

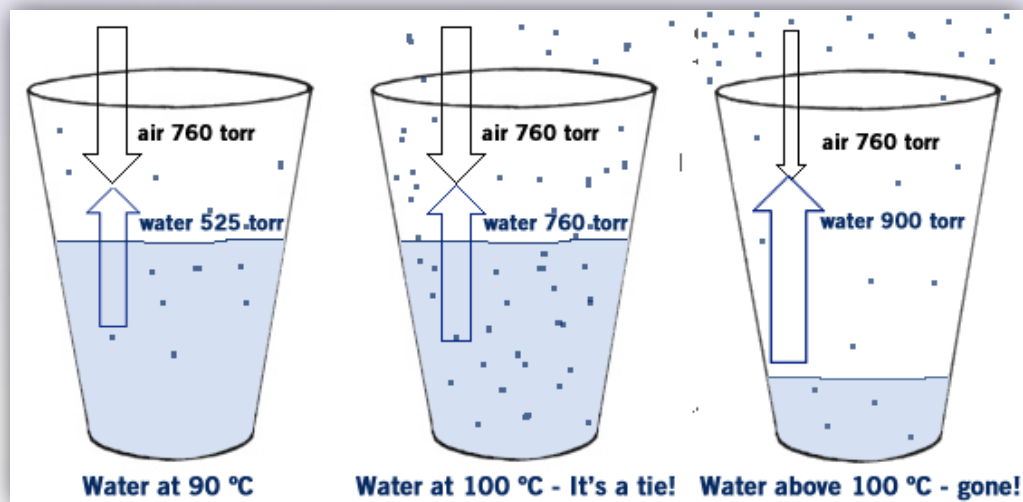


Determination of boiling point

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The boiling point (b.p.)

an organic liquid is the temperature at which the vapor pressure of the liquid equals the atmospheric pressure. OR The boiling point of an organic liquid is the temperature at which it changes from a liquid to a gas.



- ❖ the value b.p depends on the conditions (pressure) under which the measurement is made.
- ❖ The b.p. increases with the molecular mass of the substance and the types of intermolecular forces present.
- ❖ For an organic substance that is liquid at r.t., the b.p. is a measure that characterizes the substance and is indicative of its purity.

Factors Influencing Boiling Point

✓ *Atmospheric pressure :*

pressure \uparrow = $P.b$ \uparrow &

pressure \downarrow = $P.b$ \downarrow

✓ *Molecular weight :*

M.wt \uparrow = $P.b$ \uparrow &

M.wt \downarrow = $P.b$ \downarrow

✓ *Polarity*

Polarity \uparrow = $P.b$ \uparrow &

Polarity \downarrow = $P.b$ \downarrow

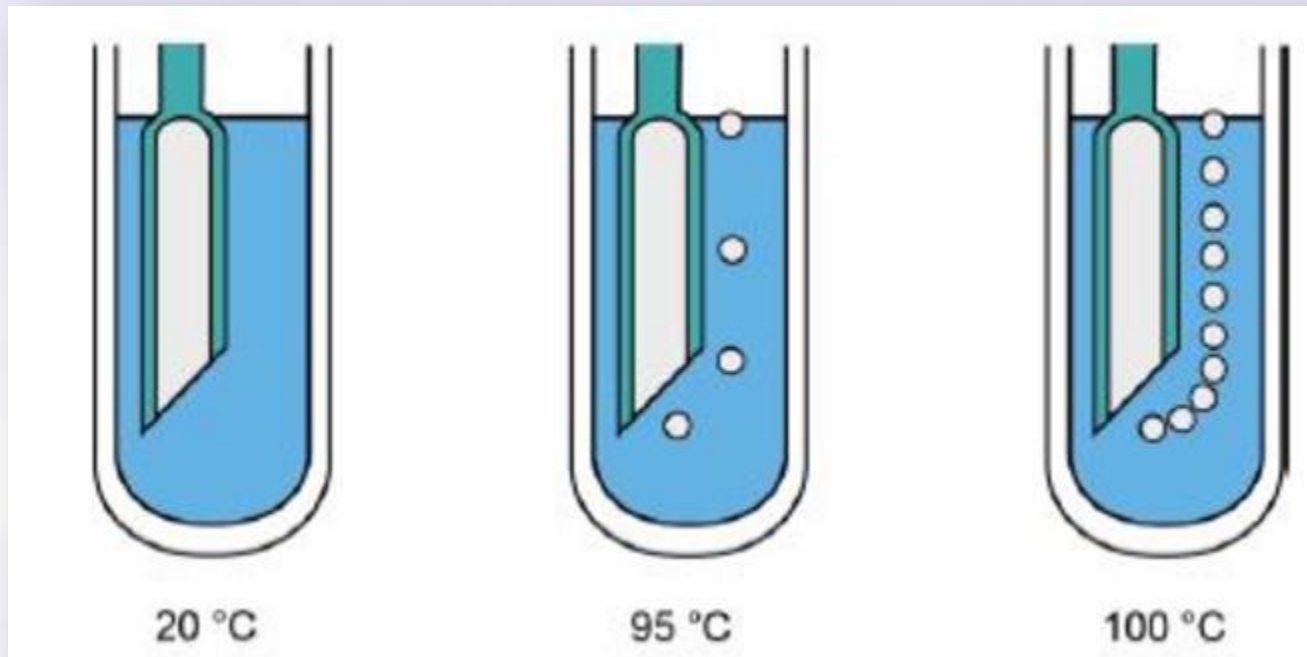
✓ *Branching*
Branching \uparrow = $P.b$ \downarrow

✓ *impurities :*

Pure liquids have sharp b.p. while mixtures show a b.p. range.

