

## Heat of Fusion of Ice

**Introduction:** In this experiment, we will experimentally determine the heat of fusion of ice,  $C_f$ .

This experiment requires that each lab group have the following items:

- |                     |                           |
|---------------------|---------------------------|
| 2 large, foam cups  | dry paper towels          |
| Celsius thermometer | 100 mL graduated cylinder |
| ice cubes           |                           |

**Procedure:** (NOTE: All temp. readings should be taken to the nearest 0.5°C.)

1. Using the graduated cylinder, measure out exactly 120 mL of tap water and place it in the doubly-insulated foam cups. Take the temperature of the water.
2. Using a dry paper towel, wipe off one ice cube to remove any surface water. Place the ice cube in the water and stir.
3. Continue stirring until the ice is completely melted, then read the temp. again.
4. Using the graduated cylinder, measure the total volume of the water in order to find out the mass of ice that you added.
5. **Make a simple data table.** It should include the initial mass of the water, initial water temperature, initial mass of ice, initial ice temperature (assume it to be 0°C), final mass of the water, and final water temperature.

**Calculations:** Calculations should be done on a separate sheet of paper. Show your work, and be sure to include units.

1. Using  $\Delta H_{\text{liquid}} = C_p \cdot m \cdot \Delta T$ , calculate the *heat lost* by the original 120 mL of water.
2. Using  $\Delta H_{\text{gas}} = C_p \cdot m \cdot \Delta T$ , calculate the *heat gained* by the water (formerly ice) as it heated up from 0°C to the final temperature.
3. Write the relationship between the total heat lost by the original 120 mL of water and the total heat gained by the “ice-which-gained-heat-to-turn-to-water-which-then-gained-some-more-heat-to-reach- $T_f$ .”
4. Use the relationship  $\Delta H = C_{\text{fusion}} \cdot m$ , to calculate the heat of fusion  $C_f$  of ice.

**Questions:** Answer the following questions on a separate sheet of paper in complete sentences.

1. Since the heat of fusion involves no temp. change, where does the energy go?
2. How does the heat of fusion you obtained compare with the established value?
3. What important assumption (which may or may not be correct) did we make when we calculated the heat of fusion above?
4. Cite at least two factors that could have introduced error into your results.

**What to Turn In:** DON'T BE SLOPPY.

1. Your data table.
2. Calculations.
3. Questions.