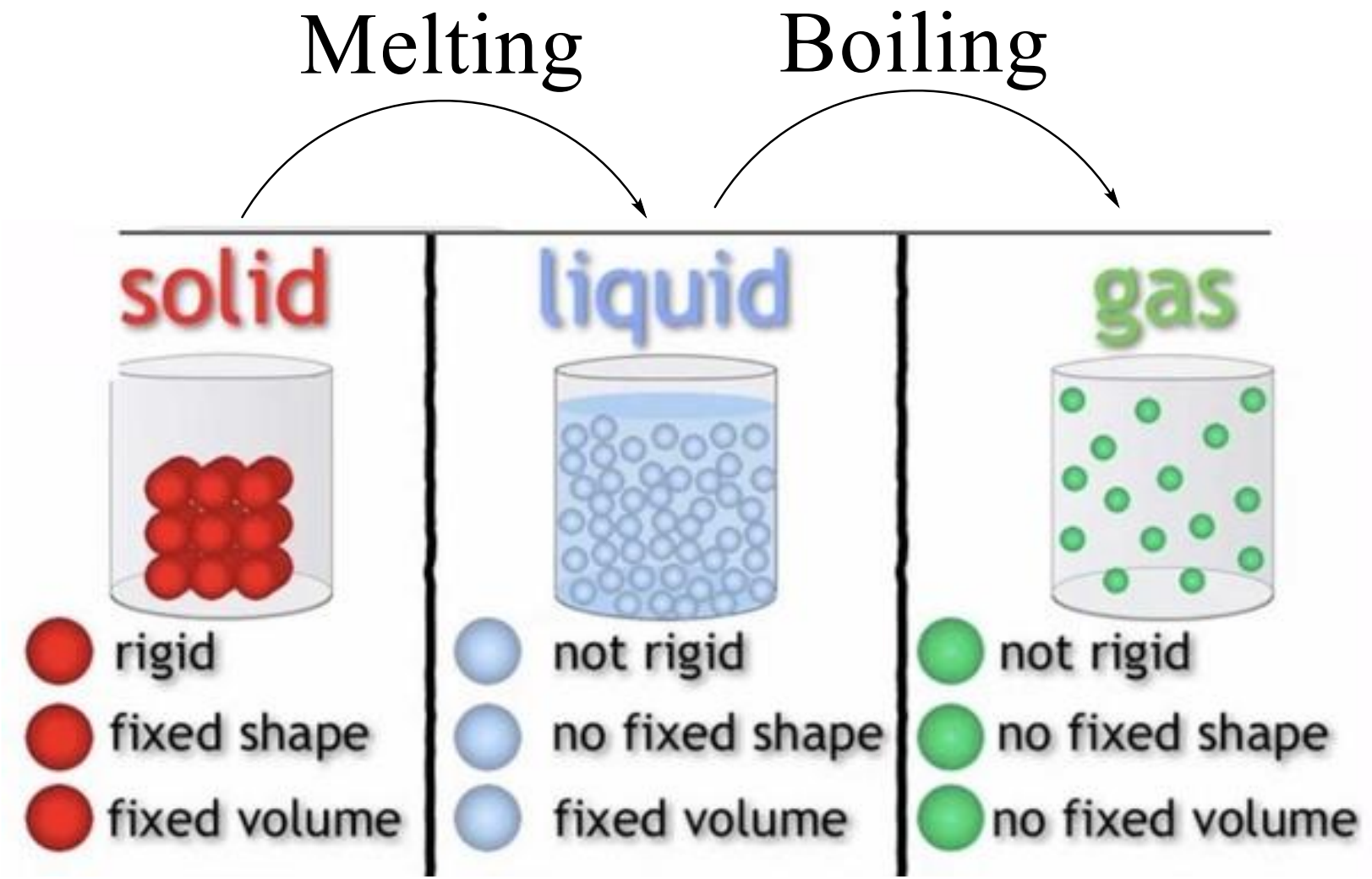
Tishk International University
Faculty of Science
Medical Analysis Department

