Partial Phase Change of Water

You do NOT have to write this part…

This week in class, we have learned about matter: Physical and Chemical properties, physical and chemical changes, energy of molecules, phase changes, and model representations.

This lab you will explore the phase change of water incorporating temperature and pressure.

Begin writing now…

Lab Objective: To explore the phase diagram of water under heating and manipulated situations to finally explore options for separating a mixture.

Materials:, beaker, water slurry, thermometer, hot plate, beaker tongs Part 2: 60-mL syringe w/ stopcock

Note: Later in the lab you will receive an assembled stopcock-syringe apparatus. When the white flap is downward-air comes out the side. When the white flap is sideways- air comes out the bottom. When the white flap is upward-air cannot enter the syringe. BE CAREFUL WITH SYRINGE, THEY ARE DELICATE! You will use this information later in the lab.

Procedure:

Part 1-

1. Secure lab materials listed above. Verify hot plate is cool. BE CAREFUL!
2. Measure out 50 mL of water, adding ice cubes to make a slurry.
3. Record temperature of initial temp of ice water in data table using thermometer.
4. Place beaker on hot plate and turn on hot plate
5. Measure ice/water temperature every minute and record.
6. When all ice has melted, denote in data table when phase change occurred. Circle/highlight etc.
7. When water begins to boil, denote in data table when phase change occurred.
8. When water has been boiling for 2 minutes, take final temperature and record. **Turn off hot plate** and begin part 2.

Caution: DO NOT REMOVE BEAKER FROM HOT PLATE!

Data Table for part 1:

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Temperature | Time | Temperature |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Part 2-

1. Retrieve the syringe w/ stop cock from teacher.
2. Practice using syringe to ensure understanding of its functionality.
3. Push black ring completely in until it is at zero.
4. Uptake warm/hot water from beaker into syringe, 10 mL.
5. Point the tip upward after in taking water and draw air into syringe until black ring is at 15 mL line.
6. Close the stopcock to seal syringe, point tip down, and pull the plunger gently.

Caution: DO NOT PULL PLUNGER OUT OF SYRINGE!!!

1. Make observations and discard water back into beaker and begin clean up process.

Data Analysis:

Using the data table from part 1, create a graph illustrating data.

Conclusion:

What do you conclude from the lab you just completed?

Post-Lab Questions:

1. Compare the graph your data presented vs. a theoretical phase change diagram for water. Does it look the same or different? Why or why not?
2. What were the variables in this experiement?

Independent / Dependent / Control

1. Why does the temperature of the liquid water never reach 100 degrees Celsius?