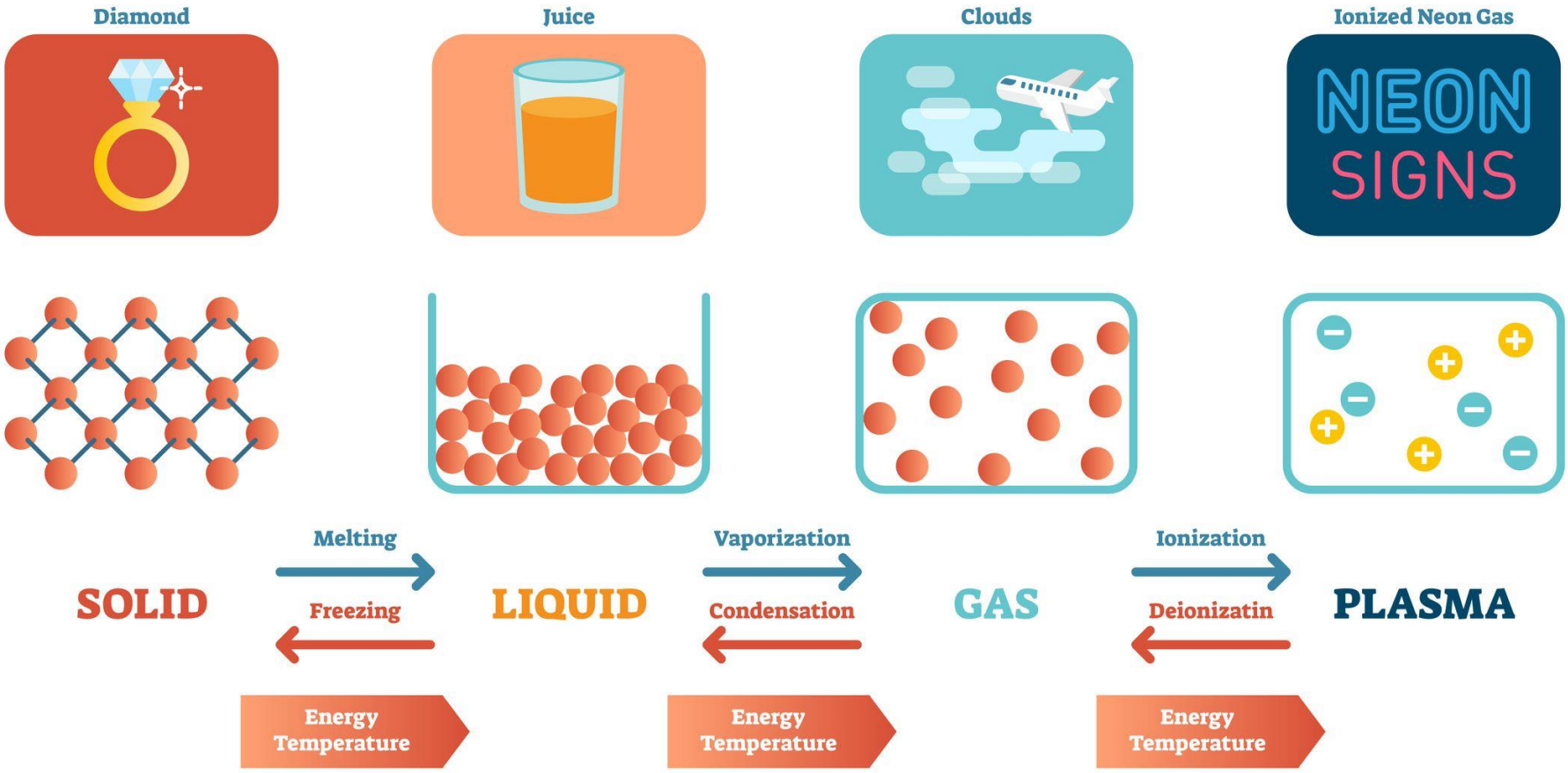
Tishk International University
Faculty of Science
Medical Analysis Department

