

MOCVD – HF cleaning procedure

The MOCVD quartz glass components, including the liner, ceiling plate, cover plate (donut), and downstream plate of the MOCVD reactor need to be cleaned by diluted HF solution every two to three months. The diluted HF solution will slightly etch the surface of the glass components so that the deposits on the glass surface are removed. The procedure of the HF cleaning is as follows:

1. Carefully take out the liner, ceiling plate, cover plate (donut), and downstream plate from the reactor.
 - **Avoid contamination:** Use the clean-room wipes to cover your gloves (black glove box gloves)
 - **Avoid contamination:** Use clean-room wipes beneath the glass ware
 - **Avoid contamination:** Cover the surface of the glass components with clean-room wipes
2. Put the glass components into the HF cleaning box.
3. Wear chemically-resistive gloves, helmet, and gown for protection from HF.
4. Use DI water to clean a dedicated beaker.
5. Use the beaker to measure the total volume of DI water filled in the HF cleaning box. Make sure that the water level covers the upper surface of the glass components.
6. Calculate the volume of HF needed for the cleaning. The target concentration of the diluted HF solution is 2%. Add HF into the HF cleaning box to make diluted HF solution.

Example: The total volume of DI water in the HF cleaning box is 15000 ml, and the concentration of research-level HF solution in our lab is 50% (1:1 diluted). If 2% diluted HF solution is needed, the volume of research-level HF solution needed is $15000 \text{ ml} \times 2\% \div 50\% = 600 \text{ ml}$.
7. Cover the HF cleaning box. Wash the beaker and the gloves thoroughly.
8. After 24 hours, take out the glass components from the HF cleaning box. Use DI water to rinse the glass components for at least 10 minutes (as long as possible).
9. Put all the glass components into the oven. Bake the glass components at 150 °C under nitrogen ambient for at least 24 hours.
10. Calculate the mass of NaOH needed to neutralize the acid.

Example: For every liter of research-level HF (50%) added to the solution we need 920 g NaOH for neutralization.
11. Add NaOH into the diluted HF to neutralize the solution. Use PH indicator to test the PH value of the solution. Make sure that the PH value of the solution is 7 before draining it.