

AIM

Determination of melting point of given organic compound

PRINCIPLE

A pure organic solid has a definite sharp melting point, while an impure substance has a lower and indefinite melting point.

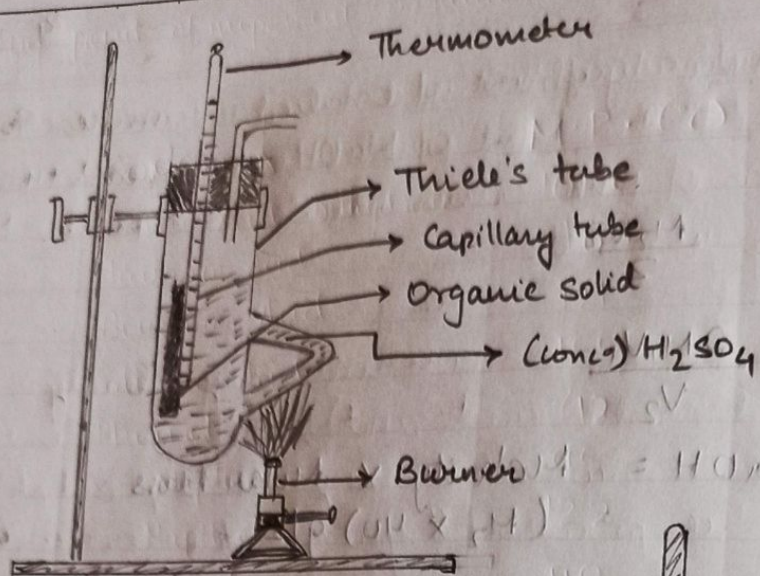
Melting point of a solid may be defined as the temperature at which the solid and liquid states exist in equilibrium with each other at an external pressure of 1 atm.

PROCEDURE

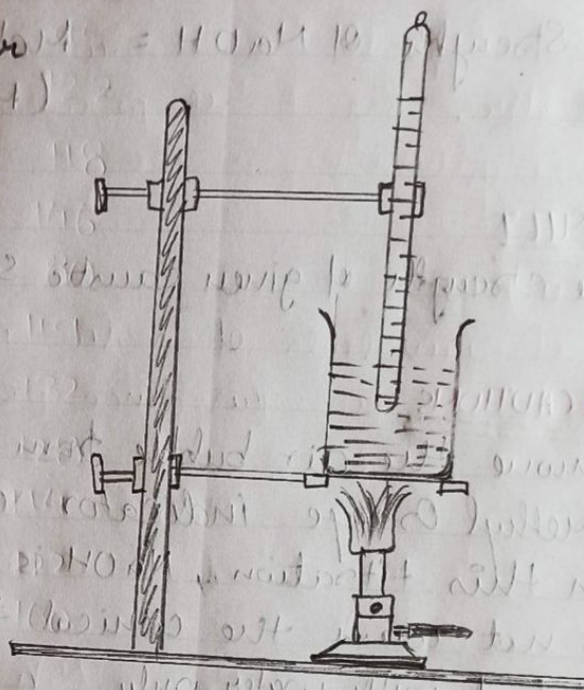
A capillary tube, 5 to 6 cm long and 1 mm in diameter, is closed at one end and finally dried and powdered organic solid is inserted in it. The tube is tapped to accumulate the crystals at the bottom of capillary tube. Filling is continued until the length of the packed solid is 3 to 4 mm.

The apparatus used for determination of melting point is shown in fig 2.1. The bulb of the thermometer is dipped in sulphuric acid bath and then taken out. The capillary tube is then placed along the thermometer in such a manner so that the sealed end of capillary is near the ~~thermometer~~ bulb. The capillary tube sticks to the thermometer due to surface tension and viscosity of the acid. The thermometer is now lowered in the bath and held in a position so as to keep half of the capillary tube out of bath. The bath is slowly heated as to keep the temperature uniform throughout the bath. When the solid in the capillary tube just shows signs of melting, the heating is stopped. The temperature at which the substance

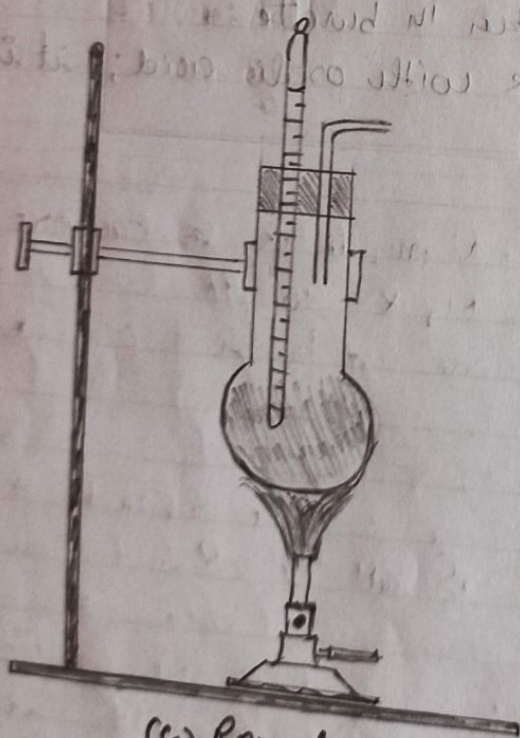




(a) Thiele's tube



(b) Beaker



(c) Round-bottom flask

Fig 2.1  
Different apparatus  
used for melting point  
determination



just melts and becomes transparent is recorded. This is the melting point of organic solid.

Thiele's tube or round bottom flask (50ml) or a boiling tube can be used for the determination of melting point of an organic solid.

### NOTE

- (a) M.P. of solid substance is exactly equal to freezing point of its liquid
- (b) M.P. of impure liquids are lower than pure compounds
- (c) M.P. of a compound is affected by Pressure. M.P. of compounds are usually coated at 1 atm ext pressure
- (d) Conc.  $H_2SO_4$  is used to determine M.P. of solid because b.pt of  $H_2SO_4$  is very high. Any other liquid with high boiling point can be used eg. ~~gly~~ glycerine, paraffin oil etc.
- (e) M.P. of pure solid is fixed and sharp; whole solid melts within a temperature range of  $1^\circ C$ . It should be noted that melting point of ~~crystalline~~ amorphous solids like glass have no sharp M.P., they melt over a range of temperature.



## Melting point of important organic solids

COMPOUND	M.P. (°C)
Oxalic Acid Dihydrate	101°C
Tartaric Acid	169
Benzonic Acid	121
Salicylic Acid	155
Phenol	42
$\alpha$ -Naphthol	95
$\beta$ -Naphthol	122
Resorcinol	118
D-glucose	146
Naphthalene	80
Adoform	119
Urea	132
Benzamide	128
Acetanilide	114
Picric Acid	122
Sucrose	160