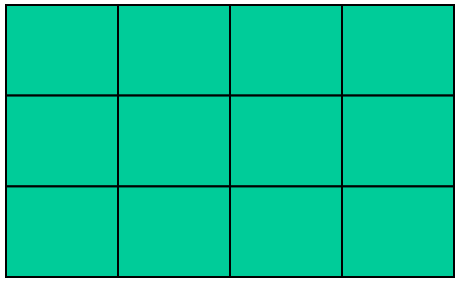
Lab. 03

Melting and Melting Point

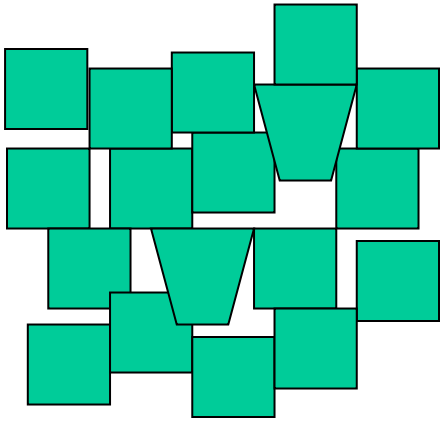
Practical General Chemistry
For
First grade Students

States of Matter





Solid Compounds



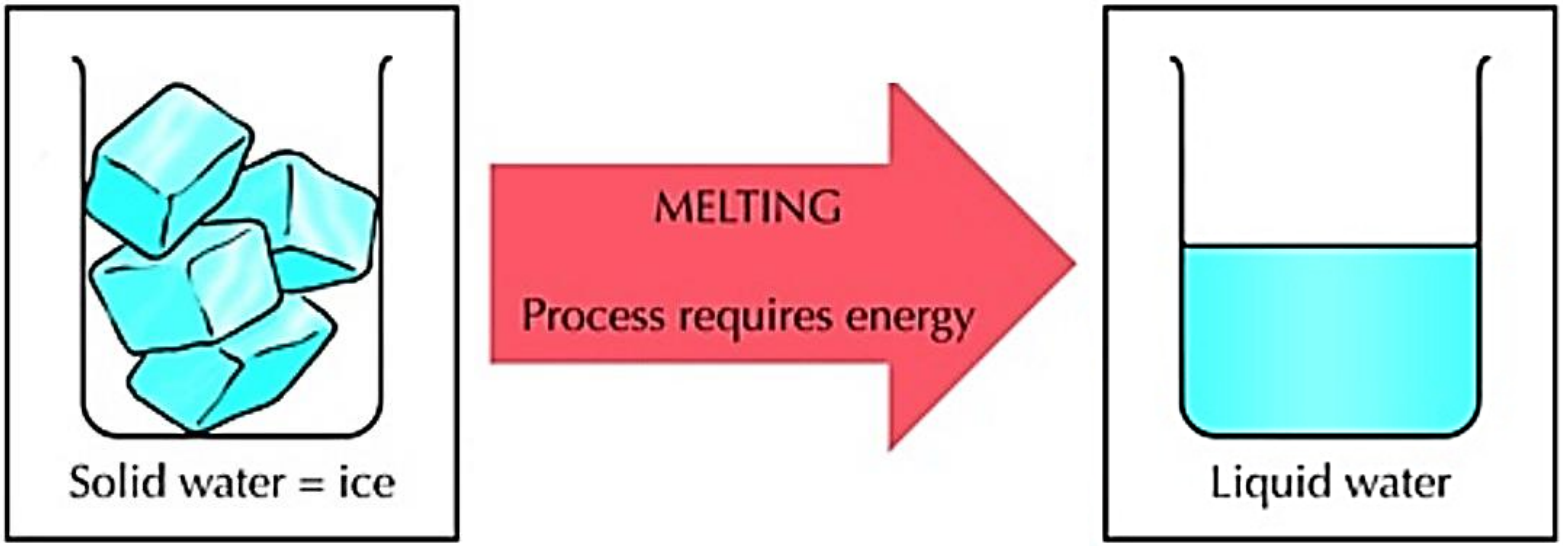
Liquid Compounds

1- High ordered arrangement of particles.
2- Low thermal energy of particles.
3- Restricted motion of particles
4- Regular shape.

1- Low ordered arrangement of particles.
2- High thermal energy of particles.
3- free motion of particles
4- Random shape.

Melting Process

Melting is a physical process in which a solid phase compound changed into liquid phase, without changing the properties of the compound



Melting point: is a temperature in which the liquid and solid are in equilibrium.

