

MOCVD Growth Sequence

1. Check that Toxic Gas Monitor status lamp outside room 240 is green
2. Open N₂/H₂ cylinder valves and check for adequate pressure (>400psi)
3. Turn on MOCVD control panel using "CONTROL PANEL" switch by the MOCVD power panel
4. Turn on vacuum pump oil purifier using "OIL PURIFIER" switch by the MOCVD power panel
5. Turn on vacuum pump using "VACUUM PUMP" switch by the MOCVD power panel
6. Turn on appropriate refrigeration units (to insure proper temperature of source, this step may need to be performed the night before growth)
7. Turn on induction heater and refrigerator #1 (induction heater cooling water) using the appropriate switches by the MOCVD power panel.
8. Press green Start/Reset button on control panel to bring system out of Power Fail condition
9. Perform hydrogen purifier start up procedure or return from idling procedure as appropriate
10. Load substrate
11. Check heater and spinner set points
12. Open valves on required liquid and gas sources
 - a. For gas sources, open both the cylinder thumbwheel and XGMV1 (where X is A for arsine and P for phosphine)
 - b. For liquid sources, open the bubbler output valve and then the input valve to prevent backflow of the liquid source into the carrier gas piping
13. Proceed with growth using LabView program
14. Once the substrate temperature is below 40°, remove the substrate (if Phosphine was used in growth, the scrubber should be oxidized before opening reactor as Phosphine is pyrophoric – follow step 4 in the end of day procedures)
15. If additional growth runs will be performed, go to step 9; otherwise continue with end of day procedure

MOCVD End of Day Procedures

1. Close valves on liquid and gas sources used for growth
 - a. For gas sources, close both the cylinder thumbwheel and XGMV1 (where X is A for arsine and P for phosphine)
 - b. For liquid sources, close the bubbler input valve and then the output valve to prevent backflow of the liquid source into the carrier gas piping
2. Turn off refrigerators and induction heater using switches by the MOCVD power panel
3. Idle or shut down H₂ purifier (idle purifier if growth runs are planned for the next day, otherwise shut down purifier)
4. Oxidize scrubber
 - a. Set N₂ flow to 300sccm
 - b. Turn on scrubber oxidation switch on vacuum control panel
 - c. Wait 10 minutes, occasionally monitoring scrubber temperature by feel (scrubber oxidation is exothermic, if scrubber is warm to the touch near the top of the scrubber the scrubber may need to be recharged)
 - d. Turn off the scrubber oxidation and the N₂
5. Let the oil purifier run for a few hours (as the purifier is working during reactor cool down, purifier shut-down/idling, and scrubber oxidation; these times should be considered part of the oil purification)
6. Turn off vacuum pump, oil purifier, and control panel
7. If hydrogen purifier is shut down, close both N₂ and H₂ cylinder valves, otherwise close only the H₂ cylinder valves