



**AL-Mustaqbal University College**  
**Medical laboratory Techniques**  
**Department**

**Practical General Chemistry**

**Lecture Ten (10)**  
**(Boiling point measurement)**



**Lecturer : M. Sc. Sarah Abd AL-Rheem Ali**

**M. Sc. Saif Sahib Radhi**

# Boiling Point

The boiling point is the temperature at which the vapor pressure of a liquid equals the external pressure surrounding the liquid. Therefore, the boiling point of a liquid depends on atmospheric pressure. The boiling point becomes lower as the external pressure is reduced. As an example, at sea level the boiling point of water is 100 C (212) F.

## NOTE

- ✓ 1-Boiling point is also known as saturation temperature. Sometimes boiling point is defined by the pressure at which the measurement was taken.
- ✓ 2-The boiling point is affected by atmospheric pressure.
- ✓ 3- The boiling point of water is 100 °C or 212 °F at 1 atmosphere of pressure .
- ✓ 4-The boiling point of water also depends on the purity of the water. Water that contains impurities (such as salted water) boils at a higher temperature than pure water. This phenomenon is called boiling point elevation!

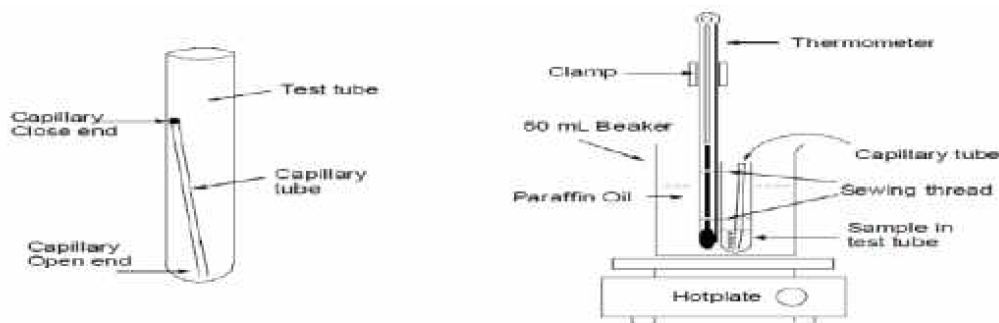
## Boiling vs. Evaporation

Boiling differs from evaporation. Evaporation is a surface phenomenon that occurs at any temperature in which molecules at the liquid edge escape as vapor because there is not enough liquid pressure on all sides to hold them. In contrast, boiling affects all molecules in the liquid, not

just those on the surface. Because molecules within the liquid change to vapor, bubbles form.

## Experimental Procedures of Boiling Point

1. Obtain a liquid unknown from your instructor. Record the sample number.
2. Attach a clean and empty test tube to a thermometer with sewing thread. Put an empty capillary tube in the test tube so that the open end of capillary is down.
3. Ensure that the temperature of the paraffin oil is below 50 °C. Place 2-3 mL of sample in the test tube.
4. Turn on the hot plate and use a clean glass rod to stir the paraffin oil to ensure a uniform heat distribution.
5. Record the temperature when rapid air bubbles come out from the capillary. At this stage, the vapor pressure of the unknown inside the capillary is higher than the atmospheric pressure.
6. Turn off the hot plate and carefully insert a ceramic tile between the beaker and the hotplate. Alternatively, you may replace the hot plate with the one that has not been used. However, the thermometer bulb and the content in the test tube should be submerged in the paraffin oil at all times.
7. As the temperature decreases, air bubbling will gradually slow down. Record the temperature when you see the last bubble come out and some liquid goes into the capillary.



Apparatus set-up for boiling-point determination