MELTING POINT

DETERMINATION OF MELTING POINT

The Melting point of a solid crystalline compound is the temperature at which the solid begins to change in to liquid under a pressure of atmosphere, or it is the temperature at which there is equilibrium between liquid and solid state. if the resultant liquid is cooled, solidification will occur at the same temperature, the melting point and the freezing point for a pure substance are identical. the melting point is considered as a criterion of purity of a compound and is useful for identification of organic compounds.

There is a temperature difference between the beginning of melting (T_1) and the end of melting (T_2) at which the entire solid convert into liquid

(The Melting Point Range)

Pure organic compounds usually have sharp melting points and they melt within a range of about **0.5 – 1** ^{o}**C** while impure substances have no sharp melting points and melt over a range of several degrees . the same idea will apply for pure organic compounds if they undergo slight decomposition before reaching the melting point. the decomposition products act as impurities that decrease the melting point and increase the melting point range.

Mixed Melting point

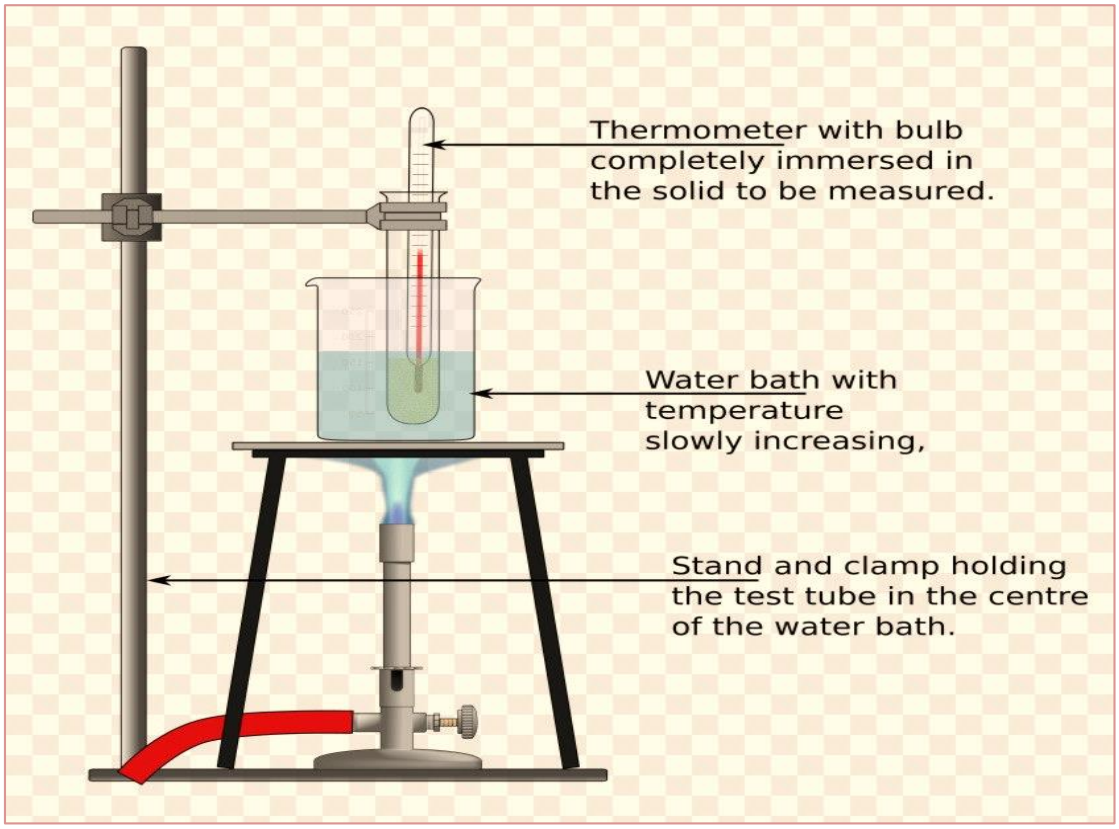
suppose that you have two solid samples (**A** and **B**) with the same melting point . if tou do not know whether these two samples are the same or different, you can mix them and measure the melting point for the resultant mixture. if **A** and **B** are different, one of them will act as an impurity for the other and the measured melting point will be lower than the original one with a higher melting point range. On the other hand, if the measured melting point is the same as the original one, **A** and **B** represent the same compound.

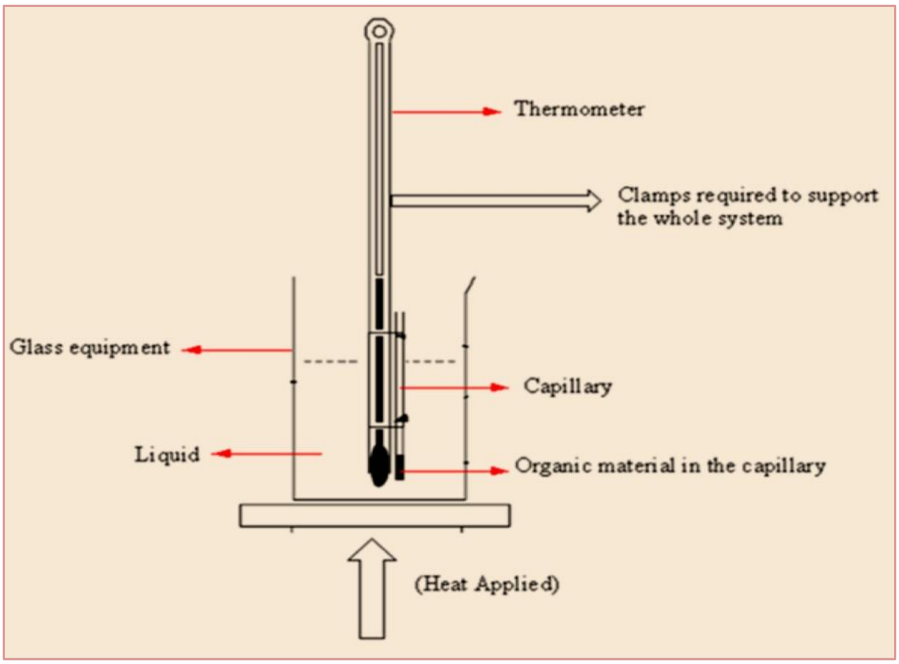
Procedure

the method used for the determination of the melting point is called the capillary tube method.

Few milligrams of the solid are placed in a thin glass capillary tube having a diameter of about 1 mm. the capillary tube is attached to a thermometer (by a rubber ring) in such a way that its closed end is attached to the bottom of the thermometer s bulb . then both of them are placed in an oil bath (the rubber ring should be above the surface of the oil bath) Heating is started gradually .

The range between the temperature at which the powdered solid inside the capillary tube begins to liquefy (T_1) and the temperature at which a clear liquid is observed inside the capillary tube (T_2) is recoded as the observed melting point range.


Thermometer with bulb completely immersed in the solid to be measured.
Water bath with temperature slowly increasing,
Stand and clamp holding the test tube in the centre of the water bath.


Thermometer
Clamps required to support the whole system
Glass equipment
Capillary
Liquid
Organic material in the capillary
(Heat Applied)