Lab. 04

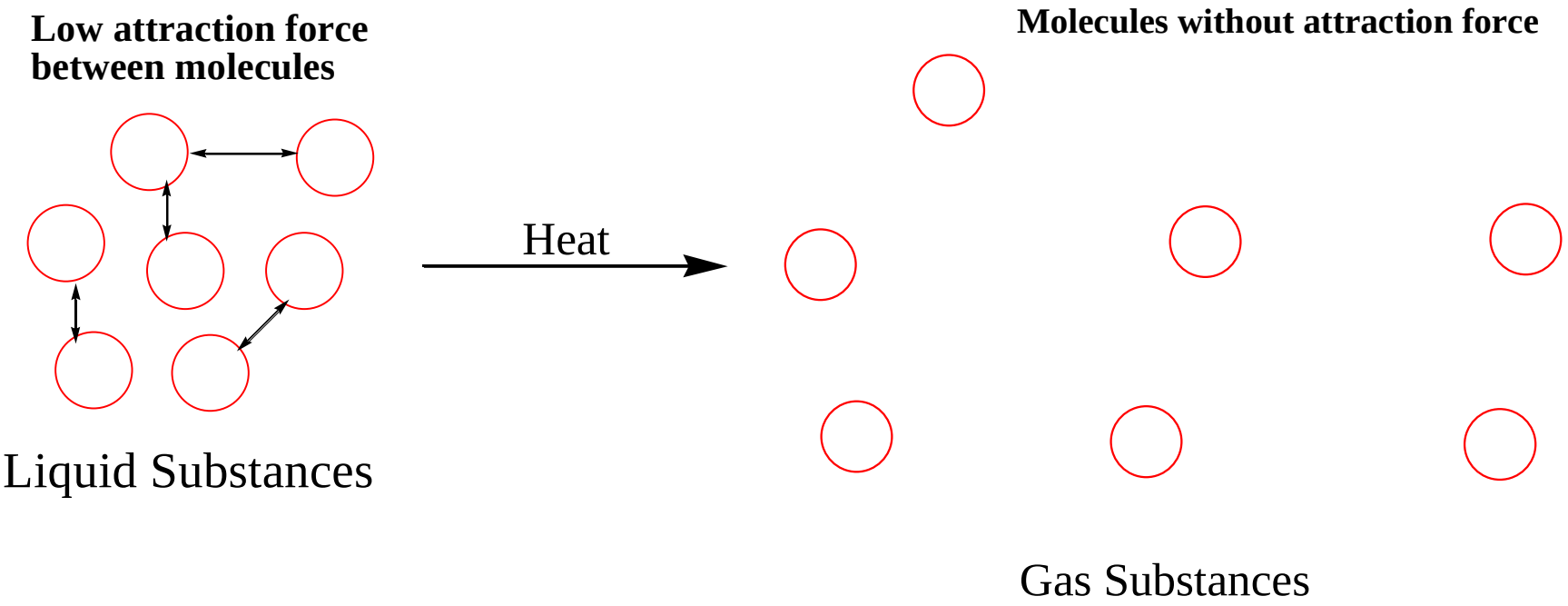
Boiling and Boiling Point

Practical General Chemistry
For
First grade Students


Melting
Boiling
solid
liquid
gas
rigid
fixed shape
fixed volume
not rigid
no fixed shape
fixed volume
not rigid
no fixed shape
no fixed volume

Boiling process:-

Is the amount of the energy to overcome the attraction force between the molecules of the liquid substances.



