

PRE-LAB DISCUSSION

A flask of boiling water is closed and inverted into ice bath. The water and vapor in the flask are cooled by crushed ice, and the water boils at a low temperature.

A liquid boils when the molecules gain enough energy to escape the surface of the liquid and produce a pressure equal to the pressure of the atmosphere or vapor above the liquid. Water must be heated to 100°C at normal atmospheric pressure before the molecules have enough energy. When the pressure above the water is much lower than atmospheric pressure/ as when the condensed steam leaves a low pressure above the water in the flask/ the water will than boil when very little external energy is added to the system. The water boils when it is quite cool.

PURPOSE

To observe the relation of pressure and boiling point.

EQUIPMENT

boiling flask
stopper
ring stand

Bunsen burner
wire gauze
baggie

MATERIALS

ice

water

PROCEDURE

1. Place the flask on wire gauze as shown in the diagram. (On the next page – figure 1)
2. Fill the flask approximately half full of water.
3. Heat the flask until the water boils and steam is produced
4. Remove the burner.

5. Firmly insert the stopper in the flask. Wrap masking tape around the stopper to be sure that it held in place.
6. Remove the wire gauze and place the flask neck down through the ring. Notice that the water is hot, but NOT boiling.
7. Place a closed baggie full of crushed ice directly on top of the inverted flask.
8. Observe.

NOTES

1. Be sure to tape the stopper into the neck of the flask. If the stopper should come out, hot water spill over the desk.
2. When a substance has a high vapor pressure, its molecules will break their attraction for other molecules in the liquid and enter the atmosphere as a gas. We can detect substances with high vapor pressures by smelling them. Examples are perfumes, ether/ and so forth.

CONCLUSIONS AND QUESTIONS

1. Do you think that liquids would boil a higher or lower temperature at, say, 20,000 km above sea level?
2. What effect did adding the ice pack have on the boiling point?

Can you make warm water boil by this method? Try it! What is the lowest temperature at which water will boil when the ice pack is added? Try it.

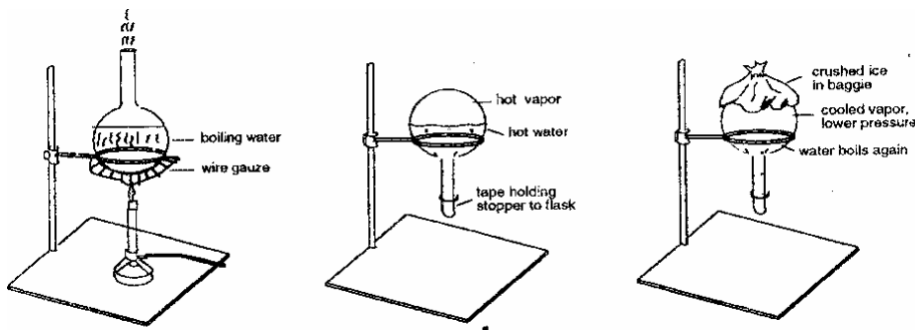


figure 1