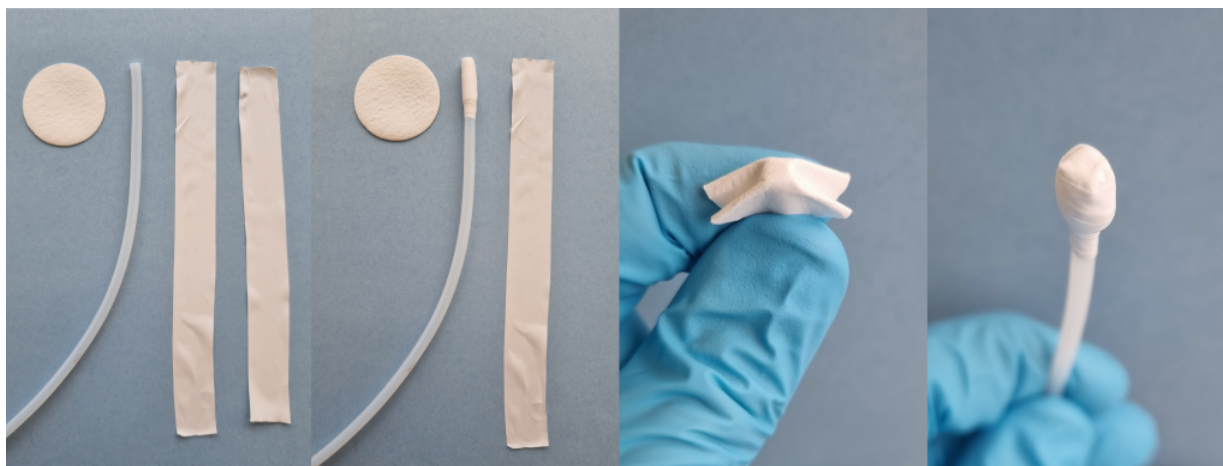


## 5.1: Cannula Filtration

Cannula filtrations are a convenient and routine method employed in Schlenk line chemistry. This method is recommended in situations where the crystallised or precipitated solids readily settles out of solution; fine solids or suspensions on the other hand can easily block the filter cannula. For large crystals, it may be sufficient to simply decant off the supernatant using a long needle and syringe, or to perform a standard cannula transfer.

### Preparing the Filter Cannula

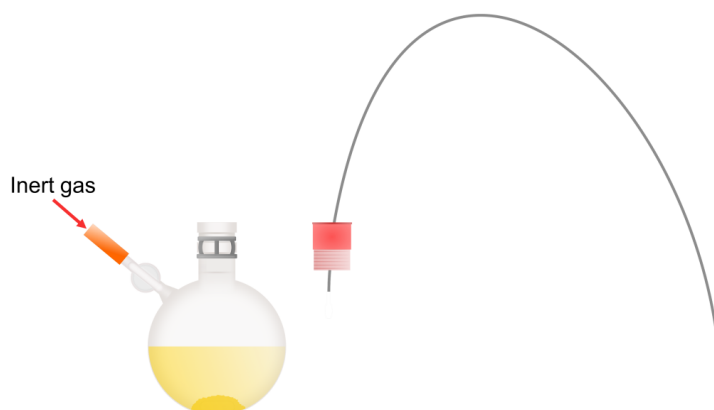
Cannulas used for filtrations should contain one end which is flat or suitably modified to allow a small glass microfibre filter to be secured to the cannula using PTFE tape. Firstly, a ~10 cm length of PTFE tape is wrapped around a flat-ended cannula, making sure to not obstruct the hole. A 125 mm diameter glass microfibre filter is then carefully folded around the cannula, ensuring that the filter remains flat and flush with the end of the cannula. Finally, a second ~10 cm length of PTFE tape is wrapped around the filter to secure it to the cannula. The filter cannula is then stored in an oven prior to use. It is also possible to purchase [premade filter attachments](#) (available in different sizes and porosities) that connect to the cannula and can be secured in place using PTFE tape.



Preparing a filter cannula.

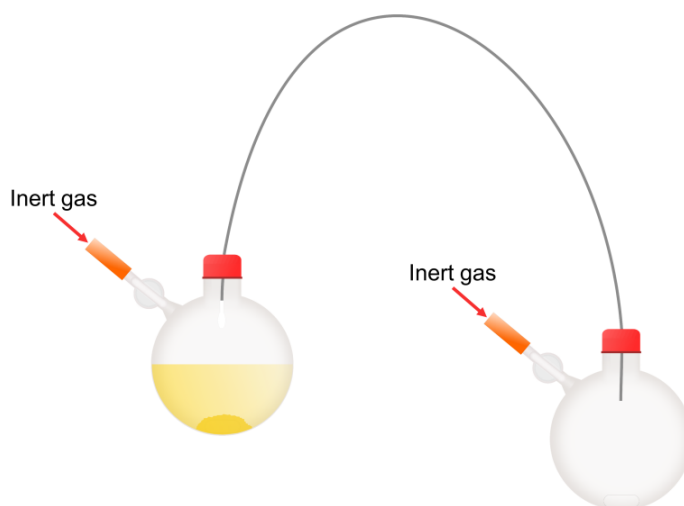
### Performing a Cannula Filtration

**Step 1:** Pierce the sharp end of the prepared filter cannula through the bottom of a rubber septum and pull it along so that the end of the cannula containing the filter is close to the bottom of the septum.



