the nitrogen supply for the active vibration isolation. There are two switches which control the nitrogen supply to the	





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	vibration isolation table.	Switch 2
	Make sure both are on.	Open Closed
22.	Place your sample chip on the heating stage.	
23.	Turn on the microscope light.	COLUMBIA UNIVERSITY 0219541



24.	Placement of transfer slide - Fasten the transfer slide on to the slide holder using the small screw driver and tighten the base of the slide holder to the base using the larger screw driver.	
25.	All tools can be found in a yellow plastic bin near the stage.	
26.	You can use the X, Y and Z knobs to adjust the position of the transfer slide above the chip roughly. Finer adjustments can be done using software.	



 27. Open the Autofinder code in python - Python script can be used to move the stage in X and Y directions. The microscope objective can be moved in Z direction to adjust the focus. 28. Stage left/right -> 1/3 	Autor Edit with Pythonwin Code Edit with IDLE Edit with IDLE > Create shortcut Open with Over Stare with Malwarebytes Image: Shortcut WinZip > Cut Copy Cut Copy Cut Copy Create shortcut Delete Rename Properties Shortcut Properties
Stage up/down -> 2/5 Fine movements -> f Medium movements -> m Fast movements-> h Focus control – Objective movement A -> down by 5 steps Z -> up by 5 steps S -> down by 50 steps X -> up by 50 steps D -> down by 500 steps C -> up by 500 steps W-> down by 2000 steps E -> up by 2000 steps	A Marcon John Grunnant A Start - 5/50/500 1/3 left/right 5/2 up/down f/l/#/h changes xy to 5/100/1000/0000 steps 7/3 Jump between x5 to x10/x20 facus (59080) Correcting for x2, xy drifts/angles press '[* at ist position than ']' at 2nd 0-quit, i-stage location, /-shows instruction





30	You can view the live camera window by using the Motic software, located on the taskbar Stacking in the glovebox can be done by utilizing the robotic picomotor micromanipulator (the red one to the right of the Autofinder stage).	
31.	Open 'PicomotorApp'	File View Setup Help Tell Controllers Motor 1 Motor 3 US8 US8 Steps Zero 420311 steps Motor 2 Motor 1 Zero Motor 4 2ero Motor 4 US8 Steps Zero 9865 steps Zero 0 steps Step Motion Stop Motion 1 2 3 3 3 9 Cycle Terminal Relative Jog Ocycle Terminal Relative: 10000 steps Voide Jog (Pree Run) Image: 10000 steps Go Ready. Connected C C C K R







