



Ministry of Higher Education and Scientific Research

University of Anbar

Science College

Department of Chemistry



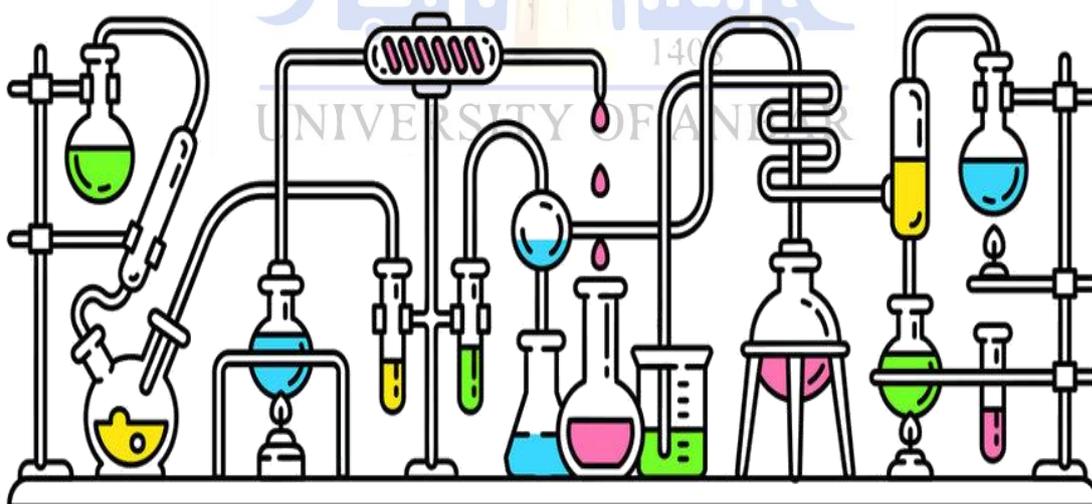
ORGANIC DIAGNOSIS PRACTICAL

Fourth stage
EXPERIMENT 1

By

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EXP1 :- Determination Of Melting Point & Boiling Point

Melting Point

The melting point is defined as the temperature at which the solid phase of a substance is in equilibrium with its liquid phase under atmospheric pressure. It is a fixed physical property that helps identify organic compounds and assess their purity.

✓ Characteristics :

- The sample must be completely dry.
- The sample should be finely powdered.
- Melting range is measured (difference between beginning and end of melting).
- Impurities lower the melting point and broaden the melting range.

✓ Factors Affecting Melting Point :

- a) Nature of compound (ionic vs covalent).
- b) Pressure.
- c) Molecular weight.
- d) Molecular symmetry.
- e) Impurities and moisture.

✓ Practical Measurement :

- Capillary tube method with oil bath heating.
- Record beginning and end of melting.

✓ melting range: melting range

It is the difference between the beginning of the fusion and its end, which is about (2-1), and its usefulness is for diagnosis Compounds and knowing their strength.

The melting point is usually measured using the capillary tube method, where a small amount of the unknown substance is usually taken, placed in the capillary tube, connected to a thermometer, then placed in an oil bath and heated slowly.

Impurities, if present with the unknown substance, work to reduce the melting point (M.P) and increase the extent of fusion, while moisture increases the melting point (M.P) of the unknown substance..

There are substances in which the range reaches from 5 to 10 degrees, and this does not mean that the substance is impure, but rather its nature is that way. An example of this is hydrocarbons and amino acids.

Some compounds, when melted, decomposition, which is a process that turns the substance from burning

It melts into a dark-colored substance, meaning a change in color occurs, and this happens with salts and compounds

High molecular weights such as anthracene.

The melting point of organic materials is measured by the traditional method, which is the thermometer method, while the melting points of inorganic materials are not measured in this way because they are materials with high melting points.

✓ Melting point characteristics of pure organic matter

1. It must be fixed
2. It is very sharp for a pure organic compound, and when the substance is 100% pure, it is called the melting point (the degree of purity).
3. The melting point cannot be changed, but it changes in the presence of impurities

✓ **The effect of impurities on the melting point**

- a) Low melting point
- b) Prolonging the melting time

✓ **Factors affecting the melting point**

- 1- The nature of the compound is either ionic or covalent
- 2- Pressure (reverse)
- 3- Molecular weight
- 4- Particle coordination (arrangement)
- 5- Impurities
- 6- Humidity

✓ **The importance of the melting point of organic matter**

- a) Knowing the purity of the organic compound
- b) Organic diagnosis of the compound

Why is an oil bath preferred over a water bath to measure the melting point?

1. There are no bubbles that affect the visualization
2. Transparent and easy to see
3. Its density is high so that heat is distributed throughout it
4. Its boiling point is higher than 100
5. It is non-toxic

✓ **Measuring the melting point practically:**

1. One of the nozzles of the capillary tube is blocked by the flame of a lamp.
2. The solid material is taken, crushed to become soft, and filled into a tube to about 0.5%.
3. The tube is connected to the thermometer with a rubber ring so that it becomes the end of the tube The noodles are parallel to the onion of the heater
4. Place it in an oil bath of 1400, silicone 2000, or wax 300C.
5. Wait until the melting point range is read on the thermometer.

Boiling point

It is the temperature at which the vapor pressure of the liquid is equal to the atmospheric pressure and at which the liquid turns into vapor as its temperature rises, and it is one of the important characteristics that characterizes every liquid.

The presence of impurities increases the boiling point because it increases atmospheric pressure.

✓ **The importance of boiling point**

- a) Diagnosis of liquid organic compounds
- b) The purity of liquid compounds. A liquid that boils at one or two degrees is considered a pure liquid. If it boils for more than that, it is impure and contains impurities.
- c) Separating two or more compounds

✓ **Methods for finding the boiling point**

- A. Distillation method, which is used when a large amount of liquid is available
- B. The capillary tube method (Sobolov method), which is used for small amounts of liquid

✓ **Factors that affect the boiling point**

1. The nature of the organic compound
2. Molecular weight
3. External pressure
4. The vapor pressure of the compound
5. Impurities

✓ **Measurement of boiling point in practice :**

1. Fill a dry and clean boiling tube with the liquid substance for which the boiling point (B.p) is to be measured. From 1 to 2 cm.
2. A capillary tube is placed inside the boiling tube, closed at one end so that the open end is down and the closed end is up. **Note** :If the liquid enters the capillary tube before heating, this means that it is open.
3. The boiling tube is connected to the thermometer so that its end reaches the thermometer bulb.
4. Place it in an oil bath and heat gently until thermal uniformity (homogeneity) is achieved.
5. When the first bubble appears, followed by the second, then a stream of bubbles emerges, the fire is removed from it. We wait until the stream of bubbles ends, and when the liquid enters the capillary tube, the boiling point is recorded through The heater.