

DISTILLATION



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By:

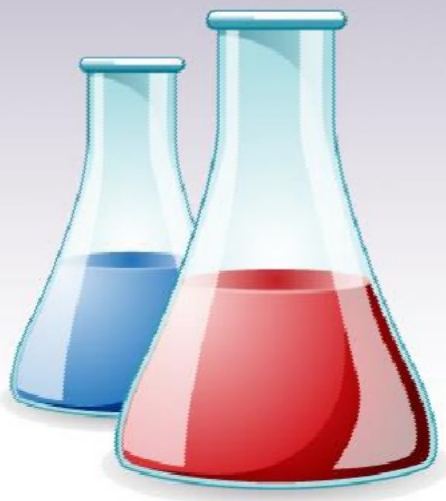
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Distillation is process of purification of liquid organic compounds by conversion to the vapor state with the aid of heat, and condensation of the vapor state with the aid of heat to the liquid state.

The temperature at which the liquid distills is definite value (at a given pressure) for every pure organic compound and is known as the ***boiling point***.

Aim of the experiment:

1. Purification of liquid organic substances.
2. Determination of the boiling point.
3. Separation of liquid organic substances from each other or from a nonvolatile solid compound.



Types of Distillation:

1. Simple distillation: This method is used for the separation of liquids having boiling points ranging from 30 °C to 150 °C and is stable to heat.

2- Vacuum distillation. (Distillation under reduced or diminished pressure): This method is used for the separation of liquids with high boiling points or is unstable to heat.



These difficulties may be overcome by lowering the pressure over the substance, thus lowering the boiling point and the temperature necessary to effect the distillation (diminished-pressure distillation).

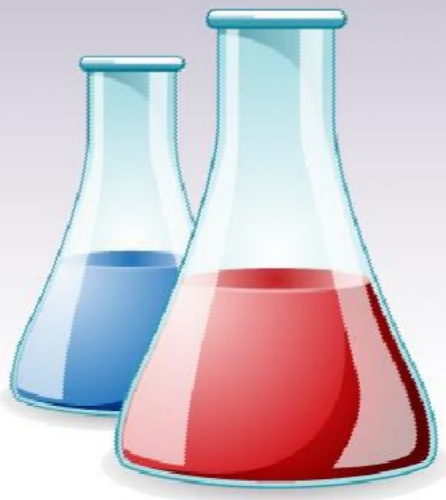
3- Steam distillation: This method is used for the purification of non-volatile organic compounds and which are immiscible with water.

4- Fractional distillation: This method is used for the separation of two or more liquids with different boiling points.

