Simple distillation

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Expermental Theory

Distillation process: It involves heating the liquid to the temperature at which the liquid turns into vapor, then condensing the vapor back into a liquid in another part of the system.

Distillation is divided into four types:

1. Simple distillation
2. Fractional distillation
3. Steam distillation
4. Distillation under reduced pressure

Simple distillation is one of the most common methods and is used (benefit) for the purpose of:

- 1.Purifying liquids from non-volatile solids.
- 2.Separating two or more mixed liquids provided the difference in their boiling points is 50°C or more.
- 3.To determine the true boiling point

Note:

- In simple distillation, the vapor pressure increases with increasing heating until it becomes equal to atmospheric pressure, at which point boiling begins and the liquid turns into vapor. The vapor rises in the apparatus and flows downward when it meets the cold walls of the condenser, which gradually remove its heat and condense it back into liquid.

QUESTIONS AND ANSWERS

Q/ Why is a boiling stone used in a simple distillation experiment?

Because the surface of the porcelain contains a number of pores. The air bubbles that form when a liquid is heated prevent the particles from reaching a superheated state, and the liquid boils gently.

Procedure:

1. Arrange the apparatus as shown in the figure, then place the liquid to be distilled in the distillation flask and add granules of rough porcelain called boiling stones.
2. Close the mouth of the distillation flask with a cork carrying a thermometer, ensuring that the thermometer bulb is positioned slightly below the side arm of the distillation flask so that it can measure the vapor temperature at the condenser, which represents the boiling point of the liquid in the distillation flask. Then fix the distillation flask using a clamp on a tripod stand.
3. Fix a perforated stopper in the wide end of the condenser neck, and through it pass the side arm of the distillation flask. Then attach the condenser and connect it with rubber tubes to a water source using a clamp on a tripod stand. Place a flask (receiver) to collect the distilled liquid (the liquid to be purified).
4. Pass water through the condenser using the rubber tube connected to the main water source, then start heating.
5. Collect the distilled liquid using a flask or beaker (receiver), then record its volume using a graduated cylinder for volume measurement.

Note:

Heating must be appropriate. An indication of appropriate heating is the presence of a drop of liquid suspended on the bulb of the thermometer throughout the distillation process

