CE-DISTIL1

Distillation Lab Procedure

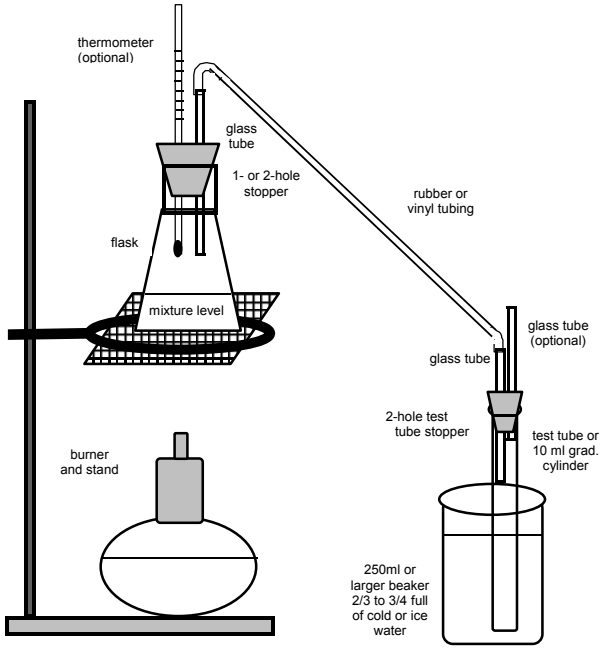
This guide explains how to use simple lab equipment to set up a distillation apparatus and perform a distillation.

Equipment

- Flask, any type, 100-500 ml (a 250 ml Erlenmeyer flask works well)
- Burner (either bunsen burner or alcohol lamp) with stand (ring stand with ring and gauze, or alcohol lamp stand)
- Large test tube (16x150 mm or larger) or 10 ml glass graduated cylinder.
- Beaker, 250 ml or 400 ml
- Rubber stopper, 1 or 2 hole, to fit flask (# 6 for 250 ml flask)
- Rubber stopper, 2 hole, to fit test tube (# 1 for 16 mm)
- Glass tubing, 2-3 pieces about 6" long. To fit
- Rubber or vinyl tubing, 18"
- Thermometer, 6" or longer, partial immersion type (This is optional. You'll need a 2-hole stopper with thermometer; otherwise use 1-hole.)
- Glycerin to assemble glass tubes in

Apparatus Assembly and Distillation

1. Form your hypothesis. What will happen to the vapor temperature in the flask during distillation? Why?
2. Wet one piece of glass tubing with glycerin and stick through the flask stopper so that one end extends 1-2" into the vapor space of the flask when the stopper is inserted.
3. If using a thermometer, wet it with glycerin and stick it through the other hole in the flask stopper so its tip is even with the end of the glass tubing.
4. Wet a second piece of glass tubing with glycerin and insert it into one hole of the test tube stopper so that the bottom end extends 1-2" into the tube when the stopper is inserted.
5. If using a third piece of glass tubing, wet it with glycerin and stick it into the second hole of the stopper so that the bottom of it is even with the bottom of the stopper. If you're only using one piece of glass tubing in the stopper, leave the second hole open. (This opening allows non-condensables to escape.)
6. Assemble the burner and stand so that the flask will sit about 2" above the burner.
7. Fill the flask with the material to be distilled, no more than half full. Place the flask stopper assembly firmly in the flask and put the flask on the burner stand.
8. Fill the beaker 2/3 to 3/4 full with cold water or ice water.
9. Place the test tube stopper firmly in the test tube or 10 ml graduated cylinder and place it in the beaker.
10. Use rubber or vinyl tubing to connect the glass tube in the flask to the glass tube that extends into the test tube.
11. Light your burner and slowly heat the mixture in the flask to a gentle boil. As it boils, you will observe condensation form in the flask glass tube and work its way toward the test tube. The material that's condensing will have a very high concentration of the lowest boiling component in the flask mixture.
12. If using a thermometer, carefully observe the temperature in the flask when condensation first drips into the test tube. Record the temperature every few minutes until the test tube is 3/4 full of distillate. If using a 10 ml graduated cylinder, record the volume of distillate collected at each temperature recording. Compare the temperatures to pure component boiling points. Compare distillate volumes to mixture recipes.



Mixtures to Distill

WARNING: Alcohols and acetone are very flammable. Use extreme caution while handling and distilling.

- Rubbing alcohol & water: mix 15 ml rubbing alcohol (70% isopropyl alcohol, BP=82.4 °C) and 85 ml water (BP=100 °C)
- Ethanol & water: mix 10 ml ethyl alcohol (BP=78.5 °C) and 90 ml water. You can use also different rations of these.
- Acetone & water: mix 10 ml acetone (BP=56.2 °C) and 90 ml water. You can use different ratios of these.