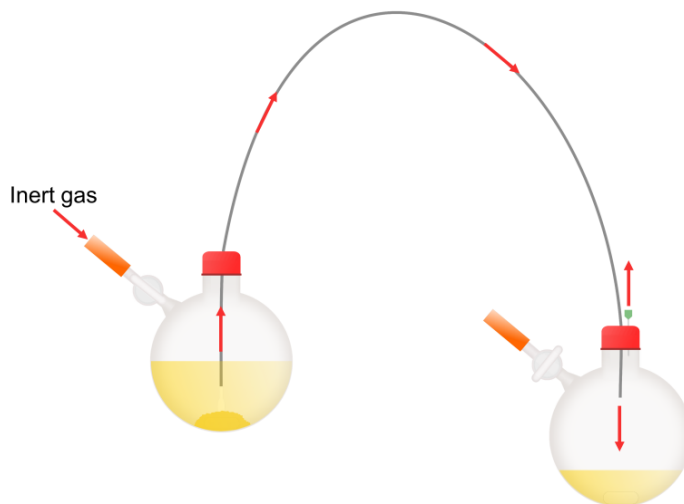
Inserting the filter cannula and septum into the Schlenk flask.

**Step 2:** Replace the ground glass stopper with the rubber septum/filter cannula under a positive pressure of inert gas. Purge the cannula for 15-30 seconds before inserting the sharp end of the cannula into a receiving Schlenk flask that has previously been [cycled](#) onto the Schlenk line.



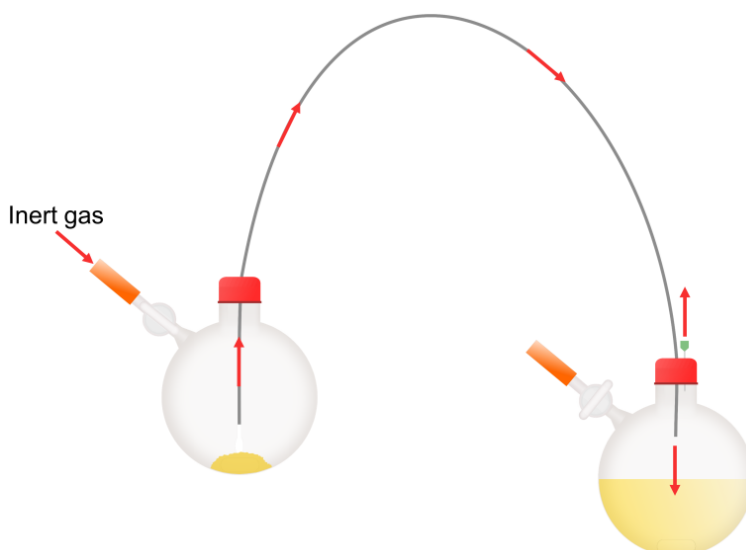
Setup prior to filtration.

**Step 3:** Insert a bleed needle into the septum on the receiving flask and close the stopcock to establish a pressure differential. Lower the filter cannula down into the supernatant. For cannula filtrations, it may be necessary to increase the inert gas over-pressure and raise the height of the transfer flask to help speed up the filtration.



Performing the cannula filtration.

**Step 4:** Once the filtration is complete, the filter cannula is raised above the solids to allow any remaining filtrate to pass through the cannula. If necessary, it is possible to add additional solvent to the transfer flask to wash or extract the solids (by syringe or cannula transfer) and repeat the filtration.



Completed cannula filtration.

**Step 5:** The stopcock on the receiving flask is opened to inert gas and the bleed needle is removed from the septum. The cannula is removed from the septum of the receiving flask and then from the transfer flask along with the septum and replaced with a greased stopper.



Transfer and receiving flasks after filtration.

Clean the cannula immediately after use to prevent blocking. The solids can now be dried under vacuum (if desired) or discarded/quenched, and the filtrate is ready for further manipulations.

This technique is also amenable to being performed at low temperatures by simply submerging the transfer flask in a suitable cooling bath. Hot filtrations using cannula filters may lead to undesirable crystallisation or precipitation of solids within the cannula or on the filter paper and should therefore be used cautiously.

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