All the solid compounds during the heating gave a range, known as melting range.

Pure compounds during heating process characterized by a **sharp melting range (0 – 2) °C**, while compounds containing impurities characterized by a **broad (wide) melting point range (higher than 2) °C**

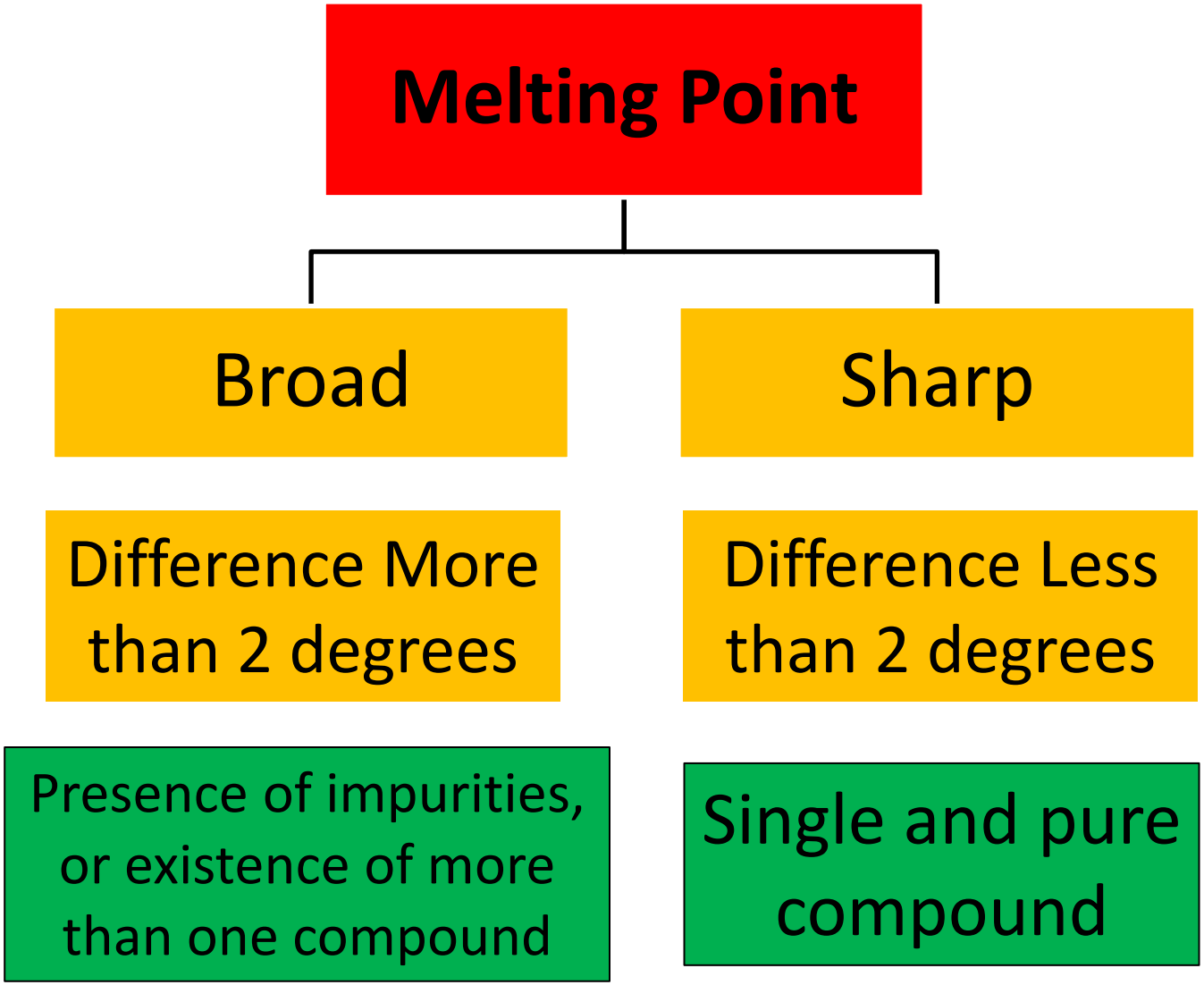
Melting point used to:

1. Determination the purity criteria

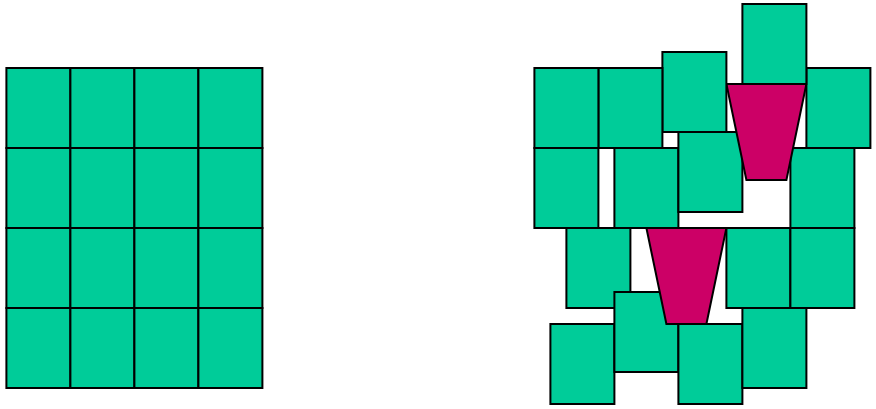
Ex. M.P. of impure Benzoic acid = 121 – 124 °C

2. Identification of the compounds

Ex. M.P. of pure Benzoic acid = 121 – 122 °C


Melting Point
Broad
Sharp
Difference More than 2 degrees
Difference Less than 2 degrees
Presence of impurities, or existence of more than one compound
Single and pure compound

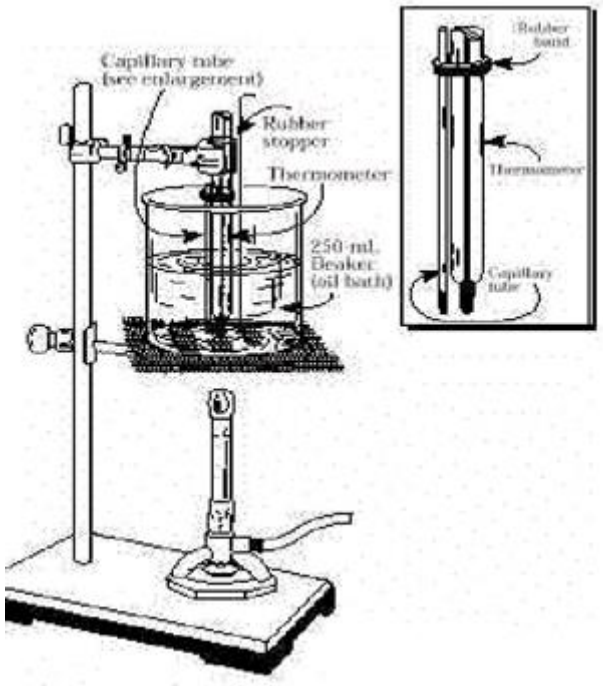
- Impurities lower melting point:
  - takes less energy to disrupt crystal lattice when impurities are present
  - melting point will be lower
  - melting point will be broader



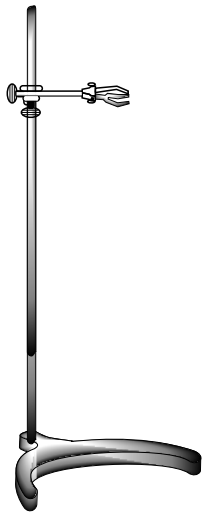
Melting point apparatus

Digital melting point apparatus.

Classical melting point apparatus

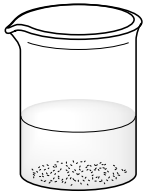


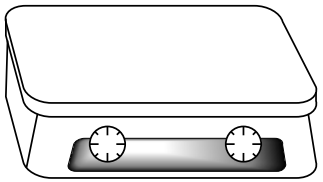
Apparatuses used in determination of Melting point