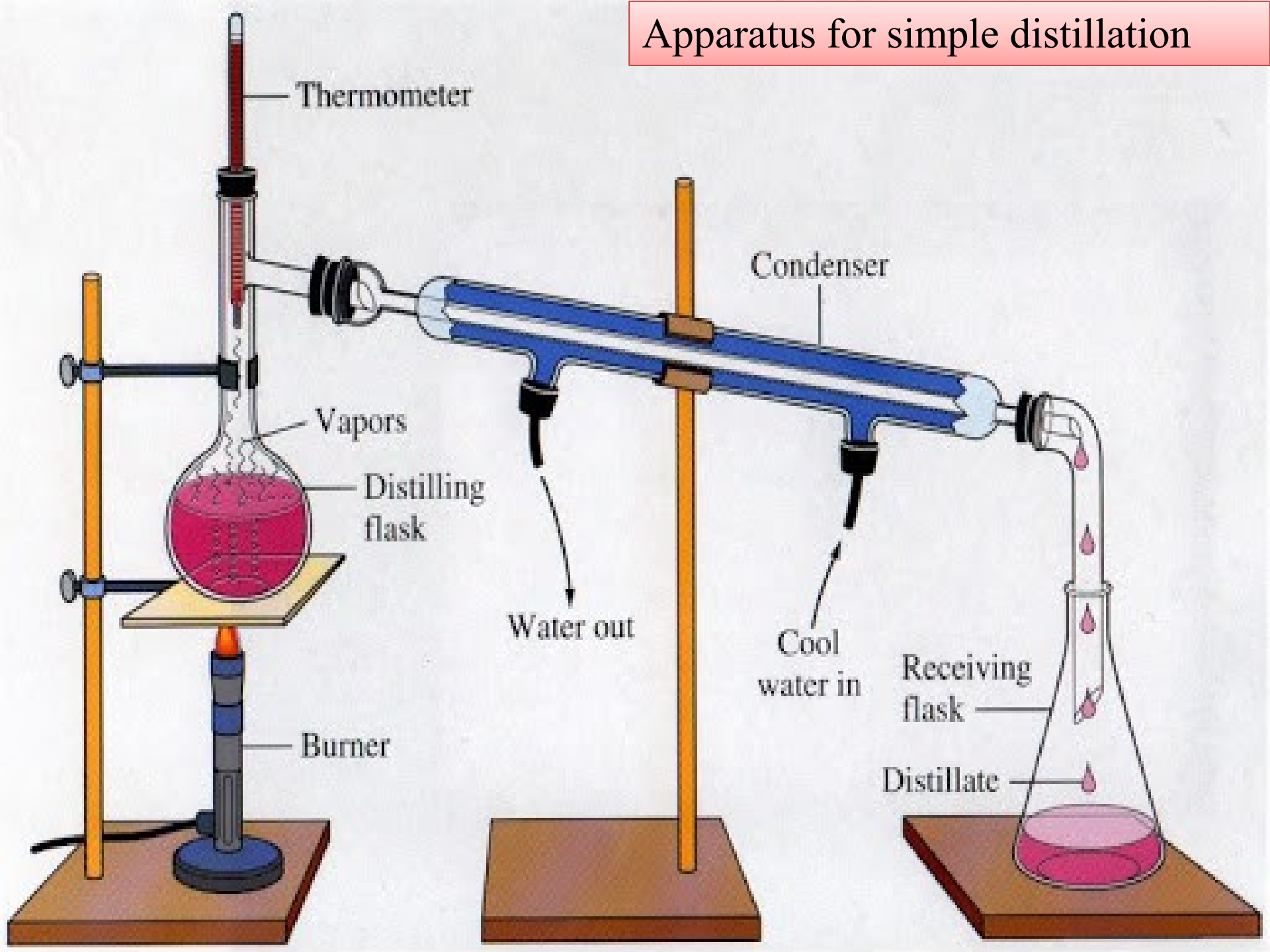


Simple distillation:

- A single, individual organic substance is readily distilled with ordinary distillation apparatus (see the figure), which consists of a **distillation flask** fitted with a **thermometer** and water-cooled **condenser**.
- Two or three pieces of **boiling chips** are placed in the flask with the substance to be distilled; they prevent bumping by producing a constant stream of bubbles that keeps the liquid in motion. If the liquid is quite volatile (low boiling), the flask is heated by a water bath rather than by a flame.



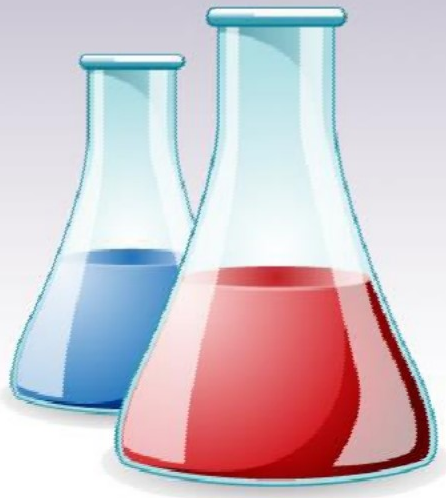
Apparatus for simple distillation



Effect of impurities on the boiling point

- The boiling point is affected by impurities; some may increase the boiling point, others may decrease it, and some may not affect it.

For example the addition of sodium chloride to water results in raising the boiling point of water. The effect observed here is the lowering of the vapor pressure of water that is, the tendency of the molecules to escape has been diminished.

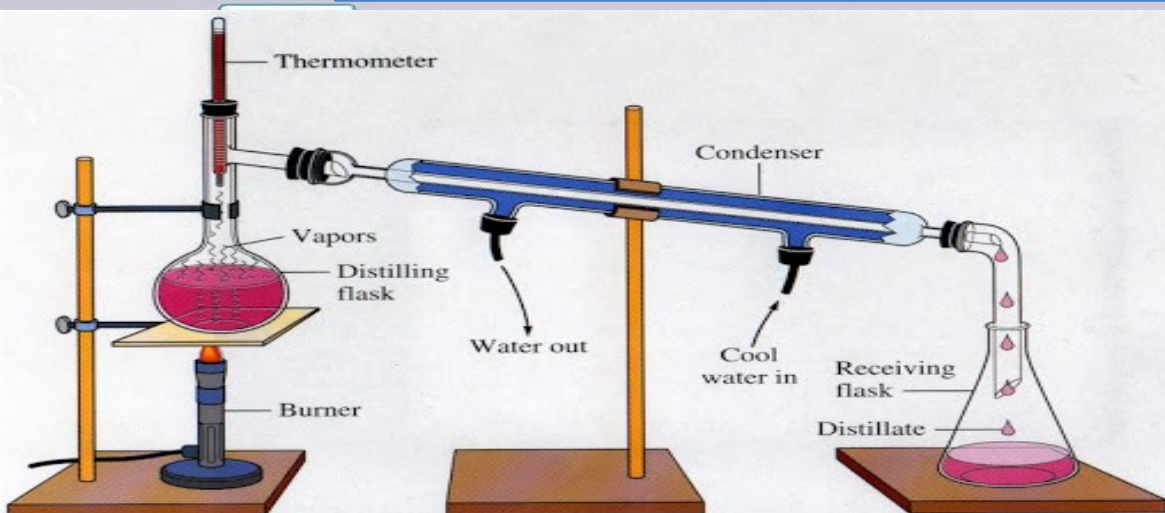


Procedure:

1. Put (100 ml) of ethanol in a boiling flask.
2. Add 2-3 pieces of boiling chips.
3. Start the water running slowly through the condenser.
4. Heat until boiling.
5. Adjust the temperature so that distillation proceeds at 2-3 drops per second.

Discard the first 2-3 ml of the distillate.

1. Continue distillation until you collect 30-60 ml.
2. Record the boiling point of your liquid, ethanol.



Thank you