Boiling point:-

- The boiling point of a liquid is the temperature at which the vapor pressure of the liquid equals to the applied pressure (normally 1 atm) . Or

- *Is a temperature at which the vapor pressure of the liquid equals to the pressure of the surrounding system.*

- *Boiling point is a characteristic physical constant of the liquid compounds and pure sample give us a sharp boiling point. Therefore, like that the melting point, boiling point can be used to identify and characterize liquid compounds.*

Factors affecting on boiling point

1- Pressure

2- Impurity

3- Attraction forces

1- Pressure

Generally with increasing the pressure, the boiling point increase.

2- Impurities

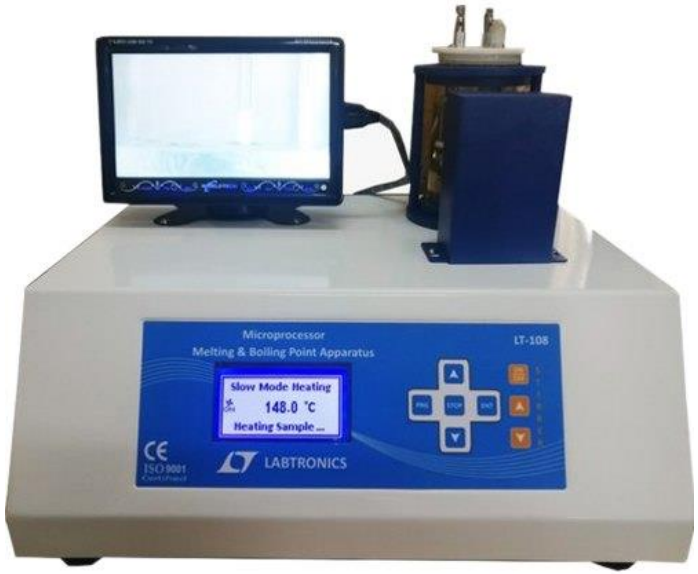
The effect of an impurity on the boiling point of a liquid, varies with the characteristics of the impurities (nature of the impurities), depending upon its solubility and volatility.

3- Attraction forces

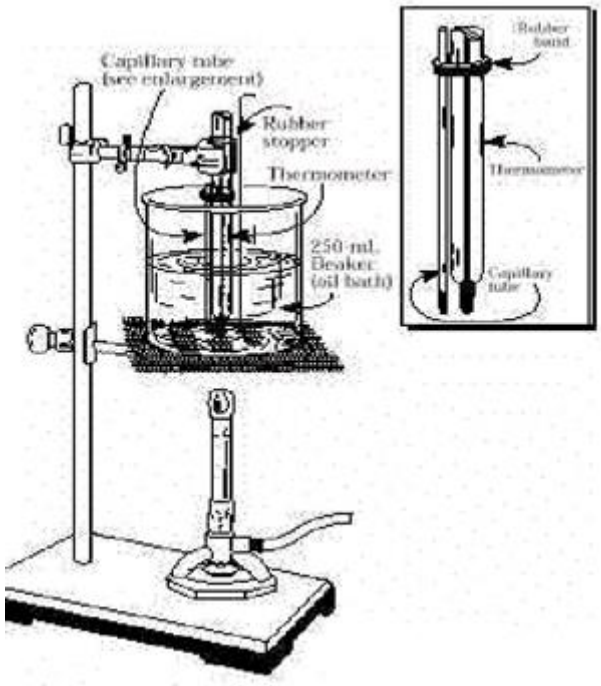
H.W. What is the effect of Attraction force on the Boiling point ?