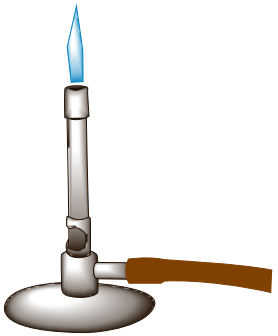


Stand and Clamp

Beaker

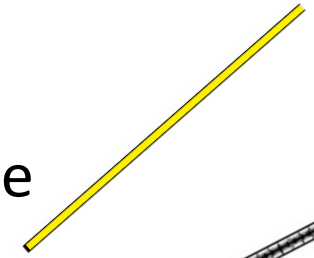




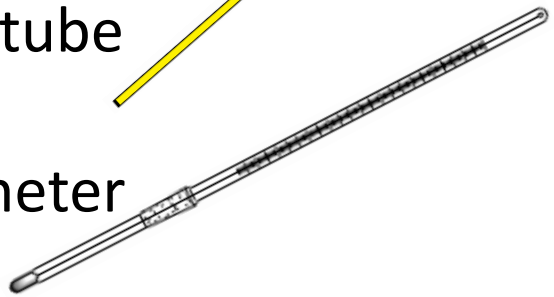


Heating Source

Test tube



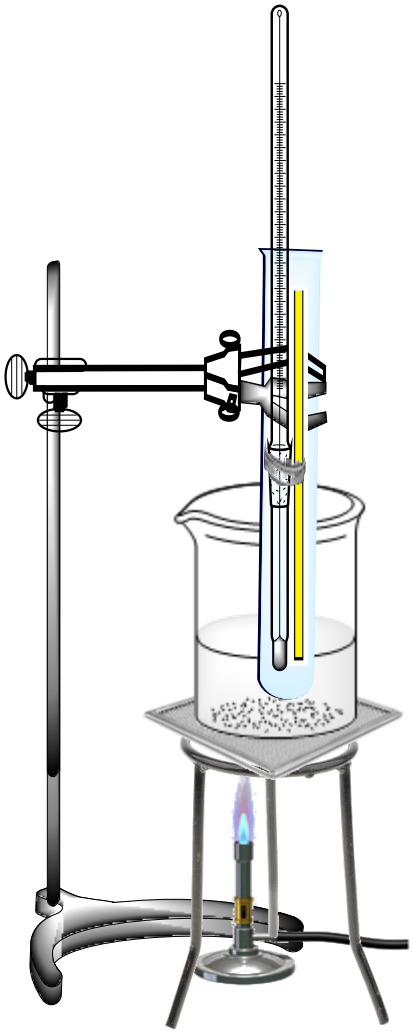
Capillary tube



Thermometer

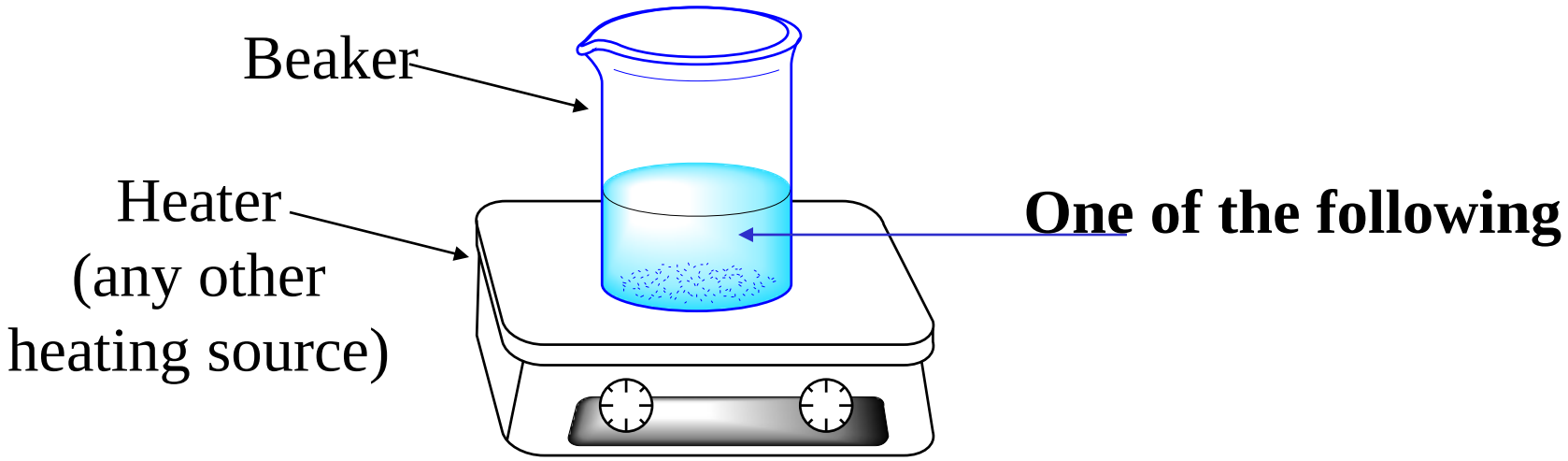
Tripod and Wire Gauze (If Bensen Burner used)

