Chapter:
12

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AIM: TO CALCULATE THE MELTING POINT OF GIVEN SAMPLE

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Requirements

- 100 ml beaker,
- Thermometer,
- Thin-walled capillary tube with a length of 8 to 10 cm and a diameter of 1 to 2 mm,

Theory

The temperature at which a substance transforms from its solid state into its liquid foam is known as its **melting point**. It is a highly helpful physical constant because an impure substance has a lower melting point and melts over a wider temperature range, whereas a pure material melts at a specific temperature and has a sharp melting point. Therefore, figuring out a solid's melting point is a very practical way to assess its purity. Furthermore, by contrasting a substance's melting point with the melting points of other known chemicals, melting point determination can be used to identify a material.

Procedure

1. Pulverize the crystalline substance. Take a capillary tube and use heat to seal one end. Make a pile of the powdered material on the permeable plate to fill the substance. The capillary tube's open end should be pushed into the mass. There will be some substance added to it. Now lightly tap the capillary tube's sealed end against the porous plate. To a depth of 2–3 mm, fill the capillary tube.
2. Connect the capillary tube to the thermometer and submerge it in a paraffin bath. The capillary tube is held in place by the surface tension of the bath liquid.

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3. Gently heat the beaker while continuing to swirl the liquid within to maintain a constant temperature. A glass loop stirrer is raised and lowered to accomplish this. The flame is reduced when the temperature is within 15° of the pure substance's melting point. The temperature can now progressively increase.

4. When the substance begins to melt, the temperature is recorded. When it has entirely melted, the temperature is once more recorded. The substance's melting point is determined by averaging the two values.

Or

By Using Digital Melting Point Detector

1. The machine is made to allow the sample-containing capillary tube to be inserted and quickly heated to a predetermined temperature.

2. To observe when the sample melts, heat the capillary tube to just below melting point and then reduce the rate of temperature increase.

3. A viewing eyepiece is used for observation.

4. A melting point apparatus will most likely display the temperature in digital form for convenient data recording.

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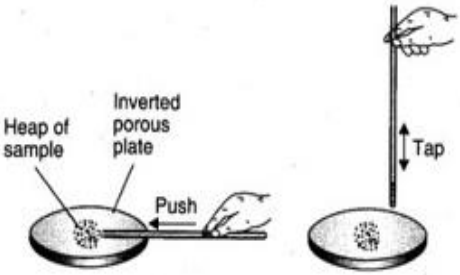
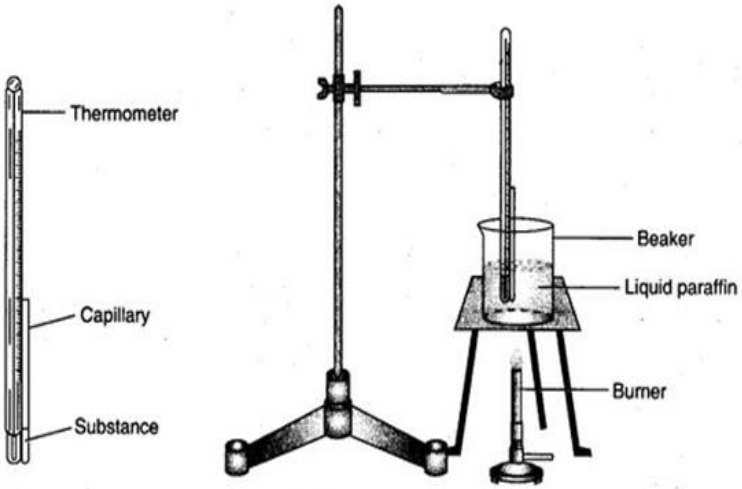
Diagram

Sealing one end of the capillary tube.



Charging the capillary tube



Taking the melting point.

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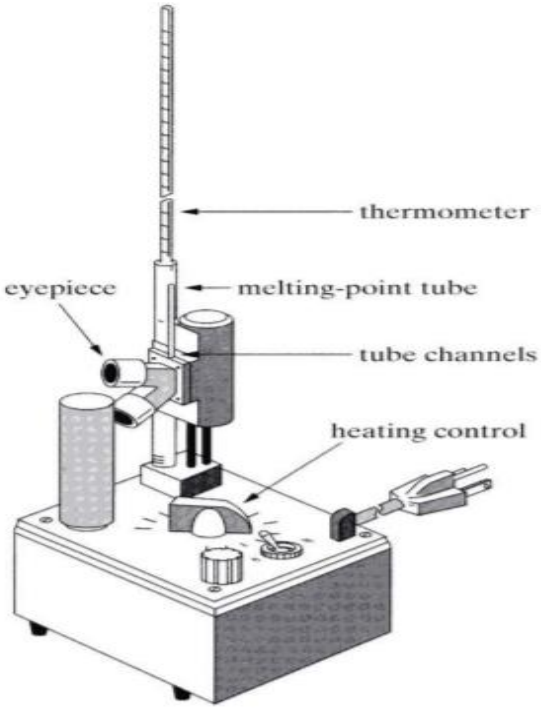

Observations

The temperature at which the unidentified substance starts to melt = t_1°C

The temperature at which a material will totally melt = t_2°C

Unknown substance's melting point = [(t1+t2)/2]°C.

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