Boiling point apparatus

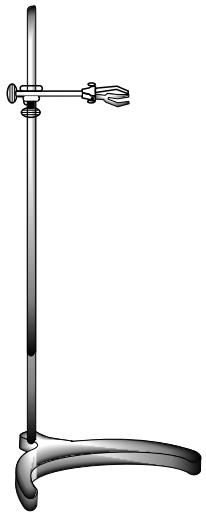
Digital Boiling point apparatus



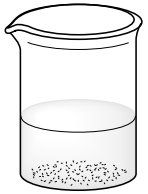
Classical Boiling point apparatus



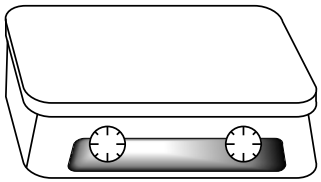
Apparatuses used in determination of Boiling point

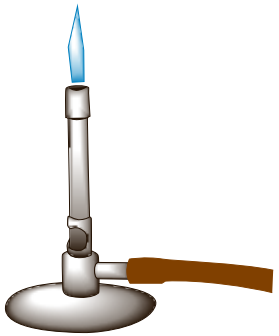


Stand and Clamp



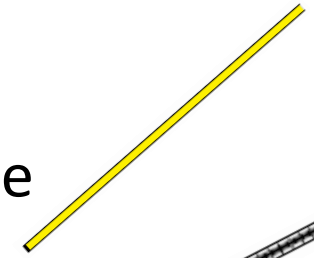
Beaker



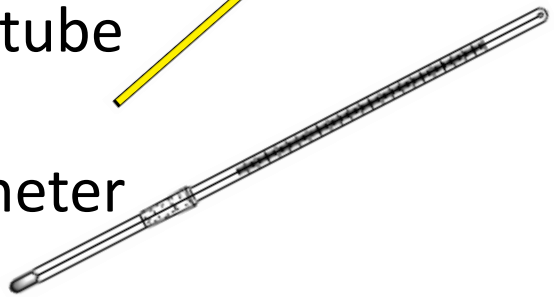


Heating Source

Test tube



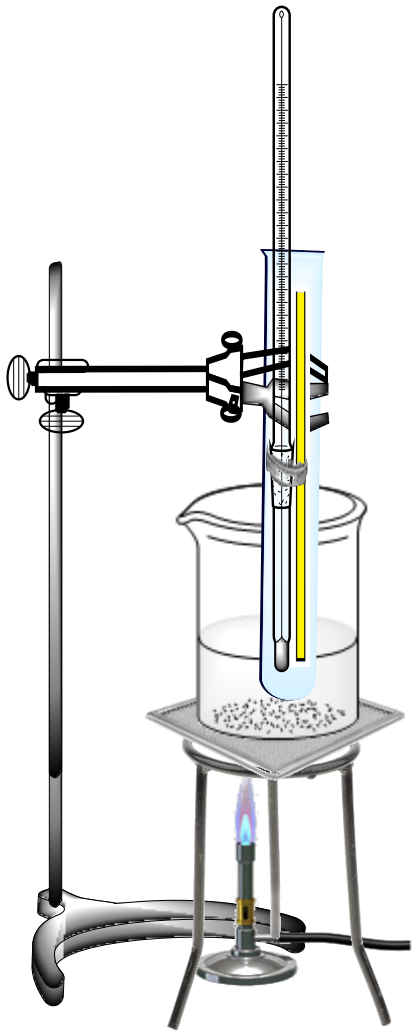
Capillary tube



Thermometer

Tripod and Wire Gauze (If Bensen Burner used)

Classical (Manual) Boiling point apparatus



When the first bubble appeared, record the temperature till all the bubble appeared and then disappeared. Record both temperatures, summation of both and dividing by 2 is the Boiling point.

Procedure:-

1- Add about (0.5-1)ml of the liquid sample into the test tube.

2- Enclose one ends of the capillary tube, then immerse the opened side into the test tube.

3- Place the test tube beside a *thermometer,* using a rubber for such process .

4- Put the (test tube + *thermometer)* into an oil bath gently.

5- Heat the oil bath gently.

6- Record the temp. (T_1) at which a rapid, continues stream of air bubble come out from the capillary tube.

7- Record the temp. (T_2) at which stream of air bubble disappeared from the capillary tube.

8- Find the real boiling point of the sample through detecting average boiling point.

$$T_{real} = (T_1 + T_2) / 2$$