

Chemistry 143: Simple Distillation and Boiling Point

- *Read pages 62-67*

Possible Unknowns

cyclohexane

chloroform

hexane

2-propanol

ethyl acetate

methanol

ethanol

*These chemicals should be listed in your table of physical constants with their boiling points, densities, and molecular weights. You should **draw the structures** in the equation portion or your pre-lab.*

Obtain an unknown sample. Record the unknown number/letter.

Assemble a simple distillation apparatus as shown in Fig. 10.2-1 on p.66 of your lab text, using a 250 ml round bottom flask (RBF) as the boiling flask. Use blue Keck clamps to hold the ground glass joints together. Use a graduated cylinder in place of the collection flask. Make sure the bulb of the thermometer is below the outlet to the condenser (why?). Fit a heating mantle snugly around the boiling flask, making sure the mantle is plugged into a variac, not a regular 110 V outlet (do not turn on yet). Fit two rubber hoses for the cooling water supply to the condenser. Make sure the water inlet tube is the lower of the two (why?). Clamp the whole apparatus securely to ring stands in the three locations shown in the text.

Add your unknown liquid to the boiling flask. Add some boiling stones (why?).

Turn on the variac and dial it up about half way. Turn the condenser cooling water on and wait for the liquid in the flask to begin boiling. At this time, turn the heat down (to about 1/4 on the variac).

Construct a table of boiling point vs. volume of distillate. Take readings every minute. Continue doing this until ~90% of your liquid has been distilled. Turn off the variac and lower the heating mantle. Using a spreadsheet program such as Excel, plot your data and tape the graph into your notebook. Determine the boiling point (as seen by the plateau on your graph) and use it to identify the unknown.