Unit 7 – Activity 3 - Freezing Lauric Acid

Procedure

1. Fill a 400 mL beaker 2/3 full of cool water. Put on your goggles!

2. Launch Logger Pro. Go to [Experiment] → [Data collection]. Change the length of the experiment to 20 minutes and the sampling rate to 2 readings/minute.

3. Obtain a tube filled with molten lauric acid[1]. Clamp the tube to the ring stand, insert the temperature sensor into the tube of molten lauric acid and wait until the reading stabilizes; make sure the initial temperature is at least 60˚C. Press the [Collect] button and lower the tube into the beaker of cool water.

4. For the first few minutes, gently move the probe up and down in the lauric acid between readings. When the acid begins to stiffen, leave the probe in the middle of the sample.

5. Allow Logger Pro to collect data until it reaches the end of the time interval. Print the page and quit the program.

6. Disconnect the temperature probe and transfer the test tube of lauric acid with the embedded probe to the beaker of warm water. When the lauric acid melts to the point that the probe comes free, wipe the probe with a piece of paper towel and replace the probe at the lab station.

Lab Write-up

Divide your heating curve into three regions; label each region:

(A) a region of temperature change
(B) a temperature plateau
(C) a region of temperature change

The following questions should be answered on the back of your graph from the lab.

1. Did the lauric acid undergo a chemical change? Explain.
   Did the system absorb or release energy? How do you know?

2. For each region on your graph,
   a. describe from what account the lauric acid transferred energy (E_{th} or E_{ph}).
   b. state what phases were present.
   c. draw a model at the particle level that somehow shows how the lauric acid particles were behaving.

3. How would increasing the size of the sample affect the shape of the curve?

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[1] Lauric acid is an organic compound found in candle wax. It is not a strong acid.