Classical (Manual) melting point apparatus



When the first solid particle starts turning to liquid record the temperature till al the solid has been converted into liquid. This is the melting range

Type of baths for classical melting point apparatus:-



1- Water bath (used for heating less than 100 ^{o}C)

2- Oil bath (used for heating 100 – 160 ^{o}C)

3- Acidic bath (used for heating 160 – 310 ^{o}C)

4- Silicon bath (or wax) more than 300 ^{o}C

SAMPLE SIZE

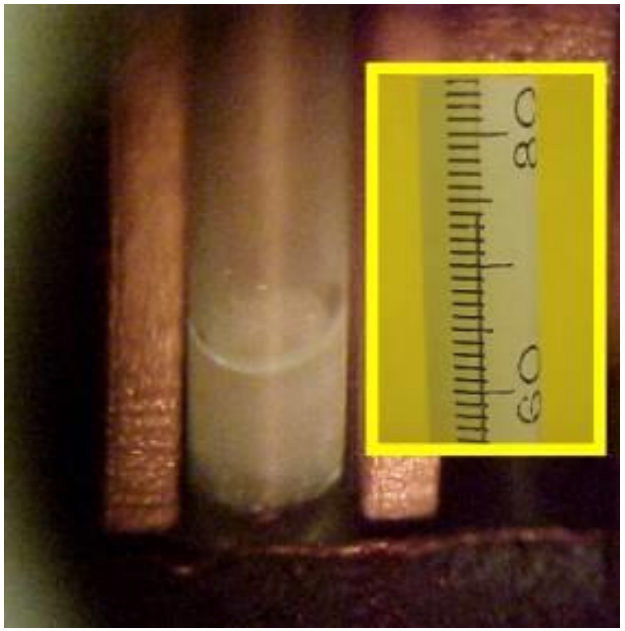
Pure Ibuprofen extracted from commercial drug

First transformation from solid is 72 ^{o}C

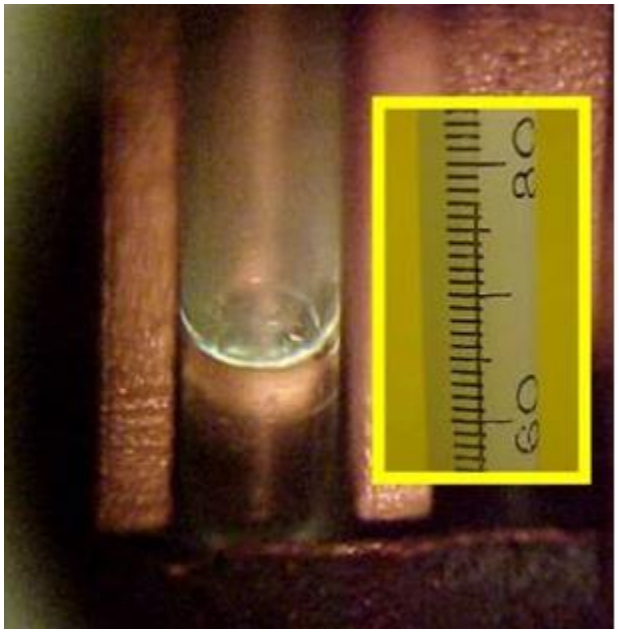
Last particle which transferred from solid to liquid is at 73 ^{o}C

Commercial Ibuprofen drug (not purified)

First transformation from solid is 74 °C



Last particle which transferred from solid to liquid is at 77 °C



Exp. 1

Melting point :(mp)

1- Close one end of a standard melting –point tube in a Benzene flame.

2-Inroduce the sample to a depth of about 2mm at the sealed end of the tube.

3-place the tube in an electrically heated melting-point apparatus.

4- Adjust the rate of heating so that the temperature rises about 3-4 for a min.

5-Watch the temperature carefully .Note it down in your report; deliver it with answers of questions to your supervisor