Presence of impurities raises the boiling point of a particular liquid

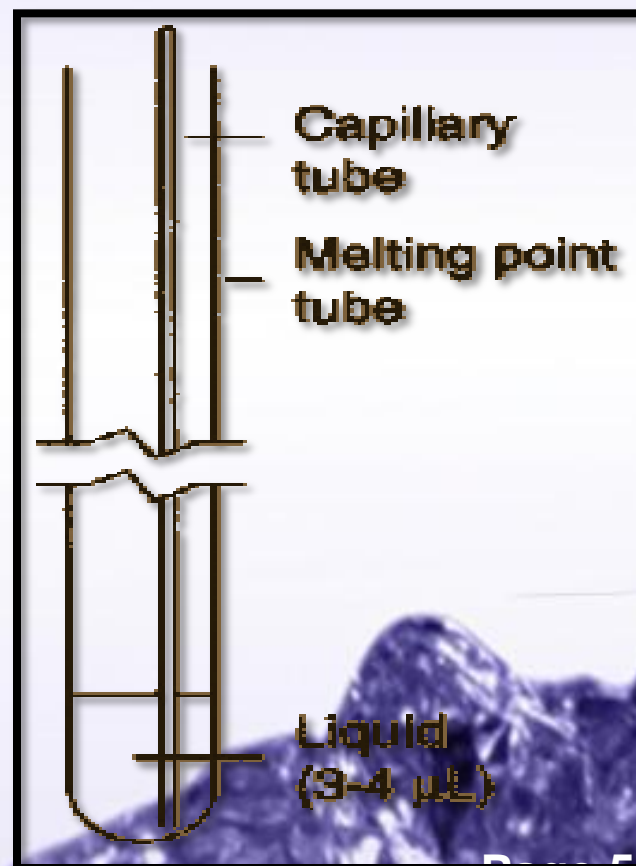
temperature range



Range temp. Of P.b. = $T_2 - T_1$

Procedure:

1. Place a few milliliters of a known liquid organic compound in a small test tube.
2. Into the test tube, place the capillary tube with closed end upward.
3. Clamp the test tube to a ring stand and immerse a thermometer in the test tube. Be sure to clamp the thermometer to the ring stand as well.



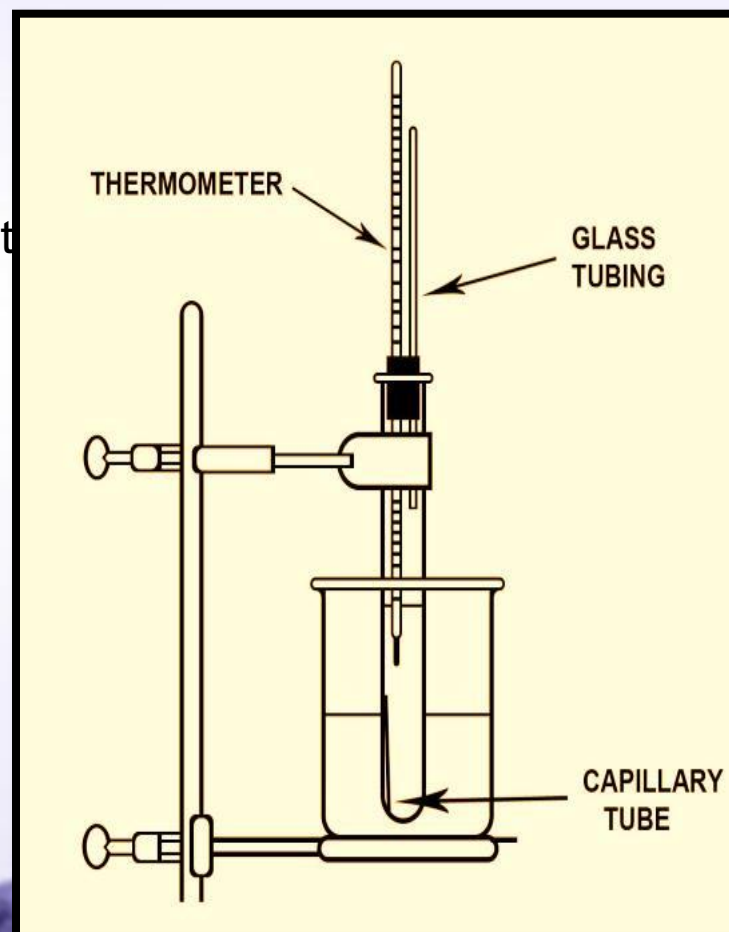
4. Fill a beaker 3/4 full with **oil** and place on the hot plate. Carefully lower the test tube and thermometer combination into the beaker of water so that the test tube is immersed half way in the water.

5. Begin to heat the hot plate/water slowly. As the liquid approaches its boiling point, a few bubbles will be observed flowing out of the end of the capillary tube. When a steady stream of bubbles are observed, turn off the hot plate and allow the contents of the test tube to cool.

6. As the contents of the test tube cools, observe the capillary tube carefully.

When the liquid begins to flow into the capillary tube, record the temperature of the liquid as its boiling point temperature, see Figs(1 and 2) .

7. Obtain an unknown liquid and repeat steps 1-6



Data and Report Sheet

- **Name:**
- **Group:**
- **Date:**
- **Title of experiment:**
- **aim of experiment:**
- **devices and tools:**

Table:

| Reference Compound | Correct B.P. | Measured B.P. | Range |
|--------------------|--------------|---------------|-------|
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