

## T7 Vacuum Filtration

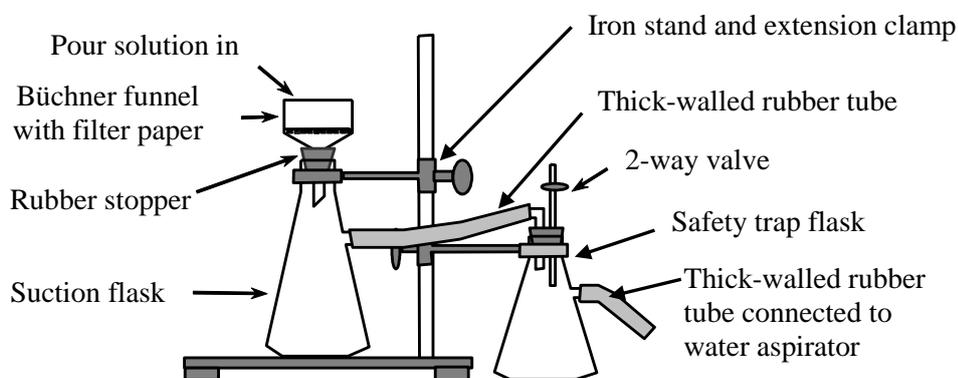


Figure T7-1 Setup of vacuum filtration

Vacuum filtration (suction filtration) uses a water aspirator to reduce the pressure and creates a partial vacuum. The pressure difference and gravity are driven forces that help quickly separating liquid and solid precipitates. A safety trap must be used with an aspirator as Fig. T7-1. If the water pressure in the lab line drops suddenly, the pressure in the filter flask may suddenly become less than that in the water aspirator. This would cause water to be drawn from the aspirator stream into the filter flask and contaminate the filtrate.

### Operation

1. Fill up the water tank of circulating water aspirator with water (water flows in from bottom and out from top), and keep circulating flow.
2. Fix safety trap flask and suction flask with extension clamp.
3. A Büchner or Hirsch funnel is sealed to the filter flask by the rubber stopper or a rubber gasket cone.
4. Select a suitable unfolded piece of circular filter paper to cover the perforations of Büchner funnel or Hirsch funnel. The paper must be neither too big nor too small. It must cover all the holes in the bottom of the funnel, but it must not extend up the sides.
5. Moisten the paper with small amount of solvent, and tightly sealed against the bottom by turning on the water aspirator and closing the 2-way valve (stopcock parallel to bench) to apply suction.

6. Test the suction works, then pour the solution down to a glass rod aimed at the center of the filter paper.
7. In order to collect the precipitate (crystal), it can be washed by adding small amounts of wash liquid over the surface of the precipitate. Precipitate can be air-dried by allowing them to stand in the funnel and drawing a current of air from the room through the precipitate with the vacuum pump.  
Note 1: Do not use too much washing liquid for it may dissolve some precipitate and decrease the yield.  
Note 2: If you are going to collect the filtrate, wash the suction flask thoroughly, and do not use too much liquid for rinsing too.
8. After filtration, open 2-way valve first (stopcock perpendicular to bench) and confirm no one is using vacuum filtration, then turn off the power of water aspirator to avoid the water backflow to the safety trap bottle from water tank.
9. Turn off the circulating flow; drain the water in the water tank.

### References

1. Pavia, D. L.; Lampman, G. M.; Kriz, G. S. *Introduction to Organic Laboratory Techniques: a Contemporary Approach*; Saunders College Publishing: New York, 1976.
2. Shugar, G. J.; Shugar, R. A.; Bauman, L.; Bauman, R. S. *Chemical Technicians' Ready Reference Handbook*; 2nd ed.; McGraw-Hill Book Co.: New York, 1981.