

Phase Change Curve For Paraffin

Name _____ Date _____ Period _____

Teacher: Mr. G.P. Meccariello

Unit: Key idea 4; Energy exists in many forms, and when these forms change, energy is conserved. (NYSED Standard: 4.2ii-4.2iii)

Objectives:

- To enforce the profile and meaning behind the line segments that make up a phase change curve, as studied in lecture class.
- To take part in the preparation of complex laboratory setups.

Material:

Gulf Wax
Knife
Weighing boat
250 – ml beaker
Hot Plate – Corning 210
Balloon
Temperature probe (through a #7 Rubber Stopper)
Temperature Probe (through a #5 Rubber Stopper)
#7 Rubber Stopper
Rubber Band
100- ml Graduated Cylinder
Short, Wide Stem Plastic Funnel
GCA Precision Hot Plate
Round Bottom Three Port Flask
Condenser
2, 1- Meter Plastic Hoses
Computer with appropriate software
~ 600 – ml Distilled Water

Needed materials



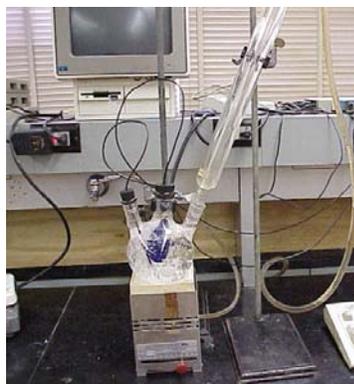
Setup:

1. Prepare sample by shaving wax with a knife into the weighing boat. (see photo below)
2. Then put the wax into the 250 – ml beaker and slowly melt the wax on the hot plate.
3. While the wax is melting push the balloon into the graduated cylinder and stretch the open end over the mouth of the cylinder, then place the plastic funnel into the open end of the balloon.
4. Once the wax is melted carefully pour the hot wax through the funnel and into the stretched balloon.



Shaved wax

5. Allow the wax to harden while inside the cylinder because its diameter is just smaller than the opening in the round bottom three-port flask, so later it will fit inside. Setup the other equipment as shown below, except, do not insert the wax filled balloon, just cover that port with a # 7 stopper.



Phase Change Setup

5. Once all the equipment is assembled add the distilled water being sure it is well below the level of each port so that the condenser can function properly.
6. First, turn on the cold water for the condenser, and then turn on the hot plate to high.
7. Next, plug both the balloon and bath temperature probe into the computer and collect baseline data. The bath water should be boiling and the wax should be at room temperature for about 30seconds.
8. Last, carefully remove the #7 stopper by pulling it toward you and then inset the wax balloon.
9. Keep a careful watch on the system if water begins to raise up the condenser shut the heat off so hot water does not shoot out of the top.
10. Collect data until all the wax is a liquid, which should be determined by noting the temperature time graph stops increasing in temperature. Then turn off the heat and clean up.

Safety:

1. Shave the wax by drawing the knife away from yourself.
2. Do not boil the wax it can catch fire.
3. Hot wax can burn skin, so do not hold the graduated cylinder with an unprotected hand when filling the balloon with hot wax.
4. Carefully monitor the flask water volume, as you add the distilled water, so that it does not isolate the top portion of any of the three ports and cause a build up in pressure when the water boils.
5. Maintain all other prudent laboratory practices at all times in the lab.

Assessment:

Type a lab report and include;

1. A title page
2. An introduction, which describes a phase change curve for water, from the text.
3. A brief summary of the above experiment.
4. A comparison between the phase change curves, water and wax. Explain any significant differences.

Follow-up:

Discuss assessment #4. above and show the PowerPoint presentation which unravels the truth about the crystallization of soft condensed matter, like paraffin.

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NYSED Standard: 4.2ii-4.2iii;

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Program: RET I, @ CCMR

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