

Standard Operating Procedure: How to Clean Optical Cells

Properly cleaned cells are key for any spectroscopy measurements. You are required to clean the cells after using them, so they are ready to go for the next person. ***Do not hoard cells in your work area. All optical cells belong in the “optical cells” drawer in room 429.***

Note: This SOP applies to both regular quartz/glass cuvettes and air-free cells

Personal Protective Equipment Required

Lab coat, safety glasses or goggles, nitrile gloves. Concentrated hydrochloric acid must be handled inside a fume hood.

Hazards

Breaking an optical cell might lead to cuts, so handle them carefully (additionally, breaking a matched air-free cell might lead to DAR's uncontrollable anger).

Using flammable solvents such as methanol and acetone may lead to a lab fire. Use these solvents in the hood so you don't inhale them.

Concentrated hydrochloric acid may cause burns and it also irritates airways. Wear gloves and only open the bottle inside a properly-working fume hood.

Cleaning Optical Cells

First, empty the cell, disposing of its contents in the appropriate container.

- *If the cell only has clean solvent (no sample)*

After emptying the cell, rinse it 2–3 times with the same solvent, and then 3 times with acetone and 3 times with methanol. When doing this, be sure to completely fill the cell with solvent.

Let it air-dry; air-free cells must be securely clamped for this.

- *For cells that had samples (i.e., something other than solvent)*

After emptying the cell, rinse it 2–3 times with the solvent used to make your sample (the solvent should look clear when you are done – some more concentrated solutions might require more rinses). Wash the outside of the cell if you spilled any sample on it.

Rinse the cell once with water, and fill it (even the long neck) with a diluted HCl solution. You have two options for this: a) add 3 drops of concentrated HCl to 20 mL of DI water; b) use a ~0.05 M HCl solution previously made (if you use optical cells regularly, it's a

good idea to make this solution ahead of time and store it in a wash bottle). Let the cell sit for at least 15 minutes.

The diluted HCl solution can be poured down the drain; rinse the cell with DI water 5 times; these rinses can also be poured down the drain.

Rinse the cell with acetone 3 times, and then with methanol 3 times. Then clamp it and let it air-dry.

- *General Guidelines*

If you were using a Kontes valve, wipe it down with solvents (first the same solvent you were using, then acetone, then methanol).

Once the cells are clean, wipe the exterior using lens paper and isopropanol. ***Never use dry lens paper or kimwipes.***

To make a 0.05 M HCl solution: take 3 mL of concentrated HCl and add DI water to a final volume of 500 mL.

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